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Preface

Oracle Application Express API Reference describes the Application Programming Interfaces, referred to as APIs, available when programming in the Oracle Application Express environment. To utilize these APIs, such as APEX_JSON, when not developing with Oracle Application Express, you need to install Oracle Application Express into the database.

- [Audience](#) (page xxvii)
- [Documentation Accessibility](#) (page xxvii)
- [Related Documents](#) (page xxvii)
- [Conventions](#) (page xxviii)

Audience

Oracle Application Express API Reference is intended for application developers who are building database-centric web applications using Oracle Application Express. The guide describes the APIs available when programming in the Oracle Application Express environment.

To use this guide, you need to have a general understanding of relational database concepts and an understanding of the operating system environment under which you are running Oracle Application Express.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

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Related Documents

For more information, see these Oracle resources:

- *Oracle Application Express Release Notes*
- *Oracle Application Express Installation Guide*

- *Oracle Application Express App Builder User's Guide*
- *Oracle Application Express Administration Guide*
- *Oracle Application Express Application Migration Guide*
- *Oracle Application Express SQL Workshop Guide*
- *Oracle Application Express End User's Guide*
- *Oracle Database Concepts*
- *Oracle Database Administrator's Guide*
- *Oracle Database SQL Language Reference*
- *SQL*Plus User's Guide and Reference*
- *Oracle Database PL/SQL Language Reference*

Conventions

For a description of PL/SQL subprogram conventions, refer to the *Oracle Database PL/SQL Language Reference*. This document contains the following information:

- Specifying subprogram parameter modes
- Specifying default values for subprogram parameters
- Overloading PL/SQL subprogram Names

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Changes in This Release

This preface contains:

- [Changes in Oracle Application Express Release 18.1](#) (page xxix)

Changes in Oracle Application Express Release 18.1

The following are changes in *Oracle Application Express API Reference* for Oracle Application Express release 18.1.

- [New Features](#) (page xxix)
- [Deprecated and Desupported Features](#) (page xxxi)

New Features

The following features are new in this release:

- **APEX_PKG_APP_INSTALL** (New)

This is a new package providing utilities you can use to manage Packaged Applications.

DEINSTALL Procedure Signature 1 – This procedure deinstalls specified packaged application.

DEINSTALL Procedure Signature 2 – This procedure deinstalls specified packaged application.

INSTALL Function Signature 1 – This function installs specified packaged application and returns installed application ID.

INSTALL Function Signature 2 – This function installs specified packaged application and returns installed application ID.

UPGRADE Procedure Signature 1 – This procedure upgrades specified packaged application.

UPGRADE Procedure Signature 2 – This procedure upgrades specified packaged application.

- **APEX_ACL** (New)

This is a new package providing utilities that you can use when programming in the Oracle Application Express environment related to application access control shared components.

ADD_USER_ROLE Procedure Signature 1 – This procedure assigns a role to a user.

ADD_USER_ROLE Procedure Signature 2 – This procedure assigns a role to a user.

HAS_USER_ANY_ROLES Function – This function returns `TRUE` if, the user is assigned to any application role.

HAS_USER_ROLE Function – This function returns `TRUE` if, the user is assigned to the specified role.

REMOVE_USER_ROLE Procedure Signature 1 – This procedure removes an assigned role from a user.

REMOVE_USER_ROLE Procedure Signature 2 – This procedure removes an assigned role from a user.

REPLACE_USER_ROLES Procedure Signature 1 – This procedure replaces any existing assigned user roles to new array of roles.

REPLACE_USER_ROLES Procedure Signature 2 – This procedure replaces any existing assigned user roles to new array of roles.

REMOVE_ALL_USER_ROLES Procedure – This procedure removes all assigned roles from a user.

- APEX_APP_SETTING (New)

This is a new package providing utilities you can use when programming in the Oracle Application Express environment related to application setting shared components.

SET_VALUE Procedure – This procedure changes the application setting value in the current application.

GET_VALUE Function – This function gets the application setting value in the current application.

- APEX_MAIL (Updates)

PREPARE_TEMPLATE Procedure – Procedure to return a formatted mail based on an e-mail template where the placeholders specified as json string are substituted.

SEND Procedure – This procedure is used to add a mail to the mail queue of Application Express.

SEND Function – This function returns a mail id after adding the mail to the mail queue of Application Express.

- APEX_UTIL (Updates)

PREPARE_URL Function (Updates) – Added a new parameter `p_plain_url`.

SET_PARSING_SCHEMA_FOR_REQUEST Procedure (New) – This procedure changes the parsing user for the current page view to another workspace schema.

- APEX_APPLICATION_INSTALL (Updates)

GET_NO_PROXY_DOMAINS Function (New) – Use this function to get the No Proxy Domains attribute of an application to be imported.

SET_PROXY Procedure (New) – Use this procedure to set the proxy server attributes of an application to be imported.

- APEX_JSON (Updates)

GET_T_NUMBER Function (New) – This function returns the numeric attributes of an array.

GET_T_VARCHAR2 Function (New) – This function returns the `varchar2` attributes of an array.

TO_MEMBER_NAME Function (New) – This function converts the given string to a JSON member name, usable for accessing values via the `get_%` functions.

- APEX_JWT (New)

This is a new package that provides APIs to work with JSON Web Tokens (JWT).

T_TOKEN – A `t_token` record contains the decoded parts of a JSON Web Token.

ENCODE Function – This function encodes and optionally encrypts payload.

DECODE Function – This function decodes a raw token value.

VALIDATE Procedure – This procedure validates the given token.

- APEX_COLLECTION (Updates)

CREATE_COLLECTION (Updates) – Added a new parameter `p_truncate_if_exists`.

CREATE_COLLECTION_FROM_QUERY (Updates) – Added a new parameter `p_truncate_if_exists`.

CREATE_COLLECTION_FROM_QUERY2 (Updates) – Added a new parameter `p_truncate_if_exists`.

CREATE_COLLECTION_FROM_QUERY_B (Updates) – Added a new parameter `p_truncate_if_exists`.

CREATE_COLLECTION_FROM_QUERYB2 (Updates) – Added a new parameter `p_truncate_if_exists`.

- APEX_SESSION (Updates)

CREATE_SESSION Procedure (New) – This procedure creates a new session for the given application, set environment and run the application's Initialization PL/SQL Code.

DELETE_SESSION Procedure (New) – This procedure deletes the session with the given ID. If the session is currently attached, call the application's Cleanup PL/SQL Code and reset the environment.

ATTACH Procedure (New) – This procedure based on the given application and session current, sets environment and runs the Initialization PL/SQL Code.

DETACH Procedure (New) – This procedure detaches from the current session, resets the environment and runs the application's Cleanup PL/SQL Code.

- APEX_ERROR (Updates)

APEX_ERROR.HAVE_ERRORS_OCCURRED Function (New) – This function returns `TRUE` if (inline) errors have occurred and `FALSE` if no error has occurred.

Deprecated and Desupported Features

See "Deprecated Features" and "Desupported Features" in *Oracle Application Express Release Notes*.

1

APEX_APPLICATION

The `APEX_APPLICATION` package is a PL/SQL package that implements the Oracle Application Express rendering engine. You can use this package to take advantage of many global variables. "Global Variables Available in `APEX_APPLICATION`" describes the global variables available in the `APEX_APPLICATION` package.

 **Note:**

["Global Variables \(page 1-1\)"](#)

- [Global Variables \(page 1-1\)](#)
- [Referencing Arrays \(page 1-2\)](#)
- [Referencing Values Within an On Submit Process \(page 1-3\)](#)
- [Converting an Array to a Single Value \(page 1-3\)](#)
- [HELP Procedure \(page 1-3\)](#)
- [STOP_APEX_ENGINE Procedure \(page 1-5\)](#)

1.1 Global Variables

Table 1-1 Global Variables Available in `APEX_APPLICATION`

Global Variable	Description
<code>G_USER</code>	Specifies the currently logged in user.
<code>G_FLOW_ID</code>	Specifies the ID of the currently running application.
<code>G_FLOW_STEP_ID</code>	Specifies the ID of the currently running page.
<code>G_FLOW_OWNER</code>	Defaults to the application's parsing schema. Use #OWNER# to reference this value in SQL queries and PL/SQL.
<code>G_REQUEST</code>	Specifies the value of the request variable most recently passed to or set within the show or accept modules.
<code>G_BROWSER_LANGUAGE</code>	Refers to the web browser's current language preference.

 **Note:**

Changing `G_FLOW_OWNER` at runtime does not change the parsing schema.

Table 1-1 (Cont.) Global Variables Available in APEX_APPLICATION

Global Variable	Description
G_DEBUG	Refers to whether debugging is switched on or off. Valid values for the DEBUG flag are 'Yes' or 'No'. Turning on debug shows details about application processing.
G_HOME_LINK	Refers to the home page of an application. If no page is given and if no alternative page is dictated by the authentication scheme's logic, the Application Express engine redirects to this location.
G_LOGIN_URL	Used to display a link to a login page for users that are not currently logged in.
G_IMAGE_PREFIX	Refers to the virtual path the web server uses to point to the images directory distributed with Oracle Application Express.
G_FLOW_SCHEMA_OWNER	Refers to the owner of the Application Express schema.
G_PRINTER_FRIENDLY	Refers to whether the Application Express engine is running in print view mode. This setting can be referenced in conditions to eliminate elements not desired in a printed document from a page.
G_PROXY_SERVER	Refers to the application attribute 'Proxy Server'.
G_SYSDATE	Refers to the current date on the database server. G_SYSDATE uses the DATE DATATYPE.
G_PUBLIC_USER	Refers to the Oracle schema used to connect to the database through the database access descriptor (DAD).
G_GLOBAL_NOTIFICATION	Specifies the application's global notification attribute.
G_X01, ... G_X10	Specifies the values of the X01, ... X10 variables most recently passed to or set within the show or accept modules. You typically use these variables in On-Demand AJAX processes.

1.2 Referencing Arrays

Items are typically HTML form elements such as text fields, select lists, and check boxes. When you create a new form item using a wizard, the wizard uses a standard naming format. The naming format provides a handle so you can retrieve the value of the item later on.

To create your own items, you can access them after a page is submitted by referencing `APEX_APPLICATION.G_F01` to `APEX_APPLICATION.G_F50` arrays. You can create your own HTML form fields by providing the input parameters using the format `F01`, `F02`, `F03` and so on. You can create up to 50 input parameters ranging from `F01` to `F50`, for example:

```
<INPUT TYPE="text" NAME="F01" SIZE="32" MAXLENGTH="32" VALUE="some value">

<TEXTAREA NAME="F02" ROWS=4 COLS=90 WRAP="VIRTUAL">this is the example of a text
area.</TEXTAREA>

<SELECT NAME="F03" SIZE="1">
<OPTION VALUE="abc">abc
<OPTION VALUE="123">123
</SELECT>
```

Because the F01 to F50 input items are declared as PL/SQL arrays, you can have multiple items named the same value. For example:

```
<INPUT TYPE="text" NAME="F01" SIZE="32" MAXLENGTH="32" VALUE="array element 1">
<INPUT TYPE="text" NAME="F01" SIZE="32" MAXLENGTH="32" VALUE="array element 2">
<INPUT TYPE="text" NAME="F01" SIZE="32" MAXLENGTH="32" VALUE="array element 3">
```

Note that following PL/SQL code produces the same HTML as show in the previous example.

```
FOR i IN 1..3 LOOP
APEX_ITEM.TEXT(P_IDX      => 1,
               p_value    =>'array element '||i ,
               p_size     =>32,
               p_maxlength =>32);
END LOOP;
```

1.3 Referencing Values Within an On Submit Process

You can reference the values posted by an HTML form using the PL/SQL variable APEX_APPLICATION.G_F01 to APEX_APPLICATION.G_F50. Because this element is an array, you can reference values directly, for example:

```
FOR i IN 1..APEX_APPLICATION.G_F01.COUNT LOOP
  http.p('element '||I||' has a value of '||APEX_APPLICATION.G_F01(i));
END LOOP;
```

Note that check boxes displayed using APEX_ITEM.CHECKBOX only contain values in the APEX_APPLICATION arrays for those rows which are checked. Unlike other items (TEXT, TEXTAREA, and DATE_POPUP) which can contain an entry in the corresponding APEX_APPLICATION array for every row submitted, a check box only has an entry in the APEX_APPLICATION array if it is selected.

1.4 Converting an Array to a Single Value

You can also use Oracle Application Express public utility functions to convert an array into a single value. The resulting string value is a colon-separated list of the array element values. For example:

```
http.p(APEX_UTIL.TABLE_TO_STRING(APEX_APPLICATION.G_F01));
```

This function enables you to reference G_F01 to G_F50 values in an application process that performs actions on data. The following sample process demonstrates how values are inserted into a table:

```
INSERT INTO my_table (my_column) VALUES
APEX_UTIL.TABLE_TO_STRING(APEX_APPLICATION.G_F01)
```

1.5 HELP Procedure

This function outputs page and item level help text as formatted HTML. You can also use it to customize how help information is displayed in your application.

Syntax

```
APEX_APPLICATION.HELP (
  p_request      IN VARCHAR2 DEFAULT NULL,
```

```

p_flow_id          IN VARCHAR2 DEFAULT NULL,
p_flow_step_id    IN VARCHAR2 DEFAULT NULL,
p_show_item_help  IN VARCHAR2 DEFAULT 'YES',
p_show_regions    IN VARCHAR2 DEFAULT 'YES',
p_before_page_html IN VARCHAR2 DEFAULT '<p>',
p_after_page_html  IN VARCHAR2 DEFAULT NULL,
p_before_region_html IN VARCHAR2 DEFAULT NULL,
p_after_region_html IN VARCHAR2 DEFAULT '</td></tr></table></p>',
p_before_prompt_html IN VARCHAR2 DEFAULT '<p><b>',
p_after_prompt_html IN VARCHAR2 DEFAULT '</b></p>:&nbsp;';
p_before_item_html IN VARCHAR2 DEFAULT NULL,
p_after_item_html  IN VARCHAR2 DEFAULT NULL);

```

Parameters

Table 1-2 (page 1-4) describes the parameters available in the HELP procedure.

Table 1-2 HELP Parameters

Parameter	Description
p_request	Not used.
p_flow_id	The application ID that contains the page or item level help you want to output.
p_flow_step_id	The page ID that contains the page or item level help you want to display.
p_show_item_help	Flag to determine if item level help is output. If this parameter is supplied, the value must be either 'YES' or 'NO', if not the default value is 'YES'.
p_show_regions	Flag to determine if region headers are output (for regions containing page items). If this parameter is supplied, the value must be either 'YES' or 'NO', if not the default value is 'YES'.
p_before_page_html	Use this parameter to include HTML between the page level help text and item level help text.
p_after_page_html	Use this parameter to include HTML at the bottom of the output, after all other help.
p_before_region_html	Use this parameter to include HTML before every region section. Note this parameter is ignored if p_show_regions is set to 'NO'.
p_after_region_html	Use this parameter to include HTML after every region section. Note this parameter is ignored if p_show_regions is set to 'NO'.
p_before_prompt_html	Use this parameter to include HTML before every item label for item level help. Note this parameter is ignored if p_show_item_help is set to 'NO'.
p_after_prompt_html	Use this parameter to include HTML after every item label for item level help. Note this parameter is ignored if p_show_item_help is set to 'NO'.
p_before_item_html	Use this parameter to include HTML before every item help text for item level help. Note this parameter is ignored if p_show_item_help is set to 'NO'.

Parameters

None

Example 1

This example tells the browser to redirect to `http://apex.oracle.com/` and immediately stops further processing.

```
owa_util.redirect_url('http://apex.oracle.com');  
apex_application.stop_apex_engine;
```

Example 2

This example also tells the browser to redirect to `http://apex.oracle.com/` and immediately stops further processing. But, this time the code also contains a **WHEN OTHERS** exception handler which deals with the `apex_application.e_stop_apex_engine` used by `apex_application.stop_apex_engine`.

```
begin  
    ... code which can raise an exception ...  
    owa_util.redirect_url('http://apex.oracle.com');  
    apex_application.stop_apex_engine;  
exception  
    when apex_application.e_stop_apex_engine then  
        raise; -- raise again the stop Application Express engine exception  
    when others then  
        ...; -- code to handle the exception  
end;
```

2

APEX_ACL

The `APEX_ACL` package provides utilities that you can use when programming in the Oracle Application Express environment related to application access control shared components. You can use `APEX_ACL` package to add, remove, or replace user roles. You can also take advantage of `INSTEAD OF` trigger on `APEX_APPL_ACL_USERS` view to edit user roles with DML statements (`INSERT`, `UPDATE`, and `DELETE`). If the package is used outside of Oracle APEX environment, the `security_group_id` must be set using either `APEX_UTIL.SET_WORKSPACE` or `APEX_UTIL.SET_SECURITY_GROUP_ID` before the call. The related APEX views to get more information on application users and roles are `APEX_APPL_ACL_ROLES`, `APEX_APPL_ACL_USER_ROLES`, and `APEX_APPL_ACL_USERS`.

- [ADD_USER_ROLE Procedure Signature 1](#) (page 2-1)
- [ADD_USER_ROLE Procedure Signature 2](#) (page 2-2)
- [HAS_USER_ANY_ROLES Function](#) (page 2-2)
- [HAS_USER_ROLE Function](#) (page 2-3)
- [REMOVE_USER_ROLE Procedure Signature 1](#) (page 2-4)
- [REMOVE_USER_ROLE Procedure Signature 2](#) (page 2-4)
- [REPLACE_USER_ROLES Procedure Signature 1](#) (page 2-5)
- [REPLACE_USER_ROLES Procedure Signature 2](#) (page 2-6)
- [REMOVE_ALL_USER_ROLES Procedure](#) (page 2-6)

2.1 ADD_USER_ROLE Procedure Signature 1

This procedure assigns a role to a user.

Syntax

```
APEX_ACL.ADD_USER_ROLE (  
    p_application_id in number default wwv_flow_security.g_flow_id,  
    p_user_name      in varchar2,  
    p_role_id       in number );
```

Parameters

Table 2-1 ADD_USER_ROLE Procedure Signature 1 Parameters

Parameter	Description
<code>p_application_id</code>	The application ID for which you want to assign role to a user. Defaults to the current application.
<code>p_user_name</code>	The case insensitive name of the application user to assign the role to.
<code>p_role_id</code>	The ID of the role.

Example

The following example shows how to use `ADD_USER_ROLE` procedure to assign role ID of 2505704029884282 to the user name called 'SCOTT' in application 255.

```
begin
  APEX_ACL.ADD_USER_ROLE (
    p_application_id => 255,
    p_user_name      => 'SCOTT',
    p_role_id        => 2505704029884282 );
end;
```

2.2 ADD_USER_ROLE Procedure Signature 2

This procedure assigns a role to a user.

Syntax

```
APEX_ACL.ADD_USER_ROLE (
  p_application_id in number   default wwv_flow_security.g_flow_id,
  p_user_name      in varchar2,
  p_role_static_id in varchar2 );
```

Parameters

Table 2-2 ADD_USER_ROLE Procedure Signature 2 Parameters

Parameter	Description
<code>p_application_id</code>	The application ID for which you want to assign role to a user. Defaults to the current application.
<code>p_user_name</code>	The case insensitive name of the application user to assign the role to.
<code>p_role_static_id</code>	The case insensitive name of the role static ID.

Example

The following example shows how to use `ADD_USER_ROLE` procedure to assign role static ID 'ADMINISTRATOR' to the user name called 'SCOTT' in application 255.

```
begin
  APEX_ACL.ADD_USER_ROLE (
    p_application_id => 255,
    p_user_name      => 'SCOTT',
    p_role_static_id => 'ADMINISTRATOR' );
end;
```

2.3 HAS_USER_ANY_ROLES Function

This function returns `TRUE` if, the user is assigned to any application role. This function can be used to check if a user is allowed to access an application.

Syntax

```
APEX_ACL.HAS_USER_ANY_ROLES (
  p_application_id in number   default wwv_flow_security.g_flow_id,
```

```
p_user_name      in varchar2 default wwv_flow.g_user )
return boolean;
```

Parameters

Table 2-3 HAS_USER_ANY_ROLES Function Parameters

Parameter	Description
p_application_id	The application ID for which you want to check if a user is assigned to any application role. It defaults to the current application.
p_user_name	The case insensitive name of the application user to check. Defaults to the current logged in user.

Example

The following example shows how to use `HAS_USER_ANY_ROLES` function to check if the user name called 'SCOTT' is assigned to any application role in application 255.

```
begin
  return APEX_ACL.HAS_USER_ANY_ROLES (
    p_application_id => 255,
    p_user_name      => 'SCOTT' );
end;
```

2.4 HAS_USER_ROLE Function

This function returns `TRUE` if, the user is assigned to the specified role.

Syntax

```
APEX_ACL.HAS_USER_ROLE (
  p_application_id in number   default wwv_flow_security.g_flow_id,
  p_user_name      in varchar2 default wwv_flow.g_user,
  p_role_static_id in varchar2 )
return boolean;
```

Parameters

Table 2-4 HAS_USER_ROLE Function Parameters

Parameter	Description
p_application_id	The application ID for which you want to check if a user is assigned to the specific role. Defaults to the current application.
p_user_name	The case insensitive name of the application user to check. It defaults to the current logged in user.
p_role_static_id	The case insensitive name of the role static ID.

Example

The following example shows how to use `HAS_USER_ROLE` function to check if the user name called 'SCOTT' is assigned to role static IDs of 'ADMINISTRATOR' in application 255.


```

declare
    l_is_admin boolean := false;
begin
    l_is_admin := APEX_ACL.HAS_USER_ROLE (
        p_application_id => 255,
        p_user_name      => 'SCOTT',
        p_role_static_id => 'ADMINISTRATOR' );

    if not l_is_admin then
        raise_application_error(-20001, 'Scott is NOT an administrator' );
    end if;
end;

```

2.5 REMOVE_USER_ROLE Procedure Signature 1

This procedure removes an assigned role from a user.

Syntax

```

APEX_ACL.REMOVE_USER_ROLE (
    p_application_id in number    default wwv_flow_security.g_flow_id,
    p_user_name      in varchar2,
    p_role_id        in number );

```

Parameters

Table 2-5 REMOVE_USER_ROLE Procedure Signature 1 Parameters

Parameter	Description
p_application_id	The application ID from which you want to remove an assigned role from a user. Defaults to the current application.
p_user_name	The case insensitive name of the application user to remove the role from.
p_role_id	The ID of the role.

Example

The following example shows how to use `REMOVE_USER_ROLE` procedure to remove role ID of 2505704029884282 from the user name called 'SCOTT' in application 255.

```

begin
    APEX_ACL.REMOVE_USER_ROLE (
        p_application_id => 255,
        p_user_name      => 'SCOTT',
        p_role_id        => 2505704029884282 );
end;

```

2.6 REMOVE_USER_ROLE Procedure Signature 2

This procedure removes an assigned role from a user.

Syntax

```

begin
    APEX_ACL.REMOVE_USER_ROLE (
        p_application_id => 255,

```

```

        p_user_name => 'SCOTT',
        p_role_static_id => 'ADMINISTRATOR' );
end;

```

Parameters

Table 2-6 REMOVE_USER_ROLE Procedure Signature 2 Parameters

Parameter	Description
p_application_id	The application ID from which you want to remove an assigned role from a user. It defaults to the current application.
p_user_name	The case insensitive name of the application user to remove the role from.
p_role_static_id	The case insensitive name of the role static ID.

Example

The following example shows how to use `REMOVE_USER_ROLE` procedure to remove role static ID 'ADMINISTRATOR' from the user name 'SCOTT' in application 255.

```

begin
    APEX_ACL.REMOVE_USER_ROLE (
        p_application_id => 255,
        p_user_name => 'SCOTT',
        p_role_static_id => 'ADMINISTRATOR' );
end;

```

2.7 REPLACE_USER_ROLES Procedure Signature 1

This procedure replaces any existing assigned user roles to new array of roles.

Syntax

```

APEX_ACL.REPLACE_USER_ROLES (
    p_application_id in number    default wwv_flow_security.g_flow_id,
    p_user_name      in varchar2,
    p_role_ids       in wwv_flow_t_number );

```

Parameters

Table 2-7 REPLACE_USER_ROLES Procedure Signature 1 Parameters

Parameter	Description
p_application_id	The application ID for which you want to replace user role. Defaults to the current application.
p_user_name	The case insensitive name of the application user to replace the role.
p_role_ids	The array of NUMBER type role IDs.

Example

The following example shows how to use `REPLACE_USER_ROLES` procedure to replace existing roles to new role IDs of 2505704029884282, 345029884282 for the user name called 'SCOTT' in application 255.

```
begin
  APEX_ACL.REPLACE_USER_ROLES (
    p_application_id => 255,
    p_user_name      => 'SCOTT',
    p_role_ids       => wwv_flow_t_number( 2505704029884282, 345029884282 ) );
end;
```

2.8 REPLACE_USER_ROLES Procedure Signature 2

This procedure replaces any existing assigned user roles to new array of roles.

Syntax

```
APEX_ACL.REPLACE_USER_ROLES (
  p_application_id in number default wwv_flow_security.g_flow_id,
  p_user_name      in varchar2,
  p_role_static_ids in wwv_flow_t_varchar2 );
```

Parameters

Table 2-8 REPLACE_USER_ROLES Procedure Signature 2 Parameters

Parameter	Description
<code>p_application_id</code>	The application ID for which you want to replace user role. Defaults to the current application.
<code>p_user_name</code>	The case insensitive name of the application user to replace the role.
<code>p_role_static_ids</code>	The array of case insensitive VARCHAR2 type of role static IDs.

Example

The following example shows how to use `REPLACE_USER_ROLES` procedure to replace existing roles to new role static IDs of 'ADMINISTRATOR' and 'CONTRIBUTOR' for the user name called 'SCOTT' in application 255.

```
begin
  APEX_ACL.REPLACE_USER_ROLES (
    p_application_id => 255,
    p_user_name      => 'SCOTT',
    p_role_static_ids => wwv_flow_t_varchar2( 'ADMINISTRATOR', 'CONTRIBUTOR' ) );
end;
```

2.9 REMOVE_ALL_USER_ROLES Procedure

This procedure removes all assigned roles from a user.

Syntax

```
APEX_ACL.REMOVE_ALL_USER_ROLES (  
    p_application_id in number    default wwv_flow_security.g_flow_id,  
    p_user_name      in varchar2 );
```

Parameters

Table 2-9 REMOVE_ALL_USER_ROLES Procedure Parameters

Parameter	Description
p_application_id	The application ID for which you want to remove all assigned roles from a user. Defaults to the current application.
p_user_name	The case insensitive name of the application user to remove all assigned roles.

Example

The following example shows how to use `REMOVE_ALL_USER_ROLES` procedure to removes all assigned roles from the user name called 'SCOTT' in application 255.

```
begin  
    APEX_ACL.REMOVE_ALL_USER_ROLES (  
        p_application_id => 255,  
        p_user_name      => 'SCOTT' );  
end;
```

3

APEX_APPLICATION_INSTALL

The `APEX_APPLICATION_INSTALL` package provides many methods to modify application attributes during the Application Express application installation process.

- [Package Overview](#) (page 3-2)
- [Attributes Manipulated by APEX_APPLICATION_INSTALL](#) (page 3-2)
- [Import Script Examples](#) (page 3-3)
- [CLEAR_ALL Procedure](#) (page 3-5)
- [GENERATE_APPLICATION_ID Procedure](#) (page 3-5)
- [GENERATE_OFFSET Procedure](#) (page 3-6)
- [GET_APPLICATION_ALIAS Function](#) (page 3-6)
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3.1 Package Overview

Oracle Application Express provides two ways to import an application into an Application Express instance:

1. Upload and installation of an application export file by using the web interface of Application Express.
2. Execution of the application export file as a SQL script, typically in the command-line utility SQL*Plus.

Using the file upload capability of the web interface of Application Express, developers can import an application with a different application ID, different workspace ID and different parsing schema. But when importing an application by using a command-line tool like SQL*Plus, none of these attributes (application ID, workspace ID, parsing schema) can be changed without directly modifying the application export file.

To view the install log, enter the following from the command-line tool, so the server outputs are displayed:

```
set serveroutput on unlimited
```

As more and more Application Express customers create applications which are meant to be deployed by using command-line utilities or by using a non-web-based installer, they are faced with this challenge of how to import their application into an arbitrary workspace on any Application Express instance.

Another common scenario is in a training class when installing an application into 50 different workspaces that all use the same application export file. Today, customers work around this by adding their own global variables to an application export file and then varying the values of these globals at installation time. However, this manual modification of the application export file (usually done with a post-export sed or awk script) should not be necessary.

Application Express 4.0 and higher includes the APEX_APPLICATION_INSTALL API. This PL/SQL API provides many methods to set application attributes during the Application Express application installation process. All export files in Application Express 4.0 and higher contain references to the values set by the APEX_APPLICATION_INSTALL API. However, the methods in this API is only used to override the default application installation behavior.

3.2 Attributes Manipulated by APEX_APPLICATION_INSTALL

The table below lists the attributes that can be set by functions in this API.

Table 3-1 Attributes Manipulated by the APEX_APPLICATION_INSTALL API

Attribute	Description
Workspace ID	Workspace ID of the imported application. See GET_WORKSPACE_ID Function (page 3-12), SET_WORKSPACE_ID Procedure (page 3-18).

Table 3-1 (Cont.) Attributes Manipulated by the APEX_APPLICATION_INSTALL API

Attribute	Description
Application ID	Application ID of the imported application. See GENERATE_APPLICATION_ID Procedure (page 3-5), GET_APPLICATION_ID Function (page 3-7), SET_APPLICATION_ID Procedure (page 3-13).
Offset	Offset value used during application import. See GENERATE_OFFSET Procedure (page 3-6), GET_OFFSET Function (page 3-9), SET_OFFSET Procedure (page 3-15).
Schema	The parsing schema ("owner") of the imported application. See GET_SCHEMA Function (page 3-11), SET_SCHEMA Procedure (page 3-17).
Name	Application name of the imported application. See GET_APPLICATION_NAME Function (page 3-7), SET_APPLICATION_NAME Procedure (page 3-13).
Alias	Application alias of the imported application. See GET_APPLICATION_ALIAS Function (page 3-6), SET_APPLICATION_ALIAS Procedure (page 3-12).
Image Prefix	The image prefix of the imported application. See GET_IMAGE_PREFIX Function (page 3-8), SET_IMAGE_PREFIX Procedure (page 3-14).
Proxy	The proxy server attributes of the imported application. See GET_PROXY Function (page 3-10), SET_PROXY Procedure (page 3-16).

3.3 Import Script Examples

Using the workspace FRED_DEV on the development instance, you generate an application export of application 645 and save it as file f645.sql. All examples in this section assume you are connected to SQL*Plus.

Import Application without Modification

To import this application back into the FRED_DEV workspace on the same development instance using the same application ID:

```
@f645.sql
```

Import Application with Specified Application ID

To import this application back into the FRED_DEV workspace on the same development instance, but using application ID 702:

```
begin
  apex_application_install.set_application_id( 702);
  apex_application_install.generate_offset;
  apex_application_install.set_application_alias( 'F' ||
apex_application_install.get_application_id );
end;
/

@645.sql
```

Import Application with Generated Application ID

To import this application back into the FRED_DEV workspace on the same development instance, but using an available application ID generated by Application Express:

```
begin
  apex_application_install.generate_application_id;
  apex_application_install.generate_offset;
  apex_application_install.set_application_alias( 'F' ||
apex_application_install.get_application_id );
end;
/

@f645.sql
```

Import Application into Different Workspace using Different Schema

To import this application into the FRED_PROD workspace on the production instance, using schema FREDDY, and the workspace ID of FRED_DEV and FRED_PROD are different:

```
begin
  apex_application_install.set_workspace('FRED_PROD');
  apex_application_install.generate_offset;
  apex_application_install.set_schema( 'FREDDY' );
  apex_application_install.set_application_alias( 'FREDPROD_APP' );
end;
/

@f645.sql
```

Import into Training Instance for Three Different Workspaces

To import this application into the Training instance for 3 different workspaces:

```
begin
  apex_application_install.set_workspace('TRAINING1');
  apex_application_install.generate_application_id;
  apex_application_install.generate_offset;
  apex_application_install.set_schema( 'STUDENT1' );
  apex_application_install.set_application_alias( 'F' ||
apex_application_install.get_application_id );
end;
/

@f645.sql

begin
  apex_application_install.set_workspace('TRAINING2');
  apex_application_install.generate_application_id;
  apex_application_install.generate_offset;
  apex_application_install.set_schema( 'STUDENT2' );
  apex_application_install.set_application_alias( 'F' ||
apex_application_install.get_application_id );
end;
/

@f645.sql
```



```
begin
  apex_application_install.set_workspace('TRAINING3');
  apex_application_install.generate_application_id;
  apex_application_install.generate_offset;
  apex_application_install.set_schema( 'STUDENT3' );
  apex_application_install.set_application_alias( 'F' ||
apex_application_install.get_application_id );
  end;
/

@f645.sql
```

3.4 CLEAR_ALL Procedure

This procedure clears all values currently maintained in the `APEX_APPLICATION_INSTALL` package.

Syntax

```
APEX_APPLICATION_INSTALL.CLEAR_ALL;
```

Parameters

None.

Example

The following example clears all values currently set by the `APEX_APPLICATION_INSTALL` package.

```
begin
  apex_application_install.clear_all;
end;
```

3.5 GENERATE_APPLICATION_ID Procedure

This procedure generates an available application ID on the instance and sets the application ID in `APEX_APPLICATION_INSTALL`.

Syntax

```
APEX_APPLICATION_INSTALL.GENERATE_APPLICATION_ID;
```

Parameters

None.

Example

For an example of this procedure call, see ["Import Application with Generated Application ID \(page 3-4\)"](#) and ["Import into Training Instance for Three Different Workspaces \(page 3-4\)"](#).

3.6 GENERATE_OFFSET Procedure

This procedure generates the offset value used during application import. Use the offset value to ensure that the metadata for the Application Express application definition does not collide with other metadata on the instance. For a new application installation, it is usually sufficient to call this procedure to have Application Express generate this offset value for you.

Syntax

```
APEX_APPLICATION_INSTALL.GENERATE_OFFSET;
```

Parameters

None.

Example

For examples of this procedure call, see "[Import Application with Specified Application ID \(page 3-3\)](#)", "[Import Application with Generated Application ID \(page 3-4\)](#)", and "[Import into Training Instance for Three Different Workspaces \(page 3-4\)](#)".

3.7 GET_APPLICATION_ALIAS Function

This function gets the application alias for the application to be imported. This is only used if the application to be imported has an alias specified. An application alias must be unique within a workspace and it is recommended to be unique within an instance.

Syntax

```
APEX_APPLICATION_INSTALL.GET_APPLICATION_ALIAS  
RETURN VARCHAR2;
```

Parameters

None.

Example

The following example returns the value of the application alias value in the APEX_APPLICATION_INSTALL package. The application alias cannot be more than 255 characters.

```
declare  
    l_alias varchar2(255);  
begin  
    l_alias := apex_application_install.get_application_alias;  
end;
```

3.8 GET_APPLICATION_ID Function

Use this function to get the application ID of the application to be imported. The application ID should either not exist in the instance or, if it does exist, must be in the workspace where the application is being imported to.

Syntax

```
APEX_APPLICATION_INSTALL.GET_APPLICATION_ID  
RETURN NUMBER;
```

Parameters

None.

Example

The following example returns the value of the application ID value in the APEX_APPLICATION_INSTALL package.

```
declare  
    l_id number;  
begin  
    l_id := apex_application_install.get_application_id;  
end;
```

3.9 GET_APPLICATION_NAME Function

This function gets the application name of the import application.

Syntax

```
APEX_APPLICATION_INSTALL.GET_APPLICATION_NAME  
RETURN VARCHAR2;
```

Parameters

None.

Example

The following example returns the value of the application name value in the APEX_APPLICATION_INSTALL package.

```
declare  
    l_application_name varchar2(255);  
begin  
    l_application_name := apex_application_install.get_application_name;  
end;
```

3.10 GET_AUTO_INSTALL_SUP_OBJ Function

Use this function to get the automatic install of supporting objects setting used during the import of an application. This setting is valid only for command line installs. If the

setting is set to TRUE and the application export contains supporting objects, it automatically installs or upgrades the supporting objects when an application imports from the command line.

Syntax

```
APEX_APPLICATION_INSTALL.GET_AUTO_INSTALL_SUP_OBJ  
RETURN BOOLEAN;
```

Parameters

None.

Example

The following example returns the value of automatic install of supporting objects setting in the APEX_APPLICATION_INSTALL package.

```
declare  
    l_auto_install_sup_obj boolean;  
begin  
    l_auto_install_sup_obj := apex_application_install.get_auto_install_sup_obj;  
end;
```

3.11 GET_IMAGE_PREFIX Function

This function gets the image prefix of the import application. Most Application Express instances use the default image prefix of /i/.

Syntax

```
APEX_APPLICATION_INSTALL.GET_IMAGE_PREFIX  
RETURN VARCHAR2;
```

Parameters

None.

Example

The following example returns the value of the application image prefix in the APEX_APPLICATION_INSTALL package. The application image prefix cannot be more than 255 characters.

```
declare  
    l_image_prefix varchar2(255);  
begin  
    l_image_prefix := apex_application_install.get_image_prefix;  
end;
```

3.12 GET_KEEP_SESSIONS Function

This function finds out if sessions and session state will be preserved or deleted on upgrades.

Syntax

```
function get_keep_sessions  
    return boolean
```

Example

The following example shows whether print sessions will be kept or deleted.

```
dbms_output.put_line (  
    case when apex_application_install.get_keep_sessions then 'sessions will be kept'  
    else 'sessions will be deleted'  
end );
```

3.13 GET_NO_PROXY_DOMAINS Function

Use this function to get the No Proxy Domains attribute of an application to be imported.

Syntax

```
APEX_APPLICATION_INSTALL.GET_PROXY  
RETURN VARCHAR2;
```

Parameters

None.

Example

```
declare  
    l_no_proxy_domains varchar2(255);  
begin  
    l_no_proxy_domains := apex_application_install.get_no_proxy_domains;  
end;
```

3.14 GET_OFFSET Function

Use function to get the offset value used during the import of an application.

Syntax

```
APEX_APPLICATION_INSTALL.GET_OFFSET  
RETURN NUMBER;
```

Parameters

None.

Example

The following example returns the value of the application offset value in the APEX_APPLICATION_INSTALL package.

```
declare  
    l_offset number;
```

```
begin
  l_offset := apex_application_install.get_offset;
end;
```

3.15 GET_PROXY Function

Use this function to get the proxy server attribute of an application to be imported.

Syntax

```
APEX_APPLICATION_INSTALL.GET_PROXY
RETURN VARCHAR2;
```

Parameters

None.

Example

The following example returns the value of the proxy server attribute in the `APEX_APPLICATION_INSTALL` package. The proxy server attribute cannot be more than 255 characters.

```
declare
  l_proxy varchar2(255);
begin
  l_proxy := apex_application_install.get_proxy;
end;
```

3.16 GET_REMOTE_SERVER_BASE_URL Function

Use this function to get the Base URL property to be used for a given remote server during application import.

Syntax

```
APEX_APPLICATION_INSTALL.GET_REMOTE_SERVER_BASE_URL(
  p_static_id IN VARCHAR2)
RETURN VARCHAR2;
```

Parameters

Table 3-2 GET_REMOTE_SERVER_BASE_URL Function Parameters

Parameter	Description
<code>p_static_id</code>	Static ID to reference the remote server object.

Example

```
declare
  l_base_url varchar2(255);
begin
  l_base_url :=
```

```
apex_application_install.get_remote_server_base_url( 'MY_REMOTE_SERVER' );  
end;
```

3.17 GET_REMOTE_SERVER_HTTPS_HOST Function

Use this function to get the HTTPS Host property to be used for a given remote server during application import.

Syntax

```
APEX_APPLICATION_INSTALL.GET_REMOTE_SERVER_HTTPS_HOST(  
    p_static_id IN VARCHAR2)  
RETURN VARCHAR2;
```

Parameters

Table 3-3 GET_REMOTE_SERVER_HTTPS_HOST Parameters

Parameter	Description
p_static_id	Static ID to reference the remote server object.

Example

```
declare  
    l_https_host varchar2(255);  
begin  
    l_https_host :=  
    apex_application_install.get_remote_server_https_host( 'MY_REMOTE_SERVER' );  
end;
```

3.18 GET_SCHEMA Function

Use this function to get the parsing schema ("owner") of the Application Express application.

Syntax

```
APEX_APPLICATION_INSTALL.GET_SCHEMA  
RETURN VARCHAR2;
```

Parameters

None.

Example

The following example returns the value of the application schema in the APEX_APPLICATION_INSTALL package.

```
declare  
    l_schema varchar2(30);  
begin  
    l_schema := apex_application_install.get_schema;  
end;
```

3.19 GET_WORKSPACE_ID Function

Use this function to get the workspace ID for the application to be imported.

Syntax

```
APEX_APPLICATION_INSTALL.GET_WORKSPACE_ID  
RETURN NUMBER;
```

Parameters

None.

Example

The following example returns the value of the workspace ID value in the APEX_APPLICATION_INSTALL package.

```
declare  
    l_workspace_id number;  
begin  
    l_workspace_id := apex_application_install.get_workspace_id;  
end;
```

3.20 SET_APPLICATION_ALIAS Procedure

This procedure sets the application alias for the application to be imported. This is only used if the application to be imported has an alias specified. An application alias must be unique within a workspace and it is recommended to be unique within an instance.

Syntax

```
APEX_APPLICATION_INSTALL.SET_APPLICATION_ALIAS(  
    p_application_alias IN VARCHAR2);
```

Parameters

Table 3-4 SET_APPLICATION_ALIAS Parameters

Parameter	Description
p_application_alias	The application alias. The application alias is an alphanumeric identifier. It cannot exceed 255 characters, must be unique within a workspace and, ideally, is unique within an entire instance.

Example

For examples of this procedure call, see "[Import Application with Specified Application ID \(page 3-3\)](#)", "[Import Application with Generated Application ID \(page 3-4\)](#)", "[Import Application into Different Workspace using Different Schema \(page 3-4\)](#)" and "[Import into Training Instance for Three Different Workspaces \(page 3-4\)](#)."

3.21 SET_APPLICATION_ID Procedure

Use this procedure to set the application ID of the application to be imported. The application ID should either not exist in the instance or, if it does exist, must be in the workspace where the application is being imported to. This number must be a positive integer and must not be from the reserved range of Application Express application IDs.

Syntax

```
APEX_APPLICATION_INSTALL.SET_APPLICATION_ID (  
    p_application_id IN NUMBER);
```

Parameters

Table 3-5 SET_APPLICATION_ID Parameters

Parameter	Description
p_application_id	This is the application ID. The application ID must be a positive integer, and cannot be in the reserved range of application IDs (3000 - 8999). It must be less than 3000 or greater than or equal to 9000.

Example

For an example of this procedure call, see "[Import Application with Specified Application ID](#) (page 3-3)."

3.22 SET_APPLICATION_NAME Procedure

This procedure sets the application name of the import application.

Syntax

```
APEX_APPLICATION_INSTALL.SET_APPLICATION_NAME; (  
    p_application_name IN VARCHAR2);
```

Parameters

Table 3-6 SET_APPLICATION_NAME Parameters

Parameter	Description
p_application_name	This is the application name. The application name cannot be null and cannot be longer than 255 characters.

Example

The following example sets the application name in APEX_APPLICATION_INSTALL to "Executive Dashboard".

```
declare  
    l_name varchar2(255) := 'Executive Dashboard';
```

```
begin
  apex_application_install.set_application_name( p_application_name => l_name );
end;
```

3.23 SET_AUTO_INSTALL_SUP_OBJ Procedure

This procedure sets the automatic install of supporting objects value used during application import. This setting is valid only for command line installs. If the value is set to TRUE and the application export contains supporting objects, it automatically installs or upgrades the supporting objects when an application imports from the command line.

Syntax

```
APEX_APPLICATION_INSTALL.SET_AUTO_INSTALL_SUP_OBJ(
  p_auto_install_sup_obj IN BOOLEAN);
```

Parameters

Table 3-7 SET_AUTO_INSTALL_SUP_OBJ Parameters

Parameter	Description
p_auto_install_sup_obj	The automatic install of supporting objects Boolean value.

Example

The following example gets the automatic install of supporting objects setting. If it is not set to install automatically, it sets to true to override export file settings of automatic install of supporting objects.

```
begin
  apex_application_install.set_auto_install_sup_obj( p_auto_install_sup_obj =>
  true );
end;
```

3.24 SET_IMAGE_PREFIX Procedure

This procedure sets the image prefix of the import application. Most Application Express instances use the default image prefix of */i/*.

Syntax

```
APEX_APPLICATION_INSTALL.SET_IMAGE_PREFIX(
  p_image_prefix IN VARCHAR2);
```

Parameters

Table 3-8 SET_AUTO_INSTALL_SUP_OBJ Parameters

Parameter	Description
p_auto_install_sup_obj	The automatic install of supporting objects Boolean value.

Example

The following example sets the value of the image prefix variable in APEX_APPLICATION_INSTALL.

```
declare
  l_prefix varchar2(255) := '/i/';
begin
  apex_application_install.set_image_prefix( p_image_prefix => l_prefix );
end;
```

3.25 SET_KEEP_SESSIONS Procedure

This procedure preserves sessions associated with the application on upgrades.

Syntax

```
procedure set_keep_sessions (
  p_keep_sessions in boolean );
```

Parameters

Table 3-9 SET_KEEP_SESSIONS Parameters

Parameter	Description
p_keep_sessions	false is the default value.true if sessions should be preserved, false if they should be deleted. KEEP_SESSIONS_ON_UPGRADE controls the default behavior. If it is N (the default), sessions will be deleted. KEEP_SESSIONS_ON_UPGRADE is an instance parameter.

Example

The following example installs application 100 in workspace FRED_PROD and keep session state.

```
SQL> exec apex_application_install.set_workspace(p_workspace => 'FRED_PROD');
SQL> exec apex_application_install.set_keep_sessions(p_keep_sessions => true);
SQL> @f100.sql
```

3.26 SET_OFFSET Procedure

This procedure sets the offset value used during application import. Use the offset value to ensure that the metadata for the Application Express application definition does not collide with other metadata on the instance. For a new application installation, it is usually sufficient to call the `generate_offset` procedure to have Application Express generate this offset value for you.

Syntax

```
APEX_APPLICATION_INSTALL.SET_OFFSET(
  p_offset IN NUMBER);
```

Parameters

Table 3-10 SET_OFFSET Parameters

Parameter	Description
p_offset	The offset value. The offset must be a positive integer. In most cases you do not need to specify the offset, and instead, call <code>APEX_APPLICATION_INSTALL.GENERATE_OFFSET</code> , which generates a large random value and then set it in the <code>APEX_APPLICATION_INSTALL</code> package.

Example

The following example generates a random number from the database and uses this as the offset value in `APEX_APPLICATION_INSTALL`.

```
declare
    l_offset number;
begin
    l_offset := dbms_random.value(100000000000, 99999999999);
    apex_application_install.set_offset( p_offset => l_offset );
end/
```

3.27 SET_PROXY Procedure

Use this procedure to set the proxy server attributes of an application to be imported.

Syntax

```
APEX_APPLICATION_INSTALL.SET_PROXY (
    p_proxy          IN VARCHAR2,
    p_no_proxy_domains IN VARCHAR2 DEFAULT NULL );
```

Parameters

Table 3-11 SET_PROXY Parameters

Parameter	Description
p_proxy	The proxy server. There is no default value. The proxy server cannot be more than 255 characters and should not include any protocol prefix such as <code>http://</code> . A sample value might be: <code>www-proxy.company.com</code>
p_no_proxy_domains	The list of domains for which the proxy server should not be used. There is no default value.

Example

The following example sets the value of the proxy variable in `APEX_APPLICATION_INSTALL`.

```
declare
    l_proxy varchar2(255) := 'www-proxy.company.com'
begin
```

```

    apex_application_install.set_proxy( p_proxy => l_proxy );
end;
```

3.28 SET_REMOTE_SERVER Procedure

Use this procedure to set the Base URL and the HTTPS Host attributes for remote servers of the imported application. Remote Servers are identified by their Static ID.

Syntax

```

APEX_APPLICATION_INSTALL.SET_REMOTE_SERVER(
    p_static_id IN VARCHAR2,
    p_base_url IN VARCHAR2,
    p_https_host IN VARCHAR2 default null );
```

Parameters

Table 3-12 SET_REMOTE_SERVER Parameters

Parameter	Description
p_static_id	Static ID to reference the remote server object.
p_base_url	New Base URL to use for this remote server object.
p_https_host	New HTTPS Host Property to use for this remote server object. Only relevant when the base URL is https:// and the database version is 12.2 or greater.

Example

```

begin
    apex_application_install.set_remote_server(
        p_static_id => 'MY_REMOTE_SERVER',
        p_base_url => 'http://production.company.com' );
end;
```

3.29 SET_SCHEMA Procedure

Use this function to set the parsing schema ("owner") of the Application Express application. The database user of this schema must already exist, and this schema name must already be mapped to the workspace used to import the application.

Syntax

```

APEX_APPLICATION_INSTALL.SET_SCHEMA (
    p_schema IN VARCHAR2);
```

Parameters

Table 3-13 SET_SCHEMA Parameters

Parameter	Description
p_schema	The schema name.

Example

For examples of this procedure call, see ["Import Application into Different Workspace using Different Schema \(page 3-4\)"](#) and ["Import into Training Instance for Three Different Workspaces \(page 3-4\)"](#).

3.30 SET_WORKSPACE_ID Procedure

Use this function to set the workspace ID for the application to be imported.

Syntax

```
APEX_APPLICATION_INSTALL.SET_WORKSPACE_ID (
    p_workspace_id IN NUMBER);
```

Parameters**Table 3-14 SET_WORKSPACE_ID Parameters**

Parameter	Description
p_workspace_id	The workspace ID.

Example

For examples of this procedure call, see ["Import Application into Different Workspace using Different Schema \(page 3-4\)"](#) and ["Import into Training Instance for Three Different Workspaces \(page 3-4\)"](#).

3.31 SET_WORKSPACE_Procedure

This function is used to set the workspace ID for the application to be imported.

Syntax

```
procedure set_workspace (
    p_workspace in varchar2 );
```

Parameters**Table 3-15 SET_WORKSPACE_Procedure Parameters**

Parameters	Description
p_workspace	The workspace name.

Example

This example shows how to set workspace ID for workspace FRED_PROD.

```
apex_application_install.set_workspace (
    p_workspace => 'FRED_PROD' );
```

4

APEX_AUTHENTICATION

The `APEX_AUTHENTICATION` package provides a public API for authentication plug-in.

- [Constants](#) (page 4-1)
- [CALLBACK Procedure](#) (page 4-1)
- [GET_CALLBACK_URL Function](#) (page 4-3)
- [GET_LOGIN_USERNAME_COOKIE Function](#) (page 4-3)
- [IS_AUTHENTICATED Function](#) (page 4-4)
- [IS_PUBLIC_USER Function](#) (page 4-4)
- [LOGIN Procedure](#) (page 4-5)
- [LOGOUT Procedure](#) (page 4-6)
- [POST_LOGIN Procedure](#) (page 4-6)
- [SEND_LOGIN_USERNAME_COOKIE Procedure](#) (page 4-7)

4.1 Constants

The following constant is used by this package.

```
c_default_username_cookie constant varchar2(30) := 'LOGIN_USERNAME_COOKIE';
```

4.2 CALLBACK Procedure

This procedure is the landing resource for external login pages. Call this procedure directly from the browser.

Syntax

```
APEX_AUTHENTICATION.CALLBACK (  
    p_session_id IN NUMBER,  
    p_app_id IN NUMBER,  
    p_page_id IN NUMBER DEFAULT NULL,  
    p_ajax_identifier IN VARCHAR2,  
    p_x01 IN VARCHAR2 DEFAULT NULL,  
    p_x02 IN VARCHAR2 DEFAULT NULL,  
    p_x03 IN VARCHAR2 DEFAULT NULL,  
    p_x04 IN VARCHAR2 DEFAULT NULL,  
    p_x05 IN VARCHAR2 DEFAULT NULL,  
    p_x06 IN VARCHAR2 DEFAULT NULL,  
    p_x07 IN VARCHAR2 DEFAULT NULL,  
    p_x08 IN VARCHAR2 DEFAULT NULL,  
    p_x09 IN VARCHAR2 DEFAULT NULL,  
    p_x10 IN VARCHAR2 DEFAULT NULL );
```

Parameters

Table 4-1 APEX_AUTHENTICATION.CALLBACK Procedure Parameters

Parameters	Description
p_session_id	The Application Express session identifier.
p_app_id	The database application identifier.
p_page_id	Optional page identifier.
p_ajax_identifierp	The system generated Ajax identifier. See "GET_AJAX_IDENTIFIER Function (page 26-8)."
p_x01 through p_x10	Optional parameters that the external login passes to the authentication plugin.

Example 1

In this example, a redirect is performed to an external login page and the callback is passed into Application Express, which the external login redirects to after successful authentication.

```
declare
    l_callback varchar2(4000) := apex_application.get_callback_url;
begin
    sys.owa_util.redirect_url(
        'https://single-signon.example.com/my_custom_sso.login?p_on_success=' ||
        sys.utl_url.escape (
            url => l_callback,
            escape_reserved_chars => true );
    apex_application.stop_apex_engine;
end;
```

Example 2

In this example, an external login page saves user data in a shared table and performs a call back with a handle to the data. In Application Express, the callback activates the authentication plugin's ajax code. It can take the value of x01 and fetch the actual user data from the shared table.

```
---- create or replace package body my_custom_sso as
procedure login (
    p_on_success in varchar2 )
is
    l_login_id varchar2(32);
begin
    l_login_id := rawtohex(sys.dbms_crypto.random(32));
    insert into login_data(id, username) values (l_login_id, 'JOE USER');
    sys.owa_util.redirect_url (
        p_on_success || '&p_x01=' || l_login_id );
end;
---- end my_custom_sso;
```

**Note:**

["GET_CALLBACK_URL Function \(page 4-3\)"](#)

4.3 GET_CALLBACK_URL Function

This function is a plugin helper function to return a URL that is used as a landing request for external login pages. When the browser sends the request, it triggers the authentication plugin ajax callback, which can be used to log the user in.

Syntax

```
APEX_AUTHENTICATION.GET_CALLBACK_URL (
  p_x01 IN VARCHAR2 DEFAULT NULL,
  p_x02 IN VARCHAR2 DEFAULT NULL,
  p_x03 IN VARCHAR2 DEFAULT NULL,
  p_x04 IN VARCHAR2 DEFAULT NULL,
  p_x05 IN VARCHAR2 DEFAULT NULL,
  p_x06 IN VARCHAR2 DEFAULT NULL,
  p_x07 IN VARCHAR2 DEFAULT NULL,
  p_x08 IN VARCHAR2 DEFAULT NULL,
  p_x09 IN VARCHAR2 DEFAULT NULL,
  p_x10 IN VARCHAR2 DEFAULT NULL )
return VARCHAR2;
```

Parameters

Table 4-2 APEX_AUTHENTICATION.GET_CALLBACK_URL Function Parameters

Parameters	Description
p_x01 through p_x10	Optional parameters that the external login passes to the authentication plugin.

Example

4.4 GET_LOGIN_USERNAME_COOKIE Function

This function reads the cookie with the username from the default login page.

Syntax

```
get_login_username_cookie (
  p_cookie_name in varchar2 default c_default_username_cookie )
return varchar2;
```

Parameters

Table 4-3 APEX_AUTHENTICATION.GET_LOGIN_USERNAME_COOKIE Function Parameters

Parameters	Description
p_cookie_name	The cookie name which stores the username in the browser.

Example

The example code below could be from a Before Header process. It populates a text item P101_USERNAME with the cookie value and a switch P101_REMEMBER_USERNAME, based on whether the cookie already has a value.

```
:P101_USERNAME          := apex_authentication.get_login_username_cookie;  
:P101_REMEMBER_USERNAME := case when :P101_USERNAME is not null  
                             then 'Y'  
                             else 'N'  
                             end;
```

4.5 IS_AUTHENTICATED Function

This function checks if the user is authenticated in the session and returns TRUE if the user is already logged in or FALSE if the user of the current session is not yet authenticated.

Syntax

```
APEX_AUTHENTICATION.IS_AUTHENTICATED  
    RETURN BOOLEAN;
```

Parameters

None.

Example

In this example, IS_AUTHENTICATED is used to emit the username if the user has already logged in or a notification if the user has not.

```
if apex_authentication.is_authenticated then  
    sys.htp.p(apex_escape.html(:APP_USER)||', you are known to the system');  
else  
    sys.htp.p('Please sign in');  
end if;
```



Note:

["IS_PUBLIC_USER Function \(page 4-4\)"](#)

4.6 IS_PUBLIC_USER Function

This function checks if the user is not authenticated in the session. A FALSE is returned if the user is already logged on or TRUE if the user of the current session is not yet authenticated.

Syntax

```
APEX_AUTHENTICATION.IS_PUBLIC_USER  
    return BOLLEAN;
```

Parameters

None.

Example

In this example, `IS_PUBLIC_USER` is used to show a notification if the user has not already logged in or the username if the user has not.

```

if apex_authentication.is_public_user then
    sys.http.p('Please sign in');
else
    sys.http.p(apex_escape.html(:APP_USER)||', you are known to the system');
end if;

```

4.7 LOGIN Procedure

This procedure authenticates the user in the current session.

Login processing has the following steps:

1. Run authentication scheme's pre-authentication procedure.
2. Run authentication scheme's authentication function to check the user credentials (`p_username`, `p_password`), returning TRUE on success.
3. If `result=true`: run post-authentication procedure.
4. If `result=true`: save username in session table.
5. If `result=true`: set redirect url to deep link.
6. If `result=false`: set redirect url to current page, with an error message in the `notification_msg` parameter.
7. Log authentication result.
8. Redirect.

Syntax

```

APEX_AUTHENTICATION.LOGIN (
    p_username IN VARCHAR2,
    p_password IN VARCHAR2,
    p_uppercase_username IN BOOLEAN DEFAULT TRUE );

```

Parameters

Table 4-4 APEX_AUTHENTICATION.LOGIN Procedure Parameters

Parameters	Description
<code>p_username</code>	The user's name.
<code>p_password</code>	The user's password.
<code>p_uppercase_username</code>	If TRUE then <code>p_username</code> is converted to uppercase.

Example

This example passes user credentials, username and password, to the authentication scheme.

```
apex_authentication.login('JOE USER', 'mysecret');
```

**Note:**

"[POST_LOGIN Procedure](#) (page 4-6)"

4.8 LOGOUT Procedure

This procedure closes the session and redirects to the application's home page. Call this procedure directly from the browser.

Syntax

```
APEX_AUTHENTICATION.LOGOUT (
  p_session_id in number,
  p_app_id in number,
  p_ws_app_id in number default null );
```

Parameters

Table 4-5 APEX_AUTHENTICATION.LOGOUT Procedure Parameters

Parameters	Description
p_session_id	The Application Express session identifier of the session to close.
p_app_id	The database application identifier.
p_ws_app_id	The websheet application identifier.

Example

This example logs the session out.

```
apex_authentication.logout(:SESSION, :APP_ID);
```

4.9 POST_LOGIN Procedure

This procedure authenticates the user in the current session. It runs a subset of login(), without steps 1 and 2. For steps, see "[LOGIN Procedure](#) (page 4-5)." It is primarily useful in authentication schemes where user credentials checking is done externally to Application Express.

Syntax

```
APEX_AUTHENTICATION.POST_LOGIN (
  p_username IN VARCHAR2,
```

```
p_password IN VARCHAR2,
p_uppercase_username IN BOOLEAN DEFAULT TRUE );
```

Parameters

Table 4-6 APEX_AUTHENTICATION.POST_LOGIN Procedure Parameters

Parameters	Description
p_username	The user's name.
p_password	The user's password.
p_uppercase_username	If TRUE then p_username is converted to uppercase.

Example

This procedure call passes user credentials, username and password, to the authentication scheme to finalize the user's authentication.

```
apex_authentication.post_login('JOE USER', 'mysecret');
```

Note:

"LOGIN Procedure (page 4-5)"

4.10 SEND_LOGIN_USERNAME_COOKIE Procedure

This procedure sends a cookie with the username.

Syntax

```
send_login_username_cookie (
  p_username in varchar2,
  p_cookie_name in varchar2 default c_default_username_cookie,
  p_consent in boolean default false );
```

Parameters

Table 4-7 APEX_AUTHENTICATION.SEND_LOGIN_USERNAME_COOKIE Procedure Parameters

Parameters	Description
p_username	The user's name.
p_cookie_name	The cookie name which stores p_username in the browser.
p_consent	Control if the cookie should actually be sent. If true, assume the user gave consent to send the cookie. If false, do not send the cookie. If there is no consent and the cookie already exists, the procedure overwrites the existing cookie value with null.

Example

The example code below could be from a page submit process on a login page, which saves the username in a cookie when consent is given. `P101_REMEMBER_USERNAME` could be a switch. On rendering, it could be set to `Y` when the cookie has a value.

```
apex_authentication.send_login_username_cookie (  
    p_username => :P101_USERNAME,  
    p_consent  => :P101_REMEMBER_USERNAME = 'Y' );
```

5

APEX_AUTHORIZATION

The `APEX_AUTHORIZATION` package contains public utility functions used for controlling and querying access rights to the application.

- [ENABLE_DYNAMIC_GROUPS Procedure](#) (page 5-1)
- [IS_AUTHORIZED Function](#) (page 5-2)
- [RESET_CACHE Procedure](#) (page 5-3)

5.1 ENABLE_DYNAMIC_GROUPS Procedure

This procedure enables groups in the current session. These groups do not have to be created in the Application Express workspace repository, but can, for example, be loaded from a LDAP repository. Enabling a group that exists in the workspace repository and has other groups granted to it, also enables the granted groups.

If Real Application Security, available with Oracle Database Release 12g, is enabled for the authentication scheme, all dynamic groups are enabled as RAS dynamic or external groups (depending whether the group exists in `dba_xs_dynamic_roles`).

This procedure must be called during or right after authentication, for example, in a post-authentication procedure.

Syntax

```
APEX_AUTHORIZATION.ENABLE_DYNAMIC_GROUPS (  
    p_group_names IN apex_t_varchar2 );
```

Parameters

Table 5-1 ENABLE_DYNAMIC_GROUPS Procedure Parameter

Parameter	Description
<code>p_group_names</code>	Table of group names.

Example

This example enables the dynamic groups `SALES` and `HR`, for example, from within a post authentication procedure.

```
begin  
    apex_authorization.enable_dynamic_groups (  
        p_group_names => apex_t_varchar2('SALES', 'HR') );  
end;
```

5.2 IS_AUTHORIZED Function

Determine if the current user passes the authorization with name `p_authorization_name`. For performance reasons, authorization results are cached. Because of this, the function may not always evaluate the authorization when called, but take the result out of the cache.

See Also:

"Changing the Evaluation Point Attribute" in *Oracle Application Express App Builder User's Guide*

Syntax

```
APEX_AUTHORIZATION.IS_AUTHORIZED (  
    p_authorization_name IN VARCHAR2 )  
    RETURN BOOLEAN;
```

Parameters

Table 5-2 IS_AUTHORIZED Function Parameters

Parameter	Description
<code>p_authorization_name</code>	The name of an authorization scheme in the application.

Returns

Table 5-3 IS_AUTHORIZED Function Returns

Parameter	Description
TRUE	If the authorization is successful.
FALSE	If the authorization is not successful.

Example

This example prints the result of the authorization "User Is Admin".

```
begin  
    sys.htp.p('User Is Admin: '||  
        case apex_authorization.is_authorized (  
            p_authorization_name => 'User Is Admin' )  
        when true then 'YES'  
        when false then 'NO'  
        else 'null'  
        end);  
end;
```


5.3 RESET_CACHE Procedure

This procedure resets the authorization caches for the session and forces a re-evaluation when an authorization is checked next.

Syntax

```
APEX_AUTHORIZATION.RESET_CACHE;
```

Parameters

None.

Example

This examples resets the authorization cache.

```
apex_authorization.reset_cache;
```

6

APEX_COLLECTION

Collections enable you to temporarily capture one or more nonscalar values. You can use collections to store rows and columns currently in session state so they can be accessed, manipulated, or processed during a user's specific session. You can think of a collection as a bucket in which you temporarily store and name rows of information.

- [About the APEX_COLLECTION API](#) (page 6-2)
- [Naming Collections](#) (page 6-3)
- [Creating a Collection](#) (page 6-3)
- [About the Parameter p_generate_md5](#) (page 6-4)
- [Accessing a Collection](#) (page 6-4)
- [Merging Collections](#) (page 6-5)
- [Truncating a Collection](#) (page 6-5)
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- [Deleting All Collections for the Current Application](#) (page 6-5)
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- [Adding Members to a Collection](#) (page 6-5)
- [About the Parameters p_generate_md5, p_clob001, p_blob001, and p_xmltype001](#) (page 6-6)
- [Updating Collection Members](#) (page 6-6)
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- [ADD_MEMBER Procedure](#) (page 6-8)
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- [DELETE_ALL_COLLECTIONS Procedure](#) (page 6-22)
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- [DELETE_MEMBERS Procedure](#) (page 6-24)
- [GET_MEMBER_MD5 Function](#) (page 6-25)
- [MERGE_MEMBERS Procedure](#) (page 6-26)
- [MOVE_MEMBER_DOWN Procedure](#) (page 6-28)
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- [RESEQUENCE_COLLECTION Procedure](#) (page 6-29)
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- [UPDATE_MEMBER Procedure](#) (page 6-32)
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- [UPDATE_MEMBER_ATTRIBUTE Procedure Signature 1](#) (page 6-35)
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- [UPDATE_MEMBER_ATTRIBUTE Procedure Signature 4](#) (page 6-38)
- [UPDATE_MEMBER_ATTRIBUTE Procedure Signature 5](#) (page 6-39)
- [UPDATE_MEMBER_ATTRIBUTE Procedure Signature 6](#) (page 6-41)

6.1 About the APEX_COLLECTION API

Every collection contains a named list of data elements (or members) which can have up to 50 character attributes (`VARCHAR2(4000)`), five number attributes, five date attributes, one XML Type attribute, one large binary attribute (`BLOB`), and one large character attribute (`CLOB`). You insert, update, and delete collection information using the PL/SQL API `APEX_COLLECTION`.

The following are examples of when you might use collections:

- When you are creating a data-entry wizard in which multiple rows of information first need to be collected within a logical transaction. You can use collections to temporarily store the contents of the multiple rows of information, before performing the final step in the wizard when both the physical and logical transactions are completed.
- When your application includes an update page on which a user updates multiple detail rows on one page. The user can make many updates, apply these updates to a collection and then call a final process to apply the changes to the database.
- When you are building a wizard where you are collecting an arbitrary number of attributes. At the end of the wizard, the user then performs a task that takes the information temporarily stored in the collection and applies it to the database.

Beginning in Oracle Database 12c, database columns of data type `VARCHAR2` can be defined up to 32,767 bytes. This requires that the database initialization parameter `MAX_STRING_SIZE` has a value of `EXTENDED`. If Application Express was installed in Oracle Database 12c and with `MAX_STRING_SIZE = EXTENDED`, then the tables for the Application Express collections will be defined to support up to 32,767 bytes for the character attributes of a collection. For the methods in the `APEX_COLLECTION` API, all references to character attributes (`c001` through `c050`) can support up to 32,767 bytes.

6.2 Naming Collections

When you create a collection, you must give it a name that cannot exceed 255 characters. Note that collection names are not case-sensitive and are converted to uppercase.

Once the collection is named, you can access the values in the collection by running a SQL query against the view `APEX_COLLECTIONS`.

6.3 Creating a Collection

Every collection contains a named list of data elements (or members) which can have up to 50 character attributes (`VARCHAR2(4000)`), five number attributes, one XML Type attribute, one large binary attribute (`BLOB`), and one large character attribute (`CLOB`). You use the following methods to create a collection:

- `CREATE_COLLECTION`

This method creates an empty collection with the provided name. An exception is raised if the named collection exists.

- `CREATE_OR_TRUNCATE_COLLECTION`

If the provided named collection does not exist, this method creates an empty collection with the given name. If the named collection exists, this method truncates it. Truncating a collection empties it, but leaves it in place.

- `CREATE_COLLECTION_FROM_QUERY`

This method creates a collection and then populates it with the results of a specified query. An exception is raised if the named collection exists. This method can be used with a query with up to 50 columns in the `SELECT` clause. These columns in the `SELECT` clause populate the 50 character attributes of the collection (`C001` through `C050`).

- `CREATE_COLLECTION_FOM_QUERY2`

This method creates a collection and then populates it with the results of a specified query. An exception is raised if the named collection exists. It is identical to the `CREATE_COLLECTION_FROM_QUERY`, however, the first 5 columns of the `SELECT` clause must be numeric. After the numeric columns, there can be up to 50 character columns in the `SELECT` clause.

- `CREATE_COLLECTION_FROM_QUERY_B`

This method offers significantly faster performance than the `CREATE_COLLECTION_FROM_QUERY` method by performing bulk SQL operations, but has the following limitations:

- No column value in the select list of the query can be more than 2,000 bytes. If a row is encountered that has a column value of more than 2,000 bytes, an error is raised during execution.
- The MD5 checksum is not computed for any members in the collection.

- `CREATE_COLLECTION_FROM_QUERYB2`

This method also creates a collection and then populates it with the results of a specified query. An exception is raised if the named collection exists. It is identical to the `CREATE_COLLECTION_FROM_QUERY_B`, however, the first five columns of the `SELECT` clause must be numeric. After the numeric columns, there can be up to 50 character columns in the `SELECT` clause.

6.4 About the Parameter `p_generate_md5`

Use the `p_generate_md5` flag to specify if the message digest of the data of the collection member should be computed. By default, this flag is set to `NO`. Use this parameter to check the MD5 of the collection member (that is, compare it with another member or see if a member has changed).

6.5 Accessing a Collection

You can access the members of a collection by querying the database view `APEX_COLLECTIONS`. Collection names are always converted to uppercase. When querying the `APEX_COLLECTIONS` view, always specify the collection name in all uppercase. The `APEX_COLLECTIONS` view has the following definition:

```
COLLECTION_NAME  NOT NULL VARCHAR2(255)
SEQ_ID           NOT NULL NUMBER
C001             VARCHAR2(4000)
C002             VARCHAR2(4000)
C003             VARCHAR2(4000)
C004             VARCHAR2(4000)
C005             VARCHAR2(4000)
...
C050             VARCHAR2(4000)
N001             NUMBER
N002             NUMBER
N003             NUMBER
N004             NUMBER
N005             NUMBER
CLOB001         CLOB
BLOB001         BLOB
```

```
XMLTYPE001      XMLTYPE  
MD5_ORIGINAL    VARCHAR2(4000)
```

Use the `APEX_COLLECTIONS` view in an application just as you would use any other table or view in an application, for example:

```
SELECT c001, c002, c003, n001, clob001  
FROM APEX_collections  
WHERE collection_name = 'DEPARTMENTS'
```

6.6 Merging Collections

You can merge members of a collection with values passed in a set of arrays. By using the `p_init_query` argument, you can create a collection from the supplied query.

6.7 Truncating a Collection

If you truncate a collection, you remove all members from the specified collection, but the named collection remains in place.

6.8 Deleting a Collection

If you delete a collection, you delete the collection and all of its members. Be aware that if you do not delete a collection, it is eventually deleted when the session is purged.

6.9 Deleting All Collections for the Current Application

Use the `DELETE_ALL_COLLECTIONS` method to delete all collections defined in the current application.

6.10 Deleting All Collections in the Current Session

Use the `DELETE_ALL_COLLECTIONS_SESSION` method to delete all collections defined in the current session.

6.11 Adding Members to a Collection

When data elements (or members) are added to a collection, they are assigned a unique sequence ID. As you add members to a collection, the sequence ID is change in increments of 1, with the newest members having the largest ID.

You add new members to a collection using the `ADD_MEMBER` function. Calling this function returns the sequence ID of the newly added member.

You can also add new members (or an array of members) to a collection using the `ADD_MEMBERS` procedure. The number of members added is based on the number of elements in the first array.

6.12 About the Parameters `p_generate_md5`, `p_clob001`, `p_blob001`, and `p_xmltype001`

Use the `p_generate_md5` flag to specify if the message digest of the data of the collection member should be computed. By default, this flag is set to `NO`. Use this parameter to check the MD5 of the collection member (that is, compare it with another member or see if a member has changed).

Use `p_clob001` for collection member attributes which exceed 4,000 characters. Use `p_blob001` for binary collection member attributes. Use `p_xmltype001` to store well-formed XML.

6.13 Updating Collection Members

You can update collection members by calling the `UPDATE_MEMBER` procedure and referencing the desired collection member by its sequence ID. The `UPDATE_MEMBER` procedure replaces an entire collection member, not individual member attributes.

Use the `p_clob001` parameter for collection member attributes which exceed 4,000 characters.

To update a single attribute of a collection member, use the `UPDATE_MEMBER_ATTRIBUTE` procedure.

6.14 Deleting Collection Members

You can delete a collection member by calling the `DELETE_MEMBER` procedure and referencing the desired collection member by its sequence ID. Note that this procedure leaves a gap in the sequence IDs in the specified collection.

You can also delete all members from a collection by when an attribute matches a specific value. Note that the `DELETE_MEMBERS` procedure also leaves a gap in the sequence IDs in the specified collection. If the supplied attribute value is null, then all members of the named collection are deleted where the attribute (specified by `p_attr_number`) is null.

6.15 Obtaining a Member Count

Use `COLLECTION_MEMBER_COUNT` to return the total count of all members in a collection. Note that this count does not indicate the highest sequence in the collection.

6.16 Resequencing a Collection

Use `RESEQUENCE_COLLECTION` to resequence a collection to remove any gaps in sequence IDs while maintaining the same element order.

6.17 Verifying Whether a Collection Exists

Use `COLLECTION_EXISTS` to determine if a collection exists.

6.18 Adjusting a Member Sequence ID

You can adjust the sequence ID of a specific member within a collection by moving the ID up or down. When you adjust a sequence ID, the specified ID is exchanged with another ID. For example, if you were to move the ID 2 up, 2 becomes 3, and 3 would become 2.

Use `MOVE_MEMBER_UP` to adjust a member sequence ID up by one. Alternately, use `MOVE_MEMBER_DOWN` to adjust a member sequence ID down by one.

6.19 Sorting Collection Members

Use the `SORT_MEMBERS` method to reorder members of a collection by the column number. This method sorts the collection by a particular column number and also reassigns the sequence IDs for each member to remove gaps.

6.20 Clearing Collection Session State

Clearing the session state of a collection removes the collection members. A shopping cart is a good example of when you might need to clear collection session state. When a user requests to empty the shopping cart and start again, you must clear the session state for a collection. You can remove session state of a collection by calling the `TRUNCATE_COLLECTION` method or by using `f?p` syntax.

Calling the `TRUNCATE_COLLECTION` method deletes the existing collection and then recreates it, for example:

```
APEX_COLLECTION.TRUNCATE_COLLECTION(  
    p_collection_name => collection name);
```

You can also use the sixth `f?p` syntax argument to clear session state, for example:

```
f?p=App:Page:Session::NO:collection name
```

6.21 Determining Collection Status

The `p_generate_md5` parameter determines if the MD5 message digests are computed for each member of a collection. The collection status flag is set to `FALSE` immediately after you create a collection. If any operations are performed on the collection (such as add, update, truncate, and so on), this flag is set to `TRUE`.

You can reset this flag manually by calling `RESET_COLLECTION_CHANGED`.

Once this flag has been reset, you can determine if a collection has changed by calling `COLLECTION_HAS_CHANGED`.

When you add a new member to a collection, an MD5 message digest is computed against all 50 attributes and the CLOB attribute if the `p_generated_md5` parameter is set to YES. You can access this value from the `MD5_ORIGINAL` column of the view `APEX_COLLECTION`. You can access the MD5 message digest for the current value of a specified collection member by using the function `GET_MEMBER_MD5`.

6.22 ADD_MEMBER Procedure

Use this procedure to add a new member to an existing collection. An error is raised if the specified collection does not exist for the current user in the same session for the current Application ID. Gaps are not used when adding a new member, so an existing collection with members of sequence IDs (1,2,5,8) adds the new member with a sequence ID of 9.

Syntax

```
APEX_COLLECTION.ADD_MEMBER (
  p_collection_name IN VARCHAR2,
  p_c001 IN VARCHAR2 default null,
  ...
  p_c050 IN VARCHAR2 default null,
  p_n001 IN NUMBER default null,
  p_n002 IN NUMBER default null,
  p_n003 IN NUMBER default null,
  p_n004 IN NUMBER default null,
  p_n005 IN NUMBER default null,
  p_d001 IN DATE default null,
  p_d002 IN DATE default null,
  p_d003 IN DATE default null,
  p_d004 IN DATE default null,
  p_d005 IN DATE default null,
  p_clob001 IN CLOB default empty_clob(),
  p_blob001 IN BLOB default empty_blob(),
  p_xmltype001 IN XMLTYPE default null,
  p_generate_md5 IN VARCHAR2 default 'NO');
```

Parameters



Note:

Any character attribute exceeding 4,000 characters is truncated to 4,000 characters.

Table 6-1 ADD_MEMBER Procedure Parameters

Parameter	Description
<code>p_collection_name</code>	The name of an existing collection. Maximum length is 255 bytes. Collection names are not case sensitive and are converted to upper case.
<code>p_c001</code> through <code>p_c050</code>	Attribute value of the member to be added. Maximum length is 4,000 bytes. Any character attribute exceeding 4,000 characters is truncated to 4,000 characters.

Table 6-1 (Cont.) ADD_MEMBER Procedure Parameters

Parameter	Description
p_n001 through p_n005	Attribute value of the numeric attributes to be added.
p_d001 through p_d005	Attribute value of the date attribute.
p_clob001	Use p_clob001 for collection member attributes that exceed 4,000 characters.
p_blob001	Use p_blob001 for binary collection member attributes.
p_xmltype001	Use p_xmltype001 to store well-formed XML.
p_generate_md5	Valid values include YES and NO. YES to specify if the message digest of the data of the collection member should be computed. Use this parameter to compare the MD5 of the collection member with another member or to see if that member has changed.

Example

The following is an example of the ADD_MEMBER procedure.

```
APEX_COLLECTION.ADD_MEMBER(
    p_collection_name => 'GROCERIES'
    p_c001             => 'Grapes',
    p_c002             => 'Imported',
    p_n001             => 125,
    p_d001             => sysdate );
END;
```

6.23 ADD_MEMBER Function

Use this function to add a new member to an existing collection. Calling this function returns the sequence ID of the newly added member. An error is raised if the specified collection does not exist for the current user in the same session for the current Application ID. Gaps are not used when adding a new member, so an existing collection with members of sequence IDs (1,2,5,8) adds the new member with a sequence ID of 9.

Syntax

```
APEX_COLLECTION.ADD_MEMBER (
    p_collection_name IN VARCHAR2,
    p_c001 IN VARCHAR2 default null,
    ...
    p_c050 IN VARCHAR2 default null,
    p_n001 IN NUMBER default null,
    p_n002 IN NUMBER default null,
    p_n003 IN NUMBER default null,
    p_n004 IN NUMBER default null,
    p_n005 IN NUMBER default null,
    p_d001 IN DATE default null,
    p_d002 IN DATE default null,
    p_d003 IN DATE default null,
    p_d004 IN DATE default null,
    p_d005 IN DATE default null,
```

```

p_clob001 IN CLOB default empty_clob(),
p_blob001 IN BLOB default empty_blob(),
p_xmltype001 IN XMLTYPE default null,
p_generate_md5 IN VARCHAR2 default 'NO')
RETURN NUMBER;

```

Parameters



Note:

Any character attribute exceeding 4,000 characters is truncated to 4,000 characters.

Table 6-2 ADD_MEMBER Function Parameters

Parameter	Description
p_collection_name	The name of an existing collection. Maximum length is 255 bytes. Collection names are not case sensitive and are converted to upper case.
p_c001 through p_c050	Attribute value of the member to be added. Maximum length is 4,000 bytes. Any character attribute exceeding 4,000 characters is truncated to 4,000 characters.
p_n001 through p_n005	Attribute value of the numeric attributes to be added.
p_d001 through p_d005	Attribute value of the date attribute to be added.
p_clob001	Use p_clob001 for collection member attributes that exceed 4,000 characters.
p_blob001	Use p_blob001 for binary collection member attributes.
p_xmltype001	Use p_xmltype001 to store well-formed XML.
p_generate_md5	Valid values include YES and NO. YES to specify if the message digest of the data of the collection member should be computed. Use this parameter to compare the MD5 of the collection member with another member or to see if that member has changed.

Example

```

DECLARE
  l_seq number;
BEGIN
  l_seq := APEX_COLLECTION.ADD_MEMBER(
    p_collection_name => 'GROCERIES'
    p_c001             => 'Grapes',
    p_c002             => 'Imported',
    p_n001             => 125,
    p_d001             => sysdate );
END;

```

6.24 ADD_MEMBERS Procedure

Use this procedure to add an array of members to a collection. An error is raised if the specified collection does not exist for the current user in the same session for the current Application ID. Gaps are not used when adding a new member, so an existing collection with members of sequence IDs (1,2,5,8) adds the new member with a sequence ID of 9. The count of elements in the p_c001 PL/SQL table is used as the total number of items across all PL/SQL tables. For example, if p_c001.count is 2 and p_c002.count is 10, only 2 members are added. If p_c001 is null an application error is raised.

Syntax

```
APEX_COLLECTION.ADD_MEMBERS (
  p_collection_name IN VARCHAR2,
  p_c001 IN APEX_APPLICATION_GLOBAL.VC_ARR2 default empty_vc_arr,
  p_c002 IN APEX_APPLICATION_GLOBAL.VC_ARR2 default empty_vc_arr,
  p_c003 IN APEX_APPLICATION_GLOBAL.VC_ARR2 default empty_vc_arr,
  ...
  p_c050 IN APEX_APPLICATION_GLOBAL.VC_ARR2 default empty_vc_arr,
  p_n001 IN APEX_APPLICATION_GLOBAL.N_ARR default empty_n_arr,
  p_n002 IN APEX_APPLICATION_GLOBAL.N_ARR default empty_n_arr,
  p_n003 IN APEX_APPLICATION_GLOBAL.N_ARR default empty_n_arr,
  p_n004 IN APEX_APPLICATION_GLOBAL.N_ARR default empty_n_arr,
  p_n005 IN APEX_APPLICATION_GLOBAL.N_ARR default empty_n_arr,
  p_d001 IN APEX_APPLICATION_GLOBAL.D_ARR default empty_d_arr,
  p_d002 IN APEX_APPLICATION_GLOBAL.D_ARR default empty_d_arr,
  p_d003 IN APEX_APPLICATION_GLOBAL.D_ARR default empty_d_arr,
  p_d004 IN APEX_APPLICATION_GLOBAL.D_ARR default empty_d_arr,
  p_d005 IN APEX_APPLICATION_GLOBAL.D_ARR default empty_d_arr,
  p_generate_md5 IN VARCHAR2 default 'NO');
```

Parameters

Note:

Any character attribute exceeding 4,000 characters is truncated to 4,000 characters. Also, the number of members added is based on the number of elements in the first array.

Table 6-3 ADD_MEMBERS Procedure Parameters

Parameter	Description
p_collection_name	The name of an existing collection. Maximum length is 255 bytes. Collection names are not case sensitive and are converted to upper case.
p_c001 through p_c050	Array of character attribute values to be added.
p_n001 through p_n005	Array of numeric attribute values to be added.
p_d001 through p_d005	Array of date attribute values to be added.

Table 6-3 (Cont.) ADD_MEMBERS Procedure Parameters

Parameter	Description
p_generate_md5	Valid values include YES and NO. YES to specify if the message digest of the data of the collection member should be computed. Use this parameter to compare the MD5 of the collection member with another member or to see if that member has changed.

Example

The following example shows how to add two new members to the EMPLOYEE table.

```
Begin
  APEX_COLLECTION.ADD_MEMBERS(
    p_collection_name => 'EMPLOYEE',
    p_c001 => l_arr1,
    p_c002 => l_arr2);
End;
```

6.25 COLLECTION_EXISTS Function

Use this function to determine if a collection exists. A TRUE is returned if the specified collection exists for the current user in the current session for the current Application ID, otherwise FALSE is returned.

Syntax

```
APEX_COLLECTION.COLLECTION_EXISTS (
  p_collection_name IN VARCHAR2)
RETURN BOOLEAN;
```

Parameters**Table 6-4 COLLECTION_EXISTS Function Parameters**

Parameter	Description
p_collection_name	The name of the collection. Maximum length is 255 bytes. The collection name is not case sensitive and is converted to upper case.

Example

The following example shows how to use the COLLECTION_EXISTS function to determine if the collection named EMPLOYEES exists.

```
Begin
  l_exists := APEX_COLLECTION.COLLECTION_EXISTS (
    p_collection_name => 'EMPLOYEES');
End;
```

6.26 COLLECTION_HAS_CHANGED Function

Use this function to determine if a collection has changed since it was created or the collection changed flag was reset.

Syntax

```
APEX_COLLECTION.COLLECTION_HAS_CHANGED (
    p_collection_name IN VARCHAR2)
RETURN BOOLEAN;
```

Parameters

Table 6-5 COLLECTION_HAS_CHANGED Function Parameters

Parameter	Description
p_collection_name	The name of the collection. An error is returned if this collection does not exist with the specified name of the current user and in the same session.

Example

The following example shows how to use the `COLLECTION_HAS_CHANGED` function to determine if the `EMPLOYEES` collection has changed since it was created or last reset.

```
Begin
    l_exists := APEX_COLLECTION.COLLECTION_HAS_CHANGED (
        p_collection_name => 'EMPLOYEES');
End;
```

6.27 COLLECTION_MEMBER_COUNT Function

Use this function to get the total number of members for the named collection. If gaps exist, the total member count returned is not equal to the highest sequence ID in the collection. If the named collection does not exist for the current user in the current session, an error is raised.

Syntax

```
APEX_COLLECTION.COLLECTION_MEMBER_COUNT (
    p_collection_name IN VARCHAR2)
RETURN NUMBER;
```

Parameters

Table 6-6 COLLECTION_MEMBER_COUNT Function Parameters

Parameter	Description
p_collection_name	The name of the collection.

Example

This example shows how to use the `COLLECTION_MEMBER_COUNT` function to get the total number of members in the `DEPARTMENTS` collection.

```
Begin
  l_count := APEX_COLLECTION.COLLECTION_MEMBER_COUNT( p_collection_name =>
'DEPARTMENTS');
End;
```

6.28 CREATE_COLLECTION Procedure

Use this procedure to create an empty collection that does not already exist. If a collection exists with the same name for the current user in the same session for the current Application ID, an application error is raised.

Syntax

```
APEX_COLLECTION.CREATE_COLLECTION(
  p_collection_name IN VARCHAR2,
  p_truncate_if_exists IN VARCHAR2 default 'NO');
```

Parameters

Table 6-7 CREATE_COLLECTION Procedure Parameters

Parameter	Description
<code>p_collection_name</code>	The name of the collection. The maximum length is 255 characters. An error is returned if this collection exists with the specified name of the current user and in the same session.
<code>p_truncate_if_exists</code>	If YES, then members of the collection will first be truncated if the collection exists and no error will be raised. If NO (or not YES), and the collection exists, an error will be raised.

Example

This example shows how to use the `CREATE_COLLECTION` procedure to create an empty collection named `EMPLOYEES`.

```
Begin
  APEX_COLLECTION.CREATE_COLLECTION(
    p_collection_name => 'EMPLOYEES');
End;
```

6.29 CREATE_OR_TRUNCATE_COLLECTION Procedure

Use this procedure to create a collection. If a collection exists with the same name for the current user in the same session for the current Application ID, all members of the collection are removed. In other words, the named collection is truncated.

Syntax

```
APEX_COLLECTION.CREATE_OR_TRUNCATE_COLLECTION(
  p_collection_name IN VARCHAR2);
```

Parameters

Table 6-8 CREATE_OR_TRUNCATE_COLLECTION Procedure Parameters

Parameter	Description
p_collection_name	The name of the collection. The maximum length is 255 characters. All members of the named collection are removed if the named collection exists for the current user in the current session.

Example

This example shows how to use the `CREATE_OR_TRUNCATE_COLLECTION` procedure to remove all members in an existing collection named `EMPLOYEES`.

```
Begin
  APEX_COLLECTION.CREATE_OR_TRUNCATE_COLLECTION(
    p_collection_name => 'EMPLOYEES');
End;
```

6.30 CREATE_COLLECTION_FROM_QUERY Procedure

Use this procedure to create a collection from a supplied query. The query is parsed as the application owner. This method can be used with a query with up to 50 columns in the `SELECT` clause. These columns in the `SELECT` clause populates the 50 character attributes of the collection (C001 through C050). If a collection exists with the same name for the current user in the same session for the current Application ID, an application error is raised.

Syntax

```
APEX_COLLECTION.CREATE_COLLECTION_FROM_QUERY (
  p_collection_name  IN VARCHAR2,
  p_query            IN VARCHAR2,
  p_generate_md5     IN VARCHAR2 default 'NO',
  p_truncate_if_exists IN VARCHAR2 default 'NO');
```

Parameters

Table 6-9 CREATE_COLLECTION_FROM_QUERY Procedure Parameters

Parameter	Description
p_collection_name	The name of the collection. The maximum length is 255 characters. An error is returned if this collection exists with the specified name of the current user and in the same session.
p_query	Query to execute to populate the members of the collection. If <code>p_query</code> is numeric, it is assumed to be a <code>DBMS_SQL</code> cursor.
p_generate_md5	Valid values include <code>YES</code> and <code>NO</code> . <code>YES</code> to specify if the message digest of the data of the collection member should be computed. Use this parameter to compare the MD5 of the collection member with another member or to see if that member has changed.

Table 6-9 (Cont.) CREATE_COLLECTION_FROM_QUERY Procedure Parameters

Parameter	Description
p_truncate_if_exists	If YES, then members of the collection will first be truncated if the collection exists and no error will be raised. If NO (or not YES), and the collection exists, an error will be raised.

Example

The following example shows how to use the `CREATE_COLLECTION_FROM_QUERY` procedure to create a collection named `AUTO` and populate it with data from the `AUTOS` table. Because `p_generate_md5` is 'YES', the MD5 checksum is computed to allow comparisons to determine change status.

```
Begin
  l_query := 'select make, model, year from AUTOS';
  APEX_COLLECTION.CREATE_COLLECTION_FROM_QUERY (
    p_collection_name => 'AUTO',
    p_query => l_query,
    p_generate_md5 => 'YES');
End;
```

6.31 CREATE_COLLECTION_FROM_QUERY2 Procedure

Use this procedure to create a collection from a supplied query. This method is identical to `CREATE_COLLECTION_FROM_QUERY`, however, the first 5 columns of the `SELECT` clause must be numeric and the next 5 must be date. After the numeric and date columns, there can be up to 50 character columns in the `SELECT` clause. The query is parsed as the application owner. If a collection exists with the same name for the current user in the same session for the current Application ID, an application error is raised.

Syntax

```
APEX_COLLECTION.CREATE_COLLECTION_FROM_QUERY2 (
  p_collection_name    IN VARCHAR2,
  p_query              IN VARCHAR2,
  p_generate_md5       IN VARCHAR2 default 'NO',
  p_truncate_if_exists IN VARCHAR2 default 'NO');
```

Parameters**Table 6-10 CREATE_COLLECTION_FROM_QUERY2 Procedure Parameters**

Parameter	Description
p_collection_name	The name of the collection. The maximum length is 255 characters. An error is returned if this collection exists with the specified name of the current user and in the same session.
p_query	Query to execute to populate the members of the collection. If <code>p_query</code> is numeric, it is assumed to be a <code>DBMS_SQL</code> cursor.

Table 6-10 (Cont.) CREATE_COLLECTION_FROM_QUERY2 Procedure Parameters

Parameter	Description
p_generate_md5	Valid values include YES and NO. YES to specify if the message digest of the data of the collection member should be computed. Use this parameter to compare the MD5 of the collection member with another member or to see if that member has changed.
p_truncate_if_exists	If YES, then members of the collection will first be truncated if the collection exists and no error will be raised. If NO (or not YES), and the collection exists, an error will be raised.

Example

The following example shows how to use the `CREATE_COLLECTION_FROM_QUERY2` procedure to create a collection named `EMPLOYEE` and populate it with data from the `EMP` table. The first five columns (`mgr`, `sal`, `comm`, `deptno`, and `null`) are all numeric. Because `p_generate_md5` is 'NO', the MD5 checksum is not computed.

```
begin;
  APEX_COLLECTION.CREATE_COLLECTION_FROM_QUERY2 (
    p_collection_name => 'EMPLOYEE',
    p_query => 'select empno, sal, comm, deptno, null, hiredate, null, null,
null, null, ename, job, mgr from emp',
    p_generate_md5 => 'NO');
end;
```

6.32 CREATE_COLLECTION_FROM_QUERY_B Procedure

Use this procedure to create a collection from a supplied query using bulk operations. This method offers significantly faster performance than the `CREATE_COLLECTION_FROM_QUERY` method. The query is parsed as the application owner. If a collection exists with the same name for the current user in the same session for the current Application ID, an application error is raised.

This procedure uses bulk dynamic SQL to perform the fetch and insert operations into the named collection. Two limitations are imposed by this procedure:

1. The MD5 checksum for the member data is not computed.
2. No column value in query `p_query` can exceed 2,000 bytes. If a row is encountered that has a column value of more than 2,000 bytes, an error is raised during execution. In Oracle Database 11g Release 2 (11.2.0.1) or later, this column limit is 4,000 bytes.

Syntax

```
APEX_COLLECTION.CREATE_COLLECTION_FROM_QUERY_B (
  p_collection_name  IN VARCHAR2,
  p_query            IN VARCHAR2,
  p_names           IN apex_application_global.vc_arr2,
  p_values          IN apex_application_global.vc_arr2,
```

```
p_max_row_count      IN NUMBER default null,
p_truncate_if_exists IN VARCHAR2 default 'NO');
```

Parameters

Table 6-11 CREATE_COLLECTION_FROM_QUERY_B Procedure Parameters

Parameter	Description
p_collection_name	The name of the collection. The maximum length is 255 characters. An error is returned if this collection exists with the specified name of the current user and in the same session.
p_query	Query to execute to populate the members of the collection. If p_query is numeric, it is assumed to be a DBMS_SQL cursor.
p_names	Array of bind variable names used in the query statement.
p_values	Array of bind variable values used in the bind variables in the query statement.
p_max_row_count	Maximum number of rows returned from the query in p_query which should be added to the collection.
p_truncate_if_exists	If YES, then members of the collection will first be truncated if the collection exists and no error will be raised. If NO (or not YES), and the collection exists, an error will be raised.

Example

The following example shows how to use the `CREATE_COLLECTION_FROM_QUERY_B` procedure to create a collection named `EMPLOYEES` and populate it with data from the `emp` table.

```
declare
  l_query varchar2(4000);
begin
  l_query := 'select empno, ename, job, sal from emp where deptno = :b1';
  APEX_COLLECTION.CREATE_COLLECTION_FROM_QUERY_B (
    p_collection_name => 'EMPLOYEES',
    p_query => l_query,
    p_names => apex_util.string_to_table('b1'),
    p_values => apex_util.string_to_table('10'));
end;
```

6.33 CREATE_COLLECTION_FROM_QUERY_B Procedure (No bind version)

Use this procedure to create a collection from a supplied query using bulk operations. This method offers significantly faster performance than the `CREATE_COLLECTION_FROM_QUERY` method. The query is parsed as the application owner. If a collection exists with the same name for the current user in the same session for the current Application ID, an application error is raised.

This procedure uses bulk dynamic SQL to perform the fetch and insert operations into the named collection. Two limitations are imposed by this procedure:

1. The MD5 checksum for the member data is not computed.

2. No column value in query `p_query` can exceed 2,000 bytes. If a row is encountered that has a column value of more than 2,000 bytes, an error is raised during execution. In Oracle Database 11g Release 2 (11.2.0.1) or later, this column limit is 4,000 bytes.

Syntax

```
APEX_COLLECTION.CREATE_COLLECTION_FROM_QUERY_B
(
  p_collection_name IN VARCHAR2,
  p_query IN VARCHAR2,
  p_max_row_count IN NUMBER DEFAULT null);
```

Parameters

Table 6-12 CREATE_COLLECTION_FROM_QUERY_B Procedure (No bind version) Parameters

Parameter	Description
<code>p_collection_name</code>	The name of the collection. The maximum length is 255 characters. An error is returned if this collection exists with the specified name of the current user and in the same session.
<code>p_query</code>	Query to execute to populate the members of the collection. If <code>p_query</code> is numeric, it is assumed to be a <code>DBMS_SQL</code> cursor.
<code>p_max_row_count</code>	Maximum number of rows returned from the query in <code>p_query</code> which should be added to the collection.

Example

The following example shows how to use the `CREATE_COLLECTION_FROM_QUERY_B` procedure to create a collection named `EMPLOYEES` and populate it with data from the `emp` table.

```
declare
  l_query varchar2(4000);
begin
  l_query := 'select empno, ename, job, sal from emp';
  APEX_COLLECTION.CREATE_COLLECTION_FROM_QUERY_B
  (
    p_collection_name => 'EMPLOYEES',
    p_query => l_query );
end;
```

6.34 CREATE_COLLECTION_FROM_QUERYB2 Procedure

Use this procedure to create a collection from a supplied query using bulk operations. This method offers significantly faster performance than the `CREATE_COLLECTION_FROM_QUERY_2` method. The query is parsed as the application owner. If a collection exists with the same name for the current user in the same session for the current Application ID, an application error is raised. It is identical to the `CREATE_COLLECTION_FROM_QUERY_B`, however, the first five columns of the `SELECT` clause

must be numeric and the next five columns must be date. After the date columns, there can be up to 50 character columns in the `SELECT` clause

This procedure uses bulk dynamic SQL to perform the fetch and insert operations into the named collection. Two limitations are imposed by this procedure:

1. The MD5 checksum for the member data is not computed.
2. No column value in query `p_query` can exceed 2,000 bytes. If a row is encountered that has a column value of more than 2,000 bytes, an error is raised during execution. In Oracle Database 11g Release 2 (11.2.0.1) or later, this column limit is 4,000 bytes.

Syntax

```
APEX_COLLECTION.CREATE_COLLECTION_FROM_QUERYB2 (
  p_collection_name  IN VARCHAR2,
  p_query            IN VARCHAR2,
  p_names           IN apex_application_global.vc_arr2,
  p_values          IN apex_application_global.vc_arr2,
  p_max_row_count   IN NUMBER default null,
  p_truncate_if_exists IN VARCHAR2 default 'NO');
```

Parameters

Table 6-13 CREATE_COLLECTION_FROM_QUERYB2 Procedure Parameters

Parameter	Description
<code>p_collection_name</code>	The name of the collection. The maximum length is 255 characters. An error is returned if this collection exists with the specified name of the current user and in the same session.
<code>p_query</code>	Query to execute to populate the members of the collection. If <code>p_query</code> is numeric, it is assumed to be a <code>DBMS_SQL</code> cursor.
<code>p_names</code>	Array of bind variable names used in the query statement.
<code>p_values</code>	Array of bind variable values used in the bind variables in the query statement.
<code>p_max_row_count</code>	Maximum number of rows returned from the query in <code>p_query</code> which should be added to the collection.
<code>p_truncate_if_exists</code>	If <code>YES</code> , then members of the collection will first be truncated if the collection exists and no error will be raised. If <code>NO</code> (or not <code>YES</code>), and the collection exists, an error will be raised.

Example

The following example shows how to use the `CREATE_COLLECTION_FROM_QUERYB2` procedure to create a collection named `EMPLOYEES` and populate it with data from the `EMP` table. The first five columns (`mgr`, `sal`, `comm`, `deptno`, and `null`) are all numeric and the next five are all date.

```
declare
  l_query varchar2(4000);
begin
  l_query := 'select empno, sal, comm, deptno, null, hiredate, null,
null, null, null, ename, job, mgr from emp where deptno = :b1';
  APEX_COLLECTION.CREATE_COLLECTION_FROM_QUERYB2 (
    p_collection_name => 'EMPLOYEES',
```

```

p_query => l_query,
p_names => apex_util.string_to_table('b1'),
p_values => apex_util.string_to_table('10');
End;
```

6.35 CREATE_COLLECTION_FROM_QUERYB2 Procedure (No bind version)

Use this procedure to create a collection from a supplied query using bulk operations. This method offers significantly faster performance than the `CREATE_COLLECTION_FROM_QUERY_2` method. The query is parsed as the application owner. If a collection exists with the same name for the current user in the same session for the current Application ID, an application error is raised. It is identical to the `CREATE_COLLECTION_FROM_QUERY_B`, however, the first five columns of the `SELECT` clause must be numeric and the next five columns must be date. After the date columns, there can be up to 50 character columns in the `SELECT` clause

This procedure uses bulk dynamic SQL to perform the fetch and insert operations into the named collection. Two limitations are imposed by this procedure:

1. The MD5 checksum for the member data is not computed.
2. No column value in query `p_query` can exceed 2,000 bytes. If a row is encountered that has a column value of more than 2,000 bytes, an error is raised during execution. In Oracle Database 11g Release 2 (11.2.0.1) or later, this column limit is 4,000 bytes.

Syntax

```

APEX_COLLECTION.CREATE_COLLECTION_FROM_QUERYB2
(
  p_collection_name IN VARCHAR2,
  p_query IN VARCHAR2,
  p_max_row_count IN NUMBER DEFAULT);
```

Parameters

Table 6-14 CREATE_COLLECTION_FROM_QUERYB2 Procedure (No bind version) Parameters

Parameter	Description
<code>p_collection_name</code>	The name of the collection. The maximum length is 255 characters. An error is returned if this collection exists with the specified name of the current user and in the same session.
<code>p_query</code>	Query to execute to populate the members of the collection. If <code>p_query</code> is numeric, it is assumed to be a <code>DBMS_SQL</code> cursor.
<code>p_max_row_count</code>	Maximum number of rows returned from the query in <code>p_query</code> which should be added to the collection.

Example

The following example shows how to use the `CREATE_COLLECTION_FROM_QUERYB2` procedure to create a collection named `EMPLOYEES` and populate it with data from the

EMP table. The first five columns (mgr, sal, comm, deptno, and null) are all numeric and the next five are all date. Because p_generate_md5 is 'NO', the MD5 checksum is not computed.

```
declare
  l_query varchar2(4000);
Begin
  l_query := 'select empno, sal, comm, deptno, null, hiredate, null,
null, null, null, ename, job, mgr from emp where deptno = 10';
  APEX_COLLECTION.CREATE_COLLECTION_FROM_QUERYB2
  (
    p_collection_name => 'EMPLOYEES',
    p_query => l_query,
  );
End;
```

6.36 DELETE_ALL_COLLECTIONS Procedure

Use this procedure to delete all collections that belong to the current user in the current Application Express session for the current Application ID.

Syntax

```
APEX_COLLECTION.DELETE_ALL_COLLECTIONS;
```

Parameters

None.

Example

This example shows how to use the `DELETE_ALL_COLLECTIONS` procedure to remove all collections that belong to the current user in the current session and Application ID.

```
Begin
  APEX_COLLECTION.DELETE_ALL_COLLECTIONS;
End;
```

6.37 DELETE_ALL_COLLECTIONS_SESSION Procedure

Use this procedure to delete all collections that belong to the current user in the current Application Express session regardless of the Application ID.

Syntax

```
APEX_COLLECTION.DELETE_ALL_COLLECTIONS_SESSION;
```

Parameters

None.

Example

This example shows how to use the `DELETE_ALL_COLLECTIONS_SESSION` procedure to remove all collections that belong to the current user in the current session regardless of Application ID.

```
Begin
  APEX_COLLECTION.DELETE_ALL_COLLECTIONS_SESSION;
End;
```

6.38 DELETE_COLLECTION Procedure

Use this procedure to delete a named collection. All members that belong to the collection are removed and the named collection is dropped. If the named collection does not exist for the same user in the current session for the current Application ID, an application error is raised.

Syntax

```
APEX_COLLECTION.DELETE_COLLECTION (
  p_collection_name IN VARCHAR2);
```

Parameters

Table 6-15 DELETE_COLLECTION Procedure Parameters

Parameter	Description
p_collection_name	The name of the collection to remove all members from and drop. An error is returned if this collection does not exist with the specified name of the current user and in the same session.

Example

This example shows how to use the DELETE_COLLECTION procedure to remove the 'EMPLOYEE' collection.

```
Begin
  APEX_COLLECTION.DELETE_COLLECTION(
    p_collection_name => 'EMPLOYEE');
End;
```

6.39 DELETE_MEMBER Procedure

Use this procedure to delete a specified member from a given named collection. If the named collection does not exist for the same user in the current session for the current Application ID, an application error is raised.

Syntax

```
APEX_COLLECTION.DELETE_MEMBER (
  p_collection_name IN VARCHAR2,
  p_seq IN VARCHAR2);
```


Parameters

Table 6-16 DELETE_MEMBER Parameters

Parameter	Description
p_collection_name	The name of the collection to delete the specified member from. The maximum length is 255 characters. Collection names are not case sensitive and are converted to upper case. An error is returned if this collection does not exist for the current user in the same session.
p_seq	This is the sequence ID of the collection member to be deleted.

Example

This example shows how to use the `DELETE_MEMBER` procedure to remove the member with a sequence ID of '2' from the collection named `EMPLOYEES`.

```
Begin
  APEX_COLLECTION.DELETE_MEMBER(
    p_collection_name => 'EMPLOYEES',
    p_seq => '2');
End;
```

6.40 DELETE_MEMBERS Procedure

Use this procedure to delete all members from a given named collection where the attribute specified by the attribute number equals the supplied value. If the named collection does not exist for the same user in the current session for the current Application ID, an application error is raised. If the attribute number specified is invalid or outside the range of 1 to 50, an error is raised.

If the supplied attribute value is null, then all members of the named collection are deleted where the attribute, specified by `p_attr_number`, is null.

Syntax

```
APEX_COLLECTION.DELETE_MEMBERS (
  p_collection_name IN VARCHAR2,
  p_attr_number IN VARCHAR2,
  p_attr_value IN VARCHAR2);
```

Parameters

Table 6-17 DELETE_MEMBERS Parameters

Parameter	Description
p_collection_name	The name of the collection to delete the specified members from. The maximum length is 255 characters. Collection names are not case sensitive and are converted to upper case. An error is returned if this collection does not exist for the current user in the same session.

Table 6-17 (Cont.) DELETE_MEMBERS Parameters

Parameter	Description
p_attr_number	Attribute number of the member attribute used to match for the specified attribute value for deletion. Valid values are 1 through 50 and null.
p_attr_value	Attribute value of the member attribute used to match for deletion. Maximum length can be 4,000 bytes. The attribute value is truncated to 4,000 bytes if greater than this amount.

Example

The following example deletes all members of the collection named 'GROCERIES' where the 5th character attribute is equal to 'APPLE'.

```

Begin
  apex_collection.delete_members(
    p_collection_name => 'GROCERIES'
    p_attr_number     => 5,
    p_attr_value      => 'APPLE' );
  Commit;
End;
```

6.41 GET_MEMBER_MD5 Function

Use this function to compute and return the message digest of the attributes for the member specified by the sequence ID. This computation of message digest is equal to the computation performed natively by collections. Thus, the result of this function could be compared to the MD5_ORIGINAL column of the view apex_collections.

If a collection does not exist with the specified name for the current user in the same session and for the current Application ID, an application error is raised. If the member specified by sequence ID p_seq does not exist, an application error is raised.

Syntax

```

APEX_COLLECTION.GET_MEMBER_MD5 (
  p_collection_name IN VARCHAR2,
  p_seq IN NUMBER)
RETURN VARCHAR2;
```

Parameters**Table 6-18 GET_MEMBER_MD5 Parameters**

Parameter	Description
p_collection_name	The name of the collection to add this array of members to. An error is returned if this collection does not exist with the specified name of the current user and in the same session.
p_seq	Sequence ID of the collection member.

Example

The following example computes the MD5 for the 5th member of the GROCERIES collection.

```

declare
    l_md5 varchar2(4000);
begin
    l_md5 := apex_collection.get_member_md5(
        p_collection_name => 'GROCERIES'
        p_seq              => 10 );
end;
```

6.42 MERGE_MEMBERS Procedure

Use this procedure to merge members of the given named collection with the values passed in the arrays. If the named collection does not exist one is created. If a p_init_query is provided, the collection is created from the supplied SQL query. If the named collection exists, the following occurs:

1. Rows in the collection and not in the arrays are deleted.
2. Rows in the collections and in the arrays are updated.
3. Rows in the arrays and not in the collection are inserted.

The count of elements in the p_c001 PL/SQL table is used as the total number of items across all PL/SQL tables. For example, if p_c001.count is 2 and p_c002.count is 10, only 2 members are merged. If p_c001 is null an application error is raised.

Syntax

```

APEX_COLLECTION.MERGE_MEMBERS (
    p_collection_name IN VARCHAR2,
    p_seq             IN APEX_APPLICATION_GLOBAL.VC_ARR2 DEFAULT empty_vc_arr,
    p_c001           IN APEX_APPLICATION_GLOBAL.VC_ARR2 DEFAULT empty_vc_arr,
    p_c002           IN APEX_APPLICATION_GLOBAL.VC_ARR2 DEFAULT empty_vc_arr,
    p_c003           IN APEX_APPLICATION_GLOBAL.VC_ARR2 DEFAULT empty_vc_arr,
    ...
    p_c050           IN APEX_APPLICATION_GLOBAL.VC_ARR2 DEFAULT empty_vc_arr,
    p_null_index     IN NUMBER DEFAULT 1,
    p_null_value     IN VARCHAR2 DEFAULT null,
    p_init_query     IN VARCHAR2 DEFAULT null);
```

Parameters



Note:

Any character attribute exceeding 4,000 characters is truncated to 4,000 characters. Also, the number of members added is based on the number of elements in the first array.

Table 6-19 MERGE_MEMBERS Procedure Parameters

Parameter	Description
p_collection_name	The name of the collection. Maximum length is 255 bytes. Collection names are not case sensitive and are converted to upper case.
p_c001 through p_c050	Array of attribute values to be merged. Maximum length is 4,000 bytes. Any character attribute exceeding 4,000 characters is truncated to 4,000 characters. The count of the p_c001 array is used across all arrays. If no values are provided then no actions are performed.
p_c0xx	Attribute of NN attributes values to be merged. Maximum length can be 4,000 bytes. The attribute value is truncated to 4,000 bytes if greater than this amount.
p_seq	Identifies the sequence number of the collection to be merged.
p_null_index	That is if the element identified by this value is null, then treat this row as a null row. For example, if p_null_index is 3, then p_c003 is treated as a null row. In other words, tell the merge function to ignore this row. This results in the null rows being removed from the collection. The null index works with the null value. If the value of the p_cXXX argument is equal to the p_null_value then the row is treated as null.
p_null_value	Used with the p_null_index argument. Identifies the null value. If used, this value must not be null. A typical value for this argument is "0"
p_init_query	If the collection does not exist, the collection is created using this query.

Example

The following example creates a collection on the table of employees, and then merges the contents of the local arrays with the collection, updating the job of two employees.

```

DECLARE
    l_seq  APEX_APPLICATION_GLOBAL.VC_ARR2;
    l_c001 APEX_APPLICATION_GLOBAL.VC_ARR2;
    l_c002 APEX_APPLICATION_GLOBAL.VC_ARR2;
    l_c003 APEX_APPLICATION_GLOBAL.VC_ARR2;
BEGIN
    l_seq(1) := 1;
    l_c001(1) := 7369;
    l_c002(1) := 'SMITH';
    l_c003(1) := 'MANAGER';
    l_seq(2) := 2;
    l_c001(2) := 7499;
    l_c002(2) := 'ALLEN';
    l_c003(2) := 'CLERK';

    APEX_COLLECTION.MERGE_MEMBERS(
        p_collection_name => 'EMPLOYEES',
        p_seq => l_seq,
        p_c001 => l_c001,
        p_c002 => l_c002,
        p_c003 => l_c003,

```

```

        p_init_query => 'select empno, ename, job from emp order by empno');
END;
```

6.43 MOVE_MEMBER_DOWN Procedure

Use this procedure to adjust the sequence ID of specified member in the given named collection down by one (subtract one), swapping sequence ID with the one it is replacing. For example, 3 becomes 2 and 2 becomes 3. If a collection does not exist with the specified name for the current user in the same session and for the current Application ID, an application error is raised. If the member specified by sequence ID `p_seq` does not exist, an application error is raised. If the member specified by sequence ID `p_seq` is the lowest sequence in the collection, an application error is NOT returned.

Syntax

```

APEX_COLLECTION.MOVE_MEMBER_DOWN (
    p_collection_name IN VARCHAR2,
    p_seq IN NUMBER);
```

Parameters

Table 6-20 MOVE_MEMBER_DOWN Parameters

Parameter	Description
<code>p_collection_name</code>	The name of the collection. Maximum length is 255 bytes. Collection names are not case sensitive and are converted to upper case. An error is returned if this collection does not exist with the specified name of the current user in the same session.
<code>p_seq</code>	Identifies the sequence number of the collection member to be moved down by one.

Example

This example shows how to a member of the `EMPLOYEES` collection down one position. After executing this example, sequence ID '5' becomes sequence ID '4' and sequence ID '4' becomes sequence ID '5'.

```

BEGIN;
    APEX_COLLECTION.MOVE_MEMBER_DOWN(
        p_collection_name => 'EMPLOYEES',
        p_seq => '5' );
END;
```

6.44 MOVE_MEMBER_UP Procedure

Use this procedure to adjust the sequence ID of specified member in the given named collection up by one (add one), swapping sequence ID with the one it is replacing. For example, 2 becomes 3 and 3 becomes 2. If a collection does not exist with the specified name for the current user in the same session and for the current Application ID, an application error is raised. If the member specified by sequence ID `p_seq` does not exist, an application error is raised. If the member specified by sequence ID `p_seq` is the highest sequence in the collection, an application error is not returned.

Syntax

```
APEX_COLLECTION.MOVE_MEMBER_UP (
    p_collection_name IN VARCHAR2,
    p_seq IN NUMBER);
```

Parameters**Table 6-21 MOVE_MEMBER_UP Parameters**

Parameter	Description
p_collection_name	The name of the collection. Maximum length is 255 bytes. Collection names are not case sensitive and are converted to upper case. An error is returned if this collection does not exist with the specified name of the current user in the same session.
p_seq	Identifies the sequence number of the collection member to be moved up by one.

Example

This example shows how to a member of the `EMPLOYEES` collection down one position. After executing this example, sequence ID '5' becomes sequence ID '6' and sequence ID '6' becomes sequence ID '5'.

```
BEGIN;
    APEX_COLLECTION.MOVE_MEMBER_UP(
        p_collection_name => 'EMPLOYEES',
        p_seq => '5' );
END;
```

6.45 RESEQUENCE_COLLECTION Procedure

For a named collection, use this procedure to update the `seq_id` value of each member so that no gaps exist in the sequencing. For example, a collection with the following set of sequence IDs (1,2,3,5,8,9) becomes (1,2,3,4,5,6). If a collection does not exist with the specified name for the current user in the same session and for the current Application ID, an application error is raised.

Syntax

```
APEX_COLLECTION.RESEQUENCE_COLLECTION (
    p_collection_name IN VARCHAR2);
```

Parameters**Table 6-22 RESEQUENCE_COLLECTION Parameters**

Parameter	Description
p_collection_name	The name of the collection to resequence. An error is returned if this collection does not exist with the specified name of the current user and in the same session.

Example

This example shows how to resequence the `DEPARTMENTS` collection to remove gaps in the sequence IDs.

```
BEGIN;  
  APEX_COLLECTION.RESEQUENCE_COLLECTION (  
    p_collection_name => 'DEPARTMENTS');  
END;
```

6.46 RESET_COLLECTION_CHANGED Procedure

Use this procedure to reset the collection changed flag (mark as not changed) for a given collection. If a collection does not exist with the specified name for the current user in the same session and for the current Application ID, an application error is raised.

Syntax

```
APEX_COLLECTION.RESET_COLLECTION_CHANGED (  
  p_collection_name IN VARCHAR2);
```

Parameters

Table 6-23 RESET_COLLECTION_CHANGED Parameters

Parameter	Description
<code>p_collection_name</code>	The name of the collection to reset the collection changed flag. An error is returned if this collection does not exist with the specified name of the current user and in the same session.

Example

This example shows how to reset the changed flag for the `DEPARTMENTS` collection.

```
BEGIN;  
  APEX_COLLECTION.RESET_COLLECTION_CHANGED (  
    p_collection_name => 'DEPARTMENTS');  
END;
```



See Also:

["RESET_COLLECTION_CHANGED_ALL Procedure \(page 6-30\)"](#)

6.47 RESET_COLLECTION_CHANGED_ALL Procedure

Use this procedure to reset the collection changed flag (mark as not changed) for all collections in the user's current session.

Syntax

```
APEX_COLLECTION.RESET_COLLECTION_CHANGED_ALL; (
```

Parameters

None.

Example

This example shows how to reset the changed flag for all collections in the user's current session.

```
BEGIN;  
  APEX_COLLECTION.RESET_COLLECTION_CHANGED_ALL;  
END;
```

6.48 SORT_MEMBERS Procedure

Use this procedure to reorder the members of a given collection by the column number specified by `p_sort_on_column_number`. This sorts the collection by a particular column/attribute in the collection and reassigns the sequence IDs of each number such that no gaps exist. If a collection does not exist with the specified name for the current user in the same session and for the current Application ID, an application error is raised.

Syntax

```
APEX_COLLECTION.SORT_MEMBERS (  
  p_collection_name IN VARCHAR2,  
  p_sort_on_column_number IN NUMBER);
```

Parameters

Table 6-24 SORT_MEMBERS Parameters

Parameter	Description
<code>p_collection_name</code>	The name of the collection to sort. An error is returned if this collection does not exist with the specified name of the current user and in the same session.
<code>p_sort_on_column_number</code>	The column number used to sort the collection. The domain of possible values is 1 to 50.

Example

In this example, column 2 of the `DEPARTMENTS` collection is the department location. The collection is reorder according to the department location.

```
BEGIN;  
  APEX_COLLECTION.SORT_MEMBERS (  
    p_collection_name => 'DEPARTMENTS',  
    p_sort_on_column_number => '2';  
END;
```


6.49 TRUNCATE_COLLECTION Procedure

Use this procedure to remove all members from a named collection. If a collection does not exist with the specified name for the current user in the same session and for the current Application ID, an application error is raised.

Syntax

```
APEX_COLLECTION.TRUNCATE_COLLECTION (  
    p_collection_name IN VARCHAR2);
```

Parameters

Table 6-25 TRUNCATE_COLLECTION Parameters

Parameter	Description
p_collection_name	The name of the collection to truncate. An error is returned if this collection does not exist with the specified name of the current user and in the same session.

Example

This example shows how to remove all members from the DEPARTMENTS collection.

```
BEGIN;  
    APEX_COLLECTION.TRUNCATE_COLLECTION(  
        p_collection_name => 'DEPARTMENTS');  
END;
```

6.50 UPDATE_MEMBER Procedure

Use this procedure to update the specified member in the given named collection. If a collection does not exist with the specified name for the current user in the same session and for the current Application ID, an application error is raised. If the member specified by sequence ID p_seq does not exist, an application error is raised.



Note:

Using this procedure sets the columns identified and nullifies any columns not identified. To update specific columns, without affecting the values of other columns, use “UPDATE_MEMBER_ATTRIBUTE Procedure Signature 1”.

Syntax

```
APEX_COLLECTION.UPDATE_MEMBER (  
    p_collection_name IN VARCHAR2,  
    p_seq IN VARCHAR2 DEFAULT NULL,  
    p_c001 IN VARCHAR2 DEFAULT NULL,  
    p_c002 IN VARCHAR2 DEFAULT NULL,
```

```

p_c003 IN VARCHAR2 DEFAULT NULL,
...
p_c050 IN VARCHAR DEFAULT NULL,
p_n001 IN NUMBER DEFAULT NULL,
p_n002 IN NUMBER DEFAULT NULL,
p_n003 IN NUMBER DEFAULT NULL,
p_n004 IN NUMBER DEFAULT NULL,
p_n005 IN NUMBER DEFAULT NULL,
p_d001 IN DATE DEFAULT NULL,
p_d002 IN DATE DEFAULT NULL,
p_d003 IN DATE DEFAULT NULL,
p_d004 IN DATE DEFAULT NULL,
p_d005 IN DATE DEFAULT NULL,
p_clob001 IN CLOB DEFAULT empty_clob(),
p_blob001 IN BLOB DEFAULT empty_blob(),
p_xmltype001 IN XMLTYPE DEFAULT NULL);

```

Parameters

Note:

Any character attribute exceeding 4,000 characters is truncated to 4,000 characters. Also, the number of members added is based on the number of elements in the first array.

Table 6-26 UPDATE_MEMBER Parameters

Parameter	Description
p_collection_name	The name of the collection to update. Maximum length is 255 bytes. Collection names are not case sensitive and are converted to upper case.
p_c001 through p_c050	Attribute value of the member to be added. Maximum length is 4,000 bytes. Any character attribute exceeding 4,000 characters is truncated to 4,000 characters.
p_n001 through p_n005	Attribute value of the numeric attributes to be added or updated.
p_d001 through p_d005	Attribute value of the date attributes to be added or updated.
p_clob001	Use p_clob001 for collection member attributes that exceed 4,000 characters.
p_blob001	Use p_blob001 for binary collection member attributes.
p_xmltype001	Use p_xmltype001 to store well-formed XML.

Example

Update the second member of the collection named 'Departments', updating the first member attribute to 'Engineering' and the second member attribute to 'Sales'.

```

BEGIN;
  APEX_COLLECTION.UPDATE_MEMBER (
    p_collection_name => 'Departments',
    p_seq => '2',
    p_c001 => 'Engineering',
    p_c002 => 'Sales');

```

6.51 UPDATE_MEMBERS Procedure

Use this procedure to update the array of members for the given named collection. If a collection does not exist with the specified name for the current user in the same session and for the current Application ID, an application error is raised. The count of elements in the p_seq PL/SQL table is used as the total number of items across all PL/SQL tables. That is, if p_seq.count = 2 and p_c001.count = 10, only 2 members are updated. If p_seq is null, an application error is raised. If the member specified by sequence ID p_seq does not exist, an application error is raised.

Syntax

```
APEX_COLLECTION.UPDATE_MEMBERS (
    p_collection_name IN VARCHAR2,
    p_seq IN apex_application_global.VC_ARR2 DEFAULT empty_vc_arr,
    p_c001 IN apex_application_global.VC_ARR2 DEFAULT empty_vc_arr,
    p_c002 IN apex_application_global.VC_ARR2 DEFAULT empty_vc_arr,
    p_c003 IN apex_application_global.VC_ARR2 DEFAULT empty_vc_arr,
    ...
    p_c050 IN apex_application_global.VC_ARR2 DEFAULT empty_vc_arr,
    p_n001 IN apex_application_global.N_ARR DEFAULT empty_n_arr,
    p_n002 IN apex_application_global.N_ARR DEFAULT empty_n_arr,
    p_n003 IN apex_application_global.N_ARR DEFAULT empty_n_arr,
    p_n004 IN apex_application_global.N_ARR DEFAULT empty_n_arr,
    p_n005 IN apex_application_global.N_ARR DEFAULT empty_n_arr,
    p_d001 IN apex_application_global.D_ARR DEFAULT empty_d_arr,
    p_d002 IN apex_application_global.D_ARR DEFAULT empty_d_arr,
    p_d003 IN apex_application_global.D_ARR DEFAULT empty_d_arr,
    p_d004 IN apex_application_global.D_ARR DEFAULT empty_d_arr,
    p_d005 IN apex_application_global.D_ARR DEFAULT empty_d_arr)
```

Parameters



Note:

Any character attribute exceeding 4,000 characters is truncated to 4,000 characters. Also, the number of members added is based on the number of elements in the first array.

Table 6-27 UPDATE_MEMBERS Parameters

Parameter	Description
p_collection_name	The name of the collection to update. Maximum length is 255 bytes. Collection names are not case sensitive and are converted to upper case.
p_seq	Array of member sequence IDs to be updated. The count of the p_seq array is used across all arrays.
p_c001 through p_c050	Array of attribute values to be updated.
p_n001 through p_n005	Attribute value of numeric
p_d001 through p_d005	Array of date attribute values to be updated.

Example

```

DECLARE
    l_seq apex_application_global.vc_arr2;
    l_carr apex_application_global.vc_arr2;
    l_narr apex_application_global.n_arr;
    l_darr apex_application_global.d_arr;
BEGIN
    l_seq(1) := 10;
    l_seq(2) := 15;
    l_carr(1) := 'Apples';
    l_carr(2) := 'Grapes';
    l_narr(1) := 100;
    l_narr(2) := 150;
    l_darr(1) := sysdate;
    l_darr(2) := sysdate;

    APEX_COLLECTION.UPDATE_MEMBERS (
        p_collection_name => 'Groceries',
        p_seq => l_seq,
        p_c001 => l_carr,
        p_n001 => l_narr,
        p_d001 => l_darr);
END;
```

6.52 UPDATE_MEMBER_ATTRIBUTE Procedure Signature 1

Update the specified member attribute in the given named collection. If a collection does not exist with the specified name for the current user in the same session for the current Application ID, an application error is raised. If the member specified by sequence ID `p_seq` does not exist, an application error is raised. If the attribute number specified is invalid or outside the range 1-50, an error is raised. Any attribute value exceeding 4,000 bytes are truncated to 4,000 bytes.

Syntax

```

APEX_COLLECTION.UPDATE_MEMBER_ATTRIBUTE (
    p_collection_name IN VARCHAR2,
    p_seq IN NUMBER,
    p_attr_number IN NUMBER,
    p_attr_value IN VARCHAR2);
```

Parameters **Note:**

Any character attribute exceeding 4,000 characters is truncated to 4,000 characters. Also, the number of members added is based on the number of elements in the first array.

Table 6-28 UPDATE_MEMBER_ATTRIBUTE Signature 1 Parameters

Parameter	Description
p_collection_name	The name of the collection. Maximum length can be 255 bytes. Collection_names are case-insensitive, as the collection name is converted to upper case. An error is returned if this collection does not exist with the specified name of the current user and in the same session.
p_seq	Sequence ID of the collection member to be updated.
p_attr_number	Attribute number of the member attribute to be updated. Valid values are 1 through 50. Any number outside of this range is ignored.
p_attr_value	Attribute value of the member attribute to be updated.

Example

Update the second member of the collection named 'Departments', updating the first member attribute to 'Engineering' and the second member attribute to 'Sales'.

```
BEGIN
  APEX_COLLECTION.UPDATE_MEMBER_ATTRIBUTE (
    p_collection_name => 'Departments',
    p_seq => 2,
    p_attr_number => 1,
    p_attr_value => 'Engineering');
END;
```

6.53 UPDATE_MEMBER_ATTRIBUTE Procedure Signature 2

Update the specified CLOB member attribute in the given named collection. If a collection does not exist with the specified name for the current user in the same session for the current Application ID, an application error is raised. If the member specified by sequence ID p_seq does not exist, an application error is raised. If the attribute number specified is invalid or outside the valid range (currently only 1 for CLOB), an error is raised.

Syntax

```
APEX_COLLECTION.UPDATE_MEMBER_ATTRIBUTE (
  p_collection_name IN VARCHAR2,
  p_seq IN NUMBER,
  p_clob_number IN NUMBER,
  p_clob_value IN CLOB);
```

Parameters

Note:

Any character attribute exceeding 4,000 characters is truncated to 4,000 characters. Also, the number of members added is based on the number of elements in the first array.

Table 6-29 UPDATE_MEMBER_ATTRIBUTE Signature 2 Parameters

Parameter	Description
p_collection_name	The name of the collection. Maximum length can be 255 bytes. Collection_names are case-insensitive, as the collection name is converted to upper case. An error is returned if this collection does not exist with the specified name of the current user and in the same session.
p_seq	Sequence ID of the collection member to be updated.
p_clob_number	Attribute number of the CLOB member attribute to be updated. Valid value is 1. Any number outside of this range is ignored.
p_clob_value	Attribute value of the CLOB member attribute to be updated.

Example

The following example sets the first and only CLOB attribute of collection sequence number 2 in the collection named 'Departments' to a value of 'Engineering'.

```
BEGIN;
  APEX_COLLECTION.UPDATE_MEMBER_ATTRIBUTE (
    p_collection_name => 'Departments',
    p_seq => 2,
    p_clob_number => 1,
    p_clob_value => 'Engineering');
END;
```

6.54 UPDATE_MEMBER_ATTRIBUTE Procedure Signature 3

Update the specified BLOB member attribute in the given named collection. If a collection does not exist with the specified name for the current user in the same session for the current Application ID, an application error is raised. If the member specified by sequence ID p_seq does not exist, an application error is raised. If the attribute number specified is invalid or outside the valid range (currently only 1 for BLOB), an error is raised.

Syntax

```
APEX_COLLECTION.UPDATE_MEMBER_ATTRIBUTE (
  p_collection_name IN VARCHAR2,
  p_seq IN NUMBER,
```

```
p_blob_number IN NUMBER,
p_blob_value  IN BLOB);
```

Parameters



Note:

Any character attribute exceeding 4,000 characters is truncated to 4,000 characters. Also, the number of members added is based on the number of elements in the first array.

Table 6-30 UPDATE_MEMBER_ATTRIBUTE Signature 3 Parameters

Parameter	Description
p_collection_name	The name of the collection. Maximum length can be 255 bytes. Collection_names are case-insensitive, as the collection name is converted to upper case. An error is returned if this collection does not exist with the specified name of the current user and in the same session.
p_seq	Sequence ID of the collection member to be updated.
p_blob_number	Attribute number of the BLOB member attribute to be updated. Valid value is 1. Any number outside of this range is ignored.
p_blob_value	Attribute value of the BLOB member attribute to be updated.

Example

The following example sets the first and only BLOB attribute of collection sequence number 2 in the collection named 'Departments' to a value of the BLOB variable l_blob_content.

```
BEGIN
  APEX_COLLECTION.UPDATE_MEMBER_ATTRIBUTE (
    p_collection_name => 'Departments',
    p_seq => 2,
    p_blob_number => 1,
    p_blob_value => l_blob_content);
END;
```

6.55 UPDATE_MEMBER_ATTRIBUTE Procedure Signature 4

Update the specified XMLTYPE member attribute in the given named collection. If a collection does not exist with the specified name for the current user in the same session for the current Application ID, an application error is raised. If the member specified by sequence ID p_seq does not exist, an application error is raised. If the attribute number specified is invalid or outside the valid range (currently only 1 for XMLTYPE), an error is raised.

Syntax

```
APEX_COLLECTION.UPDATE_MEMBER_ATTRIBUTE (
  p_collection_name IN VARCHAR2,
  p_seq IN NUMBER,
  p_xmltype_number IN NUMBER,
  p_xmltype_value IN BLOB);
```

Parameters

Note:

Any character attribute exceeding 4,000 characters is truncated to 4,000 characters. Also, the number of members added is based on the number of elements in the first array.

Table 6-31 UPDATE_MEMBER_ATTRIBUTE Signature 4 Parameters

Parameter	Description
p_collection_name	The name of the collection. Maximum length can be 255 bytes. Collection_names are case-insensitive, as the collection name is converted to upper case. An error is returned if this collection does not exist with the specified name of the current user and in the same session.
p_seq	Sequence ID of the collection member to be updated.
p_xmltype_number	Attribute number of the XMLTYPE member attribute to be updated. Valid value is 1. Any number outside of this range is ignored.
p_xmltype_value	Attribute value of the XMLTYPE member attribute to be updated.

Example

The following example sets the first and only XML attribute of collection sequence number 2 in the collection named 'Departments' to a value of the XMLType variable l_xmltype_content.

```
BEGIN
  APEX_COLLECTION.UPDATE_MEMBER_ATTRIBUTE (
    p_collection_name => 'Departments',
    p_seq => 2,
    p_xmltype_number => 1,
    p_xmltype_value => l_xmltype_content);
END;
```

6.56 UPDATE_MEMBER_ATTRIBUTE Procedure Signature 5

Update the specified NUMBER member attribute in the given named collection. If a collection does not exist with the specified name for the current user in the same

session for the current Application ID, an application error is raised. If the member specified by sequence ID `p_seq` does not exist, an application error is raised. If the attribute number specified is invalid or outside the valid range (currently only 1 through 5 for NUMBER), an error is raised.

Syntax

```
APEX_COLLECTION.UPDATE_MEMBER_ATTRIBUTE (  
    p_collection_name IN VARCHAR2,  
    p_seq IN NUMBER,  
    p_attr_number IN NUMBER,  
    p_number_value IN NUMBER);
```

Parameters



Note:

Any character attribute exceeding 4,000 characters is truncated to 4,000 characters. Also, the number of members added is based on the number of elements in the first array.

Table 6-32 UPDATE_MEMBER_ATTRIBUTE Signature 5 Parameters

Parameter	Description
<code>p_collection_name</code>	The name of the collection. Maximum length can be 255 bytes. Collection_names are case-insensitive, as the collection name is converted to upper case. An error is returned if this collection does not exist with the specified name of the current user and in the same session.
<code>p_seq</code>	Sequence ID of the collection member to be updated.
<code>p_attr_number</code>	Attribute number of the NUMBER member attribute to be updated. Valid value is 1 through 5. Any number outside of this range is ignored.
<code>p_number_value</code>	Attribute value of the NUMBER member attribute to be updated.

Example

The following example sets the first numeric attribute of collection sequence number 2 in the collection named 'Departments' to a value of 3000.

```
BEGIN  
    APEX_COLLECTION.UPDATE_MEMBER_ATTRIBUTE (  
        p_collection_name => 'Departments',  
        p_seq => 2,  
        p_attr_number => 1,  
        p_number_value => 3000);  
END;
```

6.57 UPDATE_MEMBER_ATTRIBUTE Procedure Signature 6

Update the specified DATE member attribute in the given named collection. If a collection does not exist with the specified name for the current user in the same session for the current Application ID, an application error is raised. If the member specified by sequence ID `p_seq` does not exist, an application error is raised. If the attribute number specified is invalid or outside the valid range (currently only 1 through 5 for DATE), an error is raised.

Syntax

```
APEX_COLLECTION.UPDATE_MEMBER_ATTRIBUTE (
    p_collection_name IN VARCHAR2,
    p_seq IN NUMBER,
    p_attr_number IN NUMBER,
    p_date_value IN DATE);
```

Parameters

 **Note:**

Any character attribute exceeding 4,000 characters is truncated to 4,000 characters. Also, the number of members added is based on the number of elements in the first array.

Table 6-33 UPDATE_MEMBER_ATTRIBUTE Signature 6 Parameters

Parameter	Description
<code>p_collection_name</code>	The name of the collection. Maximum length can be 255 bytes. Collection_names are case-insensitive, as the collection name is converted to upper case. An error is returned if this collection does not exist with the specified name of the current user and in the same session.
<code>p_seq</code>	Sequence ID of the collection member to be updated.
<code>p_attr_number</code>	Attribute number of the DATE member attribute to be updated. Valid value is 1 through 5. Any number outside of this range is ignored.
<code>p_date_value</code>	Attribute value of the DATE member attribute to be updated.

Example

Update the first attribute of the second collection member in collection named 'Departments', and set it to a value of 100.

```
BEGIN
    APEX_COLLECTION.UPDATE_MEMBER_ATTRIBUTE (
        p_collection_name => 'Departments',
        p_seq => 2,
        p_attr_number => 1,
```

```
        p_date_value => 100 );  
END;
```

7

APEX_APP_SETTING

The `APEX_APP_SETTING` package provides utilities you can use when programming in the Oracle Application Express environment related to application setting shared components. You can use the `APEX_APP_SETTING` package to get and set the value of application settings.

- [SET_VALUE Procedure](#) (page 7-1)
- [GET_VALUE Function](#) (page 7-1)

7.1 SET_VALUE Procedure

This procedure changes the application setting value in the current application.

Syntax

```
APEX_APP_SETTING.GET_VALUE(  
    p_name      in varchar2,  
    p_value     in varchar2 );
```

Parameters

Table 7-1 SET_VALUE Procedure Parameters

Parameters	Description
p_name	The case insensitive name of the application setting. An error raised if: <ul style="list-style-type: none">• Application Setting name does not exist.• If build option associated with application setting is disabled.
p_value	The value of the application setting. An error raised if: <ul style="list-style-type: none">• The value is set to required, but null value passed.• The valid values defined, but the value is not in one of the valid values.

Example

The following example shows how to use the `SET_VALUE` procedure to set the value of application setting `ACCESS_CONTROL_ENABLED`.

```
begin  
    APEX_APP_SETTING.SET_VALUE(  
        p_name => 'ACCESS_CONTROL_ENABLED',  
        p_value => 'Y' );  
end;
```

7.2 GET_VALUE Function

This function gets the application setting value in the current application.

Syntax

```
APEX_APP_SETTING.GET_VALUE(  
    p_name          in varchar2 ) return varchar2;
```

Parameters

Table 7-2 GET_VALUE Function Parameters

Parameters	Description
p_name	The case insensitive name of the application setting. An error raised if: <ul style="list-style-type: none">• Application Setting name does not exist.• If build option, associated with application setting is disabled.

Example

The following example shows how to use the `GET_VALUE` function to retrieve the value of application setting `ACCESS_CONTROL_ENABLED`.

```
declare  
    l_value varchar2(4000);  
begin  
    l_value := APEX_APP_SETTING.GET_VALUE( p_name => 'ACCESS_CONTROL_ENABLED' );  
end;
```

8

APEX_CSS

The `APEX_CSS` package provides utility functions for adding CSS styles to HTTP output. This package is usually used for plug-in development.

- [ADD Procedure](#) (page 8-1)
- [ADD_3RD_PARTY_LIBRARY_FILE Procedure](#) (page 8-1)
- [ADD_FILE Procedure](#) (page 8-2)

8.1 ADD Procedure

This procedure adds a CSS style snippet that is included inline in the HTML output. Use this procedure to add new CSS style declarations.

Syntax

```
APEX_CSS.ADD (  
    p_css          IN    VARCHAR2,  
    p_key          IN    VARCHAR2 DEFAULT NULL);
```

Parameters

Table 8-1 ADD Parameters

Parameter	Description
<code>p_css</code>	The CSS style snippet. For example, <code>#test {color:#fff}</code>
<code>p_key</code>	Identifier for the style snippet. If specified and a style snippet with the same name has already been added the new style snippet will be ignored.

Example

Adds an inline CSS definition for the class `autocomplete` into the HTML page. The key `autocomplete_widget` prevents the definition from being included another time if the `apex_css.add` is called another time.

```
apex_css.add (  
    p_css => '.autocomplete { color:#ffffff }',  
    p_key => 'autocomplete_widget' );
```

8.2 ADD_3RD_PARTY_LIBRARY_FILE Procedure

This procedure adds the link tag to load a 3rd party css file and also takes into account the specified Content Delivery Network for the application. Supported libraries include: `jQuery`, `jQueryUI`, `jQueryMobile`.

If a library has already been added, it is not added a second time.

Syntax

```
add_3rd_party_library_file (
  p_library in varchar2,
  p_file_name in varchar2,
  p_directory in varchar2 default null,
  p_version in varchar2 default null,
  p_media_query in varchar2 default null );
```

Parameters**Table 8-2 ADD_3RD_PARTY_LIBRARY_FILE Parameters**

Parameters	Description
p_library	Use one of the c_library_* constants
p_file_name	Specifies the file name without version, .min and .css
p_directory	Directory where the file p_file_name is located (optional)
p_version	If no value is provided then the same version Application Express ships is used (optional)
p_media_query	Value that is set as media query (optional)

Example

The following example loads the Cascading Style Sheet file of the Accordion component of the jQuery UI.

```
apex_css.add_3rd_party_library_file (
  p_library => apex_css.c_library_jquery_ui,
  p_file_name => 'jquery.ui.accordion' )
```

8.3 ADD_FILE Procedure

This procedure adds the link tag to load a CSS library. If a library has already been added, it will not be added a second time.

Syntax

```
APEX_CSS.ADD_FILE (
  p_name          IN  VARCHAR2,
  p_directory     IN  VARCHAR2 DEFAULT APEX.G_IMAGE_PREFIX||'css/',
  p_version       IN  VARCHAR2 DEFAULT NULL,
  p_skip_extension IN  BOOLEAN  DEFAULT FALSE,
  p_media_query   IN  VARCHAR2 DEFAULT NULL,
  p_ie_condition  IN  VARCHAR2 DEFAULT NULL);
```

Parameters**Table 8-3 ADD_FILE Parameters**

Parameter	Description
p_name	Name of the CSS file.

Table 8-3 (Cont.) ADD_FILE Parameters

Parameter	Description
<code>p_directory</code>	Begin of the URL where the CSS file should be read from. If you use this function for a plug-in you should set this parameter to <code>p_plugin.file_prefix</code> .
<code>p_version</code>	Identifier of the version of the CSS file. The version will be added to the CSS filename. In most cases you should use the default of NULL as the value.
<code>p_skip_extension</code>	The function automatically adds ".css" to the CSS filename. If this parameter is set to TRUE this will not be done.
<code>p_media_query</code>	Value set as media query.
<code>p_ie_condition</code>	Condition used as Internet Explorer condition.

Example

Adds the CSS file `jquery.autocomplete.css` in the directory specified by `p_plugin.image_prefix` to the HTML output of the page and makes sure that it will only be included once if `apex_css.add_file` is called multiple times with that name.

```
apex_css.add_file (  
    p_name => 'jquery.autocomplete',  
    p_directory => p_plugin.image_prefix );
```


9

APEX_CUSTOM_AUTH

You can use the `APEX_CUSTOM_AUTH` package to perform various operations related to authentication and session management.

- [APPLICATION_PAGE_ITEM_EXISTS Function](#) (page 9-1)
- [CURRENT_PAGE_IS_PUBLIC Function](#) (page 9-2)
- [DEFINE_USER_SESSION Procedure](#) (page 9-2)
- [GET_COOKIE_PROPS Procedure](#) (page 9-3)
- [GET_LDAP_PROPS Procedure](#) (page 9-4)
- [GET_NEXT_SESSION_ID Function](#) (page 9-5)
- [GET_SECURITY_GROUP_ID Function](#) (page 9-5)
- [GET_SESSION_ID Function](#) (page 9-6)
- [GET_SESSION_ID_FROM_COOKIE Function](#) (page 9-6)
- [GET_USER Function](#) (page 9-6)
- [GET_USERNAME Function](#) (page 9-7)
- [IS_SESSION_VALID Function](#) (page 9-7)
- [LOGIN Procedure](#) (page 9-7)
- [LOGOUT Procedure \[DEPRECATED\]](#) (page 9-8)
- [POST_LOGIN Procedure](#) (page 9-9)
- [SESSION_ID_EXISTS Function](#) (page 9-10)
- [SET_SESSION_ID Procedure](#) (page 9-10)
- [SET_SESSION_ID_TO_NEXT_VALUE Procedure](#) (page 9-11)
- [SET_USER Procedure](#) (page 9-11)

9.1 APPLICATION_PAGE_ITEM_EXISTS Function

This function checks for the existence of page-level item within the current page of an application. This function requires the parameter `p_item_name`. This function returns a Boolean value (TRUE or FALSE).

Syntax

```
APEX_CUSTOM_AUTH.APPLICATION_PAGE_ITEM_EXISTS(  
    p_item_name IN VARCHAR2)  
RETURN BOOLEAN;
```

Parameters

Table 9-1 APPLICATION_PAGE_ITEM_EXISTS Parameters

Parameter	Description
p_item_name	The name of the page-level item.

Example

The following example checks for the existence of a page-level item, `ITEM_NAME`, within the current page of the application.

```
DECLARE
    L_VAL BOOLEAN;
BEGIN
    L_VAL := APEX_CUSTOM_AUTH.APPLICATION_PAGE_ITEM_EXISTS(:ITEM_NAME);
    IF L_VAL THEN
        htp.p('Item Exists');
    ELSE
        htp.p('Does not Exist');
    END IF;
END;
```

9.2 CURRENT_PAGE_IS_PUBLIC Function

This function checks whether the current page's authentication attribute is set to **Page Is Public** and returns a Boolean value (TRUE or FALSE)

Syntax

```
APEX_CUSTOM_AUTH.CURRENT_PAGE_IS_PUBLIC
RETURN BOOLEAN;
```

Example

The following example checks whether the current page in an application is public.

```
DECLARE
    L_VAL BOOLEAN;
BEGIN
    L_VAL := APEX_CUSTOM_AUTH.CURRENT_PAGE_IS_PUBLIC;
    IF L_VAL THEN
        htp.p('Page is Public');
    ELSE
        htp.p('Page is not Public');
    END IF;
END;
```

9.3 DEFINE_USER_SESSION Procedure

This procedure combines the `SET_USER` and `SET_SESSION_ID` procedures to create one call.

Syntax

```
APEX_CUSTOM_AUTH.DEFINE_USER_SESSION(
    p_user          IN   VARCHAR2,
    p_session_id    IN   NUMBER);
```

Parameters**Table 9-2** DEFINE_USER_SESSION Parameters

Parameter	Description
p_user	Login name of the user.
p_session_id	The session ID.

Example

In the following example, a new session ID is generated and registered along with the current application user.

```
APEX_CUSTOM_AUTH.DEFINE_USER_SESSION (
    :APP_USER,
    APEX_CUSTOM_AUTH.GET_NEXT_SESSION_ID);
```

9.4 GET_COOKIE_PROPS Procedure

This procedure obtains the properties of the session cookie used in the current authentication scheme for the specified application. These properties can be viewed directly in the App Builder by viewing the authentication scheme cookie attributes.

Syntax

```
APEX_CUSTOM_AUTH.GET_COOKIE_PROPS(
    p_app_id          IN   NUMBER,
    p_cookie_name     OUT  VARCHAR2,
    p_cookie_path     OUT  VARCHAR2,
    p_cookie_domain   OUT  VARCHAR2
    p_secure          OUT  BOOLEAN);
```

Parameters**Table 9-3** GET_COOKIE_PROPS Parameters

Parameter	Description
p_app_id	An application ID in the current workspace.
p_cookie_name	The cookie name.
p_cookie_path	The cookie path.
p_cookie_domain	The cookie domain.
p_secure	Flag to set secure property of cookie.

Example

The following example retrieves the session cookie values used by the authentication scheme of the current application.

```

DECLARE
    l_cookie_name  varchar2(256);
    l_cookie_path  varchar2(256);
    l_cookie_domain varchar2(256);
    l_secure       boolean;
BEGIN
    APEX_CUSTOM_AUTH.GET_COOKIE_PROPS(
        p_app_id => 2918,
        p_cookie_name => l_cookie_name,
        p_cookie_path => l_cookie_path,
        p_cookie_domain => l_cookie_domain,
        p_secure => l_secure);
END;
```

9.5 GET_LDAP_PROPS Procedure

This procedure obtains the LDAP attributes of the current authentication scheme for the current application. These properties can be viewed directly in App Builder by viewing the authentication scheme attributes.

Syntax

```

APEX_CUSTOM_AUTH.GET_LDAP_PROPS(
    p_ldap_host          OUT VARCHAR2,
    p_ldap_port          OUT INTEGER,
    p_use_ssl            OUT VARCHAR2,
    p_use_exact_dn       OUT VARCHAR2,
    p_search_filter       OUT VARCHAR2,
    p_ldap_dn            OUT VARCHAR2,
    p_ldap_edit_function OUT VARCHAR2);
```

Parameters

Table 9-4 GET_LDAP_PROPS Parameters

Parameter	Description
p_ldap_host	LDAP host name.
p_ldap_port	LDAP port number.
p_use_ssl	Whether SSL is used.
p_use_exact_dn	Whether exact distinguished names are used.
p_search_filter	The search filter used if exact DN is not used.
p_ldap_dn	LDAP DN string.
p_ldap_edit_function	LDAP edit function name.

Example

The following example retrieves the LDAP attributes associated with the current application.

```
DECLARE
    l_ldap_host          VARCHAR2(256);
    l_ldap_port          INTEGER;
    l_use_ssl            VARCHAR2(1);
    l_use_exact_dn      VARCHAR2(1);
    l_search_filter      VARCHAR2(256);
    l_ldap_dn           VARCHAR2(256);
    l_ldap_edit_function VARCHAR2(256);
BEGIN
APEX_CUSTOM_AUTH.GET_LDAP_PROPS (
    p_ldap_host      => l_ldap_host,
    p_ldap_port      => l_ldap_port,
    p_use_ssl        => l_use_ssl,
    p_use_exact_dn   => l_use_exact_dn,
    p_search_filter  => l_search_filter,
    p_ldap_dn       => l_ldap_dn,
    p_ldap_edit_function => l_ldap_edit_function);
END;
```

9.6 GET_NEXT_SESSION_ID Function

This function generates the next session ID from the Oracle Application Express sequence generator. This function returns a number.

Syntax

```
APEX_CUSTOM_AUTH.GET_NEXT_SESSION_ID
RETURN NUMBER;
```

Example

The following example generates the next session ID and stores it into a variable.

```
DECLARE
    VAL NUMBER;
BEGIN
    VAL := APEX_CUSTOM_AUTH.GET_NEXT_SESSION_ID;
END;
```

9.7 GET_SECURITY_GROUP_ID Function

This function returns a number with the value of the security group ID that identifies the workspace of the current user.

Syntax

```
APEX_CUSTOM_AUTH.GET_SECURITY_GROUP_ID
RETURN NUMBER;
```

Example

The following example retrieves the Security Group ID for the current user.

```
DECLARE
    VAL NUMBER;
BEGIN
    VAL := APEX_CUSTOM_AUTH.GET_SECURITY_GROUP_ID;
END;
```

9.8 GET_SESSION_ID Function

This function returns `APEX_APPLICATION.G_INSTANCE` global variable. `GET_SESSION_ID` returns a number.

Syntax

```
APEX_CUSTOM_AUTH.GET_SESSION_ID  
RETURN NUMBER;
```

Example

The following example retrieves the session ID for the current user.

```
DECLARE  
    VAL NUMBER;  
BEGIN  
    VAL := APEX_CUSTOM_AUTH.GET_SESSION_ID;  
END;
```

9.9 GET_SESSION_ID_FROM_COOKIE Function

This function returns the Oracle Application Express session ID located by the session cookie in a page request in the current browser session.

Syntax

```
APEX_CUSTOM_AUTH.GET_SESSION_ID_FROM_COOKIE  
RETURN NUMBER;
```

Example

The following example retrieves the session ID from the current session cookie.

```
DECLARE  
    VAL NUMBER;  
BEGIN  
    VAL := APEX_CUSTOM_AUTH.GET_SESSION_ID_FROM_COOKIE;  
END;
```

9.10 GET_USER Function

This function returns the `APEX_APPLICATION.G_USER` global variable (`VARCHAR2`).

Syntax

```
APEX_CUSTOM_AUTH.GET_USER  
RETURN VARCHAR2;
```

Examples

The following example retrieves the username associated with the current session.

```
DECLARE  
    VAL VARCHAR2(256);  
BEGIN
```

```
    VAL := APEX_CUSTOM_AUTH.GET_USER;  
END;
```

9.11 GET_USERNAME Function

This function returns user name registered with the current Oracle Application Express session in the internal sessions table. This user name is usually the same as the authenticated user running the current page.

Syntax

```
APEX_CUSTOM_AUTH.GET_USERNAME  
RETURN VARCHAR2;
```

Example

The following example retrieves the username registered with the current application session.

```
DECLARE  
    VAL VARCHAR2(256);  
BEGIN  
    VAL := APEX_CUSTOM_AUTH.GET_USERNAME;  
END;
```

9.12 IS_SESSION_VALID Function

This function is a Boolean result obtained from executing the current application's authentication scheme to determine if a valid session exists. This function returns the Boolean result of the authentication scheme's page sentry.

Syntax

```
APEX_CUSTOM_AUTH.IS_SESSION_VALID  
RETURN BOOLEAN;
```

Example

The following example verifies whether the current session is valid.

```
DECLARE  
    L_VAL BOOLEAN;  
BEGIN  
    L_VAL := APEX_CUSTOM_AUTH.IS_SESSION_VALID;  
    IF L_VAL THEN  
        htp.p('Valid');  
    ELSE  
        htp.p('Invalid');  
    END IF;  
END;
```

9.13 LOGIN Procedure

Also referred to as the "Login API," this procedure performs authentication and session registration.

Syntax

```
APEX_CUSTOM_AUTH.LOGIN(
  p_username          IN VARCHAR2 DEFAULT NULL,
  p_password          IN VARCHAR2 DEFAULT NULL,
  p_session_id       IN VARCHAR2 DEFAULT NULL,
  p_app_page         IN VARCHAR2 DEFAULT NULL,
  p_entry_point      IN VARCHAR2 DEFAULT NULL,
  p_preserve_case    IN BOOLEAN  DEFAULT FALSE);
```

Parameter

Table 9-5 LOGIN Parameters

Parameter	Description
p_username	Login name of the user.
p_password	Clear text user password.
p_session_id	Current Oracle Application Express session ID.
p_app_page	Current application ID. After login page separated by a colon (:).
p_entry_point	Internal use only.
p_preserve_case	If TRUE, do not upper p_username during session registration

Example

The following example performs the user authentication and session registration.

```
BEGIN
  APEX_CUSTOM_AUTH.LOGIN (
    p_username => 'FRANK',
    p_password => 'secret99',
    p_session_id => V('APP_SESSION'),
    p_app_page => :APP_ID||':1');
END;
```

**Note:**

Do not use bind variable notations for p_session_id argument.

9.14 LOGOUT Procedure [DEPRECATED]

**Note:**

This procedure is deprecated. Use APEX_AUTHENTICATION.LOGOUT instead.

This procedure causes a logout from the current session by unsetting the session cookie and redirecting to a new location.

Syntax

```
APEX_CUSTOM_AUTH.LOGOUT(
  p_this_app           IN VARCHAR2  DEFAULT NULL,
  p_next_app_page_sess IN VARCHAR2  DEFAULT NULL,
  p_next_url           IN VARCHAR2  DEFAULT NULL);
```

Parameter**Table 9-6 LOGOUT Parameters**

Parameter	Description
p_this_app	Current application ID.
p_next_app_page_sess	Application and page number to redirect to. Separate multiple pages using a colon (:), and optionally followed by a colon (:), and the session ID (if control over the session ID is desired).
p_next_url	URL to redirect to (use this instead of p_next_app_page_sess).

Example

The following example causes a logout from the current session and redirects to page 99 of application 1000.

```
BEGIN
  APEX_CUSTOM_AUTH.LOGOUT (
    p_this_app           => '1000',
    p_next_app_page_sess => '1000:99');
END;
```

9.15 POST_LOGIN Procedure

This procedure performs session registration, assuming the authentication step has been completed. It can be called only from within an Oracle Application Express application page context.

Syntax

```
APEX_CUSTOM_AUTH.POST_LOGIN(
  p_username           IN VARCHAR2  DEFAULT NULL,
  p_session_id        IN VARCHAR2  DEFAULT NULL,
  p_app_page          IN VARCHAR2  DEFAULT NULL,
  p_preserve_case     IN BOOLEAN   DEFAULT FALSE);
```

Parameter**Table 9-7 POST_LOGIN Parameters**

Parameter	Description
p_username	Login name of user.
p_session_id	Current Oracle Application Express session ID.
p_app_page	Current application ID and after login page separated by a colon (:).

Table 9-7 (Cont.) POST_LOGIN Parameters

Parameter	Description
p_preserve_case	If TRUE, do not include p_uname in uppercase during session registration.

Example

The following example performs the session registration following a successful authentication.

```
BEGIN
  APEX_CUSTOM_AUTH.POST_LOGIN (
    p_uname      => 'FRANK',
    p_session_id => V('APP_SESSION'),
    p_app_page   => :APP_ID||':1');
END;
```

9.16 SESSION_ID_EXISTS Function

This function returns a Boolean result based on the global package variable containing the current Oracle Application Express session ID. Returns TRUE if the result is a positive number and returns FALSE if the result is a negative number.

Syntax

```
APEX_CUSTOM_AUTH.SESSION_ID_EXISTS
RETURN BOOLEAN;
```

Example

The following example checks whether the current session ID is valid and exists.

```
DECLARE
  L_VAL BOOLEAN;
BEGIN
  L_VAL := APEX_CUSTOM_AUTH.SESSION_ID_EXISTS;
  IF L_VAL THEN
    htp.p('Exists');
  ELSE
    htp.p('Does not exist');
  END IF;
END;
```

9.17 SET_SESSION_ID Procedure

This procedure sets APEX_APPLICATION.G_INSTANCE global variable. This procedure requires the parameter P_SESSION_ID (NUMBER) which specifies a session ID.

Syntax

```
APEX_CUSTOM_AUTH.SET_SESSION_ID(
  p_session_id IN NUMBER);
```

Parameters

Table 9-8 SET_SESSION_ID Parameters

Parameter	Description
p_session_id	The session ID to be registered.

Example

In the following example, the session ID value registered is retrieved from the browser cookie.

```
APEX_CUSTOM_AUTH.SET_SESSION_ID(APEX_CUSTOM_AUTH.GET_SESSION_ID_FROM_COOKIE);
```

9.18 SET_SESSION_ID_TO_NEXT_VALUE Procedure

This procedure combines the operation of `GET_NEXT_SESSION_ID` and `SET_SESSION_ID` in one call.

Syntax

```
APEX_CUSTOM_AUTH.SET_SESSION_ID_TO_NEXT_VALUE;
```

Example

In the following example, if the current session is not valid, a new session ID is generated and registered.

```
IF NOT APEX_CUSTOM_AUTH.SESSION_ID_EXISTS THEN
  APEX_CUSTOM_AUTH.SET_SESSION_ID_TO_NEXT_VALUE;
END IF;
```

9.19 SET_USER Procedure

This procedure sets the `APEX_APPLICATION.G_USER` global variable. `SET_USER` requires the parameter `p_user` (`VARCHAR2`) which defines a user ID.

Syntax

```
APEX_CUSTOM_AUTH.SET_USER(
  p_user IN VARCHAR2);
```

Parameters

Table 9-9 SET_USER Parameters

Parameter	Description
p_user	The user ID to be registered.

Example

In the following example, if the current application user is **NOBODY**, then **JOHN.DOE** is registered as the application user.

```
IF V('APP_USER') = 'NOBODY' THEN
    APEX_CUSTOM_AUTH.SET_USER('JOHN.DOE');
END IF;
```

10

APEX_DEBUG

The `APEX_DEBUG` package provides utility functions for managing the debug message log. Specifically, this package provides the necessary APIs to instrument and debug PL/SQL code contained within your Application Express application as well as PL/SQL code in database stored procedures and functions. Instrumenting your PL/SQL code makes it much easier to track down bugs and isolate unexpected behavior more quickly.

The package also provides the means to enable and disable debugging at different debug levels and utility procedures to clean up the message log.

You can view the message log either as described in the “Accessing Debugging Mode” section of the *Oracle Application Express App Builder User's Guide* or by querying the `APEX_DEBUG_MESSAGES` view.

For further information, see the individual API descriptions.

Note:

In Oracle Application Express 4.2, the `APEX_DEBUG_MESSAGE` package was renamed to `APEX_DEBUG`. The `APEX_DEBUG_MESSAGE` package name is still supported to provide backward compatibility. As a best practice, however, use the new `APEX_DEBUG` package for new applications unless you plan to run them in an earlier version of Oracle Application Express.

- [Constants](#) (page 10-2)
- [DISABLE Procedure](#) (page 10-2)
- [DISABLE_DBMS_OUTPUT Procedure](#) (page 10-3)
- [ENABLE Procedure](#) (page 10-3)
- [ENTER Procedure](#) (page 10-4)
- [ENABLE_DBMS_OUTPUT Procedure](#) (page 10-5)
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- [REMOVE_DEBUG_BY_APP Procedure](#) (page 10-12)
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- [REMOVE_SESSION_MESSAGES Procedure](#) (page 10-13)
- [TOCHAR Function](#) (page 10-13)
- [TRACE Procedure](#) (page 10-14)
- [WARN Procedure](#) (page 10-15)

**See Also:**

"Accessing Debugging Mode" in *Oracle Application Express App Builder User's Guide*

10.1 Constants

The following constants are used by this package.

```
subtype t_log_level is pls_integer;
c_log_level_error constant t_log_level := 1; -- critical error
c_log_level_warn constant t_log_level := 2; -- less critical error
c_log_level_info constant t_log_level := 4; -- default level if debugging is enabled
(for example, used by apex_application.debug)
c_log_level_app_enter constant t_log_level := 5; -- application: messages when
procedures/functions are entered
c_log_level_app_trace constant t_log_level := 6; -- application: other messages
within procedures/functions
c_log_level_engine_enter constant t_log_level := 8; -- Application Express engine:
messages when procedures/functions are entered
c_log_level_engine_trace constant t_log_level := 9; -- Application Express engine:
other messages within procedures/functions
```

10.2 DISABLE Procedure

This procedure turns off debug messaging.

Syntax

```
APEX_DEBUG.DISABLE;
```

Parameters

None.

Example

This example shows how you can turn off debug messaging.

```
BEGIN
    APEX_DEBUG.DISABLE();
END;
```

10.3 DISABLE_DBMS_OUTPUT Procedure

This procedure stops writing all debug logs also via `dbms_output`.

Syntax

```
disable_dbms_output;
```

Parameters

None.

Example

See `enable_dbms_output`.

10.4 ENABLE Procedure

This procedure turns on debug messaging. You can specify, by level of importance, the types of debug messages that are monitored.

Note:

You only need to call `ENABLE` procedure once per page view or page accept.

Syntax

```
APEX_DEBUG.ENABLE (
    p_level IN T_LOG_LEVEL DEFAULT C_LOG_LEVEL_INFO );
```

Parameters

Table 10-1 ENABLE Procedure Parameters

Parameter	Description
<code>p_level</code>	Level or levels of messages to log. Must be an integer from 1 to 9, where level 1 is the most important messages and level 4 (the default) is the least important. Setting to a specific level logs messages both at that level and below that level. For example, setting <code>p_level</code> to 2 logs any message at level 1 and 2.

Example

This examples shows how to enable logging of messages for levels 1, 2 and 4. Messages at higher levels are not logged.

```
BEGIN
    APEX_DEBUG.ENABLE(
        apex_debug.c_log_level_info);
END;
```

10.5 ENTER Procedure

This procedure logs messages at level `c_log_level_app_enter`. Use `APEX_DEBUG.ENTER()` to log the routine name and its arguments at the beginning of a procedure or function.

Syntax

```
APEX_DEBUG.ENTER (
  p_routine_name IN VARCHAR2,
  p_name01 IN VARCHAR2 DEFAULT NULL,
  p_value01 IN VARCHAR2 DEFAULT NULL,
  p_name02 IN VARCHAR2 DEFAULT NULL,
  p_value02 IN VARCHAR2 DEFAULT NULL,
  p_name03 IN VARCHAR2 DEFAULT NULL,
  p_value03 IN VARCHAR2 DEFAULT NULL,
  p_name04 IN VARCHAR2 DEFAULT NULL,
  p_value04 IN VARCHAR2 DEFAULT NULL,
  p_name05 IN VARCHAR2 DEFAULT NULL,
  p_value05 IN VARCHAR2 DEFAULT NULL,
  p_name06 IN VARCHAR2 DEFAULT NULL,
  p_value06 IN VARCHAR2 DEFAULT NULL,
  p_name07 IN VARCHAR2 DEFAULT NULL,
  p_value07 IN VARCHAR2 DEFAULT NULL,
  p_name08 IN VARCHAR2 DEFAULT NULL,
  p_value08 IN VARCHAR2 DEFAULT NULL,
  p_name09 IN VARCHAR2 DEFAULT NULL,
  p_value09 IN VARCHAR2 DEFAULT NULL,
  p_name10 IN VARCHAR2 DEFAULT NULL,
  p_value10 IN VARCHAR2 DEFAULT NULL,
  p_value_max_length IN PLS_INTEGER DEFAULT 1000 );
```

Parameters

Table 10-2 APEX_DEBUG.ENTER Procedure Parameters

Parameter	Description
<code>p_routine_name</code>	The name of the procedure or function.
<code>p_namexx/p_valuexx</code>	The procedure or function parameter name and value.
<code>p_value_max_length</code>	The <code>p_valuexx</code> values is truncated to this length.

Example

This example shows how to use `APEX_ENTER` to add a debug message at the beginning of a procedure.

```
procedure foo (
  p_widget_id in number,
  p_additional_data in varchar2,
  p_emp_rec in emp%rowtype )
is
begin
  apex_debug.enter('foo',
    'p_widget_id' , p_widget_id,
    'p_additional_data', p_additional_data,
    'p_emp_rec.id' , p_emp_rec.id );
```



```
....do something....
end foo;
```

10.6 ENABLE_DBMS_OUTPUT Procedure

This procedure writes all debug logs via `dbms_output`. If debug is disabled, this call also enables it with log level `c_log_level_warn`. You have to set a debug level higher than `c_log_level_warn` for finer grained debug output. The output 95 starts with a configurable prefix, followed by the log level, " | " and the actual debug message.

Syntax

```
enable_dbms_output (
    p_prefix in varchar2 default '# APEX|' );
```

Parameters

Table 10-3 ENABLE_DBMS_OUTPUT Procedure Parameters

Parameter	Description
<code>p_prefix</code>	Prefix for lines that go to <code>dbms_output</code> , default '# APEX '.

Example

This sqlplus code writes the debug messages for 4, 5, 7, and 8 via `dbms_output`.

```
set serveroutput on size unlimited
begin
    apex_debug.error('1');
    apex_debug.warn('2');
    apex_debug.enable_dbms_output(p_prefix=>'Debug-');
    apex_debug.error('4');
    apex_debug.warn('5');
    apex_debug.info('6');
    apex_debug.enable(p_level=>apex_debug.c_log_level_info);
    apex_debug.info('7');
    apex_debug.enable_dbms_output;
    apex_debug.info('8');
    apex_debug.disable_dbms_output;
    apex_debug.info('9');
end;
/
Output:
    Debug-ERR|4
    Debug-WRN|5
    Debug-INF|7
    # APEX|INF|8
```

10.7 ERROR Procedure

This procedure logs messages at level `c_log_level_error`. This procedure always logs, even if debug mode is turned off.

Syntax

```
APEX_DEBUG.ERROR (
  p_message IN VARCHAR2,
  p0 IN VARCHAR2 DEFAULT NULL,
  p1 IN VARCHAR2 DEFAULT NULL,
  p2 IN VARCHAR2 DEFAULT NULL,
  p3 IN VARCHAR2 DEFAULT NULL,
  p4 IN VARCHAR2 DEFAULT NULL,
  p5 IN VARCHAR2 DEFAULT NULL,
  p6 IN VARCHAR2 DEFAULT NULL,
  p7 IN VARCHAR2 DEFAULT NULL,
  p8 IN VARCHAR2 DEFAULT NULL,
  p9 IN VARCHAR2 DEFAULT NULL,
  p_max_length IN PLS_INTEGER DEFAULT 1000 );
```

Parameters**Table 10-4 APEX_DEBUG.ERROR Procedure Parameters**

Parameter	Description
p_message	The debug message. Occurrences of '%' are replaced by p0 to p19, as in <code>utl_lms.format_message</code> and C's <code>sprintf</code> . Occurrences of '%%' represent the special character '%'. Occurrences of '%<n>' are replaced by p<n>.
p0 through p9	Substitution strings for '%' placeholders.
p_max_length	The p<n> values are truncated to this length.

Example

This example shows how to use `APEX_ERROR` to log a critical error in the debug log.

```
apex_debug.error('Critical error %s', sqlerrm);
```

10.8 INFO Procedure

This procedure logs messages at level `c_log_level_info`.

Syntax

```
APEX_DEBUG.INFO (
  p_message IN VARCHAR2,
  p0 IN VARCHAR2 DEFAULT NULL,
  p1 IN VARCHAR2 DEFAULT NULL,
  p2 IN VARCHAR2 DEFAULT NULL,
  p3 IN VARCHAR2 DEFAULT NULL,
  p4 IN VARCHAR2 DEFAULT NULL,
  p5 IN VARCHAR2 DEFAULT NULL,
  p6 IN VARCHAR2 DEFAULT NULL,
  p7 IN VARCHAR2 DEFAULT NULL,
  p8 IN VARCHAR2 DEFAULT NULL,
  p9 IN VARCHAR2 DEFAULT NULL,
  p_max_length IN PLS_INTEGER DEFAULT 1000 );
```

Parameters

Table 10-5 APEX_DEBUG.INFO Procedure Parameters

Parameter	Description
p_message	The debug message. Occurrences of '%s' are replaced by p0 to p19, as in <code>utl_lms.format_message</code> and C's <code>sprintf</code> . Occurrences of '%%' represent the special character '%'. Occurrences of '%<n>' are replaced by p<n>.
p0 through p9	Substitution strings for '%s' placeholders.
p_max_length	The p<n> values are truncated to this length.

Example

This example shows how to use `APEX_DEBUG.INFO` to log information in the debug log.

```
apex_debug.info('Important: %s', 'fnord');
```

10.9 LOG_DBMS_OUTPUT Procedure

This procedure writes the contents of `dbms_output.get_lines` to the debug log. Messages of legacy applications which use `dbms_output` are copied into the debug log. In order to write to the debug log, `dbms_output.enable` must be performed

Syntax

```
APEX_DEBUG.LOG_DBMS_OUTPUT;
```

Parameters

None.

Example

This example shows how to log the contents of the `DBMS_OUTPUT` buffer in the debug log.

```
sys.dbms_output.enable;
sys.dbms_output.put_line('some data');
sys.dbms_output.put_line('other data');
apex_debug.log_dbms_output;
```

10.10 LOG_LONG_MESSAGE Procedure

Use this procedure to emit debug messages from PLSQL components of Application Express, or PLSQL procedures and functions. This procedure is the same as `LOG_MESSAGE`, except it allows logging of much longer messages, which are subsequently split into 4,000 character chunks in the debugging output (because a single debug message is constrained to 4,000 characters).

**Note:**

Instead of this procedure, use ["ERROR Procedure \(page 10-5\)"](#), ["WARN Procedure \(page 10-15\)"](#), ["MESSAGE Procedure \(page 10-10\)"](#), ["INFO Procedure \(page 10-6\)"](#), ["ENTER Procedure \(page 10-4\)"](#), or ["TRACE Procedure \(page 10-14\)"](#).

Syntax

```
APEX_DEBUG.LOG_LONG_MESSAGE (
    p_message    IN VARCHAR2    DEFAULT NULL,
    p_enabled    IN BOOLEAN     DEFAULT FALSE,
    p_level      IN T_LOG_LEVEL DEFAULT C_LOG_LEVEL_APP_TRACE);
```

Parameters**Table 10-6** APEX_DEBUG.LOG_LONG_MESSAGE Procedure Parameters

Parameter	Description
p_message	Log long message with maximum size of 32767 bytes.
p_enabled	Set to <code>TRUE</code> to always log messages, irrespective of whether debugging is enabled. Set to <code>FALSE</code> to only log messages if debugging is enabled.
p_level	Identifies the level of the long log message. See "Constants (page 10-2)" .

Example

This example shows how to enable debug message logging for 1 and 2 level messages and display a level 1 message that could contain anything up to 32767 characters. Note, the `p_enabled` parameter need not be specified, as debugging has been explicitly enabled and the default of `FALSE` for this parameter respects this enabling.

```
DECLARE
    l_msg VARCHAR2(32767) := 'Debug outputs anything up to varchar2 limit';
BEGIN
    APEX_DEBUG.ENABLE (p_level => 2);

    APEX_DEBUG.LOG_LONG_MESSAGE(
        p_message => l_msg,
        p_level => 1 );
END;
```

10.11 LOG_MESSAGE Procedure [Deprecated]

This procedure logs a debug message.

 **Note:**

Instead of this procedure, use ["ERROR Procedure \(page 10-5\)"](#), ["WARN Procedure \(page 10-15\)"](#), ["MESSAGE Procedure \(page 10-10\)"](#), ["INFO Procedure \(page 10-6\)"](#), ["ENTER Procedure \(page 10-4\)"](#), or ["TRACE Procedure \(page 10-14\)"](#).

Syntax

```
APEX_DEBUG.LOG_MESSAGE (
  p_message IN VARCHAR2 DEFAULT NULL,
  p_enabled IN BOOLEAN DEFAULT FALSE,
  p_level IN T_LOG_LEVEL DEFAULT C_LOG_LEVEL_APP_TRACE );
```

Parameters**Table 10-7 APEX_DEBUG.LOG_MESSAGE Procedure Parameters**

Parameter	Description
p_message	The debug message with a maximum length of 1000 bytes.
p_enabled	Messages are logged when logging is enabled, setting a value of TRUE enables logging.
p_level	Identifies the level of the log message where 1 is most important and 9 is least important. This is an integer value.

Example

This example shows how to enable debug message logging for 1 and 2 level messages and display a level 1 message showing a variable value. Note, the p_enabled parameter need not be specified, as debugging has been explicitly enabled and the default of FALSE for this parameter respects this enabling.

```
DECLARE
  l_value varchar2(100) := 'test value';
BEGIN
  APEX_DEBUG.ENABLE (p_level => 2);

  APEX_DEBUG.LOG_MESSAGE(
    p_message => 'l_value = ' || l_value,
    p_level => 1 );
END;
```

10.12 LOG_PAGE_SESSION_STATE Procedure

This procedure logs the session's item values.

Syntax

```
APEX_DEBUG.LOG_PAGE_SESSION_STATE (
  p_page_id IN NUMBER DEFAULT NULL,
```

```
p_enabled IN BOOLEAN DEFAULT FALSE,
p_level IN T_LOG_LEVEL DEFAULT C_LOG_LEVEL_APP_TRACE );
```

Parameters

Table 10-8 APEX_DEBUG.LOG_SESSION_STATE Procedure Parameters

Parameter	Description
p_page_id	Identifies a page within the current application and workspace context.
p_enabled	Messages are logged when logging is enabled, setting a value of TRUE enables logging.
p_level	Identifies the level of the log message where 1 is most important, 9 is least important. Must be an integer value.

Example

This example shows how to enable debug message logging for 1 and 2 level messages and display a level 1 message containing all the session state for the application's current page. Note, the `p_enabled` parameter need not be specified, as debugging has been explicitly enabled and the default of FALSE for this parameter respects this enabling. Also note the `p_page_id` has not been specified, as this example just shows session state information for the application's current page.

```
BEGIN
  APEX_DEBUG.ENABLE (p_level => 2);

  APEX_DEBUG.LOG_PAGE_SESSION_STATE (p_level => 1);

END;
```

10.13 MESSAGE Procedure

This procedure logs a formatted debug message, general version.

Syntax

```
APEX_DEBUG.MESSAGE (
  p_message IN VARCHAR2,
  p0 IN VARCHAR2 DEFAULT NULL,
  p1 IN VARCHAR2 DEFAULT NULL,
  p2 IN VARCHAR2 DEFAULT NULL,
  p3 IN VARCHAR2 DEFAULT NULL,
  p4 IN VARCHAR2 DEFAULT NULL,
  p5 IN VARCHAR2 DEFAULT NULL,
  p6 IN VARCHAR2 DEFAULT NULL,
  p7 IN VARCHAR2 DEFAULT NULL,
  p8 IN VARCHAR2 DEFAULT NULL,
  p9 IN VARCHAR2 DEFAULT NULL,
  p10 IN VARCHAR2 DEFAULT NULL,
  p11 IN VARCHAR2 DEFAULT NULL,
  p12 IN VARCHAR2 DEFAULT NULL,
  p13 IN VARCHAR2 DEFAULT NULL,
  p14 IN VARCHAR2 DEFAULT NULL,
  p15 IN VARCHAR2 DEFAULT NULL,
  p16 IN VARCHAR2 DEFAULT NULL,
```

```

p17 IN VARCHAR2 DEFAULT NULL,
p18 IN VARCHAR2 DEFAULT NULL,
p19 IN VARCHAR2 DEFAULT NULL,
p_max_length IN PLS_INTEGER DEFAULT 1000,
p_level IN T_LOG_LEVEL DEFAULT C_LOG_LEVEL_INFO,
p_force IN BOOLEAN DEFAULT FALSE );

```

Parameters

Table 10-9 APEX_DEBUG.MESSAGE Procedure Parameters

Parameter	Description
p_message	The debug message. Occurrences of '%s' is replaced by p0 to p19, as in utl_lms.format_message and C's sprintf. Occurrences of '%%' represent the special character '%'. Occurrences of '%<n>' are replaced by p<n>.
p0 through p19	Substitution strings for '%s' placeholders.
p_max_length	The p<n> values is truncated to this length.
p_level	The log level for the message, default is c_log_level_info. See " Constants (page 10-2)."
p_force	If TRUE, this generates a debug message even if the page is not rendered in debug mode or p_level is greater than the configured debug messaging (using the URL or using the enable procedure).

Example

This example shows how to use the APEX_DEBUG.MESSAGE procedure to add text to the debug log.

```
apex_debug.message('the value of %s + %s equals %s', 3, 5, 'eight');
```

10.14 REMOVE_DEBUG_BY_AGE Procedure

Use this procedure to delete from the debug message log all data older than the specified number of days.

Syntax

```

APEX_DEBUG.REMOVE_DEBUG_BY_AGE (
  p_application_id IN NUMBER,
  p_older_than_days IN NUMBER);

```

Parameters

Table 10-10 APEX_DEBUG.REMOVE_DEBUG_BY_AGE Procedure Parameters

Parameter	Description
p_application_id	The application ID of the application.
p_older_than_days	The number of days data can exist in the debug message log before it is deleted.

Example

This example demonstrates removing debug messages relating to the current application, that are older than 3 days old.

```
BEGIN
  APEX_DEBUG.REMOVE_DEBUG_BY_AGE (
    p_application_id => TO_NUMBER(:APP_ID),
    p_older_than_days => 3 );
END;
```

10.15 REMOVE_DEBUG_BY_APP Procedure

Use this procedure to delete from the debug message log all data belonging to a specified application.

Syntax

```
APEX_DEBUG.REMOVE_DEBUG_BY_APP (
  p_application_id IN NUMBER);
```

Parameters

Table 10-11 APEX_DEBUG.REMOVE_DEBUG_BY_APP Procedure Parameters

Parameter	Description
p_application_id	The application ID of the application.

Example

This example demonstrates removing all debug messages logged for the current application.

```
BEGIN
  APEX_DEBUG.REMOVE_DEBUG_BY_APP(
    p_application_id => TO_NUMBER(:APP_ID) );
END;
```

10.16 REMOVE_DEBUG_BY_VIEW Procedure

Use this procedure to delete all data for a specified view from the message log.

Syntax

```
APEX_DEBUG.REMOVE_DEBUG_BY_VIEW (
  p_application_id IN NUMBER,
  p_view_id IN NUMBER);
```

Parameters

Table 10-12 APEX_DEBUG.REMOVE_DEBUG_BY_VIEW Procedure Parameters

Parameter	Description
p_application_id	The application ID of the application.
p_view_id	The view ID of the view.

Example

This example demonstrates the removal of debug messages within the 'View Identifier' of 12345, belonging to the current application.

```
BEGIN
  APEX_DEBUG.REMOVE_DEBUG_BY_VIEW (
    p_application_id => TO_NUMBER(:APP_ID),
    p_view_id       => 12345 );
END;
```

10.17 REMOVE_SESSION_MESSAGES Procedure

This procedure deletes from the debug message log all data for a given session in your workspace defaults to your current session.

Syntax

```
APEX_DEBUG.REMOVE_SESSION_MESSAGES (
  p_session IN NUMBER DEFAULT NULL);
```

Parameters**Table 10-13 APEX_DEBUG.REMOVE_SESSION_MESSAGES Procedure Parameters**

Parameter	Description
p_session	The session ID. Defaults to your current session.

Example

This example demonstrates the removal of all debug messages logged within the current session. Note: As no value is passed for the p_session parameter, the procedure defaults to the current session.

```
BEGIN
  APEX_DEBUG.REMOVE_SESSION_MESSAGES();
END;
```

10.18 TOCHAR Function

This procedure converts a BOOLEAN to a VARCHAR2.

Syntax

```
APEX_DEBUG.TOCHAR (  
    p_value IN BOOLEAN )  
    return VARCHAR2;
```

Parameters

Table 10-14 APEX_DEBUG.TOCHAR Function Parameters

Parameter	Description
p_value	A BOOLEAN 0 or 1 that is converted to FALSE or TRUE respectively.

Example

This example shows how to use the `APEX_DEBUG.TOCHAR` function to convert `boolean` values to `varchar2`, so they can be passed to the other debug procedures.

```
declare  
    l_state boolean;  
begin  
    ....  
    apex_debug.info('Value of l_state is %s', apex_debug.tochar(l_state));  
    ....  
end;
```

10.19 TRACE Procedure

This procedure logs messages at level `c_log_level_app_trace`.

Syntax

```
APEX_DEBUG.TRACE (  
    p_message IN VARCHAR2,  
    p0 IN VARCHAR2 DEFAULT NULL,  
    p1 IN VARCHAR2 DEFAULT NULL,  
    p2 IN VARCHAR2 DEFAULT NULL,  
    p3 IN VARCHAR2 DEFAULT NULL,  
    p4 IN VARCHAR2 DEFAULT NULL,  
    p5 IN VARCHAR2 DEFAULT NULL,  
    p6 IN VARCHAR2 DEFAULT NULL,  
    p7 IN VARCHAR2 DEFAULT NULL,  
    p8 IN VARCHAR2 DEFAULT NULL,  
    p9 IN VARCHAR2 DEFAULT NULL,  
    p_max_length IN PLS_INTEGER DEFAULT 1000 );
```

Parameters

Table 10-15 APEX_DEBUG.TRACE Procedure Parameters

Parameter	Description
p_message	The debug message. Occurrences of '%s' are replaced by p0 to p19, as in <code>utl_lms.format_message</code> and C's <code>sprintf</code> . Occurrences of '%%' represent the special character '%'. Occurrences of '%<n>' are replaced by p<n>.
p0 through p9	Substitution strings for '%s' placeholders.
p_max_length	The p<n> values are truncated to this length.

Example

This example shows how to use `APEX_DEBUG.TRACE` to log low-level debug information in the debug log.

```
apex_debug.trace('Low-level information: %s+%s=%s', 1, 2, 3);
```

10.20 WARN Procedure

This procedure logs messages at level `c_log_level_warn`.

Syntax

```
APEX_DEBUG.WARN (
  p_message IN VARCHAR2,
  p0 IN VARCHAR2 DEFAULT NULL,
  p1 IN VARCHAR2 DEFAULT NULL,
  p2 IN VARCHAR2 DEFAULT NULL,
  p3 IN VARCHAR2 DEFAULT NULL,
  p4 IN VARCHAR2 DEFAULT NULL,
  p5 IN VARCHAR2 DEFAULT NULL,
  p6 IN VARCHAR2 DEFAULT NULL,
  p7 IN VARCHAR2 DEFAULT NULL,
  p8 IN VARCHAR2 DEFAULT NULL,
  p9 IN VARCHAR2 DEFAULT NULL,
  p_max_length IN PLS_INTEGER DEFAULT 1000 );
```

Parameters

Table 10-16 APEX_DEBUG.WARN Procedure Parameters

Parameter	Description
p_message	The debug message. Occurrences of '%s' are replaced by p0 to p19, as in <code>utl_lms.format_message</code> and C's <code>sprintf</code> . Occurrences of '%%' represent the special character '%'. Occurrences of '%<n>' are replaced by p<n>.
p0 through p9	Substitution strings for '%s' placeholders.
p_max_length	The p<n> values are truncated to this length.

Example

This example shows how to use `APEX_DEBUG.WARN` to log highly important data in the debug log.

```
apex_debug.warn('Soft constraint %s violated: %s', 4711, sqlerrm);
```

11

APEX_ESCAPE

The `APEX_ESCAPE` package provides functions for escaping special characters in strings to ensure that the data is suitable for further processing.

- [Constants](#) (page 11-1)
- [HTML Function](#) (page 11-1)
- [HTML_ATTRIBUTE Function](#) (page 11-2)
- [HTML_TRUNC Function](#) (page 11-3)
- [HTML_WHITELIST Function](#) (page 11-4)
- [JS_LITERAL Function](#) (page 11-4)
- [JSON Function](#) (page 11-5)
- [LDAP_DN Function](#) (page 11-6)
- [LDAP_SEARCH_FILTER Function](#) (page 11-7)
- [NOOP Function](#) (page 11-7)
- [REGEXP Function](#) (page 11-8)
- [SET_HTML_ESCAPING_MODE Procedure](#) (page 11-9)

11.1 Constants

The `APEX_ESCAPE` package uses the following constants.

```
c_ldap_dn_reserved_chars constant varchar2(8) := '",<=>\';  
c_ldap_search_reserved_chars constant varchar2(5) := '*()\|/';  
c_html_whitelist_tags constant varchar2(255) := '<h1>,</h1>,<h2>,</h2>,<h3>,</h3>,<h4>,</h4>,<p>,</p>,<b>,</b>,<strong>,</strong>,<i>,</i>,<ul>,</ul>,<ol>,</ol>,<li>,</li>,<br />,<hr />';
```

11.2 HTML Function

This function escapes characters which can change the context in an html environment. It is an extended version of the well-known `sys.htf.escape_sc`.

The function's result depends on the escaping mode that is defined by using `apex_escape.set_html_escaping_mode`. By default, the escaping mode is "Extended", but it can be overridden by manually calling `set_html_escaping_mode` or by setting the application security attribute "HTML Escaping Mode" to "Basic". If the mode is "Basic", the function behaves like `sys.htf.escape_sc`. Otherwise, the rules below apply.

The following table, [Table 11-1](#) (page 11-2), depicts ascii characters that the function transforms and their escaped values:

Table 11-1 Escaped Values for Transformed ASCII Characters

Raw ASCII Characters	Returned Escaped Characters
&	&
"	"
<	<
>	>
'	'
/	/

Syntax

```
APEX_ESCAPE.HTML (
    p_string IN VARCHAR2 )
    return VARCHAR2;
```

Parameters

[Table 11-2](#) (page 11-2) describes the parameters available in the `HTML` function.

Table 11-2 HTML Function Parameters

Parameter	Description
<code>p_string</code>	The string text that is escaped

Example

This example tests escaping in basic ('B') and extended ('E') mode.

```
declare
procedure eq(p_str1 in varchar2,p_str2 in varchar2)
    is
    begin
        if p_str1||'.' <> p_str2||'.' then
            raise_application_error(-20001,p_str1||' <> '||p_str2);
        end if;
    end eq;
begin
    apex_escape.set_html_escaping_mode('B');
    eq(apex_escape.html('hello &"<>'/'/'), 'hello &amp;&quot;&lt;&gt;'/'/');
    apex_escape.set_html_escaping_mode('E');
    eq(apex_escape.html('hello &"<>'/'/'), 'hello
    &amp;&quot;&lt;&gt;&#x27;&#x2F;');
end;
```

11.3 HTML_ATTRIBUTE Function

Use this function to escape the values of html entity attributes. It hex escapes everything that is not alphanumeric or in one of the following characters `'" '<>'/'/`.

Syntax

```
APEX_ESCAPE.HTML_ATTRIBUTE (
  p_string IN VARCHAR2 )
  return VARCHAR2;
```

Parameters**Table 11-3 HTML_ATTRIBUTE Function Parameters**

Parameter	Description
p_string	The text string that is escaped.

Example

See “HTML_TRUNC Function”.

11.4 HTML_TRUNC Function

The `HTML_TRUNC` function escapes html and limits the returned string to `p_length` bytes. This function returns the first `p_length` bytes of an input clob and escapes them. You can use this function if the input clob might be too large to fit in a `varchar2` variable and it is sufficient to only display the first part of it.

Syntax

```
APEX_ESCAPE.HTML_TRUNC (
  p_string IN CLOB,
  p_length IN NUMBER DEFAULT 4000 )
  return VARCHAR2;
```

Parameters**Table 11-4 HTML_TRUNC Function Parameters**

Parameter	Description
p_string	The text string that is escaped.
p_length	The number of bytes from <code>p_string</code> that are escaped.

Example

This example generates a html list of titles and text bodies. Html entity attributes are escaped with `HTML_ATTRIBUTE`, whereas normal text is escaped with `HTML` and `HTML_TRUNC`.

```
begin
  http.p('<ul>');
  for l_data in ( select title, cls, body
                 from my_topics )
  loop
    sys.http.p('<li><span class="' ||
              apex_escape.html_attribute(l_data.cls) || '>' ||
              apex_escape.html(l_data.title) || '</span>');
  end loop;
```

```

sys.http.p(apex_escape.html_trunc(l_data.body));
sys.http.p('</li>');
end loop;
http.p('</ul>');
end;

```

11.5 HTML_WHITELIST Function

The `HTML_WHITELIST` function performs HTML escape on all characters in the input text except the specified whitelist tags. This function can be useful if the input text contains simple html markup but a developer wants to ensure that an attacker cannot use malicious tags for cross-site scripting.

Syntax

```

APEX_ESCAPE.HTML_WHITELIST (
  p_html IN VARCHAR2,
  p_whitelist_tags IN VARCHAR2 DEFAULT c_html_whitelist_tags )
return VARCHAR2;

```

Parameters

Table 11-5 HTML_WHITELIST Function Parameters

Parameter	Description
<code>p_html</code>	The text string that is filtered.
<code>p_whitelist_tags</code>	The comma separated list of tags that stays in <code>p_html</code> .

Example

This example shows how to use `HTML_WHITELIST` to remove unwanted html markup from a string, while preserving whitelisted tags.

```

begin
sys.http.p(apex_escape.html_whitelist(' <h1>Hello<script>alert("XSS");</script></h1>')); end;

```

11.6 JS_LITERAL Function

The `JS_LITERAL` function escapes and optionally enquotes a javascript string. This function replaces non-immune characters with `\xHH` or `\uHHHH` equivalents. The result can be injected into javascript code, within `<script>` tags or inline ("javascript:xxx"). Immune characters include a through z, A through Z, 0 through 9, commas ",", periods "." and underscores "_" if the output should not be enclosed in quotes when the parameter `p_quote` is null. If `p_quote` has a value, printable ASCII 7 characters except for `&` `<` `>` `"` `'` `\` `%` are not escaped.

Syntax

```

APEX_ESCAPE.JS_LITERAL (
  p_string IN VARCHAR2,
  p_quote IN VARCHAR2 DEFAULT '' )
return VARCHAR2;

```


Parameters

Table 11-6 JS_LITERAL Function Parameters

Parameter	Description
p_string	The text string that is escaped.
p_quote	If not null, this string is placed on the left and right of the result. The quotation character must be a single or a double quotation mark.

Example

It describes how to use `JS_LITERAL` to escape special characters in the `l_string` variable.

```
declare
  l_string varchar2(4000) := 'O''Brien';
begin
  sys.http.p('<script>'||
    'alert('||apex_escape.js_literal(l_string)||');'||'</script>');
end;
```

11.7 JSON Function

This function returns `p_string` with all special characters escaped.

Syntax

```
APEX_ESCAPE.JSON (
  p_string IN VARCHAR2 )
RETURN VARCHAR2;
```

Parameters

Table 11-7 JSON Function Parameters

Parameter	Description
p_string	The string to be escaped.

Returns/Raised Errors

Table 11-8 JSON Function Returns

Return	Description
VARCHAR2	The escaped string.

Example

The following example prints this: { "name": "O\u0027Brien" }

```
declare
  l_string varchar2(4000) := 'O''Brien';
```

```
begin
  sys.http.p('{ "name": " "||apex_escape.json(l_string)||'" }');
end;
```

11.8 LDAP_DN Function

The `LDAP_DN` function escapes reserved characters in an LDAP distinguished name, according to RFC 4514. The RFC describes "+,;<=>\ " as reserved characters (see `p_reserved_chars`). These are escaped by a backslash, for example, " becomes \". Non-printable characters, ascii 0 - 31, and ones with a code > 127 (see `p_escape_non_ascii`) are escaped as \xx, where xx is the hexadecimal character code. The space character at the beginning or end of the string and a # at the beginning is also escaped with a backslash.

Syntax

```
APEX_ESCAPE.LDAP_DN (
  p_string IN VARCHAR2,
  p_reserved_chars IN VARCHAR2 DEFAULT c_ldap_dn_reserved_chars,
  p_escaped_non_ascii IN BOOLEAN DEFAULT TRUE )
return VARCHAR2;
```

Parameters

Table 11-9 LDAP_DN Function Parameters

Parameter	Description
<code>p_string</code>	The text string that is escaped.
<code>p_reserved_chars</code>	A list of characters that when found in <code>p_string</code> is escaped with a backslash.
<code>p_escaped_non_ascii</code>	If TRUE, characters above ascii 127 in <code>p_string</code> are escaped with a backslash. This is supported by RFCs 4514 and 2253, but may cause errors with older LDAP servers and Microsoft AD.

Example

This example escapes characters in `l_name` and places the result in `l_escaped`.

```
declare
  l_name varchar2(4000) := 'Joe+User';
  l_escaped varchar2(4000);
begin
  l_escaped := apex_escape.ldap_dn(l_name);
  http.p(l_name||' becomes '||l_escaped);
end;
```



Note:

"LDAP_SEARCH_FILTER Function (page 11-7)"

11.9 LDAP_SEARCH_FILTER Function

The `LDAP_SEARCH_FILTER` function escapes reserved characters in an LDAP search filter, according to RFC 4515. The RFC describes `*` and `()` as reserved characters (see `p_reserved_chars`). These, non-printable characters (ascii 0 - 31) and ones with a code `> 127` (see `p_escape_non_ascii`) are escaped as `\xx`, where `xx` is the hexadecimal character code.

Syntax

```
APEX_ESCAPE.LDAP_SEARCH_FILTER (
    p_string          IN VARCHAR2,
    p_reserved_chars  IN VARCHAR2 DEFAULT c_ldap_search_reserved_chars,
    p_escape_non_ascii IN BOOLEAN DEFAULT TRUE )
return VARCHAR2;
```

Parameters

Table 11-10 LDAP_SEARCH_FILTER Function Parameters

Parameter	Description
<code>p_string</code>	The text string that is escaped.
<code>p_reserved_chars</code>	A list of characters that when found in <code>p_string</code> is escaped with <code>\xx</code> where <code>xx</code> is the character's ASCII hexadecimal code.
<code>p_escape_non_ascii</code>	If <code>TRUE</code> , characters above ascii 127 in <code>p_string</code> are escaped with <code>\xx</code> where <code>xx</code> is the character's ASCII hexadecimal code. This is supported by RFCs 4514, but may cause errors with older LDAP servers and Microsoft AD.

Example

This example escapes the text in `l_name` and places the result in `l_escaped`.

```
declare
l_name varchar2(4000) := 'Joe*User';
l_escaped varchar2(4000);
begin
    l_escaped := apex_escape.ldap_search_filter(l_name);
    htp.p(l_name||'|' becomes '||l_escaped);
end;
```

Note:

"LDAP_DN Function (page 11-6)"

11.10 NOOP Function

Return `p_string` unchanged. Use this function to silence automatic injection detection tests, similar to `dbms_assert.noop` for SQL injection.

Syntax

```
APEX_ESCAPE.NOOP (
  p_string IN VARCHAR2)
  return VARCHAR2 deterministic;
```

Parameters**Table 11-11 APEX_ESCAPE.NOOP Function Parameters**

Parameter	Description
p_string	The input text string.

Example

This example shows how to use `NOOP` to show the developer's intention to explicitly not escape text.

```
begin
  sys.http.p(apex_escape.noop('Cats & Dogs'));
end;
```

11.11 REGEXP Function

This function escapes characters that can change the context in a regular expression. It should be used to secure user input. The following list depicts ascii characters that the function escapes with a backslash (\):

```
\.^$*+.-?()\[\|
```

Syntax

```
APEX_ESCAPE.REGEXP (
  p_string IN VARCHAR2);
```

Parameters**Table 11-12 APEX_ESCAPE.REGEXP Function Parameters**

Parameter	Description
p_string	Text to escape.

Example

The following example ensures the special character "-" in Mary-Ann will be escaped and ignored by the regular expression engine.

```
declare
  l_subscribers varchar2(4000) := 'Christina,Hilary,Mary-Ann,Joel';
  l_name varchar2(4000) := 'Mary-Ann';
begin
  if regexp_instr(l_subscribers, '(^|,)' || apex_escape.regexp(l_name) || '($|,)' > 0
  then
    sys.http.p('found');
  else
```

```
        sys.htp.p('not found')
    endif;
end
```

11.12 SET_HTML_ESCAPING_MODE Procedure

The `SET_HTML_ESCAPING_MODE` procedure configures HTML escaping mode for `apex_escape.html`.

Syntax

```
APEX_ESCAPE.SET_HTML_ESCAPING_MODE (  
    p_mode IN VARCHAR2);
```

Parameters

Table 11-13 APEX_ESCAPE.SET_HTML_ESCAPING_MODE Procedure Parameters

Parameter	Description
<code>p_mode</code>	If equal to <code>B</code> , then do basic escaping, like <code>sys.htf.escape_sc</code> . If equal to <code>E</code> , then do extended escaping.

Example

For an example, see “HTML Function”.

12

APEX_ERROR

The APEX_ERROR package provides the interface declarations and some utility functions for an error handling function and includes procedures and functions to raise errors in an Application Express application.

- [Constants and Attributes used for Result Types](#) (page 12-1)
- [Example of an Error Handling Function](#) (page 12-2)
- [ADD_ERROR Procedure Signature 1](#) (page 12-4)
- [ADD_ERROR Procedure Signature 2](#) (page 12-5)
- [ADD_ERROR Procedure Signature 3](#) (page 12-6)
- [ADD_ERROR Procedure Signature 4](#) (page 12-7)
- [ADD_ERROR Procedure Signature 5](#) (page 12-8)
- [APEX_ERROR.HAVE_ERRORS_OCCURRED Function](#) (page 12-10)
- [AUTO_SET_ASSOCIATED_ITEM Procedure](#) (page 12-10)
- [EXTRACT_CONSTRAINT_NAME Function](#) (page 12-11)
- [GET_FIRST_ORA_ERROR_TEXT Function](#) (page 12-11)
- [INIT_ERROR_RESULT Function](#) (page 12-12)

12.1 Constants and Attributes used for Result Types

The following constants are used for the API parameter `p_display_location` and the attribute `display_location` in the `t_error` and `t_error_result` types.

```
c_inline_with_field          constant varchar2(40):='INLINE_WITH_FIELD';
c_inline_with_field_and_notif constant
varchar2(40):='INLINE_WITH_FIELD_AND_NOTIFICATION';
c_inline_in_notification     constant varchar2(40):='INLINE_IN_NOTIFICATION';
c_on_error_page              constant varchar2(40):='ON_ERROR_PAGE';
```

The following constants are used for the API parameter `associated_type` in the `t_error` type.

```
c_ass_type_page_item        constant varchar2(30):='PAGE_ITEM';
c_ass_type_region           constant varchar2(30):='REGION';
c_ass_type_region_column    constant varchar2(30):='REGION_COLUMN';
```

The following record structure is passed into an error handling callout function and contains all the relevant information about the error.

```
type t_error is record (
    message varchar2(32767),          /* Error message which will be displayed */
    additional_info varchar2(32767), /* Only used for display_location
ON_ERROR_PAGE to display additional error information */
    display_location varchar2(40),    /* Use constants "used for
```

```

display_location" below */
association_type varchar2(40),          /* Use constants "used for
asociation_type" below */
page_item_name  varchar2(255),        /* Associated page item name */
region_id       number,               /* Associated tabular form region id of
the primary application */
column_alias    varchar2(255),        /* Associated tabular form column alias */
row_num         pls_integer,          /* Associated tabular form row */
is_internal_error boolean,           /* Set to TRUE if it's a critical error
raised by the APEX engine, like an invalid SQL/PLSQL statements, ... Internal Errors
are always displayed on the Error Page */
apex_error_code varchar2(255),        /* Contains the system message code if
it's an error raised by APEX */
ora_sqlcode     number,               /* SQLCODE on exception stack which
triggered the error, NULL if the error was not raised by an ORA error */
ora_sqlerrm     varchar2(32767),      /* SQLERRM which triggered the error, NULL
if the error was not raised by an ORA error */
error_backtrace varchar2(32767),      /* Output of
sys.dbms_utility.format_error_backtrace or sys.dbms_utility.format_call_stack */
error_statement varchar2(32767),      /* Statement that was parsed when the
error occurred - only suitable when parsing caused the error */
component       apex.t_component /* Component which has been processed when the
error occurred */
);

```

The following record structure must be returned by an error handling callout function.

```

type t_error_result is record (
message          varchar2(32767), /* Error message which will be displayed */
additional_info  varchar2(32767), /* Only used for display_location ON_ERROR_PAGE
to display additional error information */
display_location varchar2(40),    /* Use constants "used for display_location"
below */
page_item_name  varchar2(255),    /* Associated page item name */
column_alias    varchar2(255)     /* Associated tabular form column alias */
);

```

12.2 Example of an Error Handling Function

The following is an example of an error handling function.

```

create or replace function apex_error_handling_example (
p_error in apex_error.t_error )
return apex_error.t_error_result
is
l_result          apex_error.t_error_result;
l_reference_id    number;
l_constraint_name varchar2(255);
begin
l_result := apex_error.init_error_result (
p_error => p_error );

-- If it's an internal error raised by APEX, like an invalid statement or
-- code which can't be executed, the error text might contain security sensitive
-- information. To avoid this security problem we can rewrite the error to
-- a generic error message and log the original error message for further
-- investigation by the help desk.
if p_error.is_internal_error then
-- mask all errors that are not common runtime errors (Access Denied
-- errors raised by application / page authorization and all errors

```

```
-- regarding session and session state)
if not p_error.is_common_runtime_error then
  -- log error for example with an autonomous transaction and return
  -- l_reference_id as reference#
  -- l_reference_id := log_error (
  --           p_error => p_error );
  --
  -- Change the message to the generic error message which doesn't expose
  -- any sensitive information.
  l_result.message := 'An unexpected internal application error
has occurred. '||
                    'Please get in contact with XXX and provide
'||
                    'reference# '||to_char(l_reference_id,
'999G999G999G990')||
                    ' for further investigation.';
  l_result.additional_info := null;
end if;
else
  -- Always show the error as inline error
  -- Note: If you have created manual tabular forms (using the package
  --       apex_item/htmldb_item in the SQL statement) you should still
  --       use "On error page" on that pages to avoid loosing entered data
  l_result.display_location := case
                                when l_result.display_location =
apex_error.c_on_error_page then apex_error.c_inline_in_notification
                                else l_result.display_location
                                end;
  --
  -- Note: If you want to have friendlier ORA error messages, you can also
define
  --       a text message with the name pattern APEX.ERROR.ORA-number
  --       There is no need to implement custom code for that.
  --
  -- If it's a constraint violation like
  --
  -- -) ORA-00001: unique constraint violated
  -- -) ORA-02091: transaction rolled back (-> can hide a deferred
constraint)
  -- -) ORA-02290: check constraint violated
  -- -) ORA-02291: integrity constraint violated - parent key not found
  -- -) ORA-02292: integrity constraint violated - child record found
  --
  -- we try to get a friendly error message from our constraint lookup
configuration.
  -- If we don't find the constraint in our lookup table we fallback to
  -- the original ORA error message.
  if p_error.ora_sqlcode in (-1, -2091, -2290, -2291, -2292) then
    l_constraint_name := apex_error.extract_constraint_name (
                        p_error => p_error );
  begin
    select message
    into l_result.message
    from constraint_lookup
    where constraint_name = l_constraint_name;
    exception when no_data_found then null; -- not every constraint has to
be in our lookup table
```



```

        end;
    end if;

    -- If an ORA error has been raised, for example a
    raise_application_error(-20xxx, '...')
    -- in a table trigger or in a PL/SQL package called by a process and we
    -- haven't found the error in our lookup table, then we just want to see
    -- the actual error text and not the full error stack with all the ORA error
    numbers.
    if p_error.ora_sqlcode is not null and l_result.message = p_error.message
    then
        l_result.message := apex_error.get_first_ora_error_text (
            p_error => p_error );
    end if;

    -- If no associated page item/tabular form column has been set, we can use
    -- apex_error.auto_set_associated_item to automatically guess the affected
    -- error field by examine the ORA error for constraint names or column names.
    if l_result.page_item_name is null and l_result.column_alias is null then
        apex_error.auto_set_associated_item (
            p_error      => p_error,
            p_error_result => l_result );
    end if;
end if;

return l_result;
end apex_error_handling_example;

```

12.3 ADD_ERROR Procedure Signature 1

This procedure adds an error message to the error stack that is used to display an error on an error page or inline in a notification. It can be called in a validation or process to add one or more errors to the error stack.



Note:

This procedure must be called before the Application Express application has performed the last validation or process. Otherwise, the error is ignored if it does not have a display location of `apex_error.c_on_error_page`.

Syntax

```

APEX_ERROR.ADD_ERROR (
    p_message          in varchar2,
    p_additional_info  in varchar2 default null,
    p_display_location in varchar2 );

```

Parameters

Table 12-1 ADD_ERROR Procedure Signature 1 Parameters

Parameters	Description
p_message	Displayed error message.

Table 12-1 (Cont.) ADD_ERROR Procedure Signature 1 Parameters

Parameters	Description
p_additional_info	Additional error information needed if the error is displayed on the error page.
p_display_location	Specifies where the error message is displayed. Use the constant <code>apex_error.c_inline_in_notification</code> or <code>apex_error.c_on_error_page</code> . See " Constants and Attributes used for Result Types (page 12-1)."

Example

This example illustrates how to add a custom error message to the error stack. The error message is displayed inline in a notification. This example can be used in a validation or process.

```
apex_error.add_error (
    p_message          => 'This custom account is not active!',
    p_display_location => apex_error.c_inline_in_notification );
```

12.4 ADD_ERROR Procedure Signature 2

This procedure adds an error message to the error stack that is used to display an error for a page item inline in a notification. It can be called in a validation or process to add one or more errors to the error stack.

 **Note:**

This procedure must be called before the Application Express application has performed the last validation or process. Otherwise, the error is ignored if it does not have a display location of `apex_error.c_on_error_page`.

Syntax

```
APEX_ERROR.ADD_ERROR (
    p_message          in varchar2,
    p_additional_info in varchar2 default null,
    p_display_location in varchar2,
    p_page_item_name  in varchar2);
```

Parameters**Table 12-2 ADD_ERROR Procedure Signature 2 Parameters**

Parameters	Description
p_message	Displayed error message.
p_additional_info	Additional error information needed if the error is displayed on the error page.

Table 12-2 (Cont.) ADD_ERROR Procedure Signature 2 Parameters

Parameters	Description
p_display_location	Specifies where the error message is displayed. Use the constant <code>apex_error.c_inline_with_field</code> or <code>apex_error.c_inline_with_field_and_notif</code> . See "Constants and Attributes used for Result Types (page 12-1)" .
p_page_item_name	Name of the page item on the current page that is highlighted if <code>apex_error.c_inline_with_field</code> or <code>apex_error.c_inline_with_field_and_notif</code> are used as the display location.

Example

This example illustrates how to add a custom error message to the error stack. The P5_CUSTOMER_ID item is highlighted on the page. The error message is displayed inline in a notification. This example can be used in a validation or process.

```
apex_error.add_error (
  p_message          => 'Invalid Customer ID!',
  p_display_location => apex_error.c_inline_with_field_and_notif,
  p_page_item_name  => 'P5_CUSTOMER_ID');
```

12.5 ADD_ERROR Procedure Signature 3

This procedure adds an error message to the error stack that is used to display text as defined by a shared component. This error message can be displayed to all display locations. It can be called in a validation or process to add one or more errors to the error stack.

Note:

This procedure must be called before the Application Express application has performed the last validation or process. Otherwise, the error is ignored if it does not have a display location of `apex_error.c_on_error_page`.

Syntax

```
APEX_ERROR.ADD_ERROR (
  p_error_code          in varchar2,
  p0                    in varchar2 default null,
  p1                    in varchar2 default null,
  p2                    in varchar2 default null,
  p3                    in varchar2 default null,
  p4                    in varchar2 default null,
  p5                    in varchar2 default null,
  p6                    in varchar2 default null,
  p7                    in varchar2 default null,
  p8                    in varchar2 default null,
  p9                    in varchar2 default null,
  p_escape_placeholders in boolean default true,
  p_additional_info     in varchar2 default null,
```

```
p_display_location    in varchar2,
p_page_item_name     in varchar2 );
```

Parameters

Table 12-3 ADD_ERROR Procedure Signature 3 Parameters

Parameters	Description
p_error_code	Name of shared component text message.
p_additional_info	Additional error information needed if the error is displayed on the error page.
p0 through p9	Values for %0 through %9 placeholders defined in the text message.
p_escape_placeholders	If set to TRUE, the values provided in p0 through p9 are escaped with <code>sys.htf.escape_sc</code> before replacing the placeholder in the text message. If set to FALSE, values are not escaped.
p_display_location	Specifies where the error message is displayed. Use the constants defined for <code>p_display_location</code> . See " Constants and Attributes used for Result Types (page 12-1)."
p_page_item_name	Name of the page item on the current page that is highlighted if <code>apex_error.c_inline_with_field</code> or <code>apex_error.c_inline_with_field_and_notif</code> are used as the display location.

Example

This example illustrates how to add a custom error message, where the text is stored in a text message, to the error stack. The P5_CUSTOMER_ID item is highlighted on the page. The error message is displayed inline in a notification. This example can be used in a validation or process.

```
apex_error.add_error (
  p_error_code      => 'INVALID_CUSTOMER_ID',
  p0                => l_customer_id,
  p_display_location => apex_error.c_inline_with_field_and_notif,
  p_page_item_name  => 'P5_CUSTOMER_ID' );
```

12.6 ADD_ERROR Procedure Signature 4

This procedure adds an error message to the error stack that is used to display an error for a tabular form inline in a notification. It can be called in a validation or process to add one or more errors to the error stack.

Note:

This procedure must be called before the Application Express application has performed the last validation or process. Otherwise, the error is ignored if it does not have a display location of `apex_error.c_on_error_page`.

Syntax

```
APEX_ERROR.ADD_ERROR (
    p_message          in varchar2,
    p_additional_info  in varchar2 default null,
    p_display_location in varchar2,
    p_region_id        in number,
    p_column_alias     in varchar2 default null,
    p_row_num          in number );
```

Parameters

Table 12-4 ADD_ERROR Procedure Signature 4 Parameters

Parameters	Description
p_message	Displayed error message.
p_additional_info	Additional error information needed if the error is displayed on the error page.
p_display_location	Specifies where the error message is displayed. Use the constant <code>apex_error.c_inline_with_field</code> or <code>apex_error.c_inline_with_field_and_notif</code> . See "Constants and Attributes used for Result Types (page 12-1)."
p_region_id	The ID of a tabular form region on the current page. The ID can be read from the view <code>APEX_APPLICATION_PAGE_REGIONS</code> .
p_column_alias	Name of a tabular form column alias defined for p_region_id that is highlighted if <code>apex_error.c_inline_with_field</code> or <code>apex_error.c_inline_with_field_and_notif</code> are used as a display location.
p_row_num	Number of the tabular form row where the error occurred.

Example

This example illustrates how to add a custom error message for a tabular form, where the column `CUSTOMER_ID` is highlighted, to the error stack. The error message is displayed inline in a notification. This example can be used in a validation or process.

```
apex_error.add_error (
    p_message          => 'Invalid Customer ID!',
    p_display_location => apex_error.c_inline_with_field_and_notif,
    p_region_id        => l_region_id,
    p_column_alias     => 'CUSTOMER_ID',
    p_row_num          => l_row_num );
```

12.7 ADD_ERROR Procedure Signature 5

This procedure adds an error message to the error stack of a tabular form that is used to display text as defined by a shared component. This error message can be displayed to all display locations. It can be called in a validation or process to add one or more errors to the error stack.

 **Note:**

This procedure must be called before the Application Express application has performed the last validation or process. Otherwise, the error is ignored if it does not have a display location of `apex_error.c_on_error_page`.

Syntax

```
APEX_ERROR.ADD_ERROR (
  p_error_code          in varchar2,
  p0                    in varchar2 default null,
  p1                    in varchar2 default null,
  p2                    in varchar2 default null,
  p3                    in varchar2 default null,
  p4                    in varchar2 default null,
  p5                    in varchar2 default null,
  p6                    in varchar2 default null,
  p7                    in varchar2 default null,
  p8                    in varchar2 default null,
  p9                    in varchar2 default null,
  p_escape_placeholders in boolean default true,
  p_additional_info     in varchar2 default null,
  p_display_location    in varchar2,
  p_region_id           in number,
  p_column_alias        in varchar2 default null,
  p_row_num             in number );
```

Parameters**Table 12-5 ADD_ERROR Procedure Signature 5 Parameters**

Parameters	Description
p_error_code	Name of shared component text message.
p0 through p9	Values for %0 through %9 placeholders defined in the text message.
p_escape_placeholders	If set to <code>TRUE</code> , the values provided in p0 through p9 are escaped with <code>sys.htf.escape_sc</code> before replacing the placeholder in the text message. If set to <code>FALSE</code> , values are not escaped.
p_additional_info	Additional error information needed if the error is displayed on the error page.
p_display_location	Specifies where the error message is displayed. Use the constants defined for <code>p_display_location</code> . See " Constants and Attributes used for Result Types (page 12-1)."
p_region_id	The ID of the tabular form region on the current page. The ID can be read from the view <code>APEX_APPLICATION_PAGE_REGIONS</code> .
p_column_alias	The name of the tabular form column alias defined for <code>p_region_id</code> that is highlighted if <code>apex_error.c_inline_with_field</code> or <code>apex_error.c_inline_with_field_and_notif</code> are used as a display location.
p_row_num	Number of the tabular form row where the error occurred.

Example

This example illustrates how to add a custom error message, where the text is stored in a text message, to the error stack. The `CUSTOMER_ID` column on the tabular form is highlighted. The error message is displayed inline in a notification. This example can be used in a validation or process.

```
apex_error.add_error (
  p_error_code      => 'INVALID_CUSTOMER_ID',
  p0                => l_customer_id,
  p_display_location => apex_error.c_inline_with_field_and_notif,
  p_region_id       => l_region_id,
  p_column_alias    => 'CUSTOMER_ID',
  p_row_num         => l_row_num );
```

12.8 APEX_ERROR.HAVE_ERRORS_OCCURRED Function

This function returns `TRUE` if (inline) errors have occurred and `FALSE` if no error has occurred.

Syntax

```
APEX_ERROR.HAVE_ERRORS_OCCURRED return boolean;
```

Example

This example only executes the statements of the `IF` statement if no error has been raised.

```
if not apex_error.have_errors_occurred then
  ...
end if;
```

12.9 AUTO_SET_ASSOCIATED_ITEM Procedure

This procedure automatically sets the associated page item or tabular form column based on a constraint contained in `p_error.ora_sqlerrm`. This procedure performs the following:

- Identifies the constraint by searching for the `schema.constraint` pattern.
- Only supports constraints of type P, U, R and C.
- For constraints of type C (check constraints), the procedure parses the expression to identify those columns that are used in the constraints expression.
- Using those columns, the procedure gets the first visible page item or tabular form column that is based on that column and set it as associated `p_error_result.page_item_name` Or `p_error_result.column_alias`.
- If a page item or tabular form column was found, `p_error_result.display_location` is set to `apex_error.c_inline_with_field_and_notif`.

Syntax

```
APEX_ERROR.AUTO_SET_ASSOCIATED_ITEM (
    p_error_result in out nocopy t_error_result,
    p_error        in          t_error );
```

Parameters**Table 12-6** AUTO_SET_ASSOCIATED_ITEM Procedure Parameters

Parameters	Description
p_error_result	The result variable of your error handling function.
p_error	The p_error parameter of your error handling function.

Example

See an example of how to use this procedure in "[Example of an Error Handling Function](#) (page 12-2)."

12.10 EXTRACT_CONSTRAINT_NAME Function

This function extracts a constraint name contained in p_error.ora_sqlerrm. The constraint must match the pattern schema.constraint.

Syntax

```
APEX_ERROR.EXTRACT_CONSTRAINT_NAME (
    p_error        in t_error,
    p_include_schema in boolean default false )
return varchar2;
```

Parameters**Table 12-7** EXTRACT_CONSTRAINT_NAME Function Parameters

Parameters	Description
p_error	The p_error parameter of your error handling function.
p_include_schema	If set to TRUE, the result is prefixed with the schema name. For example, HR.DEMO_PRODUCT_INFO_PK. If set to FALSE, only the constraint name is returned.

Example

See an example of how to use this procedure in "[Example of an Error Handling Function](#) (page 12-2)."

12.11 GET_FIRST_ORA_ERROR_TEXT Function

This function returns the first ORA error message text stored in p_error.ora_sqlerrm. If p_error_ora_sqlerrm does not contain a value, NULL is returned.

Syntax

```
APEX_ERROR.GET_FIRST_ORA_ERROR_TEXT (
    p_error          in t_error,
    p_include_error_no in boolean default false )
return varchar2;
```

Parameters**Table 12-8 GET_FIRST_ORA_TEXT Function Parameters**

Parameters	Description
p_error	The p_error parameter of your error handling function.
p_include_error_no	If set to TRUE, ORA-xxxx is included in the returned error message. If set to FALSE, only the error message text is returned.

Example

See an example of how to use this procedure in "[Example of an Error Handling Function](#) (page 12-2)."

12.12 INIT_ERROR_RESULT Function

This function returns the t_error_result type initialized with the values stored in p_error.

**Note:**

This function must be used to ensure initialization is compatible with future changes to t_error_result.

Syntax

```
APEX_ERROR.INIT_ERROR_RESULT (
    p_error in t_error)
return t_error_result;
```

Parameters**Table 12-9 INT_ERROR_RESULT Function Parameters**

Parameters	Description
p_error	The p_error parameter of your error handling function.

Example

See an example of how to use this function in "[Example of an Error Handling Function](#) (page 12-2)."

13

APEX_EXEC

The `APEX_EXEC` package encapsulates data processing and querying capabilities and provides an abstraction from the data source to Application Express components and plug-ins. It contains procedures and functions to execute queries or procedural calls on local and remote data sources as well as web source modules. It can be used for plug-in development as well as for procedural PL/SQL processing in applications or within packages and procedures.

All procedures require an APEX session to be set up. In a pure SQL or PL/SQL context, use the `APEX_SESSION` package to initialize a new session.

The typical call sequence depends on the used data source.

1. REST Enabled SQL Data Sources

- a. Prepare bind variables with [optional]
 - Create a variable of `APEX_EXEC.T_PARAMETERS` type
 - Add bind values with `APEX_EXEC.ADD_PARAMETER`
- b. Execute the remote query call
 - Call `APEX_EXEC.OPEN_REMOTE_SQL_QUERY`
- c. Get column indexes for result column names
 - Call `APEX_EXEC.OPEN_WEB_SOURCE_QUERY`
- d. Loop until the result set is exhausted
 - Call `APEX_EXEC.NEXT_ROW`
- e. Retrieve column values for each column by position
 - call `APEX_EXEC.GET_VARCHAR2`, `APEX_EXEC.GET_NUMBER`, `APEX_EXEC.GET_DATE`, ...
- f. Finally ALWAYS close the query context - IMPORTANT
 - Call `APEX_EXEC.CLOSE`

2. Web source module

- a. Prepare web source parameters variables with [optional]
 - Create a variable of `APEX_EXEC.T_PARAMETERS` type
 - Add bind values with `APEX_EXEC.ADD_PARAMETER`
- b. Prepare filters to be passed to the web source (if supported by the web source)
 - Create a variable of `APEX_EXEC.T_FILTERS` type
 - Add bind values with `APEX_EXEC.ADD_FILTER`
- c. Prepare order by expressions to be passed to the web source (if supported by the web source)
 - Create a variable of `APEX_EXEC.T_ORDER_BY` type

- Add bind values with `APEX_EXEC.ADD_ORDER_BY`
- d. Execute the remote query call
 - Call `APEX_EXEC.OPEN_WEB_SOURCE_QUERY`
 - Pass in filters, order bys and parameters previously prepared
- e. Get column indexes for result column names
 - Call `APEX_EXEC.GET_COLUMN_POSITION`
- f. Loop until the result set is exhausted
 - Call `APEX_EXEC.NEXT_ROW`
- g. Retrieve column values for each column by position
 - Call `APEX_EXEC.GET_VARCHAR2`, `APEX_EXEC.GET_NUMBER`, `APEX_EXEC.GET_DATE`, ...
- h. Finally ALWAYS close the query context - IMPORTANT
 - Call `APEX_EXEC.CLOSE`



Note:

Always add an exception handler to your procedure or function to ensure that `APEX_EXEC.CLOSE` is being called in any case. This is important to release server resources like database cursors, temporary lobbs and others.

- [Global Constants](#) (page 13-3)
- [Data Types](#) (page 13-4)
- [ADD_COLUMN Procedure](#) (page 13-7)
- [ADD_FILTER Procedure](#) (page 13-8)
- [ADD_ORDER_BY Procedure](#) (page 13-11)
- [ADD_PARAMETER Procedure](#) (page 13-13)
- [CLOSE Procedure](#) (page 13-14)
- [EXECUTE_PLSQL Procedure](#) (page 13-15)
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- [GET Functions](#) (page 13-18)
- [GET_COLUMN Function](#) (page 13-19)
- [GET_COLUMN_COUNT Function](#) (page 13-20)
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- [GET_TOTAL_ROW_COUNT Function](#) (page 13-22)
- [IS_REMOTE_SQL_AUTH_VALID Function](#) (page 13-22)
- [NEXT_ROW Function](#) (page 13-23)
- [OPEN_REMOTE_SQL_QUERY Function](#) (page 13-24)

- [OPEN_QUERY_CONTEXT Function](#) (page 13-25)
- [OPEN_WEB_SOURCE_QUERY Function](#) (page 13-26)
- [PURGE_WEB_SOURCE_CACHE Procedure](#) (page 13-28)

13.1 Global Constants

The following constants are used in `APEX_EXEC` package.

INTERNAL constants - DO NOT USE

```
c_location_local_db      constant t_location  := 'LOCAL';
c_location_remote_db    constant t_location  := 'REMOTE';
c_location_web_source    constant t_location  := 'WEB_SOURCE';

c_lov_shared            constant t_lov_type   := 1;
c_lov_sql_query         constant t_lov_type   := 2;
c_lov_static            constant t_lov_type   := 3;

subtype t_query_type is varchar2(23);

c_query_type_table      constant t_query_type := 'TABLE';
c_query_type_sql_query  constant t_query_type := 'SQL';
c_query_type_func_return_sql constant t_query_type := 'FUNC_BODY_RETURNING_SQL';

subtype t_dml_operation is pls_integer range 1..3;

c_dml_operation_insert constant t_dml_operation := 1;
c_dml_operation_update constant t_dml_operation := 2;
c_dml_operation_delete constant t_dml_operation := 3;

subtype t_target_type is varchar2(5);

c_target_type_table     constant t_target_type := 'TABLE';
c_target_type_sql_query constant t_target_type := 'SQL';
c_target_type_plsql     constant t_target_type := 'PLSQL';
```

Data type constants to be used in the `ADD_FILTER` or `ADD_COLUMN` procedures.

```
c_data_type_varchar2    constant t_data_type := 1;
c_data_type_number      constant t_data_type := 2;
c_data_type_date        constant t_data_type := 3;
c_data_type_timestamp   constant t_data_type := 4;
c_data_type_timestamp_tz constant t_data_type := 5;
c_data_type_timestamp_ltz constant t_data_type := 6;
c_data_type_interval_y2m constant t_data_type := 7;
c_data_type_interval_d2s constant t_data_type := 8;
c_data_type_blob        constant t_data_type := 9;
c_data_type_bfile       constant t_data_type := 10;
c_data_type_clob        constant t_data_type := 11;
c_data_type_rowid       constant t_data_type := 12;
c_data_type_user_defined constant t_data_type := 13;
```

Filter type constants to be used in the `ADD_FILTER` procedures.

```
c_filter_eq             constant t_filter_type := 1;
c_filter_not_eq        constant t_filter_type := 2;
c_filter_gt            constant t_filter_type := 3;
c_filter_gte          constant t_filter_type := 4;
c_filter_lt           constant t_filter_type := 5;
```

```

c_filter_lte          constant t_filter_type := 6;
c_filter_null        constant t_filter_type := 7;
c_filter_not_null    constant t_filter_type := 8;
c_filter_starts_with constant t_filter_type := 9;
c_filter_not_starts_with constant t_filter_type := 10;
c_filter_ends_with   constant t_filter_type := 11;
c_filter_not_ends_with constant t_filter_type := 12;
c_filter_contains    constant t_filter_type := 13;
c_filter_not_contains constant t_filter_type := 14;
c_filter_in          constant t_filter_type := 15;
c_filter_not_in      constant t_filter_type := 16;
c_filter_between     constant t_filter_type := 17;
c_filter_not_between constant t_filter_type := 18;
c_filter_regexp      constant t_filter_type := 19;
-- date filters: days/months/...
c_filter_last        constant t_filter_type := 20;
c_filter_not_last    constant t_filter_type := 21;
c_filter_next        constant t_filter_type := 22;
c_filter_not_next    constant t_filter_type := 23;

-- interactive reports
c_filter_like        constant t_filter_type := 24;
c_filter_not_like    constant t_filter_type := 25;
c_filter_search      constant t_filter_type := 26;
c_filter_sql_expression constant t_filter_type := 27;

c_filter_expr_sep    constant varchar2(1) := '~';
c_filter_expr_value_sep constant varchar2(1) := chr(1);

-- interval types for date filters (last, not last, next, not next)
c_filter_int_type_year   constant t_filter_interval_type := 'Y';
c_filter_int_type_month constant t_filter_interval_type := 'M';
c_filter_int_type_week   constant t_filter_interval_type := 'W';
c_filter_int_type_day    constant t_filter_interval_type := 'D';
c_filter_int_type_hour   constant t_filter_interval_type := 'H';
c_filter_int_type_minute constant t_filter_interval_type := 'MI';

```

Order by constants to be used in the `ADD_FILTER` procedures.

```

c_order_asc          constant t_order_direction := 1;
c_order_desc        constant t_order_direction := 2;

c_order_nulls_first constant t_order_nulls := 1;
c_order_nulls_last  constant t_order_nulls := 2;

```

Constants or empty filter, order by, columns or parameter arrays

```

c_empty_columns      t_columns;
c_empty_filters      t_filters;
c_empty_order_bys    t_order_bys;
c_empty_parameters   t_parameters;

```

13.2 Data Types

The data types used by the `APEX_EXEC` package are described in this section.

Generic

```
subtype t_column_name is varchar2(32767);
```

```

subtype t_data_type is pls_integer range 1..13;

type t_value is record (
  varchar2_value  varchar2(32767),
  number_value    number,
  date_value      date,
  timestamp_value timestamp,
  timestamp_tz_value timestamp with time zone,
  timestamp_ltz_value timestamp with local time zone,
  interval_y2m_value interval year to month,
  interval_d2s_value interval day to second,
  blob_value      blob,
  bfile_value     bfile,
  clob_value      clob,
  anydata_value   sys.anydata );

type t_values is table of t_value index by pls_integer;

```

Bind variables

```

type t_parameter is record (
  name      t_column_name,
  data_type t_data_type,
  value     t_value );

type t_parameters is table of t_parameter index by pls_integer;

```

Column Metadata

```

subtype t_lov_type is pls_integer range 1..3;

-- Internal type definition. ** DO NOT USE **
type t_lov is record (
  lov_type          t_lov_type,
  shared_lov_id     varchar2(32767),
  sql_query         varchar2(32767),
  static_values     varchar2(32767) );

-- Internal type definition. ** DO NOT USE **
type t_column is record (
  name              t_column_name,
  sql_expression    varchar2(4000),
  -- for analytic functions - apply these after filtering; otherwise apply before
  -- filtering to make the
  -- column available to filters
  is_aggregation   boolean default false,
  -- SQL expressions of end user columns can only work on columns specified in the
  p_columns array parameter
  is_end_user      boolean default true,
  -- required for Generic Columns. If COL25 has "Compute Sum" enabled, we generate
  a SUM (OVER) clause for it.
  -- When the base SQL query does not return COL25, we have to remove that derived
  column, so we need to know, on
  -- which column it depends.
  dependent_on     t_column_name,
  data_type        t_data_type,
  data_type_length pls_integer,
  data_type_name   t_column_name, -- $$$ look for a better name
  -- required for "display as LOV" in
  interactive reports
  lov              t_lov,

```

```
format_mask          varchar2(4000),
is_required          boolean default false,
is_primary_key       boolean default false,
is_query_only        boolean default false,
is_checksum          boolean default false,
is_returning         boolean default false );

type t_columns is table of t_column index by pls_integer;
```

Filters

```
subtype t_filter_type          is pls_integer range 1..27;
subtype t_filter_interval_type is varchar2(2);

type t_filter is record (
    column_name      t_column_name, -- $$$ should we reference the index of
t_columns instead? -> Always require to specify p_columns? Would avoid having to
specify data_type
    data_type        t_data_type,
    filter_type      t_filter_type,
    filter_values    t_values,
    sql_expression   varchar2(32767),
    search_columns   t_columns,
    null_result      boolean default false,
    is_case_sensitive boolean default true );

type t_filters is table of t_filter index by pls_integer;
```

Order Bys

```
subtype t_order_direction is pls_integer range 1..2;
subtype t_order_nulls     is pls_integer range 1..2;

type t_order_by is record (
    column_name t_column_name, -- $$$ should we reference the index of t_columns
instead? -> Always require to specify p_columns?
    position   pls_integer, -- if given, we will generate the order by clause
with a column position
    lov        t_lov,
    direction  t_order_direction,
    order_nulls t_order_nulls );

type t_order_bys is table of t_order_by index by pls_integer;

subtype t_location     is varchar2(12);
```

Context Handle

```
subtype t_context is pls_integer;
```

Data Source Capabilities

```
type t_source_capabilities is record(
    location          t_location,
    --
    pagination        boolean default false,
    --
    allow_fetch_all_rows boolean default false,
    --
    filtering          boolean default false,
    order_by          boolean default false,
```

```

group_by          boolean default false,
--
filter_eq         boolean default false,
filter_not_eq    boolean default false,
filter_gt        boolean default false,
filter_gte       boolean default false,
filter_lt        boolean default false,
filter_lte       boolean default false,
filter_null      boolean default false,
filter_not_null  boolean default false,
filter_contains  boolean default false,
filter_not_contains boolean default false,
filter_like      boolean default false,
filter_not_like  boolean default false,
filter_starts_with boolean default false,
filter_not_starts_with boolean default false,
filter_between   boolean default false,
filter_not_between boolean default false,
filter_in        boolean default false,
filter_not_in    boolean default false,
filter_regexp    boolean default false,
filter_last      boolean default false,
filter_not_last  boolean default false,
filter_next      boolean default false,
filter_not_next  boolean default false,
--
orderby_asc      boolean default false,
orderby_desc     boolean default false,
orderby_nulls    boolean default false );

```

13.3 ADD_COLUMN Procedure

This procedure adds a column to the columns collection. Columns collections can be passed the `OPEN_*_CONTEXT` calls in order to request only a subset of columns. This is particularly useful for web sources where no SQL statement is involved. If no or an empty column array is passed, all columns defined in the web source are being fetched.

Syntax

```

procedure add_column(
  p_columns          in out nocopy t_columns,
  p_column_name     in          varchar2,
  p_data_type       in          t_data_type default null,
  p_sql_expression  in          varchar2   default null );

```

Parameters

Table 13-1 ADD_COLUMN Procedure Parameters

Parameter	Description
<code>p_columns</code>	Columns array.
<code>p_column_name</code>	Column name.
<code>p_data_type</code>	Column data type.
<code>p_sql_expression</code>	SQL expression in order to derive a column from other columns.

Example

```

declare
    l_columns    apex_exec.t_columns;
    l_context    apex_exec.t_context;
begin
    apex_exec.add_column(
        p_columns    => l_columns,
        p_column_name => 'ENAME' );

    apex_exec.add_column(
        p_columns    => l_columns,
        p_column_name => 'SAL' );

    l_context := apex_exec.open_web_source_query(
        p_module_static_id => '{web source module static ID}',
        p_columns          => l_columns
        p_max_rows         => 1000 );

    while apex_exec.next_row( l_context ) loop
        -- process rows here ...
    end loop;

    apex_exec.close( l_context );
exception
    when others then
        apex_exec.close( l_context );
        raise;
end;

```

13.4 ADD_FILTER Procedure

This procedure adds a filter to the filter collection.

Syntax

```

procedure add_filter (
    p_filters          in out nocopy t_filters,
    p_filter_type      in           t_filter_type,
    p_column_name      in           t_column_name );

procedure add_filter (
    p_filters          in out nocopy t_filters,
    p_filter_type      in           t_filter_type,
    p_column_name      in           t_column_name,
    p_value            in           varchar2,
    p_null_result      in           boolean default false,
    p_is_case_sensitive in         boolean default true );

procedure add_filter (
    p_filters          in out nocopy t_filters,
    p_filter_type      in           t_filter_type,
    p_column_name      in           t_column_name,
    p_from_value       in           varchar2,
    p_to_value         in           varchar2,
    p_null_result      in           boolean default false,
    p_is_case_sensitive in         boolean default true );

procedure add_filter (

```

```
p_filters          in out nocopy t_filters,  
p_filter_type     in           t_filter_type,  
p_column_name    in           t_column_name,  
p_values         in           wwv_flow_t_varchar2,  
p_null_result    in           boolean default false,  
p_is_case_sensitive in       boolean default true );  
  
procedure add_filter (  
  p_filters          in out nocopy t_filters,  
  p_filter_type     in           t_filter_type,  
  p_column_name    in           t_column_name,  
  p_value          in           number,  
  p_null_result    in           boolean default false );  
  
procedure add_filter (  
  p_filters          in out nocopy t_filters,  
  p_filter_type     in           t_filter_type,  
  p_column_name    in           t_column_name,  
  p_from_value     in           number,  
  p_to_value       in           number,  
  p_null_result    in           boolean default false );  
  
procedure add_filter (  
  p_filters          in out nocopy t_filters,  
  p_filter_type     in           t_filter_type,  
  p_column_name    in           t_column_name,  
  p_values         in           wwv_flow_t_number,  
  p_null_result    in           boolean default false );  
  
procedure add_filter (  
  p_filters          in out nocopy t_filters,  
  p_filter_type     in           t_filter_type,  
  p_column_name    in           t_column_name,  
  p_value          in           date,  
  p_null_result    in           boolean default false );  
  
procedure add_filter (  
  p_filters          in out nocopy t_filters,  
  p_filter_type     in           t_filter_type,  
  p_column_name    in           t_column_name,  
  p_from_value     in           date,  
  p_to_value       in           date,  
  p_null_result    in           boolean default false );  
  
procedure add_filter (  
  p_filters          in out nocopy t_filters,  
  p_filter_type     in           t_filter_type,  
  p_column_name    in           t_column_name,  
  p_value          in           timestamp,  
  p_null_result    in           boolean default false );  
  
procedure add_filter (  
  p_filters          in out nocopy t_filters,  
  p_filter_type     in           t_filter_type,  
  p_column_name    in           t_column_name,  
  p_from_value     in           timestamp,  
  p_to_value       in           timestamp,  
  p_null_result    in           boolean default false );  
  
procedure add_filter (  
  p_filters          in out nocopy t_filters,
```

```

    p_filter_type      in          t_filter_type,
    p_column_name     in          t_column_name,
    p_value           in          timestamp with time zone,
    p_null_result     in          boolean default false );

procedure add_filter (
    p_filters         in out nocopy t_filters,
    p_filter_type     in          t_filter_type,
    p_column_name     in          t_column_name,
    p_from_value      in          timestamp with time zone,
    p_to_value        in          timestamp with time zone,
    p_null_result     in          boolean default false );

procedure add_filter (
    p_filters         in out nocopy t_filters,
    p_filter_type     in          t_filter_type,
    p_column_name     in          t_column_name,
    p_value           in          timestamp with local time zone,
    p_null_result     in          boolean default false );

procedure add_filter (
    p_filters         in out nocopy t_filters,
    p_filter_type     in          t_filter_type,
    p_column_name     in          t_column_name,
    p_from_value      in          timestamp with local time zone,
    p_to_value        in          timestamp with local time zone,
    p_null_result     in          boolean default false );

procedure add_filter (
    p_filters         in out nocopy t_filters,
    p_filter_type     in          t_filter_type,
    p_column_name     in          t_column_name,
    p_interval        in          pls_integer,
    p_interval_type   in          t_filter_interval_type,
    p_null_result     in          boolean default false );

procedure add_filter (
    p_filters         in out nocopy t_filters,
    p_search_columns  in          t_columns,
    p_is_case_sensitive in        boolean default false,
    p_value           in          varchar2 );

procedure add_filter (
    p_filters         in out nocopy t_filters,
    p_sql_expression  in          varchar2 );

```

Parameters

Table 13-2 ADD_FILTER Procedure Parameters

Parameter	Description
p_filters	Filters array.
p_filter_type	Type of filter - use one of the t_filter_type constants.
p_column_name	Column to apply this filter on.
p_value	Value for filters requiring one value (e.g. equals or greater than).
p_values	Value array for IN or NOT IN filters.

Table 13-2 (Cont.) ADD_FILTER Procedure Parameters

Parameter	Description
p_from_value	Lower value for filters requiring a range (e.g. between).
p_to_value	Upper value for filters requiring a range (e.g. between).
p_interval	Interval for date filters (e.g. last X months).
p_interval_type	Interval type for date filters (months, dates).
p_sql_expression	Generic SQL expression to use as filter.
p_null_result	Result to return when the actual column value is NULL.
p_is_case_sensitive	Whether this filter should work case-sensitive or not.

Example

```

declare
    l_filters    apex_exec.t_filters;
    l_context    apex_exec.t_context;
begin
    apex_exec.add_filter(
        p_filters    => l_filters,
        p_filter_type => apex_exec.c_filter_eq,
        p_column_name => 'ENAME',
        p_value      => 'KING' );

    apex_exec.add_filter(
        p_filters    => l_filters,
        p_filter_type => apex_exec.c_filter_gt,
        p_column_name => 'SAL',
        p_value      => 2000 );

    l_context := apex_exec.open_web_source_query(
        p_module_static_id => '{web source module static ID}',
        p_filters          => l_filters
        p_max_rows        => 1000 );

    while apex_exec.next_row( l_context ) loop
        -- process rows here ...
    end loop;

    apex_exec.close( l_context );
exception
    when others then
        apex_exec.close( l_context );
        raise;
end;
```

13.5 ADD_ORDER_BY Procedure

This procedure adds an order by expression to the order bys collection.

Syntax

```

procedure add_order_by (
    p_order_bys    in out nocopy t_order_bys,
    p_column_name  in          t_column_name,
```

```

    p_lov          in          t_lov,
    p_direction    in          t_order_direction default c_order_asc,
    p_order_nulls  in          t_order_nulls      default null );--
c_order_nulls_last if ascending, c_order_nulls_first when descending

procedure add_order_by (
    p_order_bys    in out nocopy t_order_bys,
    p_position     in          pls_integer,
    p_direction    in          t_order_direction default c_order_asc,
    p_order_nulls  in          t_order_nulls      default null );--
c_order_nulls_last if ascending, c_order_nulls_first when descending

```

Parameters

Table 13-3 ADD_ORDER_BY Procedure Parameters

Parameter	Description
p_order_bys	Order by collection.
p_column_name	References a column name or alias of the provided data source.
p_direction	Defines if the column should be sorted ascending or descending. Valid values are c_order_asc and c_order_desc.
p_order_nulls	Defines if NULL data will sort to the bottom or top. Valid values are NULL, c_order_nulls_first and c_order_nulls_last. Use NULL for automatic handling based on the sort direction. c_order_asc -> c_order_nulls_last c_order_desc -> c_order_nulls_first

Example

```

declare
    l_order_bys apex_exec.t_order_bys;
    l_context   apex_exec.t_context;
begin
    apex_exec.add_order_by(
        p_order_bys    => l_order_bys,
        p_column_name  => 'ENAME',
        p_direction    => apex_exec.c_order_asc );

    l_context := apex_exec.open_web_source_query(
        p_module_static_id => '{web source module static ID}',
        p_order_bys        => l_order_bys,
        p_max_rows         => 1000 );

    while apex_exec.next_row( l_context ) loop
        -- process rows here ...
    end loop;

    apex_exec.close( l_context );
exception
    when others then
        apex_exec.close( l_context );
raise;
end;

```

13.6 ADD_PARAMETER Procedure

This procedure adds a SQL parameter to the parameter collection. To use SQL parameters, prepare the array first, then use it in the execution call.

Syntax

```
procedure add_parameter (
    p_parameters in out nocopy t_parameters,
    p_name       in           t_column_name,
    p_value      in           varchar2 );

procedure add_parameter (
    p_parameters in out nocopy t_parameters,
    p_name       in           t_column_name,
    p_value      in           number );

procedure add_parameter (
    p_parameters in out nocopy t_parameters,
    p_name       in           t_column_name,
    p_value      in           date );

procedure add_parameter (
    p_parameters in out nocopy t_parameters,
    p_name       in           t_column_name,
    p_value      in           timestamp );

procedure add_parameter (
    p_parameters in out nocopy t_parameters,
    p_name       in           t_column_name,
    p_value      in           timestamp with time zone );

procedure add_parameter (
    p_parameters in out nocopy t_parameters,
    p_name       in           t_column_name,
    p_value      in           timestamp with local time zone );

procedure add_parameter (
    p_parameters in out nocopy t_parameters,
    p_name       in           t_column_name,
    p_value      in           interval year to month );

procedure add_parameter (
    p_parameters in out nocopy t_parameters,
    p_name       in           t_column_name,
    p_value      in           interval day to second );

procedure add_parameter (
    p_parameters in out nocopy t_parameters,
    p_name       in           t_column_name,
    p_value      in           blob );

procedure add_parameter (
    p_parameters in out nocopy t_parameters,
    p_name       in           t_column_name,
    p_value      in           bfile );

procedure add_parameter (
    p_parameters in out nocopy t_parameters,
```

```

        p_name      in          t_column_name,
        p_value     in          clob );

procedure add_parameter (
    p_parameters in out nocopy t_parameters,
    p_name      in          t_column_name,
    p_value     in          sys.anydata );

procedure add_parameter (
    p_parameters in out nocopy t_parameters,
    p_name      in          t_column_name,
    p_data_type in          t_data_type,
    p_value     in          t_value );

```

Parameters

Table 13-4 ADD_PARAMETER Procedure Parameters

Parameter	Description
p_parameters	SQL parameter array.
p_name	Parameter name.
p_value	Parameter value.

Example

```

declare
    l_parameters apex_exec.t_parameters;
begin
    apex_exec.add_parameter( l_parameters, 'ENAME', 'SCOTT' );
    apex_exec.add_parameter( l_parameters, 'SAL', 2000 );
    apex_exec.add_parameter( l_parameters, 'HIREDATE', sysdate );

    apex_exec.execute_remote_plsql(
        p_server_static_id => '{static ID of the REST Enabled SQL Service}',
        p_auto_bind_items => false,
        p_plsql_code       => q'#begin insert into emp values
(:ENAME, :SAL, :HIREDATE ); end;#',
        p_sql_parameters  => l_parameters );
end;

```

13.7 CLOSE Procedure

This procedure closes the query context and releases resources.



Note:

Ensure to always call this procedure after work has finished or an exception occurs.

Syntax

```

procedure close(
    p_context in t_context );

```

Parameters

Table 13-5 CLOSE Procedure Parameters

Parameter	Description
p_context	Context object obtained with one of the OPEN_functions.

13.8 EXECUTE_PLSQL Procedure

This procedure executes PL/SQL code based on the current process or plug-in location settings.

Syntax

```
procedure execute_plsql (
    p_plsql_code      in   varchar2,
    p_auto_bind_items in   boolean      default true,
    p_sql_parameters  in out t_parameters );
```

Parameters

Table 13-6 EXECUTE_PLSQL Procedure Parameters

Parameter	Description
p_plsql_code	PL/SQL code to be executed. Based on the settings of the current process or process-type plug-in, the code is executed locally or remote.
p_auto_bind_items	Whether to automatically bind page item values for IN *and* OUT direction. If the PL/SQL code references bind variables which are not page items, this must be set to false. Default: true
p_sql_parameters	Additional bind variables; if needed.

Examples

Example 1

Executes a PL/SQL block with arbitrary bind variables, so any bind can be used to pass values and to get values back.

```
declare
    l_sql_parameters apex_exec.t_parameters;
    l_out_value      varchar2(32767);
begin
    apex_exec.add_parameter( l_sql_parameters, 'MY_BIND_IN_VAR', '{some value}' );
    apex_exec.add_parameter( l_sql_parameters, 'MY_BIND_OUT_VAR', '' );

    apex_exec.execute_plsql(
        p_plsql_code      => q'#begin :MY_BIND_OUT_VAR := some_plsql( p_parameter
=> :MY_BIND_IN_VAR ); end;#',
        p_auto_bind_items => false,
        p_sql_parameters  => l_sql_parameters );
```



```

l_out_value := apex_exec.get_parameter_varchar2(
    p_parameters => l_sql_parameters,
    p_name       => 'MY_BIND_OUT_VAR');

-- further processing of l_out_value
end;

```

Example 2

Executes a PL/SQL block.

```

begin
    apex_exec.execute_plsql(
        p_plsql_code => q'#begin :P10_NEW_SAL := salary_pkg.raise_sal( p_empno
=> :P10_EMPNO ); end;#' );
end;

```

13.9 EXECUTE_REMOTE_PLSQL Procedure

This procedure executes PL/SQL code on a REST Enabled SQL instance.

Syntax

```

procedure execute_remote_plsql(
    p_server_static_id    in    varchar2,
    p_plsql_code          in    varchar2,
    p_auto_bind_items     in    boolean    default true,
    p_sql_parameters      in out t_parameters );

```

Parameters

Table 13-7 EXECUTE_REMOTE_PLSQL Procedure Parameters

Parameter	Description
p_server_static_id	Static ID of the ORDS REST Enabled SQL Instance.
p_plsql_code	PL/SQL code to be executed.
p_auto_bind_items	Whether to automatically bind page item values for IN *and* OUT direction. If the PL/SQL code references bind variables which are not page items, this must be set to FALSE. Default: TRUE
p_sql_parameters	Additional bind variables; if needed.

Examples

Example 1

Executes a PL/SQL block on a remote database.

```

begin
    apex_exec.execute_remote_plsql(
        p_server_static_id => '{Static ID of the REST Enabled SQL Service}',
        p_plsql_code       => q'#begin :P10_NEW_SAL := salary_pkg.raise_sal( p_empno
=> :P10_EMPNO ); end;#' );
end;

```

Example 2

Works with arbitrary bind variables, so any bind can be used to pass values to the REST Enabled SQL service and to get values back.

```

declare
    l_sql_parameters apex_exec.t_parameters;
    l_out_value      varchar2(32767);
begin
    apex_exec.add_parameter( l_sql_parameters, 'MY_BIND_IN_VAR', '{some
value}' );
    apex_exec.add_parameter( l_sql_parameters, 'MY_BIND_OUT_VAR',
''
    );

    apex_exec.execute_remote_plsql(
        p_server_static_id => '{Static ID of the REST Enabled SQL Service}',
        p_plsql_code       => q'#begin :MY_BIND_OUT_VAR :=
some_remote_plsql( p_parameter => :MY_BIND_IN_VAR ); end;#',
        p_auto_bind_items => false,
        p_sql_parameters  => l_sql_parameters );

    l_out_value := apex_exec.get_parameter_varchar2(
        p_parameters => l_sql_parameters,
        p_name       => 'MY_BIND_OUT_VAR');

    -- further processing of l_out_value
end;

```

13.10 EXECUTE_WEB_SOURCE Procedure

This procedure executes a web source operation based on module name, operation and URL pattern (if required). Use the `t_parameters` array to pass in values for declared web source parameters. Web Source invocation is done based on metadata defined in Shared Components.

Syntax

```

procedure execute_web_source (
    p_module_static_id in varchar2,
    p_operation        in varchar2,
    p_url_pattern      in varchar2      default null,
    p_parameters       in out t_parameters );

```

Parameters

Table 13-8 EXECUTE_WEB_SOURCE Procedure Parameters

Parameter	Description
<code>p_module_static_id</code>	Static ID of the web source module.
<code>p_operation</code>	Name of the operation, e.g. POST, GET, DELETE.
<code>p_url_pattern</code>	If multiple operations with the same name exist, specify the URL pattern, as defined in Shared Components, to identify the web source operation.
<code>p_parameters</code>	Parameter values to pass to the external web source.

Returns

Table 13-8 (Cont.) EXECUTE_WEB_SOURCE Procedure Parameters

Parameter	Description
p_parameters	Array with OUT parameter values, received from the web source module.

Example

This example assumes a REST service being created on the EMP table using ORDS and the "Auto-REST" feature (`ORDS.ENABLE_OBJECT`). Then a Web Source Module for this REST service is being created in Shared Components as "ORDS EMP".

The POST operation has the following "Request Body Template" defined:{"empno": "#EMPNO#", "ename": "#ENAME#", "job": "#JOB#", "sal": #SAL#}

Parameters are defined as follows:

Name	Direction	Type
EMPNO	IN	Request Body
ENAME	IN	Request Body
SAL	IN	Request Body
JOB	IN	Request Body
RESPONSE	OUT	Request Body
Content-Type	IN	HTTP Header

PL/SQL code to invoke that web source operation looks as follows:

```
declare
  l_params apex_exec.t_parameters;
begin
  apex_exec.add_parameter( l_params, 'ENAME', :P2_ENAME );
  apex_exec.add_parameter( l_params, 'EMPNO', :P2_EMPNO );
  apex_exec.add_parameter( l_params, 'SAL', :P2_SAL );
  apex_exec.add_parameter( l_params, 'JOB', :P2_JOB );

  apex_exec.execute_web_source(
    p_module_static_id => 'ORDS_EMP',
    p_operation         => 'POST',
    p_parameters        => l_params );

  :P2_RESPONSE := apex_exec.get_parameter_clob(l_params, 'RESPONSE');
end;
```

13.11 GET Functions

These functions retrieve column values. There is one function for each supported data type.

Syntax

```
function get_varchar2 (
  p_context      in t_context,
```

```

    p_column_idx in pls_integer ) return varchar2;

function get_number (
    p_context    in t_context,
    p_column_idx in pls_integer ) return number;

function get_date (
    p_context    in t_context,
    p_column_idx in pls_integer ) return date;

function get_timestamp (
    p_context    in t_context,
    p_column_idx in pls_integer ) return timestamp;

function get_timestamp_tz (
    p_context    in t_context,
    p_column_idx in pls_integer ) return timestamp with time zone;

function get_timestamp_ltz (
    p_context    in t_context,
    p_column_idx in pls_integer ) return timestamp with local time zone;

function get_clob (
    p_context    in t_context,
    p_column_idx in pls_integer ) return clob;

function get_intervald2s (
    p_context    in t_context,
    p_column_idx in pls_integer ) return interval day to second;

function get_intervaly2m (
    p_context    in t_context,
    p_column_idx in pls_integer ) return interval year to month;

```

Parameters

Table 13-9 GET Function Parameters

Parameter	Description
p_context	Context object obtained with one of the OPEN_ functions.
p_column_idx	Column index.

Returns

Column value as specific data type.

13.12 GET_COLUMN Function

This function returns detailed information about a result set column.

Syntax

```

function get_column(
    p_context    in t_context,
    p_column_idx in pls_integer ) return t_column;

```

Parameters**Table 13-10 GET_COLUMN Function Parameters**

Parameter	Description
p_context	Context object obtained with one of the OPEN_ functions.
p_column_idx	Index of the column to retrieve information for.

Returns

t_column object with column metadata.

13.13 GET_COLUMN_COUNT Function

This function returns the result column count for the current execution context.

Syntax

```
function get_column_count (
    p_context in t_context ) return pls_integer;
```

Parameters**Table 13-11 GET_COLUMN_COUNT Function Parameters**

Parameter	Description
p_context	Context object obtained with one of the OPEN_ functions.

Returns

Returns the result columns count.

13.14 GET_COLUMN_POSITION Function

This function returns the array index for a given column alias. In order to do this lookup operation only once, Oracle recommends you to use GET_COLUMN_POSITION function before entering the NEXT_ROW loop. This saves on computing resources.

Syntax

```
function get_column_position (
    p_context          in t_context,
    p_column_name      in varchar2,
    p_attribute_label  in varchar2 default null,
    p_is_required      in boolean   default false,
    p_data_type        in varchar2  default c_data_type_varchar2 )
    return pls_integer;
```

Parameters

Table 13-12 GET_COLUMN_POSITION Function Parameters

Parameter	Description
p_context	Context object obtained with one of the OPEN_ functions.
p_attribute_label	Attribute label to format error messages.
p_column_name	Column name.
p_is_required	Indicates whether this is a required column.
p_data_type	Indicates the requested data type.

Returns

The position of the column in the query result set. Throws an exception when p_is_required or p_data_type prerequisites are not met.

13.15 GET_PARAMETER Functions

These functions returns a SQL parameter value. Typically used to retrieve values for OUT binds of an executed SQL or PL/SQL statement.

Syntax

```
function get_parameter_varchar2(
    p_parameters    in t_parameters,
    p_name          in varchar2 ) return varchar2;

function get_parameter_number(
    p_parameters    in t_parameters,
    p_name          in varchar2 ) return number;

function get_parameter_date(
    p_parameters    in t_parameters,
    p_name          in varchar2 ) return date;

function get_parameter_timestamp(
    p_parameters    in t_parameters,
    p_name          in varchar2 ) return timestamp;

function get_parameter_timestamp_tz(
    p_parameters    in t_parameters,
    p_name          in varchar2 ) return timestamp with time zone;

function get_parameter_timestamp_ltz(
    p_parameters    in t_parameters,
    p_name          in varchar2 ) return timestamp with local time zone;

function get_parameter_clob(
    p_parameters    in t_parameters,
    p_name          in varchar2 ) return clob;

function get_parameter_interval_d2s(
    p_parameters    in t_parameters,
    p_name          in varchar2 ) return interval day to second;
```

```
function get_parameter_interval_y2m(
    p_parameters    in t_parameters,
    p_name          in varchar2 ) return interval year to month;
```

Parameters

Table 13-13 GET_PARAMETER Function Parameters

Parameter	Description
p_parameters	SQL parameter array.
p_name	Parameter name.

Returns

Parameter value

13.16 GET_TOTAL_ROW_COUNT Function

This function returns the total row count of the query result.

Syntax

```
function get_total_row_count (
    p_context in t_context ) return pls_integer;
```

Parameters

Table 13-14 GET_TOTAL_ROW_COUNT Function Parameters

Parameter	Description
p_context	Context object obtained with one of the OPEN_ functions.

Returns

The total row count; NULL if unknown.

13.17 IS_REMOTE_SQL_AUTH_VALID Function

This function checks whether the current authentication credentials are correct for the given REST Enabled SQL instance.

Syntax

```
function is_remote_sql_auth_valid(
    p_server_static_id in varchar2 ) return boolean;
```

Parameters

Table 13-15 IS_REMOTE_SQL_AUTH_VALID Function Parameters

Parameter	Description
p_server_static_id	Static ID of the REST enabled SQL instance.

Returns

Returns `true`, when credentials are correct, `false` otherwise.

Example

The following example requires a REST enabled SQL instance created as "My Remote SQL". It uses credentials stored as SCOTT_Credentials.

```
begin
  apex_credentials.set_session_credentials(
    p_application_id => {application-id},
    p_credential_name => 'SCOTT_Credentials',
    p_username       => 'SCOTT',
    p_password       => '*****' );
  if apex_exec.check_rest_enabled_sql_auth(
    p_server_static_id => 'My_Remote_SQL' )
  then
    sys.dbms_output.put_line( 'credentials are correct!');
  else
    sys.dbms_output.put_line( 'credentials are NOT correct!');
  end if;
end;
```

13.18 NEXT_ROW Function

This function advances the cursor of an open query context by one row. For Web Sources returning their data page-wise, additional pages are being fetched transparently.

Syntax

```
function next_row(
  p_context in t_context ) return boolean;
```

Parameters

Table 13-16 NEXT_ROW Function Parameters

Parameter	Description
p_context	Context object obtained with one of the OPEN_ functions.

Returns

Returns `false` when the end of the response has been reached, `true` otherwise.

13.19 OPEN_REMOTE_SQL_QUERY Function

This function opens a query context and executes the provided SQL query on the ORDS REST Enabled SQL instance.

Syntax

```
function open_remote_sql_query(
    p_server_static_id    in varchar2,
    p_sql_query           in varchar2,
    p_sql_parameters      in t_parameters default c_empty_parameters,
    p_auto_bind_items     in boolean      default true,
    --
    p_first_row           in pls_integer default null,
    p_max_rows            in pls_integer default null,
    --
    p_total_row_count     in boolean      default false,
    p_total_row_count_limit in pls_integer default null )
return t_context;
```

Parameters

Table 13-17 OPEN_REMOTE_SQL_QUERY Function Parameters

Parameter	Description
p_server_static_id	Static ID of the ORDS REST Enabled SQL Instance.
p_sql_query	SQL Query to execute.
p_sql_parameters	Bind variables to pass to the remote server.
p_auto_bind_items	Whether to auto-bind all page items.
p_first_row	First row to be fetched from the result set.
p_max_rows	Maximum amount of rows to be fetched.
p_total_row_count	Whether to determine the total row count.
p_total_row_count_limit	Upper boundary for total row count computation.

Returns

The context object representing a cursor for the web source query.

Example

The following example assumes a REST enabled ORDS instance to be configured in Shared Components with the static ID "My_Remote_SQL_Instance". Based on that, the example executes the query on the remote server and prints out the result set. This example code could be used Within a plug-in or within a "Execute PL/SQL" region.

```
declare
    l_context apex_exec.t_context;

    l_idx_empno    pls_integer;
    l_idx_ename    pls_integer;
    l_idx_job      pls_integer;
    l_idx_hiredate pls_integer;
    l_idx_mgr      pls_integer;
```

```

l_idx_sal      pls_integer;
l_idx_comm    pls_integer;
l_idx_deptno  pls_integer;

begin
  l_context := apex_exec.open_remote_sql_query(
    p_server_static_id => 'My_Remote_SQL_Instance',
    p_sql_query        => 'select * from emp' );

  l_idx_empno   := apex_exec.get_column_position( l_context, 'EMPNO' );
  l_idx_ename   := apex_exec.get_column_position( l_context, 'ENAME' );
  l_idx_job     := apex_exec.get_column_position( l_context, 'JOB' );
  l_idx_hiredate := apex_exec.get_column_position( l_context, 'HIREDATE' );
  l_idx_mgr     := apex_exec.get_column_position( l_context, 'MGR' );
  l_idx_sal     := apex_exec.get_column_position( l_context, 'SAL' );
  l_idx_comm    := apex_exec.get_column_position( l_context, 'COMM' );
  l_idx_deptno  := apex_exec.get_column_position( l_context, 'DEPTNO' );

  while apex_exec.next_row( l_context ) loop

    http.p( 'EMPNO: ' || apex_exec.get_number ( l_context, l_idx_empno ) );
    http.p( 'ENAME: ' || apex_exec.get_varchar2( l_context, l_idx_ename ) );
    http.p( 'MGR:   ' || apex_exec.get_number ( l_context, l_idx_mgr ) );

  end loop;

  apex_exec.close( l_context );
  return;
exception
  when others then
    apex_debug.log_exception;
    apex_exec.close( l_context );
  raise;
end;
```

13.20 OPEN_QUERY_CONTEXT Function

This function opens a query context based on the current region or process source.

Syntax

```

function open_query_context (
  p_columns          in t_columns      default c_empty_columns,
  --
  p_filters          in t_filters      default c_empty_filters,
  p_order_bys       in t_order_bys    default c_empty_order_bys,
  --
  p_first_row       in pls_integer    default null,
  p_max_rows        in pls_integer    default null,

  p_total_row_count in boolean        default false,
  p_total_row_count_limit in pls_integer default null,
  --
  p_select_all_query_cols in boolean  default false,
  --
  p_sql_parameters  in t_parameters   default c_empty_parameters,
  --
  p_set_session_state in boolean      default false) return t_context;
```

Parameters

Table 13-18 OPEN_QUERY_CONTEXT Function Parameters

Parameter	Description
p_columns	Columns to be selected from the data source.
p_filters	Filters to be used.
p_order_bys	Order by expressions to be used.
p_first_row	First row to be fetched.
p_max_rows	Maximum amount of rows to be fetched.
p_total_row_count	Whether to determine the total row count.
p_total_row_count_limit	Upper limit for the total row count computation.
p_select_all_query_cols	When set to TRUE, the columns passed in p_columns will be selected *in addition* to the columns of the data source. Useful to compute derived values.
p_sql_parameters	Bind variables to be used.
p_set_session_state	Whether to load column values for each row into session state. Important for Plug-In developers wanting to use column values for substitutions.

Returns

The context object representing a "cursor" for the query.

13.21 OPEN_WEB_SOURCE_QUERY Function

This function opens a Web Source query context. Based on the provided web source static ID, the operation matched to the `FETCH_COLLECTION` database operation will be selected.

Syntax

```
function open_web_source_query(
    p_module_static_id    in varchar2,
    p_parameters          in t_parameters default c_empty_parameters,
    --
    p_filters             in t_filters    default c_empty_filters,
    p_order_bys          in t_order_bys  default c_empty_order_bys,
    p_columns            in t_columns    default c_empty_columns,
    --
    p_first_row          in pls_integer  default null,
    p_max_rows           in pls_integer  default null,
    --
    p_external_filter_expr in varchar2    default null,
    p_external_order_by_expr in varchar2  default null,
    p_total_row_count     in boolean     default false )
return t_context;
```

Parameters

Table 13-19 OPEN_WEB_SOURCE_QUERY Function Parameters

Parameter	Description
p_module_static_id	Static ID of the web source module to invoke.
p_parameters	Parameter values to be passed to the web source.
p_filters	Filters to be passed to the web source.
p_order_bys	Order by expressions to be passed to the web source.
p_columns	Columns to be selected from the web source.
p_first_row	First row to be fetched from the web source.
p_max_rows	Maximum amount of rows to be fetched from the web source.
p_external_filter_expr	Filter expression to be passed 1:1 to the external web service. Depends on the actual web service being used.
p_external_order_by_expr	Order by expression to be passed 1:1 to the external web service. Depends on the actual web service being used.
p_total_row_count	whether to determine the total row count (only supported when the "allow fetch all rows" attribute is set to Yes).

Returns

The context object representing a "cursor" for the web source query

Example

The following example assumes a Web Source module with the static ID "USGS" to be created in Shared Components, based on the URL endpoint https://earthquake.usgs.gov/earthquakes/feed/v1.0/summary/all_day.geojson. The example invokes the REST service and prints out the result set. This example code could be used within a plug-in or within a "Execute PL/SQL" region.

```

declare
    l_context apex_exec.t_context;
    l_filters apex_exec.t_filters;
    l_columns apex_exec.t_columns;

    l_row      pls_integer := 1;

    l_magidx  pls_integer;
    l_titidx  pls_integer;
    l_plcidx  pls_integer;
    l_timidx  pls_integer;
    l_ididx   pls_integer;
begin
    l_context := apex_exec.open_web_source_query(
        p_module_static_id => 'USGS',
        p_max_rows         => 1000 );

    l_titidx := apex_exec.get_column_position( l_context, 'TITLE' );
    l_magidx := apex_exec.get_column_position( l_context, 'MAG' );
    l_plcidx := apex_exec.get_column_position( l_context, 'PLACE' );
    l_timidx := apex_exec.get_column_position( l_context, 'TIME' );
    l_ididx  := apex_exec.get_column_position( l_context, 'ID' );

```

```

while apex_exec.next_row( l_context ) loop

    http.p( 'ID:      ' || apex_exec.get_varchar2( l_context, l_ididx ) );
    http.p( 'MAG:     ' || apex_exec.get_varchar2( l_context, l_magidx ) );
    http.p( 'PLACE:    ' || apex_exec.get_varchar2( l_context, l_plcidx ) );
    http.p( 'TITLE:   ' || apex_exec.get_varchar2( l_context, l_titidx ) );
    http.p( 'TIME:    ' || apex_exec.get_varchar2( l_context, l_timidx ) );
end loop;

apex_exec.close( l_context );
exception
when others then
    apex_exec.close( l_context );
raise;
end;

```

13.22 PURGE_WEB_SOURCE_CACHE Procedure

This procedure purges the local cache for a Web Source module. The web source module must exist in the current application and identified by its static ID. If caching is disabled or no cache entries exist, nothing happens.

Syntax

```

procedure purge_web_source_cache(
    p_module_static_id    in varchar2,
    p_current_session_only in boolean default false );

```

Parameters

Table 13-20 PURGE_WEB_SOURCE_CACHE Procedure Parameters

Parameter	Description
p_module_static_id	Static ID of the web source module to invoke.
p_current_session_only	Specify true if you only want to purge entries that were saved for the current session. defaults to false.

Example

Purge cache for the Web Source Module with static ID "USGS" .

```

begin
    apex_exec.purge_web_source_cache(
        p_module_static_id => 'USGS' );
end;

```

14

APEX_EXPORT

The APEX_EXPORT package provides APIs to export the definitions of applications, files, feedback, and workspaces to text files. APEX_EXPORT uses utility types APEX_T_EXPORT_FILE and APEX_T_EXPORT_FILES. The APEX_T_EXPORT_FILE is a tuple of (name, contents) where name is the file name and contents is a clob containing the export object's definition. APEX_T_EXPORT_FILES is a table of APEX_T_EXPORT_FILE.

- [GET_APPLICATION Function](#) (page 14-1)
- [GET_WORKSPACE_FILES Function](#) (page 14-2)
- [GET_FEEDBACK Function](#) (page 14-3)
- [GET_WORKSPACE Function](#) (page 14-4)

14.1 GET_APPLICATION Function

This function exports the given application. Optionally, split the application definition into multiple files. The optional `p_with_*` parameters can be used to include additional information in the export.

Syntax

```
function get_application (  
    p_application_id      in number,  
    p_split              in boolean default false,  
    p_with_date          in boolean default false,  
    p_with_ir_public_reports in boolean default false,  
    p_with_ir_private_reports in boolean default false,  
    p_with_ir_notifications in boolean default false,  
    p_with_translations  in boolean default false,  
    p_with_pkg_app_mapping in boolean default false,  
    p_with_original_ids  in boolean default false,  
    p_with_no_subscriptions in boolean default false,  
    p_with_comments      in boolean default false,  
    p_with_supporting_objects in varchar2 default null,  
    p_with_acl_assignments in boolean default false)  
return wwv_flow_t_export_files;
```

Parameters

Table 14-1 GET_APPLICATION Function Parameters

Parameters	Description
<code>p_application_id</code>	The application id.
<code>p_split</code>	If true, split the definition into discrete elements that can be stored in separate files. If false, the result is a single file.
<code>p_with_date</code>	If true, include export date and time in the result.
<code>p_with_public_reports</code>	If true, include public reports that a user saved.

Table 14-1 (Cont.) GET_APPLICATION Function Parameters

Parameters	Description
<code>p_with_private_reports</code>	If <code>true</code> , include private reports that a user saved.
<code>p_with_notifications</code>	If <code>true</code> , include report notifications.
<code>p_with_translations</code>	If <code>true</code> , include application translation mappings and all text from the translation repository.
<code>p_with_pkg_app_mapping</code>	If <code>true</code> , export installed packaged applications with references to the packaged application definition. If <code>false</code> , export them as normal applications.
<code>p_with_original_ids</code>	If <code>true</code> , export with the IDs as they were when the application was imported.
<code>p_with_no_subscriptions</code>	If <code>true</code> , components contain subscription references.
<code>p_with_comments</code>	If <code>true</code> , include developer comments.
<code>p_with_supporting_objects</code>	If 'Y', export supporting objects. If 'I', automatically install on import. If 'N', do not export supporting objects. If <code>null</code> , the application's include in export deployment value is used.
<code>p_with_acl_assignments</code>	If <code>true</code> , export ACL user role assignments.

RETURNS

A table of `apex_t_export_file`. Unless the caller passes `p_split=>true` to the function, the result will be a single file.

Example

This sqlplus code fragment spools the definition of application 100 into file `f100.sql`.

```
variable name varchar2(255)
variable contents clob
declare
    l_files apex_t_export_files;
begin
    l_files := apex_export.get_application(p_application_id => 100);
    :name := l_files(1).name;
    :contents := l_files(1).contents;
end;
/
set feed off echo off head off flush off termout off trimspool on
set long 100000000 longchunksize 32767
col name new_val name
select :name name from sys.dual;
spool &name.
print contents
spool off
```

14.2 GET_WORKSPACE_FILES Function

This function exports the given workspace's static files.

Syntax

```
function get_workspace_files (
    p_workspace_id in number,
    p_with_date    in boolean default false )
return wwv_flow_t_export_files;
```

Parameters

Table 14-2 GET_WORKSPACE_FILES Function Parameters

Parameters	Description
p_workspace_id	The workspace id.
p_with_date	If true, include export date and time in the result.

RETURNS

A table of apex_t_export_file. The result is a single file, splitting into multiple files will be implemented in a future release.

Example

Export the workspace files of the workspace with id 12345678.

```
declare
    l_file apex_t_export_files;
begin
    l_file := apex_export.get_workspace(p_workspace_id => 12345678);
end;
```

14.3 GET_FEEDBACK Function

This function exports user feedback to the development environment or developer feedback to the deployment environment.

Syntax

```
function get_feedback (
    p_workspace_id    in number,
    p_with_date       in boolean default false,
    p_since            in date    default null,
    p_deployment_system in varchar2 default null )
return wwv_flow_t_export_files;
```

Parameters

Table 14-3 GET_FEEDBACK Function Parameters

Parameters	Description
p_workspace_id	The workspace id.
p_with_date	If true, include export date and time in the result.
p_since	If set, only export feedback that has been gathered since the given date.

Table 14-3 (Cont.) GET_FEEDBACK Function Parameters

Parameters	Description
p_deployment_system	If null, export user feedback. If not null, export developer feedback for the given deployment system.

RETURNS

A table of apex_t_export_file.

Examples**Example 1**

Export feedback to development environment.

```
declare
    l_file apex_t_export_files;
begin
    l_file := apex_export.get_feedback(p_workspace_id => 12345678);
end;
```

Example 2

Export developer feedback in workspace 12345678 since 8-MAR-2010 to deployment environment EA2.

```
declare
    l_file apex_t_export_files;
begin
    l_file := apex_export.get_feedback (
        p_workspace_id => 12345678,
        p_since => date'2010-03-08',
        p_deployment_system => 'EA2' );
end;
```

14.4 GET_WORKSPACE Function

This function exports the given workspace's definition and users. The optional p_with_% parameters which all default to false can be used to include additional information in the export.

Syntax

```
function get_workspace (
    p_workspace_id          in number,
    p_with_date             in boolean default false,
    p_with_team_development in boolean default false,
    p_with_misc             in boolean default false )
return wwv_flow_t_export_files;
```

Parameters

Table 14-4 GET_WORKSPACE Function Parameters

Parameters	Description
<code>p_workspace_id</code>	The workspace id.
<code>p_with_date</code>	If true, include export date and time in the result.
<code>p_with_team_development</code>	If true, include team development data.
<code>p_with_misc</code>	If true, include data from SQL Workshop, mail logs, etc. in the export.

Returns

A table of `apex_t_export_file`.

Examples

Export the definition of workspace #12345678.

```
declare
    l_file apex_t_export_files;
begin
    l_files := apex_export.get_workspace(p_workspace_id => 12345678);
end;
```

APEX_INSTANCE_ADMIN

The `APEX_INSTANCE_ADMIN` package provides utilities for managing an Oracle Application Express runtime environment. You use the `APEX_INSTANCE_ADMIN` package to get and set email settings, Oracle Wallet settings, report printing settings and to manage schema to workspace mappings. `APEX_INSTANCE_ADMIN` can be executed by the `SYS`, `SYSTEM`, and `APEX_050000` database users and any database user granted the role `APEX_ADMINISTRATOR_ROLE`.

- [Available Parameter Values](#) (page 15-2)
- [ADD_SCHEMA Procedure](#) (page 15-8)
- [ADD_WORKSPACE Procedure](#) (page 15-9)
- [CREATE_SCHEMA_EXCEPTION Procedure](#) (page 15-9)
- [FREE_WORKSPACE_APP_IDS Procedure](#) (page 15-10)
- [GET_PARAMETER Function](#) (page 15-11)
- [GET_SCHEMAS Function](#) (page 15-11)
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- [REMOVE_APPLICATION Procedure](#) (page 15-13)
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- [RESERVE_WORKSPACE_APP_IDS Procedure](#) (page 15-18)
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- [SET_PARAMETER Procedure](#) (page 15-20)
- [SET_WORKSPACE_CONSUMER_GROUP Procedure](#) (page 15-21)
- [TRUNCATE_LOG Procedure](#) (page 15-22)
- [UNRESTRICT_SCHEMA Procedure](#) (page 15-23)

15.1 Available Parameter Values

Table 15-1 (page 15-2) lists all the available parameter values you can set within the `APEX_INSTANCE_ADMIN` package, including parameters for email, wallet, and reporting printing.

Table 15-1 Available Parameters

Parameter Name	Description
<code>ACCOUNT_LIFETIME_DAYS</code>	The maximum number of days an end-user account password may be used before the account is expired.
<code>ALLOW_DB_MONITOR</code>	If set to <code>Y</code> , the default, database monitoring is enabled. If set to <code>N</code> , it is disabled.
<code>ALLOW_HOSTNAMES</code>	If set, users can only navigate to an application if the URL's hostname part contains this value. Instance administrators can configure more specific values at workspace level.
<code>ALLOW_PUBLIC_FILE_UPLOAD</code>	If set to <code>Y</code> , file uploads are allowed without user authentication. If set to <code>N</code> , the default, they are not allowed.
<code>ALLOW_RAS</code>	This parameter is only supported if running Oracle Database 12c. If set to <code>Y</code> , enable Real Application Security support for applications. If set to <code>N</code> (the default), Real Application Security cannot be used.
<code>ALLOW_REST</code>	If set to <code>Y</code> , the default, developers are allowed to expose report regions as RESTful services. If set to <code>N</code> , they are not allowed.
<code>APEX_BUILDER_AUTHENTICATION</code>	Controls the authentication scheme for the internal builder applications. Valid parameter values include: <ul style="list-style-type: none"> <code>APEX</code> - Application Express workspace accounts authentication (default) <code>DB</code> - Database accounts authentication <code>HEADER</code> - HTTP header variable based authentication <code>SSO</code> - Oracle Single Sign-On authentication <code>LDAP</code> - LDAP authentication
<code>APEX_REST_PATH_PREFIX</code>	Controls the URI path prefix used to access built-in RESTful Services exposed by Application Express. For example, built-in RESTful Service for referencing static application files using <code>#APP_IMAGES#</code> token. If the default prefix (<code>r</code>) conflicts with RESTful Services defined by users, adjust this preference to avoid the conflict.
<code>APPLICATION_ACTIVITY_LOGGING</code>	Controls instance wide setting of application activity log (<code>[A]</code> lways, <code>[N]</code> ever, <code>[U]</code> se application settings)
<code>APPLICATION_ID_MAX</code>	The largest possible ID for a worksheet or database application.
<code>APPLICATION_ID_MIN</code>	The smallest possible ID for a worksheet or database application.
<code>AUTOEXTEND_TABLESPACES</code>	If set to <code>Y</code> , the default, provisioned tablespaces is autoextended up to a maximum size. If set to <code>N</code> tablespaces are not autoextended.

Table 15-1 (Cont.) Available Parameters

Parameter Name	Description
BIGFILE_TABLESPACES_ENABLED	If set to Y , the tablespaces provisioned through Oracle Application Express are created as bigfile tablespaces. If set to N , the tablespaces are created as smallfile tablespaces.
CHECKSUM_HASH_FUNCTION	Defines the algorithm that is used to create one way hashes for URL checksums. Valid values are MD5 (deprecated), SH1 (SHA-1), SH256 (SHA-2, 256 bit), SH384 (SHA-2, 384 bit), SH512 (SHA-2, 512 bit) and null. The SHA-2 algorithms are only available on Oracle Database Release 12g and later. A null value evaluates to the most secure algorithm available and is the default.
CHECK_FOR_UPDATES	If set to N , the check for Oracle Application Express and Oracle REST Data Services product updates is disabled for the entire instance, regardless of preferences specified by individual developers. The default is Y .
DEBUG_MESSAGE_PAGE_VIEW_LIMIT	Maximum number of debug messages for a single page view. Default is 50000.
DELETE_UPLOADED_FILES_AFTER_DAYS	Uploaded files like application export files, websheet export files, spreadsheet data load files are automatically deleted after this number of days. Default is 14.
DISABLE_ADMIN_LOGIN	If set to Y , administration services are disabled. If set to N , the default, they are not disabled.
DISABLE_WORKSPACE_LOGIN	If set to Y , the workspace login is disabled. If set to N , the default, the login is not disabled.
DISABLE_WS_PROV	If set to Y , the workspace creation is disabled for requests sent out by using e-mail notification. If set to N , the default, they are not disabled.
EMAIL_IMAGES_URL	Specifies the full URL to the images directory of Application Express instance, including the trailing slash after the images directory. For example: <code>http://your_server/i/</code> This setting is used for Oracle Application Express system-generated emails.
EMAIL_INSTANCE_URL	Specifies the URL to Oracle Application Express instance, including the trailing slash after the Database Access Descriptor. For example: <code>http://your_server/pls/apex/</code> This setting used for Oracle Application Express system-generated emails.
ENABLE_TRANSACTIONAL_SQL	If set to Y , the default, transactional SQL commands are enabled on this instance. If set to N , they are not enabled.
ENCRYPTED_TABLESPACES_ENABLED	If set to Y , the tablespaces provisioned through Oracle Application Express are created as encrypted tablespaces. If set to N , the tablespaces are not encrypted.
EXPIRE_FND_USER_ACCOUNTS	If set to Y , expiration of Application Express accounts is enabled. If set to N , they are not enabled.

Table 15-1 (Cont.) Available Parameters

Parameter Name	Description
HTTP_ERROR_STATUS_ON_ERROR_PAG E_ENABLED	Used in conjunction with the APEX_INSTANCE_ADMIN.SET_PARAMETER procedure. If set to N, the default, Oracle Application Express presents an error page to the end user for all unhandled errors. If set to Y, returns an HTTP 400 status to the end user's client browser when the Application Express engine encounters an unhandled error.
HTTP_RESPONSE_HEADERS	List of http response headers, separated by newline (chr(10)). Application Express writes these headers on each request, before rendering the page. The substitution string #CDN# within the headers is replaced with the content delivery networks that are known to Application Express.
HTTP_STS_MAX_AGE	REQUIRE_HTTPS must be set to A for this parameter to be relevant. Application Express emits a Strict-Transport-Security header, with max-age=<value>, on HTTPS requests if HTTP_STS_MAX_AGE has a value greater than 0. If the request protocol is HTTP, instead of processing the request, Application Express redirects to a HTTPS URL.
INBOUND_PROXIES	Comma-separated list of IP addresses for proxy servers through which requests come in.
KEEP_SESSIONS_ON_UPGRADE	This flag affects application upgrades. If set to N, the default, delete sessions associated with the application. If set to Y, leave sessions unaffected.
LOGIN_THROTTLE_DELAY	The flag which determines the time increase in seconds after failed logins.
LOGIN_THROTTLE_METHODS	The methods to count failed logins. Colon-separated list of USERNAME_IP, USERNAME, IP.
MAX_SESSION_IDLE_SEC	The number of seconds an internal application may be idle.
MAX_SESSION_IDLE_SEC	The number of seconds an internal application may be idle.
MAX_SESSION_LENGTH_SEC	The number of seconds an internal application session may exist.
MAX_WEBSERVICE_REQUESTS	The maximum number of web service requests allowed for each workspace in a day.
PASSWORD_ALPHA_CHARACTERS	The alphabetic characters used for password complexity rules. Default list of alphabetic characters include the following: abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ YZ
PASSWORD_HASH_FUNCTION	Defines the algorithm that is used to create one way hashes for workspace user passwords. Valid values are MD5 (deprecated), SH1 (SHA-1), SH256 (SHA-2, 256 bit), SH384 (SHA-2, 384 bit), SH512 (SHA-2, 512 bit) and null. The SHA-2 algorithms are only available on Oracle Database Release 12g and later. A null value evaluates to the most secure algorithm available and is the default.

Table 15-1 (Cont.) Available Parameters

Parameter Name	Description
PASSWORD_HASH_ITERATIONS	Defines the number of iterations for the <code>PASSWORD_HASH_FUNCTION</code> (default 10000).
PASSWORD_HISTORY_DAYS	Defines the maximum number of days a developer or administrator account password may be used before the account expires. The default value is 45 days.
PASSWORD_PUNCTUATION_CHARACTER S	The punctuation characters used for password complexity rules. Default list of punctuation characters include the following: <code>!"#\$%&()``*+,-/;<=>?_</code>
PLSQL_EDITING	If set to <code>Y</code> , the default, the SQL Workshop Object Browser is enabled to allow users to edit and compile PL/SQL. If set to <code>N</code> , users are not allowed.
PRINT_BIB_LICENSED	Specify either standard support or advanced support. Advanced support requires an Oracle BI Publisher license. Valid values include: <ul style="list-style-type: none"> <code>APEX_LISTENER</code> - Requires Oracle Rest Data Services <code>ADVANCED</code> - Requires Oracle BI Publisher <code>STANDARD</code>
PRINT_SVR_HOST	Specifies the host address of the print server converting engine, for example, <code>localhost</code> . Enter the appropriate host address if the print server is installed at another location.
PRINT_SVR_PORT	Defines the port of the print server engine, for example 8888. Value must be a positive integer.
PRINT_SVR_PROTOCOL	Valid values include: <ul style="list-style-type: none"> <code>http</code> <code>https</code>
PRINT_SVR_SCRIPT	Defines the script that is the print server engine, for example: <pre>/xmlpserver/convert</pre>
QOS_MAX_SESSION_KILL_TIMEOUT	Number of seconds that an active old session can live, when <code>QOS_MAX_SESSION_REQUESTS</code> has been reached. The oldest database session with <code>LAST_CALL_ET</code> greater than <code>QOS_MAX_SESSION_KILL_TIMEOUT</code> is killed.
QOS_MAX_SESSION_REQUESTS	Number of allowed concurrent requests to one session associated with this workspace.
QOS_MAX_WORKSPACE_REQUESTS	Number of allowed concurrent requests to sessions in this workspace.
REQ_NEW_SCHEMA	If set to <code>Y</code> , the option for new schema for new workspace requests is enabled. If set to <code>N</code> , the default, the option is disabled.

Table 15-1 (Cont.) Available Parameters

Parameter Name	Description
REQUIRE_HTTPS	Set to A , to enforce HTTPS for the entire Application Express instance. Set to I , to enforce HTTPS within the Application Express development and administration applications. Set to N , to allow all applications to be used when the protocol is either HTTP or HTTPS. Please note developers can also enforce HTTPS at the application level, by setting the Secure attribute of an application scheme's cookie.
REQUIRE_HTTPS	Set to Y to allow authentication pages within the Application Express development and administration applications to be used only when the protocol is HTTPS. Select N to allow these application pages to be used when the protocol is either HTTP or HTTPS.
REQUIRE_VERIFICATION_CODE	If set to Y , the Verification Code is displayed and is required for someone to request a new workspace. If set to N , the default, the Verification Code is not required.
RESTFUL_SERVICES_ENABLED	If set to Y , the default, RESTful services development is enabled. If set to N , RESTful services are not enabled.
RM_CONSUMER_GROUP	If set, this is the resource manager consumer group to be used for all page events. A more specific group can be configured at workspace level.
SERVICE_REQUEST_FLOW	Determines default provisioning mode. Default is MANUAL .
SERVICE_REQUESTS_ENABLED	If set to Y , the default, workspace service requests for schemas, storage, and termination is enabled. If set to N , these requests are disabled.
SMTP_FROM	Defines the "from" address for administrative tasks that generate email, such as approving a provision request or resetting a password. Enter a valid email address, for example: <code>someone@somewhere.com</code>
SMTP_HOST_ADDRESS	Defines the server address of the SMTP server. If you are using another server as an SMTP relay, change this parameter to that server's address. Default setting: <code>localhost</code>
SMTP_HOST_PORT	Defines the port the SMTP server listens to for mail requests. Default setting: <code>25</code>
SMTP_PASSWORD	Defines the password Application Express takes to authenticate itself against the SMTP server, with the parameter <code>SMTP_USERNAME</code> .

Table 15-1 (Cont.) Available Parameters

Parameter Name	Description
SMTP_TLS_MODE	Defines whether Application Express opens an encrypted connection to the SMTP server. Encryption is only supported on database versions 11.2.0.2 and later. On earlier database versions, the connection is not encrypted. If set to N, the connection is unencrypted (default). If set to Y, the connection is encrypted before data is sent. If STARTTLS, Application Express sends the SMTP commands EHLO <SMTP_HOST_ADDRESS> and STARTTLS before encrypting the connection.
SMTP_USERNAME	Defines the username Application Express takes to authenticate itself against the SMTP server (default is null). Starting with database version 11.2.0.2, Application Express uses UTL_MAIL'S AUTH procedure for authentication. This procedure negotiates an authentication mode with the SMTP server. With earlier database versions, the authentication mode is always AUTH LOGIN. If SMTP_USERNAME is null, no authentication is used.
SQL_SCRIPT_MAX_OUTPUT_SIZE	The maximum allowable size for an individual script result. Default is 200000.
SSO_LOGOUT_URL	Defines the URL Application Express redirects to in order to trigger a logout from the Single Sign-On server. Application Express automatically appends "?p_done_url=...login url...". Example: https://login.mycompany.com/pls/orasso/orasso.wvssso_app_admin.ls_logout
STRONG_SITE_ADMIN_PASSWORD	If set to Y, the default, the apex_admin password must conform to the default set of strong complexity rules. If set to N, the password is not required to follow the strong complexity rules.
SYSTEM_HELP_URL	Location of the help and documentation accessed from the Help link within the development environment. Default is http://apex.oracle.com/doc41 .
TRACING_ENABLED	If set to Y (the default), an application with Debug enabled can also generate server side db trace files using &p_trace=YES on the URL. If set to N, the request to create a trace file is ignored.
USERNAME_VALIDATION	The regular expression used to validate a username if the Builder authentication scheme is not APEX. Default is as follows: ^[[:alnum:]]_%-]+@[[:alnum:]]-+\.[[:alpha:]]{2,4}\$
WALLET_PATH	The path to the wallet on the file system, for example: file:/home/<username>/wallets
WALLET_PWD	The password associated with the wallet.
WEBSERVICE_LOGGING	Controls instance wide setting of web service activity log ([A]lways, [N]ever, [U]se workspace settings).

Table 15-1 (Cont.) Available Parameters

Parameter Name	Description
WEBSHEET_SQL_ACCESS	If set to Y, the default, SQL tags and SQL reports are possible in Websheet applications. If set to N, they are not possible.
WORKSPACE_EMAIL_MAXIMUM	Maximum number of emails allowed to be sent by using APEX_MAIL per workspace in a 24 hour period. Default is 1000.
WORKSPACE_MAX_FILE_BYTES	The maximum number of bytes for uploaded files for a workspace. A setting at the workspace-level overrides the instance-level setting.
WORKSPACE_MAX_OUTPUT_SIZE	The maximum space allocated for script results. Default is 2000000.
WORKSPACE_PROVISION_DEMO_OBJECTS	If set to Y, the default, demonstration applications and database objects are created in new workspaces. If set to N, they are not created in the current workspace.
WORKSPACE_WEBSHEET_OBJECTS	If set to Y, the default, Application Express Websheet database objects are created in new workspaces. If set to N, they are not created in the current workspace.

15.2 ADD_SCHEMA Procedure

The ADD_SCHEMA procedure adds a schema to a workspace to schema mapping.

Syntax

```
APEX_INSTANCE_ADMIN.ADD_SCHEMA(
    p_workspace IN VARCHAR2,
    p_schema    IN VARCHAR2);
```

Parameters

Table 15-2 ADD_SCHEMA Parameters

Parameter	Description
p_workspace	The name of the workspace to which the schema mapping is added.
p_schema	The schema to add to the schema to workspace mapping.

Example

The following example demonstrates how to use the ADD_SCHEMA procedure to map a schema mapped to a workspace.

```
BEGIN
    APEX_INSTANCE_ADMIN.ADD_SCHEMA('MY_WORKSPACE', 'FRANK');
END;
```

15.3 ADD_WORKSPACE Procedure

The `ADD_WORKSPACE` procedure adds a workspace to an Application Express Instance.

Syntax

```
APEX_INSTANCE_ADMIN.ADD_WORKSPACE(
  p_workspace_id      IN NUMBER DEFAULT NULL,
  p_workspace         IN VARCHAR2,
  p_source_identifier IN VARCHAR2 DEFAULT NULL,
  p_primary_schema    IN VARCHAR2,
  p_additional_schemas IN VARCHAR2,
  p_rm_consumer_group IN VARCHAR2 DEFAULT NULL );
```

Parameters

Table 15-3 ADD_WORKSPACE Parameters

Parameter	Description
<code>p_workspace_id</code>	The ID to uniquely identify the workspace in an Application Express instance. This may be left null and a new unique ID is assigned.
<code>p_workspace</code>	The name of the workspace to be added.
<code>p_source_identifier</code>	A short identifier for the workspace used when synchronizing feedback between different instances.
<code>p_primary_schema</code>	The primary database schema to associate with the new workspace.
<code>p_additional_schemas</code>	A colon delimited list of additional schemas to associate with this workspace.
<code>p_rm_consumer_group</code>	Resource Manager consumer group which is used when executing applications of this workspace.

Example

The following example demonstrates how to use the `ADD_WORKSPACE` procedure to add a new workspace named `MY_WORKSPACE` using the primary schema, `SCOTT`, along with additional schema mappings for `HR` and `OE`.

```
BEGIN
  APEX_INSTANCE_ADMIN.ADD_WORKSPACE (
    p_workspace_id      => 8675309,
    p_workspace         => 'MY_WORKSPACE',
    p_primary_schema    => 'SCOTT',
    p_additional_schemas => 'HR:OE' );
END;
```

15.4 CREATE_SCHEMA_EXCEPTION Procedure

This procedure creates an exception which allows assignment of a restricted schema to a specific workspace.

Syntax

```
APEX_INSTANCE_ADMIN.CREATE_SCHEMA_EXCEPTION (
  p_schema    in varchar2,
  p_workspace in varchar2 );
```

Parameter**Table 15-4 CREATE_SCHEMA_EXCPETION Parameters**

Parameter	Description
p_schema	The schema.
p_workspace	The workspace.

Example

This example allows the assignment of restricted schema `HR` to workspace `HR_WORKSPACE`.

```
begin
  apex_instance_admin.create_schema_exception (
    p_schema    => 'HR',
    p_workspace => 'HR_WORKSPACE' );
  commit;
end;
```

15.5 FREE_WORKSPACE_APP_IDS Procedure

This procedure removes the reservation of application IDs for a given workspace ID. Use this procedure to undo a reservation, when the reservation is not necessary anymore because it happened by mistake or the workspace no longer exists. To reserve application IDs for a given workspace, see "[RESERVE_WORKSPACE_APP_IDS Procedure](#) (page 15-18)."

Syntax

```
APEX_INSTANCE_ADMIN.FREE_WORKSPACE_APP_IDS (
  p_workspace_id IN NUMBER );
```

Parameters**Table 15-5 FREE_WORKSPACE_APP_IDS Parameters**

Parameter	Description
p_workspace_id	The unique ID of the workspace.

Example

This example illustrates how to undo the reservation of application IDs that belong to a workspace with an ID of `1234567890`.

```
begin
  apex_instance_admin.free_workspace_app_ids(1234567890);
end;
```

15.6 GET_PARAMETER Function

The `GET_PARAMETER` function retrieves the value of a parameter used in administering a runtime environment.

Syntax

```
APEX_INSTANCE_ADMIN.GET_PARAMETER(
  p_parameter      IN VARCHAR2)
RETURN VARCHAR2;
```

Parameters

Table 15-6 GET_PARAMETER Parameters

Parameter	Description
<code>p_parameter</code>	The instance parameter to be retrieved. See " Available Parameter Values (page 15-2)".

Example

The following example demonstrates how to use the `GET_PARAMETER` function to retrieve the `SMTP_HOST_ADDRESS` parameter currently defined for an Oracle Application Express instance.

```
DECLARE
  L_VAL VARCHAR2(4000);
BEGIN
  L_VAL :=APEX_INSTANCE_ADMIN.GET_PARAMETER('SMTP_HOST_ADDRESS');
  DBMS_OUTPUT.PUT_LINE('The SMTP Host Setting Is: '||L_VAL);
END;
```

15.7 GET_SCHEMAS Function

The `GET_SCHEMAS` function retrieves a comma-delimited list of schemas that are mapped to a given workspace.

Syntax

```
APEX_INSTANCE_ADMIN.GET_SCHEMAS(
  p_workspace      IN VARCHAR2)
RETURN VARCHAR2;
```

Parameters

Table 15-7 GET_SCHEMAS Parameters

Parameter	Description
<code>p_workspace</code>	The name of the workspace from which to retrieve the schema list.

Example

The following example demonstrates how to use the `GET_SCHEMA` function to retrieve the underlying schemas mapped to a workspace.

```
DECLARE
    L_VAL VARCHAR2(4000);
BEGIN
    L_VAL :=APEX_INSTANCE_ADMIN.GET_SCHEMAS('MY_WORKSPACE');
    DBMS_OUTPUT.PUT_LINE('The schemas for my workspace: '||L_VAL);
END;
```

15.8 GET_WORKSPACE_PARAMETER

The `GET_WORKSPACE_PARAMETER` procedure gets the workspace parameter.

Syntax

```
get_workspace_parameter(
    p_workspace      IN VARCHAR2,
    p_parameter      IN VARCHAR2,
```

Parameters

Table 15-8 GET_WORKSPACE_PARAMETER Parameters

Parameter	Description
<code>p_workspace</code>	The name of the workspace to which you are getting the workspace parameter.
<code>p_parameter</code>	The parameter name that overrides the instance parameter value of the same name for this workspace. Parameter names include: <ul style="list-style-type: none"> • <code>ALLOW_HOSTNAMES</code> • <code>MAX_SESSION_IDLE_SEC</code> • <code>MAX_SESSION_LENGTH_SEC</code> • <code>QOS_MAX_WORKSPACE_REQUESTS</code> • <code>QOS_MAX_SESSION_REQUESTS</code> • <code>QOS_MAX_SESSION_KILL_TIMEOUT</code> • <code>RM_CONSUMER_GROUP</code> • <code>WORKSPACE_EMAIL_MAXIMUM</code> • <code>WORKSPACE_MAX_FILE_BYTES</code>

Example

The following example prints the value of `ALLOW_HOSTNAMES` for the HR workspace.

```
BEGIN
    DBMS_OUTPUT.PUT_LINE (
APEX_INSTANCE_ADMIN.GET_WORKSPACE_PARAMETER (
        p_workspace => 'HR',
        p_parameter => 'ALLOW_HOSTNAMES' ));
END;
```

15.9 REMOVE_APPLICATION Procedure

The REMOVE_APPLICATION procedure removes the application specified from the Application Express instance.

Syntax

```
APEX_INSTANCE_ADMIN.REMOVE_APPLICATION (  
    p_application_id IN NUMBER);
```

Parameters

Table 15-9 REMOVE_APPLICATION Parameters

Parameter	Description
p_application_id	The ID of the application to remove.

Example

The following example demonstrates how to use the REMOVE_APPLICATION procedure to remove an application with an ID of 100 from an Application Express instance.

```
BEGIN  
    APEX_INSTANCE_ADMIN.REMOVE_APPLICATION(100);  
END;
```

15.10 REMOVE_SAVED_REPORT Procedure

The REMOVE_SAVED_REPORT procedure removes a specific user's saved interactive report settings for a particular application.

Syntax

```
APEX_INSTANCE_ADMIN.REMOVE_SAVED_REPORT(  
    p_application_id    IN NUMBER,  
    p_report_id        IN NUMBER);
```

Parameters

Table 15-10 REMOVE_SAVED_REPORT Parameters

Parameter	Description
p_application_id	The ID of the application for which to remove user saved interactive report information.
p_report_id	The ID of the saved user interactive report to be removed.

Example

The following example demonstrates how to use the REMOVE_SAVED_REPORT procedure to remove user saved interactive report with the ID 123 for the application with an ID of 100.

```
BEGIN
  APEX_INSTANCE_ADMIN.REMOVE_SAVED_REPORT(100,123);
END;
```

15.11 REMOVE_SAVED_REPORTS Procedure

The `REMOVE_SAVED_REPORTS` procedure removes all user saved interactive report settings for a particular application or for the entire instance.

Syntax

```
APEX_INSTANCE_ADMIN.REMOVE_SAVED_REPORTS(
  p_application_id    IN NUMBER DEFAULT NULL);
```

Parameters

Table 15-11 REMOVE_SAVED_REPORTS Parameters

Parameter	Description
<code>p_application_id</code>	The ID of the application for which to remove user saved interactive report information. If this parameter is left null, all user saved interactive reports for the entire instance is removed.

Example

The following example demonstrates how to use the `REMOVE_SAVED_REPORTS` procedure to remove user saved interactive report information for the application with an ID of 100.

```
BEGIN
  APEX_INSTANCE_ADMIN.REMOVE_SAVED_REPORTS(100);
END;
```

15.12 REMOVE_SCHEMA Procedure

This `REMOVE_SCHEMA` procedure removes a workspace to schema mapping.

Syntax

```
APEX_INSTANCE_ADMIN.REMOVE_SCHEMA(
  p_workspace    IN VARCHAR2,
  p_schema       IN VARCHAR2);
```

Parameters

Table 15-12 REMOVE_SCHEMA Parameters

Parameter	Description
<code>p_workspace</code>	The name of the workspace from which the schema mapping is removed.
<code>p_schema</code>	The schema to remove from the schema to workspace mapping.

Example

The following example demonstrates how to use the `REMOVE_SCHEMA` procedure to remove the schema named `Frank` from the `MY_WORKSPACE` workspace to schema mapping.

```
BEGIN
  APEX_INSTANCE_ADMIN.REMOVE_SCHEMA('MY_WORKSPACE', 'FRANK');
END;
```

15.13 REMOVE_SCHEMA_EXCEPTION Procedure

This procedure removes an exception that allows the assignment of a restricted schema to a given workspace.

Syntax

```
APEX_INSTANCE_ADMIN.REMOVE_SCHEMA_EXCEPTION (
  p_schema      in varchar2,
  p_workspace   in varchar2 );
```

Parameter

Table 15-13 REMOVE_SCHEMA_EXCEPTION Parameters

Parameter	Description
<code>p_schema</code>	The schema.
<code>p_workspace</code>	The workspace.

Example

This example removes the exception that allows the assignment of schema `HR` to workspace `HR_WORKSPACE`.

```
begin
  apex_instance_admin.remove_schema_exception (
    p_schema      => 'HR',
    p_workspace   => 'HR_WORKSPACE' );
  commit;
end;
```

15.14 REMOVE_SCHEMA_EXCEPTIONS Procedure

This procedure removes all exceptions that allow the assignment of a given schema to workspaces.

Syntax

```
APEX_INSTANCE_ADMIN.REMOVE_SCHEMA_EXCEPTIONS (
  p_schema in varchar2 );
```

Parameter

Table 15-14 REMOVE_SCHEMA_EXCEPTIONS Parameter

Parameter	Description
p_schema	The schema.

Example

This example removes all exceptions that allow the assignment of the HR schema to workspaces.

```
begin
  apex_instance_admin.remove_schema_exceptions (
    p_schema => 'HR' );
  commit;
end;
```

15.15 REMOVE_SUBSCRIPTION Procedure

The REMOVE_SUBSCRIPTION procedure removes a specific interactive report subscription.

Syntax

```
APEX_INSTANCE_ADMIN.REMOVE_SUBSCRIPTION(
  p_subscription_id  IN NUMBER);
```

Parameters

Table 15-15 REMOVE_SUBSCRIPTION Procedure Parameters

Parameter	Description
p_subscription_id	The ID of the interactive report subscription to be removed.

Example

The following example demonstrates how to use the REMOVE_SUBSCRIPTION procedure to remove interactive report subscription with the ID 12345. Use of APEX_APPLICATION_PAGE_IR_SUB view can help identifying the subscription ID to remove.

```
BEGIN
  APEX_INSTANCE_ADMIN.REMOVE_SUBSCRIPTION (
    p_subscription_id => 12345);
END;
```

15.16 REMOVE_WORKSPACE Procedure

The REMOVE_WORKSPACE procedure removes a workspace from an Application Express instance.

Syntax

```
APEX_INSTANCE_ADMIN.REMOVE_WORKSPACE(
  p_workspace      IN VARCHAR2,
  p_drop_users     IN VARCHAR2 DEFAULT 'N',
  p_drop_tablespaces IN VARCHAR2 DEFAULT 'N' );
```

Parameters**Table 15-16 REMOVE_WORKSPACE Parameters**

Parameter	Description
p_workspace	The name of the workspace to be removed.
p_drop_users	'Y' to drop the database user associated with the workspace. The default is 'N'.
p_drop_tablespaces	'Y' to drop the tablespace associated with the database user associated with the workspace. The default is 'N'.

Example

The following example demonstrates how to use the `REMOVE_WORKSPACE` procedure to remove an existing workspace named `MY_WORKSPACE`, along with the associated database users and tablespace.

```
BEGIN
  APEX_INSTANCE_ADMIN.REMOVE_WORKSPACE('MY_WORKSPACE','Y','Y');
END;
```

15.17 REMOVE_WORKSPACE_EXCEPTIONS Procedure

This procedure removes all exceptions that allow the assignment of restricted schemas to given workspace.

Syntax

```
APEX_INSTANCE_ADMIN.REMOVE_WORKSPACE_EXCEPTIONS ( p_workspace in varchar2 );
```

Parameter**Table 15-17 REMOVE_WORKSPACE_EXCEPTIONS Parameter**

Parameter	Description
p_workspace	The workspace.

Example

This example removes all exceptions that allow the assignment of restricted schemas to `HR_WORKSPACE`.

```
begin apex_instance_admin.remove_schema_exceptions ( p_workspace =>
'HR_WORKSPACE' ); commit;end;
```

15.18 RESERVE_WORKSPACE_APP_IDS Procedure

This procedure permanently reserves the IDs of websheet and database applications in a given workspace. Even if the workspace and its applications get removed, developers can not create other applications with one of these IDs.

Syntax

```
APEX_INSTANCE_ADMIN.RESERVE_WORKSPACE_APP_IDS (
    p_workspace_id IN NUMBER );
```

Parameters

Table 15-18 RESERVE_WORKSPACE_APP_IDS Parameters

Parameter	Description
p_workspace_id	The unique ID of the workspace.

Example

This example demonstrates setting up two separate Application Express instances where the application IDs are limited to within a specific range. At a later point, a workspace and all of its applications are moved from instance 1 to instance 2. For the workspace that is moved, the developer reserves all of its application IDs to ensure that no applications with the same IDs are created on instance 1.

1. After setting up Application Express instance 1, ensure that application IDs are between 100000 and 199999.

```
begin
    apex_instance_admin.set_parameter('APPLICATION_ID_MIN', 100000);
    apex_instance_admin.set_parameter('APPLICATION_ID_MAX', 199999);
end;
```

2. After setting up Application Express instance 2, ensure that application IDs are between 200000 and 299999.

```
begin
    apex_instance_admin.set_parameter('APPLICATION_ID_MIN', 200000);
    apex_instance_admin.set_parameter('APPLICATION_ID_MAX', 299999);
end;
```

3. Later, the operations team decides that workspace `MY_WORKSPACE` with ID 1234567890 should be moved from instance 1 to instance 2. The required steps are:

- a. Export the workspace, applications and data on instance 1 (not shown here).

- b. Ensure that no other application on instance 1 can reuse application IDs of this workspace.

```
begin
    apex_instance_admin.reserve_workspace_app_ids(1234567890);
end;
```

- c. Drop workspace, accompanying data and users on instance 1.

```
begin
    apex_instance_admin.remove_workspace('MY_WORKSPACE');
end;
```

- d. Import the workspace, applications and data on instance 2 (not shown here).

15.19 RESTRICT_SCHEMA Procedure

This procedure revokes the privilege to assign a schema to workspaces.

Syntax

```
APEX_INSTANCE_ADMIN.RESTRICT_SCHEMA (  
    p_schema in varchar2 );
```

Parameter

Table 15-19 RESTRICT_SCHEMA Parameters

Parameter	Description
p_schema	The schema.

Example

This example revokes the privilege to assign schema HR to workspaces.

```
begin  
    apex_instance_admin.restrict_schema(p_schema => 'HR');  
    commit;  
end;
```

15.20 SET_LOG_SWITCH_INTERVAL Procedure

Set the log switch interval for each of the logs maintained by Application Express.

Syntax

```
APEX_INSTANCE_ADMIN.SET_LOG_SWITCH_INTERVAL(  
    p_log_name          IN VARCHAR2,  
    p_log_switch_after_days IN NUMBER );
```

Parameters

Table 15-20 SET_LOG_SWITCH_INTERVAL Parameters

Parameters	Description
p_log_name	Specifies the name of the log. Valid values include ACCESS, ACTIVITY, CLICKTHRU, and DEBUG.
p_log_switch_after_days	This interval must be a positive integer between 1 and 180.

Example

This example sets the log switch interval for the ACTIVITY log to 30 days.

```
begin  
    apex_instance_admin.set_log_switch_interval( p_log_name => 'ACTIVITY',  
    p_log_switch_after_days => 30 );
```

```

        commit;
    end;

```

15.21 SET_WORKSPACE_PARAMETER

The `SET_WORKSPACE_PARAMETER` procedure sets the designated workspace parameter.

Syntax

```

SET_WORKSPACE_PARAMETER(
    p_workspace      IN VARCHAR2,
    p_parameter      IN VARCHAR2,
    p_value          IN VARCHAR2 );

```

Parameters

Table 15-21 SET_WORKSPACE_PARAMETER Parameters

Parameter	Description
<code>p_workspace</code>	The name of the workspace to which you are setting the workspace parameter.
<code>p_parameter</code>	The parameter name which overrides the instance parameter value of the same for this workspace. Parameter names include: <ul style="list-style-type: none"> • <code>ALLOW_HOSTNAMES</code> • <code>MAX_SESSION_IDLE_SEC</code> • <code>MAX_SESSION_LENGTH_SEC</code> • <code>QOS_MAX_WORKSPACE_REQUESTS</code> • <code>QOS_MAX_SESSION_REQUESTS</code> • <code>QOS_MAX_SESSION_KILL_TIMEOUT</code> • <code>RM_CONSUMER_GROUP</code> • <code>WORKSPACE_EMAIL_MAXIMUM</code> • <code>WORKSPACE_MAX_FILE_BYTES</code>
<code>p_value</code>	The parameter value.

Example

The following example demonstrates how to use the `set_workspace_parameter` procedure to restrict URLs for accessing applications in the HR workspace that have `hr.example.com` in the hostname or domain name.

```

BEGIN
    apex_instance_admin.set_workspace_parameter (
        p_workspace => 'HR',
        p_parameter => 'ALLOW_HOSTNAMES' );
        p_value      => 'hr.example.com' );
END;

```

15.22 SET_PARAMETER Procedure

The `SET_PARAMETER` procedure sets a parameter used in administering a runtime environment. You must issue a commit for the parameter change to take affect.

Syntax

```
APEX_INSTANCE_ADMIN.SET_PARAMETER(
    p_parameter    IN VARCHAR2,
    p_value        IN VARCHAR2 DEFAULT 'N');
```

Parameters**Table 15-22 SET_PARAMETER Parameters**

Parameter	Description
p_parameter	The instance parameter to be set.
p_value	The value of the parameter. See " Available Parameter Values (page 15-2)".

Example

The following example demonstrates how to use the SET_PARAMETER procedure to set the SMTP_HOST_ADDRESS parameter for an Oracle Application Express instance.

```
BEGIN
    APEX_INSTANCE_ADMIN.SET_PARAMETER('SMTP_HOST_ADDRESS', 'mail.example.com');
    COMMIT;
END;
```

15.23 SET_WORKSPACE_CONSUMER_GROUP Procedure

The SET_WORKSPACE_CONSUMER_GROUP procedure sets a Resource Manager Consumer Group to a workspace.

Syntax

```
set_workspace_consumer_group(
    p_workspace in varchar2,
    p_rm_consumer_group in varchar2 );
```

Parameters**Table 15-23 SET_WORKSPACE_CONSUMER_GROUP Parameters**

Parameters	Description
p_workspace	This is the name of the workspace for which the resource consumer group is to be set.

Table 15-23 (Cont.) SET_WORKSPACE_CONSUMER_GROUP Parameters

Parameters	Description
p_rm_consumer_group	The parameter P_RM_CONSUMER_GROUP is the Oracle Database Resource Manager Consumer Group name. The consumer group does not have to exist at the time this procedure is invoked. But if the Resource Manager Consumer Group is set for a workspace and the consumer group does not exist, then an error will be raised when anyone attempts to login to this workspace or execute any application in the workspace. If the value of P_RM_CONSUMER_GROUP is null, then the Resource Manager consumer group associated with the specified workspace is cleared.

Example

The following example sets the workspace to the Resource Manager consumer group "CUSTOM_GROUP1":

```
begin
    apex_instance_admin.set_workspace_consumer_group(
        p_workspace => 'MY_WORKSPACE',
        p_rm_consumer_group => 'CUSTOM_GROUP1' );
    commit;
end;
/
```

15.24 TRUNCATE_LOG Procedure

The TRUNCATE_LOG procedure truncates the log entries specified by the input parameter.

Syntax

```
APEX_INSTANCE_ADMIN.TRUNCATE_LOG(
    p_log      IN VARCHAR2);
```


Parameters

Table 15-24 TRUNCATE_LOG Parameters

Parameter	Description
p_log	This parameter can have one of the following values: ACTIVITY - removes all entries that record page access. USER_ACCESS - removes all entries that record user login. MAIL - removes all entries that record mail sent. CLICKS - removes all entries that record clicks tracked to external sites. LOCK_INSTALL_SCRIPT - removes all entries that record developer locking of supporting objects script. LOCK_PAGE - removes all entries that record developer locking of pages. WORKSPACE_HIST - removes all entries that record daily workspace summary. PURGE - removes all entries that record automatic workspace purge activity. FILE - removes all entries that record automatic file purge activity. SCRIPT - removes all entries that record results of SQL scripts executed in SQL Workshop. SQL - removes all entries that record the history of commands executed in SQL Workshop SQL Commands

Example

The following example demonstrates how to use the `TRUNCATE_LOG` procedure to remove all log entries that record access to Application Express application pages.

```
BEGIN
  APEX_INSTANCE_ADMIN.TRUNCATE_LOG('ACTIVITY');
END;
```

15.25 UNRESTRICT_SCHEMA Procedure

This procedure re-grants the privilege to assign a schema to workspaces, if it has been revoked before.

Syntax

```
APEX_INSTANCE_ADMIN.UNRESTRICT_SCHEMA (
  p_schema in varchar2 );
```

Parameter

Table 15-25 RESTRICT_SCHEMA Parameters

Parameter	Description
p_schema	The schema.

Example

This example re-grants the privilege to assign schema HR to workspaces.

```
begin
  apex_instance_admin.unrestrict_schema(p_schema => 'HR');
  commit;
end;
```

16

APEX_IR

The `APEX_IR` package provides utilities you can use when programming in the Oracle Application Express environment related to interactive reports. You can use the `APEX_IR` package to get an interactive report runtime query based on local and remote data source, add filters, reset or clear report settings, delete saved reports and manage subscriptions.

- [ADD_FILTER Procedure Signature 1](#) (page 16-1)
- [ADD_FILTER Procedure Signature 2](#) (page 16-3)
- [CHANGE_SUBSCRIPTION_EMAIL Procedure](#) (page 16-4)
- [CHANGE_REPORT_OWNER Procedure](#) (page 16-5)
- [CHANGE_SUBSCRIPTION_EMAIL Procedure](#) (page 16-6)
- [CHANGE_SUBSCRIPTION_LANG Procedure](#) (page 16-6)
- [CLEAR_REPORT Procedure Signature 1](#) (page 16-7)
- [CLEAR_REPORT Procedure Signature 2](#) (page 16-8)
- [DELETE_REPORT Procedure](#) (page 16-9)
- [DELETE_SUBSCRIPTION Procedure](#) (page 16-9)
- [GET_LAST_VIEWED_REPORT_ID Function](#) (page 16-10)
- [GET_REPORT Function](#) (page 16-11)
- [RESET_REPORT Procedure Signature 1](#) (page 16-12)
- [RESET_REPORT Procedure Signature 2](#) (page 16-13)

16.1 ADD_FILTER Procedure Signature 1

This procedure creates a filter on an interactive report using a report ID.

Note:

The use of this procedure in a page rendering process causes report download issues (CSV, HTML, Email, and so on). When a user downloads the report, the interactive report reloads the page with download format in the `REQUEST` value. Any interactive report settings changes (such as add filter or reset report) are done in partial page refresh. Thus, the download data may not match the report data user is seeing. For this reason, Oracle recommends only using this procedure in a page submit process.

Syntax

```
APEX_IR.ADD_FILTER(
    p_page_id      IN NUMBER,
    p_region_id    IN NUMBER,
    p_report_column IN VARCHAR2,
    p_filter_value IN VARCHAR2,
    p_operator_abbr IN VARCHAR2 DEFAULT NULL,
    p_report_id    IN NUMBER DEFAULT NULL);
```

Parameters

Table 16-1 ADD_FILTER Procedure Signature 1 Parameters

Parameter	Description
p_page_id	Page of the current Application Express application that contains an interactive report.
p_region_id	The interactive report region (ID).
p_report_column	Name of the report SQL column, or column alias, to be filtered.
p_filter_value	The filter value. This value is not used for N and NN.
p_operator_abbr	Filter type. Valid values are as follows: EQ = Equals NEQ = Not Equals LT = Less than LTE = Less then or equal to GT = Greater Than GTE = Greater than or equal to LIKE = SQL Like operator NLIKE = Not Like N = Null NN = Not Null C = Contains NC = Not Contains IN = SQL In Operator NIN = SQL Not In Operator
p_report_id	The saved report ID within the current application page. If p_report_id is null, it adds the filter to the last viewed report settings.

Example

The following example shows how to use the `ADD_FILTER` procedure to filter the interactive report with report ID of 880629800374638220 in page 1, region 2505704029884282 of the current application with `DEPTNO` equals 30.

```
BEGIN
    APEX_IR.ADD_FILTER(
        p_page_id      => 1,
        p_region_id    => 2505704029884282,
        p_report_column => 'DEPTNO',
        p_filter_value => '30',
        p_operator_abbr => 'EQ',
```

```
        p_report_id    => 880629800374638220);  
END;
```

16.2 ADD_FILTER Procedure Signature 2

This procedure creates a filter on an interactive report using a report alias.

Note:

The use of this procedure in a page rendering process causes report download issues (CSV, HTML, Email, and so on). When a user downloads the report, the interactive report reloads the page with download format in the REQUEST value. Any interactive report settings changes (such as add filter or reset report) are done in partial page refresh. Thus, the download data may not match the report data user is seeing. For this reason, Oracle recommends only using this procedure in a page submit process.

Syntax

```
APEX_IR.ADD_FILTER(  
    p_page_id        IN NUMBER,  
    p_region_id      IN NUMBER,  
    p_report_column  IN VARCHAR2,  
    p_filter_value   IN VARCHAR2,  
    p_operator_abbr  IN VARCHAR2 DEFAULT NULL,  
    p_report_alias   IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 16-2 ADD_FILTER Procedure Signature 2

Parameter	Description
p_page_id	Page of the current Application Express application that contains an interactive report.
p_region_id	The interactive report region (ID).
p_report_column	Name of the report SQL column, or column alias, to be filtered.
p_filter_value	This is the filter value. This value is not used for N and NN.

Table 16-2 (Cont.) ADD_FILTER Procedure Signature 2

Parameter	Description
p_operator_abbr	Filter type. Valid values are as follows: EQ = Equals NEQ = Not Equals LT = Less than LTE = Less then or equal to GT = Greater Than GTE = Greater than or equal to LIKE = SQL Like operator NLIKE = Not Like N = Null NN = Not Null C = Contains NC = Not Contains IN = SQL In Operator NIN = SQL Not In Operator
p_report_alias	The saved report alias within the current application page. If p_report_alias is null, it adds filter to the last viewed report settings.

Example

The following example shows how to use the `ADD_FILTER` procedure to filter an interactive report with a report alias of `CATEGORY_REPORT` in page 1, region 2505704029884282 of the current application with `DEPTNO` equals 30.

```
BEGIN
  APEX_IR.ADD_FILTER(
    p_page_id      => 1,
    p_region_id    => 2505704029884282,
    p_report_column => 'DEPTNO',
    p_filter_value => '30',
    p_operator_abbr => 'EQ',
    p_report_alias => 'CATEGORY_REPORT');
END;
```

16.3 CHANGE_SUBSCRIPTION_EMAIL Procedure

This procedure changes interactive report subscriptions email address. When an email is sent out, the subscription sends message to the defined email address.

Syntax

```
APEX_IR.CHANGE_SUBSCRIPTION_EMAIL (
  p_subscription_id  IN NUMBER,
  p_email_address    IN VARCHAR2);
```

Parameters

Table 16-3 CHANGE_SUBSCRIPTION_EMAIL Parameters

Parameter	Description
p_subscription_id	Subscription ID to change the email address within the current workspace.
p_email_address	The new email address to change to. The email address needs to be a valid email syntax and cannot be set to null.

Example

The following example shows how to use CHANGE_SUBSCRIPTION_EMAIL procedure to change the email address to `some.user@somecompany.com` for the interactive report subscription `956136850459718525`.

```
BEGIN
  APEX_IR.CHANGE_SUBSCRIPTION_EMAIL (
    p_subscription_id => 956136850459718525,
    p_email_address => 'some.user@somecompany.com');
END;
```

16.4 CHANGE_REPORT_OWNER Procedure

This procedure changes the owner of a saved interactive report using a report ID. This procedure cannot change the owner of default interactive reports.

Syntax

```
APEX_IR.CHANGE_REPORT_OWNER (
  p_report_id    in number,
  p_old_owner    in varchar2,
  p_new_owner    in varchar2);
```

Parameters

Table 16-4 CHANGE_REPORT_OWNER Procedure

Parameters	Description
p_report_id	The saved report ID within the current application page.
p_old_owner	The previous owner name to change from (case sensitive). The owner needs to a valid login user accessing the report.
p_new_owner	The new owner name to change to (case sensitive). The owner must be a valid login user accessing the report.

Example

This example shows how to use CHANGE_REPORT_OWNER procedure to change the old owner name of `JOHN` to the new owner name of `JOHN.DOE` for a saved report. The saved report has a report ID of `1235704029884282`.

```
BEGIN
  APEX_IR.CHANGE_REPORT_OWNER (
```

```
p_report_id    => 1235704029884282,  
p_old_owner   => 'JOHN',  
p_new_owner   => 'JOHN.DOE');  
END;
```

16.5 CHANGE_SUBSCRIPTION_EMAIL Procedure

This procedure changes interactive report subscriptions email address. When an email is sent out, the subscription sends message to the defined email address.

Syntax

```
APEX_IR.CHANGE_SUBSCRIPTION_EMAIL (  
    p_subscription_id    IN NUMBER,  
    p_email_address      IN VARCHAR2);
```

Parameters

Table 16-5 CHANGE_SUBSCRIPTION_EMAIL Parameters

Parameter	Description
p_subscription_id	Subscription ID to change the email address within the current workspace.
p_email_address	The new email address to change to. The email address needs to be a valid email syntax and cannot be set to null.

Example

The following example shows how to use CHANGE_SUBSCRIPTION_EMAIL procedure to change the email address to `some.user@somecompany.com` for the interactive report subscription 956136850459718525.

```
BEGIN  
    APEX_IR.CHANGE_SUBSCRIPTION_EMAIL (  
        p_subscription_id => 956136850459718525,  
        p_email_address => 'some.user@somecompany.com');  
END;
```

16.6 CHANGE_SUBSCRIPTION_LANG Procedure

This procedure changes the interactive report subscription language.

Syntax

```
APEX_IR.CHANGE_SUBSCRIPTION_LANG(  
    p_subscription_id IN NUMBER,  
    p_language        IN VARCHAR2);
```


Parameters

Table 16-6 CHANGE_SUBSCRIPTION_LANG Procedure Parameters

Parameter	Description
p_subscription_id	Subscription ID to change the language within the current workspace.
p_language	This is an IANA language code. Some examples include: en, de, de-at, zh-cn, and pt-br.

Example

The following example shows how to use the `CHANGE_SUBSCRIPTION_LANG` procedure to change the subscription with the ID of 567890123 to German in the current workspace.

```
BEGIN
  APEX_IR.CHANGE_SUBSCRIPTION_LANG(
    p_subscription_id => 567890123,
    p_language       => 'de');
END;
```

16.7 CLEAR_REPORT Procedure Signature 1

This procedure clears report settings using the report ID.

Note:

The use of this procedure in a page rendering process causes report download issues (CSV, HTML, Email, and so on). When a user downloads the report, the interactive report reloads the page with download format in the REQUEST value. Any interactive report settings changes (such as add filter or reset report) are done in partial page refresh. Thus, the download data may not match the report data user is seeing. For this reason, Oracle recommends only using this procedure in a page submit process.

Syntax

```
APEX_IR.CLEAR_REPORT(
  p_page_id   IN NUMBER,
  p_region_id IN NUMBER,
  p_report_id IN NUMBER DEFAULT NULL);
```

Parameters

Table 16-7 CLEAR_REPORT Procedure Signature 1 Parameters

Parameter	Description
p_page_id	Page of the current Application Express application that contains an interactive report.

Table 16-7 (Cont.) CLEAR_REPORT Procedure Signature 1 Parameters

Parameter	Description
p_region_id	The interactive report region (ID).
p_report_id	The saved report ID within the current application page. If p_report_id is null, it clears the last viewed report settings.

Example

The following example shows how to use the `CLEAR_REPORT` procedure to clear interactive report settings with a report ID of 880629800374638220 in page 1, region 2505704029884282 of the current application.

```
BEGIN
  APEX_IR.CLEAR_REPORT(
    p_page_id      => 1,
    p_region_id    => 2505704029884282,
    p_report_id    => 880629800374638220);
END;
```

16.8 CLEAR_REPORT Procedure Signature 2

This procedure clears report settings using report alias.

**Note:**

The use of this procedure in a page rendering process causes report download issues (CSV, HTML, Email, and so on). When a user downloads the report, the interactive report reloads the page with download format in the REQUEST value. Any interactive report settings changes (such as add filter or reset report) are done in partial page refresh. Thus, the download data may not match the report data user is seeing. For this reason, Oracle recommends only using this procedure in a page submit process.

Syntax

```
APEX_IR.CLEAR_REPORT(
  p_page_id      IN NUMBER,
  p_region_id    IN NUMBER,
  p_report_alias IN VARCHAR2 DEFAULT NULL);
```

Parameters**Table 16-8 CLEAR_REPORT Procedure Signature 2 Parameters**

Parameter	Description
p_page_id	Page of the current Application Express application that contains an interactive report.
p_region_id	The interactive report region (ID).

Table 16-8 (Cont.) CLEAR_REPORT Procedure Signature 2 Parameters

Parameter	Description
p_report_alias	The saved report alias within the current application page. If p_report_alias is null, it clears the last viewed report settings.

Example

The following example shows how to use the `CLEAR_REPORT` procedure to clear interactive report settings with report alias of `CATEGORY_REPORT` in page 1, region 2505704029884282 of the current application.

```
BEGIN
  APEX_IR.CLEAR_REPORT(
    p_page_id      => 1,
    p_region_id    => 2505704029884282,
    p_report_alias => 'CATEGORY_REPORT');
END;
```

16.9 DELETE_REPORT Procedure

This procedure deletes saved interactive reports. It deletes a specific saved report in the current logged in workspace and application.

Syntax

```
APEX_IR.DELETE_REPORT(
  p_report_id IN NUMBER);
```

Parameters**Table 16-9 DELETE_REPORT Procedure Parameters**

Parameter	Description
p_report_id	Report ID to delete within the current Application Express application.

Example

The following example shows how to use the `DELETE_REPORT` procedure to delete the saved interactive report with ID of 880629800374638220 in the current application.

```
BEGIN
  APEX_IR.DELETE_REPORT (
    p_report_id => 880629800374638220);
END;
```

16.10 DELETE_SUBSCRIPTION Procedure

This procedure deletes interactive report subscriptions.

Syntax

```
APEX_IR.DELETE_SUBSCRIPTION(
    p_subscription_id IN NUMBER);
```

Parameters**Table 16-10 DELETE_SUBSCRIPTION Procedure Parameters**

Parameter	Description
p_subscription_id	Subscription ID to delete within the current workspace.

Example

The following example shows how to use the `DELETE_SUBSCRIPTION` procedure to delete the subscription with ID of 567890123 in the current workspace.

```
BEGIN
    APEX_IR.DELETE_SUBSCRIPTION(
        p_subscription_id => 567890123);
END;
```

16.11 GET_LAST_VIEWED_REPORT_ID Function

This function returns the last viewed base report ID of the specified page and region.

Syntax

```
APEX_IR.GET_LAST_VIEWED_REPORT_ID(
    p_page_id IN NUMBER,
    p_region_id IN NUMBER);
```

Parameters**Table 16-11 GET_LAST_VIEWED_REPORT_ID Function Parameters**

Parameter	Description
p_page_id	Page of the current Application Express application that contains an interactive report.
p_region_id	The interactive report region ID.

Example

The following example shows how to use the `GET_LAST_VIEWED_REPORT_ID` function to retrieve the last viewed report ID in page 1, region 2505704029884282 of the current application.

```
DECLARE
    l_report_id number;
BEGIN
    l_report_id := APEX_IR.GET_LAST_VIEWED_REPORT_ID (
        p_page_id => 1,
        p_region_id => 2505704029884282);
END;
```

16.12 GET_REPORT Function

This function returns an interactive report runtime query.

Syntax

```
APEX_IR.GET_REPORT(
  p_page_id   IN NUMBER,
  p_region_id IN NUMBER,
  p_report_id IN NUMBER DEFAULT NULL,
  p_view      IN VARCHAR2 DEFAULT C_VIEW_REPORT );
```

Parameters

Table 16-12 GET_REPORT Function Parameters

Parameter	Description
p_page_id	Page of the current Application Express application that contains an interactive report.
p_region_id	The interactive report region ID.
p_report_id	The saved report ID within the current application page. If p_report_id is null, it gets last viewed report query.
p_view	The view type available for the report. The values can be APEX_IR.C_VIEW_REPORT, APEX_IR.C_VIEW_GROUPBY or APEX_IR.C_VIEW_PIVOT. If p_view is null, it gets the view currently used by the report. If p_view passed which doesn't exist for the current report, an error is raised.

Example 1

The following example shows how to use the GET_REPORT function to retrieve the runtime report query with bind variable information with report ID of 880629800374638220 in page 1, region 2505704029884282 of the current application.

```
DECLARE
  l_report apex_ir.t_report;
  l_query varchar2(32767);
BEGIN
  l_report := APEX_IR.GET_REPORT (
    p_page_id => 1,
    p_region_id => 2505704029884282,
    p_report_id => 880629800374638220);
  l_query := l_report.sql_query;
  sys.htp.p('Statement = '||l_report.sql_query);
  for i in 1..l_report.binds.count
  loop
    sys.htp.p(i||'. '||l_report.binds(i).name||' = '||l_report.binds(i).value);
  end loop;
END;
```

Example 2

The following example shows how to use the GET_REPORT function to retrieve Group By view query defined in the current report page with region 2505704029884282.

```

DECLARE
    l_report APEX_IR.T_REPORT;
BEGIN
    l_report := APEX_IR.GET_REPORT (
        p_page_id      => :APP_PAGE_ID,
        p_region_id    => 2505704029884282,
        p_view         => APEX_IR.C_VIEW_GROUPBY );
    sys.http.p( 'Statement = '||l_report.sql_query );
END;

```

16.13 RESET_REPORT Procedure Signature 1

This procedure resets report settings to the developer defined default settings using the report ID.

Note:

The use of this procedure in a page rendering process causes report download issues (CSV, HTML, Email, and so on). When a user downloads the report, the interactive report reloads the page with download format in the REQUEST value. Any interactive report settings changes (such as add filter or reset report) are done in partial page refresh. Thus, the download data may not match the report data user is seeing. For this reason, Oracle recommends only using this procedure in a page submit process.

Syntax

```

APEX_IR.RESET_REPORT(
    p_page_id  IN NUMBER,
    p_region_id IN NUMBER,
    p_report_id IN NUMBER DEFAULT NULL);

```

Parameters

Table 16-13 RESET_REPORT Procedure Signature 1 Parameters

Parameter	Description
p_page_id	Page of the current Application Express application that contains an interactive report.
p_region_id	The interactive report region ID.
p_report_id	The saved report ID within the current application page. If p_report_id is null, it resets the last viewed report settings.

Example

The following example shows how to use the RESET_REPORT procedure signature 1 to reset interactive report settings with report ID of 880629800374638220 in page 1, region 2505704029884282 of the current application.

```

BEGIN
    APEX_IR.RESET_REPORT(
        p_page_id      => 1,
        p_region_id    => 2505704029884282,

```

```

        p_report_id => 880629800374638220);
END;
```

16.14 RESET_REPORT Procedure Signature 2

This procedure resets report settings using the report alias.

Note:

The use of this procedure in a page rendering process causes report download issues (CSV, HTML, Email, and so on). When a user downloads the report, the interactive report reloads the page with download format in the REQUEST value. Any interactive report settings changes (such as add filter or reset report) are done in partial page refresh. Thus, the download data may not match the report data user is seeing. For this reason, Oracle recommends only using this procedure in a page submit process.

Syntax

```

APEX_IR.RESET_REPORT(
    p_page_id      IN NUMBER,
    p_region_id    IN NUMBER,
    p_report_alias IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 16-14 RESET_REPORT Procedure Signature 2 Parameters

Parameter	Description
p_page_id	Page of the current Application Express application that contains an interactive report.
p_region_id	The interactive report region ID.
p_report_alias	The saved report alias within the current application page. If p_report_alias is null, it resets the last viewed report settings.

Example

The following example shows how to use the RESET_REPORT procedure to reset interactive report settings with a report alias of CATEGORY_REPORT in page 1, region 2505704029884282 of the current application.

```

BEGIN
    APEX_IR.RESET_REPORT(
        p_page_id      => 1,
        p_region_id    => 2505704029884282,
        p_report_alias => 'CATEGORY_REPORT');
END;
```

17

APEX_ITEM

You can use the `APEX_ITEM` package to create form elements dynamically based on a SQL query instead of creating individual items page by page.

- [CHECKBOX2 Function](#) (page 17-1)
- [DATE_POPUP Function](#) (page 17-3)
- [DATE_POPUP2 Function](#) (page 17-4)
- [DISPLAY_AND_SAVE Function](#) (page 17-5)
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- [POPUP_FROM_LOV Function](#) (page 17-9)
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- [TEXTAREA Function](#) (page 17-24)
- [TEXT_FROM_LOV Function](#) (page 17-25)
- [TEXT_FROM_LOV_QUERY Function](#) (page 17-26)

17.1 CHECKBOX2 Function

This function creates check boxes.

Syntax

```
APEX_ITEM.CHECKBOX2(  
  p_idx                IN    NUMBER,  
  p_value              IN    VARCHAR2 DEFAULT NULL,  
  p_attributes         IN    VARCHAR2 DEFAULT NULL,  
  p_checked_values    IN    VARCHAR2 DEFAULT NULL,
```



```

p_checked_values_delimiter IN VARCHAR2 DEFAULT ':',
p_item_id                  IN VARCHAR2 DEFAULT NULL,
p_item_label               IN VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;

```

Parameters

Table 17-1 CHECKBOX2 Parameters

Parameter	Description
p_idx	Number that determines which APEX_APPLICATION global variable is used. Valid range of values is 1 to 50. For example 1 creates F01 and 2 creates F02
p_value	Value of a check box, hidden field, or input form item
p_attributes	Controls the size of the text field
p_checked_values	Values to be checked by default
p_checked_values_delimiter	Delimits the values in the previous parameter, p_checked_values
p_item_id	HTML attribute ID for the <input> tag
p_item_label	Invisible label created for the item

Examples of Default Check Box Behavior

The following example demonstrates how to create a selected check box for each employee in the emp table.

```

SELECT APEX_ITEM.CHECKBOX2(1,empno,'CHECKED') "Select",
       ename, job
FROM   emp
ORDER BY 1

```

The following example demonstrates how to have all check boxes for employees display without being selected.

```

SELECT APEX_ITEM.CHECKBOX2(1,empno) "Select",
       ename, job
FROM   emp
ORDER BY 1

```

The following example demonstrates how to select the check boxes for employees who work in department 10.

```

SELECT APEX_ITEM.CHECKBOX2(1,empno,DECODE(deptno,10,'CHECKED',NULL)) "Select",
       ename, job
FROM   emp
ORDER BY 1

```

The next example demonstrates how to select the check boxes for employees who work in department 10 or department 20.

```

SELECT APEX_ITEM.CHECKBOX2(1,deptno,NULL,'10:20',':') "Select",
       ename, job
FROM   emp
ORDER BY 1

```

Creating an On-Submit Process

If you are using check boxes in your application, you might need to create an On Submit process to perform a specific type of action on the selected rows. For example, you could have a Delete button that uses the following logic:

```
SELECT APEX_ITEM.CHECKBOX2(1,empno) "Select",
       ename, job
FROM   emp
ORDER BY 1
```

Consider the following sample on-submit process:

```
FOR I in 1..APEX_APPLICATION.G_F01.COUNT LOOP
    DELETE FROM emp WHERE empno = to_number(APEX_APPLICATION.G_F01(i));
END LOOP;
```

The following example demonstrates how to create unselected checkboxes for each employee in the emp table, with a unique ID. This is useful for referencing records from within JavaScript code:

```
SELECT APEX_ITEM.CHECKBOX2(1,empno,NULL,NULL,NULL, 'f01_#ROWNUM#') "Select",
       ename, job
FROM   emp
ORDER BY 1
```

17.2 DATE_POPUP Function

Use this function with forms that include date fields. The `DATE_POPUP` function dynamically generates a date field that has a popup calendar button.

Syntax

```
APEX_ITEM.DATE_POPUP(
    p_idx           IN      NUMBER,
    p_row          IN      NUMBER,
    p_value        IN      VARCHAR2 DEFAULT NULL,
    p_date_format  IN      DATE DEFAULT 'DD-MON-YYYY',
    p_size         IN      NUMBER DEFAULT 20,
    p_maxlength   IN      NUMBER DEFAULT 2000,
    p_attributes  IN      VARCHAR2 DEFAULT NULL,
    p_item_id     IN      VARCHAR2 DEFAULT NULL,
    p_item_label  IN      VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;
```

Parameters

Table 17-2 DATE_POPUP Parameters

Parameter	Description
<code>p_idx</code>	Number that determines which <code>APEX_APPLICATION</code> global variable is used. Valid range of values is 1 to 50. For example, 1 creates <code>F01</code> and 2 creates <code>F02</code>
<code>p_row</code>	This parameter is deprecated. Anything specified for this value is ignored
<code>p_value</code>	Value of a field item

Table 17-2 (Cont.) DATE_POPUP Parameters

Parameter	Description
p_date_format	Valid database date format
p_size	Controls HTML tag attributes (such as disabled)
p_maxlength	Determines the maximum number of enterable characters. Becomes the maxlength attribute of the <input> HTML tag
p_attributes	Extra HTML parameters you want to add
p_item_id	HTML attribute ID for the <input> tag
p_item_label	Invisible label created for the item

Example

The following example demonstrates how to use `APEX_ITEM.DATE_POPUP` to create popup calendar buttons for the `hiredate` column.

```
SELECT
  empno,
  APEX_ITEM.HIDDEN(1,empno)||
  APEX_ITEM.TEXT(2,ename) ename,
  APEX_ITEM.TEXT(3,job) job,
  mgr,
  APEX_ITEM.DATE_POPUP(4,rownum,hiredate,'dd-mon-yyyy') hd,
  APEX_ITEM.TEXT(5,sal) sal,
  APEX_ITEM.TEXT(6,comm) comm,
  deptno
FROM emp
ORDER BY 1
```

17.3 DATE_POPUP2 Function

Use this function with forms that include date fields. The `DATE_POPUP2` function dynamically generates a date field that has a jQuery based popup calendar with button.

Syntax

```
APEX_ITEM.DATE_POPUP2(
  p_idx           in number,
  p_value         in date   default null,
  p_date_format  in varchar2 default null,
  p_size         in number  default 20,
  p_maxLength    in number  default 2000,
  p_attributes   in varchar2 default null,
  p_item_id      in varchar2 default null,
  p_item_label   in varchar2 default null,
  p_default_value in varchar2 default null,
  p_max_value    in varchar2 default null,
  p_min_value    in varchar2 default null,
  p_show_on      in varchar2 default 'button',
  p_number_of_months in varchar2 default null,
  p_navigation_list_for in varchar2 default 'NONE',
```

```

p_year_range          in varchar2 default null,
p_validation_date     in varchar2 default null)
RETURN VARCHAR2;

```

Parameters

Table 17-3 DATE_POPUP2 Parameters

Parameter	Description
p_idx	Number that determines which APEX_APPLICATION global variable is used. Valid range of values is 1 to 50. For example, 1 creates F01 and 2 creates F02.
p_value	Value of a field item
p_date_format	Valid database date format
p_size	Controls HTML tag attributes (such as disabled)
p_maxlength	Determines the maximum number of enterable characters. Becomes the maxlength attribute of the <input> HTML tag
p_attributes	Extra HTML parameters you want to add
p_item_id	HTML attribute ID for the <input> tag
p_item_label	Invisible label created for the item
p_default_value	The default date which should be selected in DatePicker calendar popup
p_max_value	The Maximum date that can be selected from the datepicker
p_min_value	The Minimum date that can be selected from the datepicker.
p_show_on	Determines when the datepicker displays, on button click or on focus of the item or both.
p_number_of_months	Determines number of months displayed. Value should be in array formats follows: [row,column]
p_navigation_list_for	Determines if a select list is displayed for Changing Month, Year or Both. Possible values include: MONTH, YEAR, MONTH_AND_YEAR and default is null.
p_year_range	The range of years displayed in the year selection list.
p_validation_date	Used to store the Date value for the which date validation failed

17.4 DISPLAY_AND_SAVE Function

Use this function to display an item as text, but save its value to session state.

Syntax

```

APEX_ITEM.DISPLAY_AND_SAVE(
  p_idx          IN    NUMBER,
  p_value        IN    VARCHAR2 DEFAULT NULL,
  p_item_id      IN    VARCHAR2 DEFAULT NULL,

```

```
p_item_label IN VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;
```

Parameters

Table 17-4 DISPLAY_AND_SAVE Parameters

Parameter	Description
p_idx	Number that determines which APEX_APPLICATION global variable is used. Valid range of values is 1 to 50. For example, 1 creates F01 and 2 creates F02
p_value	Current value
p_item_id	HTML attribute ID for the tag
p_item_label	Invisible label created for the item

Example

The following example demonstrates how to use the APEX_ITEM.DISPLAY_AND_SAVE function.

```
SELECT APEX_ITEM.DISPLAY_AND_SAVE(10,empno) c FROM emp
```

17.5 HIDDEN Function

This function dynamically generates hidden form items.

Syntax

```
APEX_ITEM.HIDDEN(
  p_idx          IN NUMBER,
  p_value        IN VARCHAR2 DEFAULT
  p_attributes   IN VARCHAR2 DEFAULT NULL,
  p_item_id      IN VARCHAR2 DEFAULT NULL,
  p_item_label   IN VARCHAR2 DEFAULT NULL
) RETURN VARCHAR2;
```

Parameters

Table 17-5 HIDDEN Parameters

Parameter	Description
p_idx	Number to identify the item you want to generate. The number determines which G_FXX global is populated See Also: " APEX_APPLICATION (page 1-1)"
p_value	Value of the hidden input form item
p_attributes	Extra HTML parameters you want to add
p_item_id	HTML attribute ID for the <input> tag
p_item_label	Invisible label created for the item

Example

Typically, the primary key of a table is stored as a hidden column and used for subsequent update processing, for example:

```

SELECT
  empno,
  APEX_ITEM.HIDDEN(1,empno) ||
  APEX_ITEM.TEXT(2,ename) ename,
  APEX_ITEM.TEXT(3,job) job,
  mgr,
  APEX_ITEM.DATE_POPUP(4,rownum,hiredate,'dd-mon-yyyy') hiredate,
  APEX_ITEM.TEXT(5,sal) sal,
  APEX_ITEM.TEXT(6,comm) comm,
  deptno
FROM emp
ORDER BY 1

```

The previous query could use the following page process to process the results:

```

BEGIN
  FOR i IN 1..APEX_APPLICATION.G_F01.COUNT LOOP
    UPDATE emp
      SET
        ename=APEX_APPLICATION.G_F02(i),
        job=APEX_APPLICATION.G_F03(i),
        hiredate=to_date(APEX_APPLICATION.G_F04(i),'dd-mon-yyyy'),
        sal=APEX_APPLICATION.G_F05(i),
        comm=APEX_APPLICATION.G_F06(i)
      WHERE empno=to_number(APEX_APPLICATION.G_F01(i));
  END LOOP;
END;

```

Note that the `G_F01` column (which corresponds to the hidden `EMPNO`) is used as the key to update each row.

17.6 MD5_CHECKSUM Function

Use this function for lost update detection. Lost update detection ensures data integrity in applications where data can be accessed concurrently.

This function produces hidden form field(s) with a name attribute equal to 'fcs' and as value a MD5 checksum based on up to 50 inputs. `APEX_ITEM.MD5_CHECKSUM` also produces an MD5 checksum using Oracle database `DBMS_CRYPTO`:

```
UTL_RAW.CAST_TO_RAW(DBMS_CRYPTO.MD5())
```

An MD5 checksum provides data integrity through hashing and sequencing to ensure that data is not altered or stolen as it is transmitted over a network.

Syntax

```

APEX_ITEM.MD5_CHECKSUM(
  p_value01  IN    VARCHAR2 DEFAULT NULL,
  p_value02  IN    VARCHAR2 DEFAULT NULL,
  p_value03  IN    VARCHAR2 DEFAULT NULL,
  ...
  p_value50  IN    VARCHAR2 DEFAULT NULL,

```

```

p_col_sep IN VARCHAR2 DEFAULT '|',
p_item_id IN VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;

```

Parameters

Table 17-6 MD5_CHECKSUM Parameters

Parameter	Description
p_value01	Fifty available inputs. If no parameters are supplied, the default to NULL
...	
p_value50	
p_col_sep	String used to separate p_value inputs. Defaults to the pipe symbol ()
p_item_id	ID of the HTML form item

Example

This function generates hidden form elements with the name 'fcs'. The values can subsequently be accessed by using the `APEX_APPLICATION.G_FCS` array.

```

SELECT APEX_ITEM.MD5_CHECKSUM(ename,job,sal) md5_cks,
       ename, job, sal
FROM emp

```

17.7 MD5_HIDDEN Function

Use this function for lost update detection. Lost update detection ensures data integrity in applications where data can be accessed concurrently.

This function produces a hidden form field with a MD5 checksum as value which is based on up to 50 inputs. `APEX_ITEM.MD5_HIDDEN` also produces an MD5 checksum using Oracle database `DBMS_CCRYPTO`:

```

UTL_RAW.CAST_TO_RAW(DBMS_CCRYPTO.MD5())

```

An MD5 checksum provides data integrity through hashing and sequencing to ensure that data is not altered or stolen as it is transmitted over a network

Syntax

```

APEX_ITEM.MD5_HIDDEN(
  p_idx      IN  NUMBER,
  p_value01  IN  VARCHAR2 DEFAULT NULL,
  p_value02  IN  VARCHAR2 DEFAULT NULL,
  p_value03  IN  VARCHAR2 DEFAULT NULL,
  ...
  p_value50  IN  VARCHAR2 DEFAULT NULL,
  p_col_sep  IN  VARCHAR2 DEFAULT '|',
  p_item_id  IN  VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;

```

Parameters

Table 17-7 MD5_HIDDEN Parameters

Parameter	Description
p_idx	Indicates the form element to be generated. For example, 1 equals F01 and 2 equals F02. Typically the p_idx parameter is constant for a given column
p_value01	Fifty available inputs. Parameters not supplied default to NULL
...	
p_value50	
p_col_sep	String used to separate p_value inputs. Defaults to the pipe symbol ()
p_item_id	ID of the HTML form item

Example

The p_idx parameter specifies the FXX form element to be generated. In the following example, 7 generates F07. Also note that an HTML hidden form element is generated.

```
SELECT APEX_ITEM.MD5_HIDDEN(7,ename,job,sal)md5_h, ename, job, sal
FROM emp
```

17.8 POPUP_FROM_LOV Function

This function generates an HTML popup select list from an application shared list of values (LOV). Like other available functions in the APEX_ITEM package, POPUP_FROM_LOV function is designed to generate forms with F01 to F50 form array elements.

Syntax

```
APEX_ITEM.POPUP_FROM_LOV(
  p_idx          IN      NUMBER,
  p_value        IN      VARCHAR2 DEFAULT NULL,
  p_lov_name     IN      VARCHAR2,
  p_width        IN      VARCHAR2 DEFAULT NULL,
  p_max_length   IN      VARCHAR2 DEFAULT NULL,
  p_form_index   IN      VARCHAR2 DEFAULT '0',
  p_escape_html  IN      VARCHAR2 DEFAULT NULL,
  p_max_elements IN      VARCHAR2 DEFAULT NULL,
  p_attributes   IN      VARCHAR2 DEFAULT NULL,
  p_ok_to_query  IN      VARCHAR2 DEFAULT 'YES',
  p_item_id      IN      VARCHAR2 DEFAULT NULL,
  p_item_label   IN      VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;
```

Parameters

Table 17-8 POPUP_FROM_LOV Parameters

Parameter	Description
p_idx	Form element name. For example, 1 equals F01 and 2 equals F02. Typically, p_idx is a constant for a given column

Table 17-8 (Cont.) POPUP_FROM_LOV Parameters

Parameter	Description
p_value	Form element current value. This value should be one of the values in the p_lov_name parameter
p_lov_name	Named LOV used for this popup
p_width	Width of the text box
p_max_length	Maximum number of characters that can be entered in the text box
p_form_index	HTML form on the page in which an item is contained. Defaults to 0 and rarely used. Only use this parameter when it is necessary to embed a custom form in your page template (such as a search field that posts to a different website). If this form comes before the #FORM_OPEN# substitution string, then its index is zero and the form opened automatically by Oracle Application Express must be referenced as form 1. This functionality supports the JavaScript used in the popup LOV that passes a value back to a form element.
p_escape_html	Replacements for special characters that require an escaped equivalent: <ul style="list-style-type: none"> • &lt; for < • &gt; for > • &amp; for & Range of values is YES and NO. If YES, special characters are escaped. This parameter is useful if you know your query returns illegal HTML.
p_max_elements	Limit on the number of rows that can be returned by your query. Limits the performance impact of user searches. By entering a value in this parameter, you force the user to search for a narrower set of results.
p_attributes	Additional HTML attributes to use for the form item.
p_ok_to_query	Range of values is YES and NO. If YES, a popup returns first set of rows for the LOV. If NO, a search is initiated to return rows.
p_item_id	ID attribute of the form element.
p_item_label	Invisible label created for the item.

Example

The following example demonstrates a sample query the generates a popup from an LOV named DEPT_LOV.

```
SELECT APEX_ITEM.POPUP_FROM_LOV (1,deptno,'DEPT_LOV') dt
FROM emp
```

17.9 POPUP_FROM_QUERY Function

This function generates an HTML popup select list from a query. Like other available functions in the APEX_ITEM package, the POPUP_FROM_QUERY function is designed to generate forms with F01 to F50 form array elements.

Syntax

```

APEX_ITEM.POPUP_FROM_QUERY(

    p_idx          IN    NUMBER,
    p_value        IN    VARCHAR2 DEFAULT NULL,
    p_lov_query    IN    VARCHAR2,
    p_width        IN    VARCHAR2 DEFAULT NULL,
    p_max_length   IN    VARCHAR2 DEFAULT NULL,
    p_form_index   IN    VARCHAR2 DEFAULT '0',
    p_escape_html  IN    VARCHAR2 DEFAULT NULL,
    p_max_elements IN    VARCHAR2 DEFAULT NULL,
    p_attributes   IN    VARCHAR2 DEFAULT NULL,
    p_ok_to_query  IN    VARCHAR2 DEFAULT 'YES',
    p_item_id      IN    VARCHAR2 DEFAULT NULL,
    p_item_label   IN    VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;

```

Parameters

Table 17-9 POPUP_FROM_QUERY Parameters

Parameter	Description
p_idx	Form element name. For example, 1 equals F01 and 2 equals F02. Typically, p_idx is a constant for a given column.
p_value	Form element current value. This value should be one of the values in the p_lov_query parameter.
p_lov_query	SQL query that is expected to select two columns (a display column and a return column). For example: SELECT dname, deptno FROM dept
p_width	Width of the text box.
p_max_length	Maximum number of characters that can be entered in the text box.
p_form_index	HTML form on the page in which an item is contained. Defaults to 0 and rarely used. Only use this parameter when it is necessary to embed a custom form in your page template (such as a search field that posts to a different website). If this form comes before the #FORM_OPEN# substitution string, then its index is zero and the form opened automatically by Oracle Application Express must be referenced as form 1. This functionality supports the JavaScript used in the popup LOV that passes a value back to a form element.
p_escape_html	Replacements for special characters that require an escaped equivalent. <ul style="list-style-type: none"> &lt; for < &gt; for > &amp; for & Range of values is YES and NO. If YES, special characters are escaped. This parameter is useful if you know your query returns illegal HTML.

Table 17-9 (Cont.) POPUP_FROM_QUERY Parameters

Parameter	Description
p_max_elements	Limit on the number of rows that can be returned by your query. Limits the performance impact of user searches. By entering a value in this parameter, you force the user to search for a narrower set of results.
p_attributes	Additional HTML attributes to use for the form item.
p_ok_to_query	Range of values is YES and NO. If YES, a popup returns the first set of rows for the LOV. If NO, a search is initiated to return rows.
p_item_id	ID attribute of the form element.
p_item_label	Invisible label created for the item.

Example

The following example demonstrates a sample query that generates a popup select list from the emp table.

```
SELECT APEX_ITEM.POPUP_FROM_QUERY (1,deptno,'SELECT dname, deptno FROM dept') dt
FROM emp
```

17.10 POPUPKEY_FROM_LOV Function

This function generates a popup key select list from a shared list of values (LOV). Similar to other available functions in the APEX_ITEM package, the POPUPKEY_FROM_LOV function is designed to generate forms with F01 to F50 form array elements.

Syntax

```
APEX_ITEM.POPUPKEY_FROM_LOV(
  p_idx          IN    NUMBER,
  p_value        IN    VARCHAR2 DEFAULT NULL,
  p_lov_name     IN    VARCHAR2,
  p_width        IN    VARCHAR2 DEFAULT NULL,
  p_max_length   IN    VARCHAR2 DEFAULT NULL,
  p_form_index   IN    VARCHAR2 DEFAULT '0',
  p_escape_html  IN    VARCHAR2 DEFAULT NULL,
  p_max_elements IN    VARCHAR2 DEFAULT NULL,
  p_attributes   IN    VARCHAR2 DEFAULT NULL,
  p_ok_to_query  IN    VARCHAR2 DEFAULT 'YES',
  p_item_id      IN    VARCHAR2 DEFAULT NULL,
  p_item_label   IN    VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;
```

Although the text field associated with the popup displays in the first column in the LOV query, the actual value is specified in the second column in the query.

Parameters

Table 17-10 POPUPKEY_FROM_LOV Parameters

Parameter	Description
p_idx	<p>Identifies a form element name. For example, 1 equals F01 and 2 equals F02. Typically, p_idx is a constant for a given column</p> <p>Because of the behavior of POPUPKEY_FROM_QUERY, the next index value should be p_idx + 1. For example:</p> <pre>SELECT APEX_ITEM.POPUPKEY_FROM_LOV (1,deptno,'DEPT') dt, APEX_ITEM.HIDDEN(3,empno) eno</pre>
p_value	Indicates the current value. This value should be one of the values in the P_LOV_NAME parameter.
p_lov_name	Identifies a named LOV used for this popup.
p_width	Width of the text box.
p_max_length	Maximum number of characters that can be entered in the text box.
p_form_index	<p>HTML form on the page in which an item is contained. Defaults to 0 and rarely used.</p> <p>Only use this parameter when it is necessary to embed a custom form in your page template (such as a search field that posts to a different website). If this form comes before the #FORM_OPEN# substitution string, then its index is zero and the form opened automatically by Oracle Application Express must be referenced as form 1. This functionality supports the JavaScript used in the popup LOV that passes a value back to a form element.</p>
p_escape_html	<p>Replacements for special characters that require an escaped equivalent.</p> <ul style="list-style-type: none"> • &lt; for < • &gt; for > • &amp; for & <p>This parameter is useful if you know your query returns illegal HTML.</p>
p_max_elements	Limit on the number of rows that can be returned by your query. Limits the performance impact of user searches. By entering a value in this parameter, you force the user to search for a narrower set of results.
p_attributes	Additional HTML attributes to use for the form item.
p_ok_to_query	Range of values is YES and NO. If YES, a popup returns the first set of rows for the LOV. If NO, a search is initiated to return rows.
p_item_id	HTML attribute ID for the <input> tag
p_item_label	Invisible label created for the item

Example

The following example demonstrates how to generate a popup key select list from a shared list of values (LOV).

```
SELECT APEX_ITEM.POPUPKEY_FROM_LOV (1,deptno,'DEPT') dt
FROM emp
```

17.11 POPUPKEY_FROM_QUERY Function

This function generates a popup key select list from a SQL query. Similar to other available functions in the `APEX_ITEM` package, the `POPUPKEY_FROM_QUERY` function is designed to generate forms with F01 to F50 form array elements.

Syntax

```
APEX_ITEM.POPUPKEY_FROM_QUERY(
  p_idx          IN     NUMBER,
  p_value        IN     VARCHAR2 DEFAULT NULL,
  p_lov_query    IN     VARCHAR2,
  p_width        IN     VARCHAR2 DEFAULT NULL,
  p_max_length   IN     VARCHAR2 DEFAULT NULL,
  p_form_index   IN     VARCHAR2 DEFAULT '0',
  p_escape_html  IN     VARCHAR2 DEFAULT NULL,
  p_max_elements IN     VARCHAR2 DEFAULT NULL,
  p_attributes   IN     VARCHAR2 DEFAULT NULL,
  p_ok_to_query  IN     VARCHAR2 DEFAULT 'YES',
  p_item_id      IN     VARCHAR2 DEFAULT NULL,
  p_item_label   IN     VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;
```

Parameters

Table 17-11 POPUPKEY_FROM_QUERY Parameters

Parameter	Description
<code>p_idx</code>	Form element name. For example, 1 equals F01 and 2 equals F02. Typically, <code>p_idx</code> is a constant for a given column. Because of the behavior of <code>POPUPKEY_FROM_QUERY</code> , the next index value should be <code>p_idx + 1</code> . For example: <pre>SELECT APEX_ITEM.POPUPKEY_FROM_QUERY (1,deptno,'SELECT dname, deptno FROM dept') dt, APEX_ITEM.HIDDEN(3,empno) eno</pre>
<code>p_value</code>	Form element current value. This value should be one of the values in the <code>P_LOV_QUERY</code> parameter.
<code>p_lov_query</code>	LOV query used for this popup.
<code>p_width</code>	Width of the text box.
<code>p_max_length</code>	Maximum number of characters that can be entered in the text box.
<code>p_form_index</code>	HTML form on the page in which an item is contained. Defaults to 0 and rarely used. Only use this parameter when it is necessary to embed a custom form in your page template (such as a search field that posts to a different website). If this form comes before the <code>#FORM_OPEN#</code> substitution string, then its index is zero and the form opened automatically by Oracle Application Express must be referenced as form 1. This functionality supports the JavaScript used in the popup LOV that passes a value back to a form element.

Table 17-11 (Cont.) POPUPKEY_FROM_QUERY Parameters

Parameter	Description
p_escape_html	Replacements for special characters that require an escaped equivalent. <ul style="list-style-type: none"> • &lt; for < • &gt; for > • &amp; for & This parameter is useful if you know your query returns illegal HTML.
p_max_elements	Limit on the number of rows that can be returned by your query. Limits the performance impact of user searches. By entering a value in this parameter, you force the user to search for a narrower set of results.
p_attributes	Additional HTML attributes to use for the form item.
p_ok_to_query	Range of values is YES and NO. If YES, a popup returns first set of rows for the LOV. If NO, a search is initiated to return rows.
p_item_id	ID attribute of the form element.
p_item_label	Invisible label created for the item.

Example

The following example demonstrates how to generate a popup select list from a SQL query.

```
SELECT APEX_ITEM.POPUPKEY_FROM_QUERY (1,deptno,'SELECT dname, deptno FROM dept') dt
FROM emp
```

17.12 RADIOGROUP Function

This function generates a radio group from a SQL query.

Syntax

```
APEX_ITEM.RADIOGROUP(
  p_idx          IN    NUMBER,
  p_value        IN    VARCHAR2 DEFAULT NULL,
  p_selected_value IN  VARCHAR2 DEFAULT NULL,
  p_display      IN    VARCHAR2 DEFAULT NULL,
  p_attributes   IN    VARCHAR2 DEFAULT NULL,
  p_onblur      IN    VARCHAR2 DEFAULT NULL,
  p_onchange    IN    VARCHAR2 DEFAULT NULL,
  p_onfocus    IN    VARCHAR2 DEFAULT NULL,
  p_item_id     IN    VARCHAR2 DEFAULT NULL,
  p_item_label  IN    VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;
```

Parameters

Table 17-12 RADIOGROUP Parameters

Parameter	Description
p_idx	Number that determines which APEX_APPLICATION global variable is used. Valid range of values is 1 to 50. For example 1 creates F01 and 2 creates F02.
p_value	Value of the radio group.
p_selected_value	Value that should be selected.
p_display	Text to display next to the radio option.
p_attributes	Extra HTML parameters you want to add.
p_onblur	JavaScript to execute in the onBlur event.
p_onchange	JavaScript to execute in the onChange event.
p_onfocus	JavaScript to execute in the onFocus event.
p_item_id	HTML attribute ID for the <input> tag
p_item_label	Invisible label created for the item

Example

The following example demonstrates how to select department 20 from the emp table as a default in a radio group.

```
SELECT APEX_ITEM.RADIOGROUP (1,deptno,'20',dname) dt
FROM dept
ORDER BY 1
```

17.13 SELECT_LIST Function

This function dynamically generates a static select list. Similar to other functions available in the APEX_ITEM package, these select list functions are designed to generate forms with F01 to F50 form array elements.

Syntax

```
APEX_ITEM.SELECT_LIST(
  p_idx          IN  NUMBER,
  p_value        IN  VARCHAR2 DEFAULT NULL,
  p_list_values  IN  VARCHAR2 DEFAULT NULL,
  p_attributes   IN  VARCHAR2 DEFAULT NULL,
  p_show_null    IN  VARCHAR2 DEFAULT 'NO',
  p_null_value   IN  VARCHAR2 DEFAULT '%NULL%',
  p_null_text    IN  VARCHAR2 DEFAULT '%',
  p_item_id      IN  VARCHAR2 DEFAULT NULL,
  p_item_label   IN  VARCHAR2 DEFAULT NULL,
  p_show_extra   IN  VARCHAR2 DEFAULT 'YES')
RETURN VARCHAR2;
```

Parameters

Table 17-13 SELECT_LIST Parameters

Parameter	Description
p_idx	Form element name. For example, 1 equals F01 and 2 equals F02. Typically the P_IDX parameter is constant for a given column.
p_value	Current value. This value should be a value in the P_LIST_VALUES parameter.
p_list_values	List of static values separated by commas. Displays values and returns values that are separated by semicolons. Note that this is only available in the SELECT_LIST function.
p_attributes	Extra HTML parameters you want to add.
p_show_null	Extra select option to enable the NULL selection. Range of values is YES and NO.
p_null_value	Value to be returned when a user selects the NULL option. Only relevant when p_show_null equals YES.
p_null_text	Value to be displayed when a user selects the NULL option. Only relevant when p_show_null equals YES.
p_item_id	HTML attribute ID for the <input> tag.
p_item_label	Invisible label created for the item.
p_show_extra	Shows the current value even if the value of p_value is not located in the select list.

Example

The following example demonstrates a static select list that displays Yes, returns Y, defaults to Y, and generates a F01 form item.

```
SELECT APEX_ITEM.SELECT_LIST(1, 'Y', 'Yes;Y,No;N')yn
FROM emp
```

The following example demonstrates the use of APEX_ITEM.SELECT_LIST to generate a static select list where:

- A form array element F03 is generated (p_idx parameter).
- The initial value for each element is equal to the value for deptno for the row from emp (p_value parameter).
- The select list contains 4 options (p_list_values parameter).
- The text within the select list displays in red (p_attributes parameter).
- A null option is displayed (p_show_null) and this option displays -Select- as the text (p_null_text parameter).
- An HTML ID attribute is generated for each row, where #ROWNUM# is substituted for the current row rownum (p_item_id parameter). (So an ID of 'f03_4' is generated for row 4.)
- A HTML label element is generated for each row (p_item_label parameter).
- The current value for deptno is displayed, even if it is not contained with the list of values passed in the p_list_values parameter (p_show_extra parameter).


```

SELECT empno "Employee #",
       ename "Name",
       APEX_ITEM.SELECT_LIST(
         p_idx      => 3,
         p_value    => deptno,
         p_list_values => 'ACCOUNTING;10,RESEARCH;20,SALES;30,OPERATIONS;40',
         p_attributes => 'style="color:red;"',
         p_show_null => 'YES',
         p_null_value => NULL,
         p_null_text => '-Select-',
         p_item_id   => 'f03_#ROWNUM#',
         p_item_label => 'Label for f03_#ROWNUM#',
         p_show_extra => 'YES') "Department"
FROM emp;

```

17.14 SELECT_LIST_FROM_LOV Function

This function dynamically generates select lists from a shared list of values (LOV). Similar to other functions available in the `APEX_ITEM` package, these select list functions are designed to generate forms with F01 to F50 form array elements. This function is the same as `SELECT_LIST_FROM_LOV`, but its return value is `CLOB`. Use this function in SQL queries where you need to handle a column value longer than 4000 characters.

Syntax

```

APEX_ITEM.SELECT_LIST_FROM_LOV(
  p_idx      IN NUMBER,
  p_value    IN VARCHAR2 DEFAULT NULL,
  p_lov      IN VARCHAR2,
  p_attributes IN VARCHAR2 DEFAULT NULL,
  p_show_null IN VARCHAR2 DEFAULT 'YES',
  p_null_value IN VARCHAR2 DEFAULT '%NULL%',
  p_null_text IN VARCHAR2 DEFAULT '%',
  p_item_id   IN VARCHAR2 DEFAULT NULL,
  p_item_label IN VARCHAR2 DEFAULT NULL,
  p_show_extra IN VARCHAR2 DEFAULT 'YES')
RETURN VARCHAR2;

```

Parameters

Table 17-14 SELECT_LIST_FROM_LOV Parameters

Parameter	Description
<code>p_idx</code>	Form element name. For example, 1 equals F01 and 2 equals F02. Typically, the <code>p_idx</code> parameter is constant for a given column.
<code>p_value</code>	Current value. This value should be a value in the <code>p_lov</code> parameter.
<code>p_lov</code>	Text name of an application list of values. This list of values must be defined in your application. This parameter is used only by the <code>select_list_from_lov</code> function.
<code>p_attributes</code>	Extra HTML parameters you want to add.
<code>p_show_null</code>	Extra select option to enable the NULL selection. Range of values is YES and NO.
<code>p_null_value</code>	Value to be returned when a user selects the NULL option. Only relevant when <code>p_show_null</code> equals YES.

Table 17-14 (Cont.) SELECT_LIST_FROM_LOV Parameters

Parameter	Description
p_null_text	Value to be displayed when a user selects the NULL option. Only relevant when p_show_null equals YES.
p_item_id	HTML attribute ID for the <select> tag.
p_item_label	Invisible label created for the item.
p_show_extra	Shows the current value even if the value of p_value is not located in the select list.

Example

The following example demonstrates a select list based on an LOV defined in the application.

```
SELECT APEX_ITEM.SELECT_LIST_FROM_LOV(2,job,'JOB_FLOW_LOV') job
FROM emp
```

17.15 SELECT_LIST_FROM_LOV_XL Function

This function dynamically generates very large select lists (greater than 32K) from a shared list of values (LOV). Similar to other functions available in the APEX_ITEM package, these select list functions are designed to generate forms with F01 to F50 form array elements. This function is the same as SELECT_LIST_FROM_LOV, but its return value is CLOB. Returned values will be limited to 32k.

Syntax

```
APEX_ITEM.SELECT_LIST_FROM_LOV_XL(
  p_idx          IN  NUMBER,
  p_value        IN  VARCHAR2 DEFAULT NULL,
  p_lov          IN  VARCHAR2,
  p_attributes   IN  VARCHAR2 DEFAULT NULL,
  p_show_null    IN  VARCHAR2 DEFAULT 'YES',
  p_null_value   IN  VARCHAR2 DEFAULT '%NULL%',
  p_null_text    IN  VARCHAR2 DEFAULT '%',
  p_item_id      IN  VARCHAR2 DEFAULT NULL,
  p_item_label   IN  VARCHAR2 DEFAULT NULL,
  p_show_extra   IN  VARCHAR2 DEFAULT 'YES')
RETURN CLOB;
```

Parameters**Table 17-15 SELECT_LIST_FROM_LOV_XL Parameters**

Parameter	Description
p_idx	Form element name. For example, 1 equals F01 and 2 equals F02. Typically, the p_idx parameter is constant for a given column.
p_value	Current value. This value should be a value in the p_lov parameter.
p_lov	Text name of a list of values. This list of values must be defined in your application. This parameter is used only by the select_list_from_lov function.

Table 17-15 (Cont.) SELECT_LIST_FROM_LOV_XL Parameters

Parameter	Description
p_attributes	Extra HTML parameters you want to add.
p_show_null	Extra select option to enable the NULL selection. Range of values is YES and NO.
p_null_value	Value to be returned when a user selects the NULL option. Only relevant when p_show_null equals YES.
p_null_text	Value to be displayed when a user selects the NULL option. Only relevant when p_show_null equals YES.
p_item_id	HTML attribute ID for the <select> tag.
p_item_label	Invisible label created for the item.
p_show_extra	Shows the current value even if the value of p_value is not located in the select list.

Example

The following example demonstrates how to create a select list based on an LOV defined in the application.

```
SELECT APEX_ITEM.SELECT_LIST_FROM_LOV_XL(2,job,'JOB_FLOW_LOV') job
FROM emp
```

17.16 SELECT_LIST_FROM_QUERY Function

This function dynamically generates a select list from a query. Similar to other functions available in the APEX_ITEM package, these select list functions are designed to generate forms with F01 to F50 form array elements.

Syntax

```
APEX_ITEM.SELECT_LIST_FROM_QUERY(
  p_idx          IN    NUMBER,
  p_value        IN    VARCHAR2 DEFAULT NULL,
  p_query        IN    VARCHAR2,
  p_attributes   IN    VARCHAR2 DEFAULT NULL,
  p_show_null    IN    VARCHAR2 DEFAULT 'YES',
  p_null_value   IN    VARCHAR2 DEFAULT '%NULL%',
  p_null_text    IN    VARCHAR2 DEFAULT '%',
  p_item_id      IN    VARCHAR2 DEFAULT NULL,
  p_item_label   IN    VARCHAR2 DEFAULT NULL,
  p_show_extra   IN    VARCHAR2 DEFAULT 'YES')
RETURN VARCHAR2;
```

Parameters**Table 17-16 SELECT_LIST_FROM_QUERY Parameters**

Parameter	Description
p_idx	Form element name. For example, 1 equals F01 and 2 equals F02. Typically, the p_idx parameter is constant for a given column.

Table 17-16 (Cont.) SELECT_LIST_FROM_QUERY Parameters

Parameter	Description
p_value	Current value. This value should be a value in the p_query parameter.
p_query	SQL query that is expected to select two columns, a display column, and a return column. For example: SELECT dname, deptno FROM dept Note that this is used only by the SELECT_LIST_FROM_QUERY function. Also note, if only one column is specified in the select clause of this query, the value for this column is used for both display and return purposes.
p_attributes	Extra HTML parameters you want to add.
p_show_null	Extra select option to enable the NULL selection. Range of values is YES and NO.
p_null_value	Value to be returned when a user selects the NULL option. Only relevant when p_show_null equals YES.
p_null_text	Value to be displayed when a user selects the NULL option. Only relevant when p_show_null equals YES.
p_item_id	HTML attribute ID for the <select> tag.
p_item_label	Invisible label created for the item.
p_show_extra	Show the current value even if the value of p_value is not located in the select list.

Example

The following example demonstrates a select list based on a SQL query.

```
SELECT APEX_ITEM.SELECT_LIST_FROM_QUERY(3, job, 'SELECT DISTINCT job FROM emp') job
FROM emp
```

17.17 SELECT_LIST_FROM_QUERY_XL Function

This function is the same as SELECT_LIST_FROM_QUERY, but its return value is a CLOB. This allows its use in SQL queries where you need to handle a column value longer than 4000 characters. Returned values will be limited to 32K. Similar to other functions available in the APEX_ITEM package, these select list functions are designed to generate forms with F01 to F50 form array elements.

Syntax

```
APEX_ITEM.SELECT_LIST_FROM_QUERY_XL(
  p_idx          IN    NUMBER,
  p_value        IN    VARCHAR2 DEFAULT NULL,
  p_query        IN    VARCHAR2,
  p_attributes   IN    VARCHAR2 DEFAULT NULL,
  p_show_null    IN    VARCHAR2 DEFAULT 'YES',
  p_null_value   IN    VARCHAR2 DEFAULT '%NULL%',
  p_null_text    IN    VARCHAR2 DEFAULT '%',
  p_item_id      IN    VARCHAR2 DEFAULT NULL,
  p_item_label   IN    VARCHAR2 DEFAULT NULL,
  p_show_extra   IN    VARCHAR2 DEFAULT 'YES')
RETURN CLOB;
```

Parameters

Table 17-17 SELECT_LIST_FROM_QUERY_XL Parameters

Parameter	Description
p_idx	Form element name. For example, 1 equals F01 and 2 equals F02. Typically the p_idx parameter is constant for a given column.
p_value	Current value. This value should be a value in the p_query parameter.
p_query	SQL query that is expected to select two columns, a display column, and a return column. For example: SELECT dname, deptno FROM dept Note that this is used only by the SELECT_LIST_FROM_QUERY_XL function. Also note, if only one column is specified in the select clause of this query, the value for this column is used for both display and return purposes.
p_attributes	Extra HTML parameters you want to add.
p_show_null	Extra select option to enable the NULL selection. Range of values is YES and NO.
p_null_value	Value to be returned when a user selects the NULL option. Only relevant when p_show_null equals YES.
p_null_text	Value to be displayed when a user selects the NULL option. Only relevant when p_show_null equals YES.
p_item_id	HTML attribute ID for the <select> tag.
p_item_label	Invisible label created for the item.
p_show_extra	Show the current value even if the value of p_value is not located in the select list.

Example

The following example demonstrates a select list based on a SQL query.

```
SELECT APEX_ITEM.SELECT_LIST_FROM_QUERY_XL(3,job,'SELECT DISTINCT job FROM emp')job
FROM emp
```

17.18 SWITCH Function

This function dynamically generates flip toggle item. If On/Off value and label are not passed, it renders Yes/No toggle. Similar to other functions available in the APEX_ITEM package, switch function is designed to generate forms with F01 to F50 form array elements.

Syntax

```
APEX_ITEM.SWITCH(
    p_idx IN NUMBER,
    p_value IN VARCHAR2,
    p_on_value IN VARCHAR2 DEFAULT 'Y',
    p_on_label IN VARCHAR2 DEFAULT 'Yes',
    p_off_value IN VARCHAR2 DEFAULT 'N',
    p_off_label IN VARCHAR2 DEFAULT 'No',
    p_item_id IN VARCHAR2 DEFAULT NULL,
```

```

p_item_label IN VARCHAR2,
p_attributes IN VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;

```

Parameters

Table 17-18 SWITCH Parameters

Parameter	Description
p_idx	Form element name. For example, 1 equals F01 and 2 equals F02. Typically the P_IDX parameter is constant for a given column.
p_value	Form element current value.
p_on_value	The value of the item if the user picks On option.
p_on_label	The display text for the On option.
p_off_value	The value of the item if the user picks Off option.
p_off_label	The display text for the Off option.
p_item_id	HTML attribute ID for the <input> tag. Try concatenating some string with rownum to make it unique.
p_item_label	Invisible label created for the item.
p_attributes	Additional HTML attributes to use for the form item.

Example

The following example demonstrates the use of APEX_ITEM.SWITCH to generate a Yes/No flip toggle item where:

- A form array element F01 will be generated (p_idx parameter).
- The initial value for each element will be equal to N (p_value parameter).
- A HTML ID attribute will be generated for each row with the current rownum to uniquely identify. (p_item_id parameter). An ID of 'IS_MANAGER_2' is generated for row 2.)
- A HTML label element will be generated for each row (p_item_label parameter).

```

SELECT
  ename "Name",
  APEX_ITEM.SWITCH (
    p_idx => 1,
    p_value => 'N',
    p_item_id => 'IS_MANAGER_'||rownum,
    p_item_label => apex_escape.html(ename)||': Is Manager' )
  "Is Manager"
FROM emp;

```

17.19 TEXT Function

This function generates text fields (or text input form items) from a SQL query.

Syntax

```

APEX_ITEM.TEXT(
  p_idx          IN   NUMBER,

```

```

p_value      IN      VARCHAR2 DEFAULT NULL,
p_size       IN      NUMBER DEFAULT NULL,
p_maxlength  IN      NUMBER DEFAULT NULL,
p_attributes IN      VARCHAR2 DEFAULT NULL,
p_item_id    IN      VARCHAR2 DEFAULT NULL,
p_item_label IN      VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;

```

Parameters

Table 17-19 TEXT Parameters

Parameter	Description
p_idx	Number to identify the item you want to generate. The number determines which G_FXX global is populated. See Also: " APEX_APPLICATION (page 1-1)"
p_value	Value of a text field item.
p_size	Controls HTML tag attributes (such as disabled).
p_maxlength	Maximum number of characters that can be entered in the text box.
p_attributes	Extra HTML parameters you want to add.
p_item_id	HTML attribute ID for the <input> tag.
p_item_label	Invisible label created for the item.

Example

The following sample query demonstrates how to generate one update field for each row. Note that the `ename`, `sal`, and `comm` columns use the `APEX_ITEM.TEXT` function to generate an HTML text field for each row. Also, notice that each item in the query is passed a unique `p_idx` parameter to ensure that each column is stored in its own array.

```

SELECT
  empno,
  APEX_ITEM.HIDDEN(1,empno) ||
  APEX_ITEM.TEXT(2,ename) ename,
  APEX_ITEM.TEXT(3,job) job,
  mgr,
  APEX_ITEM.DATE_POPUP(4,rownum,hiredate,'dd-mon-yyyy') hiredate,
  APEX_ITEM.TEXT(5,sal) sal,
  APEX_ITEM.TEXT(6,comm) comm,
  deptno
FROM emp
ORDER BY 1

```

17.20 TEXTAREA Function

This function creates text areas.

Syntax

```

APEX_ITEM.TEXTAREA(
  p_idx      IN      NUMBER,
  p_value    IN      VARCHAR2 DEFAULT NULL,

```

```

p_rows      IN      NUMBER DEFAULT 40,
p_cols      IN      NUMBER DEFAULT 4,
p_attributes IN      VARCHAR2 DEFAULT NULL,
p_item_id   IN      VARCHAR2 DEFAULT NULL,
p_item_label IN      VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;

```

Parameters

Table 17-20 TEXTAREA Parameters

Parameter	Description
p_idx	Number to identify the item you want to generate. The number determines which G_FXX global is populated. See Also: " APEX_APPLICATION (page 1-1)"
p_value	Value of the text area item.
p_rows	Height of the text area (HTML rows attribute)
p_cols	Width of the text area (HTML column attribute).
p_attributes	Extra HTML parameters you want to add.
p_item_id	HTML attribute ID for the <textarea> tag.
p_item_label	Invisible label created for the item.

Example

The following example demonstrates how to create a text area based on a SQL query.

```

SELECT APEX_ITEM.TEXTAREA(3,ename,5,80) a
FROM emp

```

17.21 TEXT_FROM_LOV Function

Use this function to display an item as text, deriving the display value of the named LOV.

Syntax

```

APEX_ITEM.TEXT_FROM_LOV (
  p_value      IN      VARCHAR2 DEFAULT NULL,
  p_lov        IN      VARCHAR2,
  p_null_text  IN      VARCHAR2 DEFAULT '%' )
RETURN VARCHAR2;

```

Parameters

Table 17-21 TEXT_FROM_LOV Parameters

Parameter	Description
p_value	Value of a field item. Note that if p_value is not located in the list of values, p_null_text is value displayed.
p_lov	Text name of a shared list of values. This list of values must be defined in your application.

Table 17-21 (Cont.) TEXT_FROM_LOV Parameters

Parameter	Description
p_null_text	Value displayed when the value of the field item is NULL.

Example

The following example demonstrates how to derive the display value from a named LOV (EMPNO_ENAME_LOV).

```
SELECT APEX_ITEM.TEXT_FROM_LOV(empno, 'EMPNO_ENAME_LOV') c FROM emp
```

17.22 TEXT_FROM_LOV_QUERY Function

Use this function to display an item as text, deriving the display value from a list of values query.

Syntax

```
APEX_ITEM.TEXT_FROM_LOV_QUERY (
  p_value      IN      VARCHAR2 DEFAULT NULL,
  p_query      IN      VARCHAR2,
  p_null_text  IN      VARCHAR2 DEFAULT '%' )
RETURN VARCHAR2;
```

Parameters**Table 17-22 TEXT_FROM_LOV_QUERY Parameters**

Parameter	Description
p_value	Value of a field item.
p_query	SQL query that is expected to select two columns, a display column and a return column. For example: SELECT dname, deptno FROM dept Note if only one column is specified in the select clause of this query, the value for this column is used for both display and return purposes.
p_null_text	Value to be displayed when the value of the field item is NULL or a corresponding entry is not located for the value p_value in the list of values query.

Example

The following example demonstrates how to derive the display value from a query.

```
SELECT APEX_ITEM.TEXT_FROM_LOV_QUERY(empno, 'SELECT ename, empno FROM emp') c from emp
```

18

APEX_JAVASCRIPT

The `APEX_JAVASCRIPT` package provides utility functions for adding dynamic JavaScript code to HTTP output. This package is usually used for plug-in development.

- [ADD_3RD_PARTY_LIBRARY_FILE Procedure](#) (page 18-1)
- [ADD_ATTRIBUTE Function Signature 1](#) (page 18-2)
- [ADD_ATTRIBUTE Function Signature 2](#) (page 18-3)
- [ADD_ATTRIBUTE Function Signature 3](#) (page 18-4)
- [ADD_ATTRIBUTE Function Signature 4](#) (page 18-4)
- [ADD_INLINE_CODE Procedure](#) (page 18-5)
- [ADD_LIBRARY Procedure](#) (page 18-6)
- [ADD_REQUIREJS Procedure](#) (page 18-7)
- [ADD_REQUIREJS_DEFINE Procedure](#) (page 18-7)
- [ADD_ONLOAD_CODE Procedure](#) (page 18-8)
- [ADD_VALUE Function Signature 1](#) (page 18-8)
- [ADD_VALUE Function Signature 2](#) (page 18-9)
- [ADD_VALUE Function Signature 3](#) (page 18-9)
- [ADD_VALUE Function Signature 4](#) (page 18-10)
- [Escape Function](#) (page 18-10)

18.1 ADD_3RD_PARTY_LIBRARY_FILE Procedure

This procedure adds the script tag to load a 3rd party javascript library file and also takes into account the specified Content Delivery Network for the application. Supported libraries include: jQuery, jQueryUI, and jQuery Mobile.

Syntax

```
add_3rd_party_library_file (  
    p_library in varchar2,  
    p_file_name in varchar2,  
    p_directory in varchar2 default null,  
    p_version in varchar2 default null );
```

Parameters

Table 18-1 ADD_3RD_PARTY_LIBRARY_FILE Parameters

Parameters	Description
<code>p_library</code>	Use one of the <code>c_library_*</code> constants

Table 18-1 (Cont.) ADD_3RD_PARTY_LIBRARY_FILE Parameters

Parameters	Description
p_file_name	Specifies the file name without version, .min and .js
p_directory	Directory where the file p_file_name is located (optional)
p_version	If no value is provided then the same version Application Express ships is used (optional)

Example

This example loads the JavaScript file of the Draggable feature of jQuery UI.

```
apex_javascript.add_3rd_party_library_file (
    p_library =>apex_javascript.c_library_jquery_ui,
    p_file_name => 'jquery.ui.draggable' )
```

18.2 ADD_ATTRIBUTE Function Signature 1

This function returns the attribute and the attribute's escaped text surrounded by double quotation marks.

 **Note:**

This function does not escape HTML tags. It only prevents HTML tags from breaking the JavaScript object attribute assignment. To prevent XSS (cross site scripting) attacks, you must also call `SYS.HTF.ESCAPE_SC` to prevent embedded JavaScript code from being executed when you inject the string into the HTML page.

Syntax

```
APEX_JAVASCRIPT.ADD_ATTRIBUTE (
    p_name      IN VARCHAR2,
    p_value     IN VARCHAR2,
    p_omit_null IN BOOLEAN:=TRUE,
    p_add_comma IN BOOLEAN:=TRUE)
RETURN VARCHAR2;
```

Parameters**Table 18-2 ADD_ATTRIBUTE Signature 1 Parameters**

Parameter	Description
p_name	Name of the JavaScript object attribute.
p_value	Text to be assigned to the JavaScript object attribute.
p_omit_null	If set to TRUE and p_value is empty, returns NULL.
p_add_comma	If set to TRUE, a trailing comma is added when a value is returned.

Example

Adds a call to the `addEmployee` JavaScript function and passes in a JavaScript object with different attribute values. The output of this call looks like:

```
addEmployee(
  { "FirstName": "John",
    "LastName": "Doe",
    "Salary": 2531.29,
    "Birthday": new Date(1970,1,15,0,0,0),
    "isSalesman": true
  });
```

As the last attribute you should use the parameter combination `FALSE` (`p_omit_null`), `FALSE` (`p_add_comma`) so that the last attribute is always generated. This avoids that you have to check for the other parameters if a trailing comma should be added or not.

```
apex_javascript.add_onload_code (
  'addEmployee(' ||
    '{ ' ||
      apex_javascript.add_attribute('FirstName',
sys.htf.escape_sc(l_first_name)) ||
      apex_javascript.add_attribute('LastName',   sys.htf.escape_sc(l_last_name)) ||
      apex_javascript.add_attribute('Salary',     l_salary) ||
      apex_javascript.add_attribute('Birthday',   l_birthday) ||
      apex_javascript.add_attribute('isSalesman', l_is_salesman, false, false) ||
    '}); ' );
```

18.3 ADD_ATTRIBUTE Function Signature 2

This function returns the attribute and the attribute's number.

Syntax

```
APEX_JAVASCRIPT.ADD_ATTRIBUTE (
  p_name      IN VARCHAR2,
  p_value     IN NUMBER,
  p_omit_null IN BOOLEAN:=TRUE,
  p_add_comma IN BOOLEAN:=TRUE)
RETURN VARCHAR2;
```

Parameters

Table 18-3 ADD_ATTRIBUTE Signature 2 Parameters

Parameter	Description
<code>p_name</code>	Name of the JavaScript object attribute.
<code>p_value</code>	Number which should be assigned to the JavaScript object attribute.
<code>p_omit_null</code>	If set to <code>TRUE</code> and <code>p_value</code> is empty, returns <code>NULL</code> .
<code>p_add_comma</code>	If set to <code>TRUE</code> , a trailing comma is added when a value is returned.

Example

See example for [ADD_ATTRIBUTE Function Signature 1](#) (page 18-2).

18.4 ADD_ATTRIBUTE Function Signature 3

This function returns the attribute and a JavaScript boolean of TRUE, FALSE, or NULL.

Syntax

```
APEX_JAVASCRIPT.ADD_ATTRIBUTE (
    p_name      IN VARCHAR2,
    p_value     IN BOOLEAN,
    p_omit_null IN BOOLEAN:=TRUE,
    p_add_comma IN BOOLEAN:=TRUE)
RETURN VARCHAR2;
```

Parameters

Table 18-4 ADD_ATTRIBUTE Signature 3 Parameters

Parameter	Description
p_name	Name of the JavaScript object attribute.
p_value	Boolean assigned to the JavaScript object attribute.
p_omit_null	If p_omit_null is TRUE and p_value is NULL the function returns NULL.
p_add_comma	If set to TRUE a trailing comma is added when a value is returned.

Example

See example for [ADD_ATTRIBUTE Function Signature 1](#) (page 18-2)

18.5 ADD_ATTRIBUTE Function Signature 4

This function returns the attribute and the attribute's date. If p_value is null the value null is returned.

Syntax

```
APEX_JAVASCRIPT.ADD_ATTRIBUTE (
    p_name      IN VARCHAR2,
    p_value     IN DATE,
    p_omit_null IN BOOLEAN:=TRUE,
    p_add_comma IN BOOLEAN:=TRUE)
RETURN VARCHAR2;
```

Parameters

Table 18-5 ADD_ATTRIBUTE Signature 4 Parameters

Parameter	Description
p_name	Name of the JavaScript object attribute.
p_value	Date assigned to the JavaScript object attribute.
p_omit_null	If p_omit_null is TRUE and p_value is NULL the function returns NULL.
p_add_comma	If set to TRUE a trailing comma is added when a value is returned.

Example

See example for [ADD_ATTRIBUTE Function Signature 1](#) (page 18-2)

18.6 ADD_INLINE_CODE Procedure

This procedure adds a code snippet that is included inline into the HTML output. For example, you can use this procedure to add new functions or global variable declarations.

 **Note:**

If you want to execute code you should use [ADD_ONLOAD_CODE Procedure](#) (page 18-8).

Syntax

```
APEX_JAVASCRIPT.ADD_INLINE_CODE (
  p_code      IN VARCHAR2,
  p_key       IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 18-6 ADD_INLINE_CODE Parameters

Parameter	Description
p_code	JavaScript code snippet. For example: <code>\$\$s('P1_TEST',123);</code>
p_key	Identifier for the code snippet. If specified and a code snippet with the same name has already been added, the new code snippet is ignored. If p_key is NULL the snippet is always added.

Example

The following example includes the JavaScript function `initMySuperWidget` in the HTML output. If the plug-in is used multiple times on the page and the `add_inline_code` is

called multiple times, it is added once to the HTML output because all calls have the same value for `p_key`.

```
apex_javascript.add_inline_code (
    p_code => 'function initMySuperWidget(){'|chr(10)||
              ' // do something'|chr(10)||
              '};',
    p_key => 'my_super_widget_function' );
```

18.7 ADD_LIBRARY Procedure

This procedure adds the script tag to load a JavaScript library. If a library has been added, it is not added a second time.

Syntax

```
APEX_JAVASCRIPT.ADD_LIBRARY (
    p_name                IN VARCHAR2,
    p_directory           IN VARCHAR2,
    p_version             IN VARCHAR2 DEFAULT NULL,
    p_check_to_add_minified IN BOOLEAN DEFAULT FALSE,
    p_skip_extension      IN BOOLEAN DEFAULT FALSE,
    p_ie_condition        IN VARCHAR2 DEFAULT NULL,
    p_requirejs_module    IN VARCHAR2 DEFAULT NULL,
    p_requirejs_js_expression IN VARCHAR2 DEFAULT NULL,
    p_requirejs_required  IN BOOLEAN DEFAULT FALSE,
    p_key                 IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 18-7 ADD_LIBRARY Parameters

Parameter	Description
<code>p_name</code>	Name of the JavaScript file. Must not use <code>.js</code> when specifying.
<code>p_directory</code>	Directory where JavaScript library is loaded. Must have a trailing slash.
<code>p_version</code>	Version identifier.
<code>p_check_to_add_minified</code>	If TRUE, the procedure tests if it is appropriate to add <code>.min</code> extension and add it if appropriate. This is added if an application is not running in DEBUG mode, and omitted when in DEBUG mode.
<code>p_skip_extension</code>	If TRUE the extension <code>.js</code> is NOT added.
<code>p_ie_condition</code>	Condition which is used as Internet Explorer condition.
<code>p_requirejs_module</code>	Module name which is used to expose the library to RequireJS.
<code>p_requirejs_js_expression</code>	JavaScript expression which is used to expose the library to the RequireJS module.
<code>p_requirejs_required</code>	This has to be true if the library uses RequireJS in its code to loading other JavaScript files.
<code>p_key</code>	Name used to indicate if the library has already been loaded. If not specified, defaults to <code>p_directory p_name p_version</code> .

Example

The following example includes the JavaScript library file named `hammer-2.0.4.min.js` (if the application has not been started from the Builder), or `hammer-2.0.4.js` (if the application has been started from the Builder or is running in DEBUG mode), from the directory specified by `p_plugin.file_prefix`. Since `p_skip_extension` is not specified, this defaults to `.js`. Also, since `p_key` is not specified, the key defaults to `p_plugin.file_prefix|hammer-2.0.4`. Hammer is a JavaScript library which exposes itself to RequireJS using `hammerjs` as module name.

```
apex_javascript.add_library (
    p_name           => 'hammer-2.0.4#MIN#',
    p_directory      => p_plugin.file_prefix,
    p_requirejs_module => 'hammerjs',
    p_requirejs_js_expression => 'Hammer' );
```

18.8 ADD_REQUIREJS Procedure

This procedure adds the script tag to load the RequireJS library.

Syntax

```
procedure add_requirejs;
```

18.9 ADD_REQUIREJS_DEFINE Procedure

This procedure adds a RequireJS define after RequireJS has been loaded to let it know about the existence of a library.

Syntax

```
APEX_JAVASCRIPT.add_requirejs_define (
    p_module          in varchar2,
    p_js_expression in varchar2 );
```

Parameters

Table 18-8 ADD_REQUIREJS_DEFINE Parameters

Parameter	Description
<code>p_module</code>	
<code>p_js_expression</code>	

Example

```
apex_javascript.add_requirejs_define (
    p_module          => 'hammerjs',
    p_js_expression => 'Hammer' );
```


18.10 ADD_ONLOAD_CODE Procedure

This procedure adds a javascript code snippet to the HTML output which is executed by the onload event. If an entry with the same key exists it is ignored. If `p_key` is NULL the snippet is always added.

Syntax

```
APEX_JAVASCRIPT.ADD_ONLOAD_CODE (  
    p_code          IN VARCHAR2,  
    p_key           IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 18-9 ADD_ONLOAD_CODE Parameters

Parameter	Description
<code>p_code</code>	Javascript code snippet to be executed during the onload event.
<code>p_key</code>	Any name to identify the specified code snippet. If specified, the code snippet is added if there has been no other call with the same <code>p_key</code> . If <code>p_key</code> is NULL the code snippet is always added.

Example

Adds the JavaScript call `initMySuperWidget()` to the onload buffer. If the plug-in is used multiple times on the page and the `add_onload_code` is called multiple times, it is added once to the HTML output because all calls have the same value for `p_key`

```
apex_javascript.add_onload_code (  
    p_code => 'initMySuperWidget()';  
    p_key  => 'my_super_widget' );
```

18.11 ADD_VALUE Function Signature 1

This function returns the escaped text surrounded by double quotation marks. For example, this string could be returned `"That\'s a test"`.

Note:

This function does not escape HTML tags. It only prevents HTML tags from breaking the JavaScript object attribute assignment. To prevent XSS (cross site scripting) attacks, you must also call `SYS.HTF.ESCAPE_SC` to prevent embedded JavaScript code from being executed when you inject the string into the HTML page.

Syntax

```
APEX_JAVASCRIPT.ADD_VALUE (  
    p_value          IN VARCHAR2,  
    p_add_comma     IN BOOLEAN :=TRUE)  
RETURN VARCHAR2;
```

Parameters

Table 18-10 ADD_VALUE Signature 1 Parameters

Parameter	Description
p_value	Text to be escaped and wrapped by double quotation marks.
p_add_comma	If p_add_comma is TRUE a trailing comma is added.

Example

This example adds some JavaScript code to the onload buffer. The value of p_item.attribute_01 is first escaped with htf.escape_sc to prevent XSS attacks and then assigned to the JavaScript variable lTest by calling apex_javascript.add_value. Add_value takes care of properly escaping the value and wrapping it with double quotation marks. Because commas are not wanted, p_add_comma is set to FALSE.

```
apex_javascript.add_onload_code (
    'var lTest = ' ||
    apex_javascript.add_value(sys.htf.escape_sc(p_item.attribute_01), FALSE) || ';' ||
    chr(10) ||
    'showMessage(lTest);' );
```

18.12 ADD_VALUE Function Signature 2

This function returns p_value as JavaScript number, if p_value is NULL the value null is returned.

Syntax

```
APEX_JAVASCRIPT.ADD_VALUE (
    p_value          IN NUMBER,
    p_add_comma     IN BOOLEAN :=TRUE)
RETURN VARCHAR2;
```

Parameters

Table 18-11 ADD_VALUE Signature 2 Parameters

Parameter	Description
p_value	Number which should be returned as JavaScript number.
p_add_comma	If p_add_comma is TRUE a trailing comma is added. Default is TRUE.

Example

See example for [ADD_VALUE Function Signature 1](#) (page 18-8) .

18.13 ADD_VALUE Function Signature 3

This function returns p_value as JavaScript boolean. If p_value is NULL the value null is returned.

Syntax

```
APEX_JAVASCRIPT.ADD_VALUE (
    p_value          IN BOOLEAN,
    p_add_comma     IN BOOLEAN :=TRUE)
RETURN VARCHAR2;
```

Parameters**Table 18-12** ADD_VALUE Signature 3 Parameters

Parameter	Description
p_value	Boolean which should be returned as JavaScript boolean.
p_add_comma	If p_add_comma is TRUE a trailing comma is added. Default is TRUE.

Example

See example for [ADD_VALUE Function Signature 1](#) (page 18-8) .

18.14 ADD_VALUE Function Signature 4

This function returns p_value as JavaScript date object, if p_value is NULL the value null is returned.

Syntax

```
APEX_JAVASCRIPT.ADD_VALUE (
    p_value          IN NUMBER,
    p_add_comma     IN BOOLEAN :=TRUE)
RETURN VARCHAR2;
```

Parameters**Table 18-13** ADD_VALUE Signature 4 Parameters

Parameter	Description
p_value	Date which should be returned as JavaScript date object.
p_add_comma	If p_add_comma is TRUE a trailing comma is added. Default is TRUE.

Example

See example for [ADD_VALUE Function Signature 1](#) (page 18-8) .

18.15 Escape Function

This function escapes text to be used in JavaScript. This function uses APEX_ESCAPE.JS_LITERAL to escape characters and provide a reference to that other API.

 **Note:**

This function prevents HTML tags from breaking the JavaScript object attribute assignment and also escapes the HTML tags '<' and '>'. It does not escape other HTML tags, therefore to be sure to prevent XSS (cross site scripting) attacks, you must also call `SYS.HTF.ESCAPE_SC` to prevent embedded JavaScript code from being executed when you inject the string into the HTML page.

Syntax

```
APEX_JAVASCRIPT.ESCAPE (  
    p_text IN VARCHAR2)  
RETURN VARCHAR2;
```

Parameters

Table 18-14 ESCAPE Parameters

Parameter	Description
p_text	Text to be escaped.

Example

Adds some JavaScript code to the onload buffer. The value of p_item.attribute_01 is first escaped with `htf.escape_sc` to prevent XSS attacks and then escaped with `apex_javascript.escape` to prevent that special characters like a quotation mark break the JavaScript code.

```
apex_javascript.add_onload_code (  
    'var lTest = ''||  
apex_javascript.escape(sys.htf.escape_sc(p_item.attribute_01))||'';'||chr(10)||  
    'showMessage(lTest);' );
```

19

APEX_JSON

This package includes utilities that parse and generate JSON.

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19.1 Package Overview and Examples

To read from a string that contains JSON data, first use `parse()` to convert the string to an internal format. Then use the `get_*` routines (e.g. `get_varchar2()`, `get_number()`, ...) to access the data and `find_paths_like()` to search.

Alternatively, use `to_xmltype()` to convert a JSON string to an `xmltype`.

This package also contains procedures to generate JSON-formatted output. Use the overloaded `open_*`, `close_*` and `write()` procedures for writing.

Example 1

This example parses a JSON string and prints the value of member variable "a".

```
DECLARE
  s varchar2(32767) := '{ "a": 1, "b": ["hello", "world"]}';
BEGIN
  apex_json.parse(s);
  sys.dbms_output.put_line('a is '||apex_json.get_varchar2(p_path => 'a'));
END;
```

Example 2

This example converts a JSON string to XML and uses `XMLTABLE` to query member values.

```

select col1, col2
from xmltable (
  '/json/row'
  passing apex_json.to_xmltype('["coll": 1, "col2": "hello"],'||
    '{"coll": 2, "col2": "world"}')
  columns
    col1 number path '/row/coll',
    col2 varchar2(5) path '/row/col2' );

```

Example 3

This example writes a nested JSON object to the HTTP buffer.

```

BEGIN
  apex_json.open_object;          -- {
  apex_json.write('a', 1);      -- "a":1
  apex_json.open_array('b');    -- ,"b":[
  apex_json.open_object;        -- {
  apex_json.write('c',2);      -- "c":2
  apex_json.close_object;       -- }
  apex_json.write('hello');     -- ,"hello"
  apex_json.write('world');     -- ,"world"
  apex_json.close_all;          -- ]
                                -- }
END;

```

19.2 Constants and Data Types

Parser Interface

The following are constants used for the parser interface:

```

subtype t_kind is binary_integer range 1 .. 8;
c_null      constant t_kind := 1;
c_true      constant t_kind := 2;
c_false     constant t_kind := 3;
c_number    constant t_kind := 4;
c_varchar2  constant t_kind := 5;
c_object    constant t_kind := 6;
c_array     constant t_kind := 7;
c_clob      constant t_kind := 8;

```

Storage for JSON Data

JSON data is stored in an index by varchar2 table. The JSON values are stored as records. The discriminator "kind" determines whether the value is null, true, false, a number, a varchar2, a clob, an object or an array. It depends on "kind" which record fields are used and how. If not explicitly mentioned below, the other record fields' values are undefined:

* c_null: -

* c_true: -

* c_false: -

* c_number: number_value contains the number value

* c_varchar2: varchar2_value contains the varchar2 value

* c_clob: clob_value contains the clob

* `c_object`: `object_members` contains the names of the object's members

* `c_array`: `number_value` contains the array length

```
type t_value is record (  
    kind          t_kind,  
    number_value  number,  
    varchar2_value varchar2(32767),  
    clob_value    clob,  
    object_members apex_t_varchar2 );  
type t_values is table of t_value index by varchar2(32767);
```

Default Format for Dates

```
c_date_iso8601 constant varchar2(30) := 'yyyy-mm-dd"T"hh24:mi:ss"Z";
```

Default JSON Values Table

```
g_values t_values;
```

Errors Thrown for PARSE()

```
e_parse_error    exception;  
pragma exception_init(e_parse_error, -20987);
```

19.3 CLOSE_ALL Procedure

This procedure closes all objects and arrays up to the outermost nesting level.

Syntax

```
APEX_JSON.CLOSE_ALL;
```

Parameters

None.

Example

See "[Package Overview and Examples](#) (page 19-2)".

19.4 CLOSE_ARRAY Procedure

This procedure writes a close bracket symbol as follows:

```
]
```

Syntax

```
APEX_JSON.CLOSE_ARRAY ();
```

Parameters

None.

Example

See "[Package Overview and Examples](#) (page 19-2)".

19.5 CLOSE_OBJECT Procedure

This procedure writes a close curly bracket symbol as follows:

```
}
```

Syntax

```
APEX_JSON.CLOSE_OBJECT ();
```

Parameters

None.

Example

See "[Package Overview and Examples](#) (page 19-2)".

19.6 DOES_EXIST Function

This function determines whether the given path points to an existing value.

Syntax

```
APEX_JSON.DOES_EXIST (
  p_path          IN VARCHAR2,
  p0              IN VARCHAR2 DEFAULT NULL,
  p1              IN VARCHAR2 DEFAULT NULL,
  p2              IN VARCHAR2 DEFAULT NULL,
  p3              IN VARCHAR2 DEFAULT NULL,
  p4              IN VARCHAR2 DEFAULT NULL,
  p_values        IN t_values DEFAULT g_values )
RETURN BOOLEAN;
```

Parameters

Table 19-1 DOES_EXIST Function Parameters

Parameter	Description
p_path	Index into p_values.
p[0-4]	Each %N in p_path is replaced by p _N and every i-th %s or %d is replaced by the p[i-1].
p_values	Parsed JSON members. The default is g_values.

Returns

Table 19-2 DOES_EXIST Function Returns

Return	Description
TRUE	Given path points to an existing value.
FALSE	Given path does not point to an existing value

Example

This example parses a JSON string and prints whether it contains values under a path.

```

DECLARE
  j apex_json.t_values;
BEGIN
  apex_json.parse(j, '{ "items": [ 1, 2, { "foo": true } ] }');
  if apex_json.does_exist(p_path => 'items[%d].foo', p0 => 3, p_values =>
j) then
    dbms_output.put_line('found items[3].foo');
  end if;
END;

```

19.7 FIND_PATHS_LIKE Function

This function returns paths into `p_values` that match a given pattern.

Syntax

```

APEX_JSON.FIND_PATHS_LIKE (
  p_return_path      IN VARCHAR2,
  p_subpath          IN VARCHAR2 DEFAULT NULL,
  p_value            IN VARCHAR2 DEFAULT NULL,
  p_values           IN t_values DEFAULT g_values )
RETURN apex_t_varchar2;

```

Parameters

Table 19-3 FIND_PATHS_LIKE Function Parameters

Parameter	Description
<code>p_return_path</code>	Search pattern for the return path..
<code>p_subpath</code>	Search pattern under <code>p_return_path</code> (optional).
<code>p_value</code>	Search pattern for value (optional).
<code>p_values</code>	Parsed JSON members. The default is <code>g_values</code> .

Returns/Raised Errors

Table 19-4 FIND_PATHS_LIKE Function Returns and Raised Errors

Return	Description
<code>apex_t_varchar2</code>	Table of paths that match the pattern.
<code>VALUE_ERROR</code>	Raises this error if <code>p_values(p_path)</code> is not an array or object.

Example

This example parses a JSON string, finds paths that match a pattern, and prints the values under the paths.

```

DECLARE
  j          apex_json.t_values;
  l_paths apex_t_varchar2;

```

```

BEGIN
  apex_json.parse(j, '{ "items": [ { "name": "Amulet of Yendor", "magical":
true }, |||
                                     { "name": "Slippers", "magical": "rather
not" } ]}');
  l_paths := apex_json.find_paths_like (
    p_values      => j,
    p_return_path => 'items[%]',
    p_subpath     => '.magical',
    p_value       => 'true' );
  dbms_output.put_line('Magical items:');
  for i in 1 .. l_paths.count loop
    dbms_output.put_line(apex_json.get_varchar2(p_values => j, p_path =>
l_paths(i)|||.name'));
  end loop;
END;

```

19.8 FREE_OUTPUT Procedure

Frees output resources. Call this procedure after process if you are using `INITIALIZE_CLOB_OUTPUT` to write to a temporary CLOB.

Syntax

```
free_output;
```

Example

This example configures `APEX_JSON` for CLOB output, generate JSON, print the CLOB with `DBMS_OUTPUT`, and finally free the CLOB.

```

BEGIN
  apex_json.initialize_clob_output;

  apex_json.open_object;
  apex_json.write('hello', 'world');
  apex_json.close_object;

  dbms_output.put_line(apex_json.get_clob_output);

  apex_json.free_output;
END;

```

19.9 FLUSH Procedure

This procedure flushes pending changes. Note that close procedures automatically flush.

Syntax

```
APEX_JSON.FLUSH
```

Parameters

None.

Example

This example writes incomplete JSON.

```

BEGIN
  apex_json.open_object;
  apex_json.write('attr', 'value');
  apex_json.flush;
  sys.http.p('the "]" is missing');
END;

```

19.10 GET_BOOLEAN Function

This function returns a boolean number value.

Syntax

```

APEX_JSON.GET_BOOLEAN (
  p_path          IN VARCHAR2,
  p0              IN VARCHAR2 DEFAULT NULL,
  p1              IN VARCHAR2 DEFAULT NULL,
  p2              IN VARCHAR2 DEFAULT NULL,
  p3              IN VARCHAR2 DEFAULT NULL,
  p4              IN VARCHAR2 DEFAULT NULL,
  p_default      IN BOOLEAN  DEFAULT NULL,
  p_values        IN t_values DEFAULT g_values )
RETURN BOOLEAN;

```

Parameters

Table 19-5 GET_BOOLEAN Function Parameters

Parameter	Description
p_path	Index into p_values.
p[0-4]	Each %N in p_path is replaced by pN and every i-th %s or %d is replaced by the p[i-1].
p_default	The default value if the member does not exist.
p_values	Parsed JSON members. The default is g_values.

Returns

Table 19-6 GET_BOOLEAN Function Returns

Return	Description
TRUE	Value at the given path position.
FALSE	Value at the given path position.
NULL	Value at the given path position.
VALUE_ERROR	Raises this error if p_values(p_path) is not boolean.

Example

This example parses a JSON string and prints the boolean value at a position.

```

DECLARE
  j apex_json.t_values;
BEGIN
  apex_json.parse(j, '{ "items": [ 1, 2, { "foo": true } ] }');

```

```

        if apex_json.get_boolean(p_path=>'items[%d].foo', p0=>3,p_values=>j) then
            dbms_output.put_line('items[3].foo is true');
        END IF;
    END;
```

19.11 GET_CLOB_OUTPUT Function

Returns the temporary CLOB that you created with `INITIALIZE_CLOB_OUTPUT`.

Syntax

```
function get_clob_output
    return clob;
```

Example

This example configures `APEX_JSON` for CLOB output, generate JSON, print the CLOB with `DBMS_OUTPUT`, and finally free the CLOB.

```

BEGIN
    apex_json.initialize_clob_output;

    apex_json.open_object;
    apex_json.write('hello', 'world');
    apex_json.close_object;

    dbms_output.put_line(apex_json.get_clob_output);

    apex_json.free_output;
END;
```

19.12 GET_COUNT Function

This function returns the number of array elements or object members.

Syntax

```

APEX_JSON.GET_COUNT (
    p_path          IN VARCHAR2,
    p0              IN VARCHAR2 DEFAULT NULL,
    p1              IN VARCHAR2 DEFAULT NULL,
    p2              IN VARCHAR2 DEFAULT NULL,
    p3              IN VARCHAR2 DEFAULT NULL,
    p4              IN VARCHAR2 DEFAULT NULL,
    p_values        IN t_values DEFAULT g_values )
RETURN NUMBER;
```

Parameters

Table 19-7 GET_COUNT Function Parameters

Parameter	Description
<code>p_path</code>	Index into <code>p_values</code> .
<code>p[0-4]</code>	Each <code>%N</code> in <code>p_path</code> is replaced by <code>pN</code> and every <code>i</code> -th <code>%s</code> or <code>%d</code> is replaced by the <code>p[i-1]</code> .
<code>p_values</code>	Parsed JSON members. The default is <code>g_values</code> .

Returns/Raised Errors**Table 19-8 GET_COUNT Function Returns and Raised Errors**

Return	Description
NUMBER	The number of array elements or object members or null if the array or object could not be found
VALUE_ERROR	Raises this error if <code>p_values(p_path)</code> is not an array or object.

Example

This example parses a JSON string and prints the number of members at positions.

```

DECLARE
    j apex_json.t_values;
BEGIN
    apex_json.parse(j, '{ "foo": 3, "bar": [1, 2, 3, 4] }');
    dbms_output.put_line(apex_json.get_count(p_path=>'.',p_values=>j)); -- 2 (foo
and bar)
    dbms_output.put_line(apex_json.get_count(p_path=>'bar',p_values=>j)); -- 4
END;
```

19.13 GET_DATE Function

This function returns a date member value.

Syntax

```

APEX_JSON.GET_DATE (
    p_path          IN VARCHAR2,
    p0              IN VARCHAR2 DEFAULT NULL,
    p1              IN VARCHAR2 DEFAULT NULL,
    p2              IN VARCHAR2 DEFAULT NULL,
    p3              IN VARCHAR2 DEFAULT NULL,
    p4              IN VARCHAR2 DEFAULT NULL,
    p_default       IN DATE      DEFAULT NULL,
    p_format        IN VARCHAR2 DEFAULT c_date_iso8601,
    p_values        IN t_values  DEFAULT g_values )
RETURN DATE;
```

Parameters**Table 19-9 GET_DATE Function Parameters**

Parameter	Description
<code>p_path</code>	Index into <code>p_values</code> .
<code>p[0-4]</code>	Each <code>%N</code> in <code>p_path</code> is replaced by <code>pN</code> and every <code>i</code> -th <code>%s</code> or <code>%d</code> is replaced by the <code>p[i-1]</code> .
<code>p_default</code>	The default value if the member does not exist.
<code>p_format</code>	The date format mask.
<code>p_values</code>	Parsed JSON members. The default is <code>g_values</code> .

Returns/Raised Errors

Table 19-10 GET_DATE Function Returns and Raised Errors

Return	Description
DATE	.Returns the date.
VALUE_ERROR	Raises this error if p_values(p_path) is not a date.

Example

This example parses a JSON string and prints the value at a position.

```
DECLARE
    j apex_json.t_values;
BEGIN
    apex_json.parse(j, '{ "items": [ 1, 2, { "foo": "2014-04-29T10:08:00Z" } ] }');

    dbms_output.put_line(to_char(apex_json.get_date(p_path=>'items[%d].foo', p0=>3,
    p_values=>j), 'DD-Mon-YYYY'));
END;
```

19.14 GET_MEMBERS Function

This function returns the table of OBJECT_MEMBERS names for an object.

Syntax

```
APEX_JSON.GET_MEMBERS (
    p_path          IN VARCHAR2,
    p0              IN VARCHAR2 DEFAULT NULL,
    p1              IN VARCHAR2 DEFAULT NULL,
    p2              IN VARCHAR2 DEFAULT NULL,
    p3              IN VARCHAR2 DEFAULT NULL,
    p4              IN VARCHAR2 DEFAULT NULL,
    p_values        IN t_values DEFAULT g_values )
RETURN APEX_T_VARCHAR2;
```

Parameters

Table 19-11 GET_MEMBERS Function Parameters

Parameter	Description
p_path	Index into p_values.
p[0-4]	Each %N in p_path is replaced by p _N and every i-th %s or %d is replaced by the p[<i>i</i> -1].
p_values	Parsed JSON members. The default is g_values.

Returns/Raised Errors**Table 19-12 GET_MEMBERS Function Returns and Raised Errors**

Return	Description
OBJECT_MEMBERS	The OBJECT_MEMBERS of the object or null if the object could not be found.
VALUE_ERROR	Raises this error if p_values(p_path) is not an array or object.

Example

This example parses a JSON string and prints members at positions.

```

DECLARE
    j apex_json.t_values;
BEGIN
    apex_json.parse(j, '{ "foo": 3, "bar": [1, 2, 3, 4] }');
    dbms_output.put_line(apex_json.get_members(p_path=>'.',p_values=>j)(1)); -- foo
    dbms_output.put_line(apex_json.get_members(p_path=>'.',p_values=>j)(2)); -- bar
END;
```

19.15 GET_NUMBER Function

This function returns a numeric number value.

Syntax

```

APEX_JSON.GET_NUMBER (
    p_path          IN VARCHAR2,
    p0              IN VARCHAR2 DEFAULT NULL,
    p1              IN VARCHAR2 DEFAULT NULL,
    p2              IN VARCHAR2 DEFAULT NULL,
    p3              IN VARCHAR2 DEFAULT NULL,
    p4              IN VARCHAR2 DEFAULT NULL,
    p_default       IN BOOLEAN DEFAULT NULL,
    p_values        IN t_values DEFAULT g_values )
RETURN NUMBER;
```

Parameters**Table 19-13 GET_NUMBER Function Parameters**

Parameter	Description
p_path	Index into p_values.
p[0-4]	Each %N in p_path is replaced by pN and every i-th %s or %d is replaced by the p[i-1].
p_default	The default value if the member does not exist.
p_values	Parsed JSON members. The default is g_values.

Returns/Raised Errors**Table 19-14 GET_NUMBER Function Returns and Raised Errors**

Return	Description
NUMBER	The value at the given path position.
VALUE_ERROR	Raises this error if <code>p_values(p_path)</code> is not a number.

Example

This example parses a JSON string and prints the value at a position.

```
DECLARE
    j apex_json.t_values;
BEGIN
    apex_json.parse(j, '{ "items": [ 1, 2, { "foo": 42 } ] }');
    dbms_output.put_line(apex_json.get_number(p_path=>'items[%d].foo',p0=>
3,p_values=>j));
END;
```

19.16 GET_VALUE Function

This function returns the `t_value`.

Syntax

```
APEX_JSON.GET_VALUE (
    p_path          IN VARCHAR2,
    p0              IN VARCHAR2 DEFAULT NULL,
    p1              IN VARCHAR2 DEFAULT NULL,
    p2              IN VARCHAR2 DEFAULT NULL,
    p3              IN VARCHAR2 DEFAULT NULL,
    p4              IN VARCHAR2 DEFAULT NULL,
    p_values        IN t_values DEFAULT g_values )
RETURN t_value;
```

Parameters**Table 19-15 GET_VALUE Function Parameters**

Parameter	Description
<code>p_path</code>	Index into <code>p_values</code> .
<code>p[0-4]</code>	Each <code>%N</code> in <code>p_path</code> is replaced by <code>pN</code> and every <code>i</code> -th <code>%s</code> or <code>%d</code> is replaced by the <code>p[i-1]</code> .
<code>p_values</code>	Parsed JSON members. The default is <code>g_values</code> .

Returns/Raised Errors**Table 19-16 GET_VALUE Function Returns and Raised Errors**

Return	Description
t_value	The t_value at the given path position. The record attributes are null if no data is found.
VALUE_ERROR	Raises this error if p_values(p_path) is not an array or object.

Example

This example parses a JSON string and prints attributes of values at positions.

```

DECLARE
    j apex_json.t_values;
    v apex_json.t_value;
BEGIN
    apex_json.parse(j, '{ "foo": 3, "bar": [1, 2, 3, 4] }');
    v := apex_json.get_value(p_path=>'bar[%d]',p0=> 2,p_values=>j); -- returns the
t_value for bar[2]
    dbms_output.put_line(v.number_value); -- 2
    v := apex_json.get_value(p_path=>'does.not.exist',p_values=>j);
    dbms_output.put_line(case when v.kind is null then 'not found!' end);
END;
```

19.17 GET_T_NUMBER Function

This function returns the numeric attributes of an array.

Syntax

```

function get_t_number (
    p_path          in varchar2,
    p0              in varchar2 default null,
    p1              in varchar2 default null,
    p2              in varchar2 default null,
    p3              in varchar2 default null,
    p4              in varchar2 default null,
    p_values        in t_values default g_values )
return wwv_flow_t_number;
```

Parameters**Table 19-17 GET_T_NUMBER Parameters**

Parameter	Description
p_path	Index into p_values.
p[0-4]	Each %N in p_path is replaced by pN and every i-th %s or %d is replaced by the p[i-1].
p_values	Parsed JSON members. The default is p_values.

Returns

Array member values if the referenced `t_value` is an array. An array with just the referenced value if its type can be converted to a number.

Table 19-18 GET_T_NUMBER Function Raised Errors

Return	Description
VALUE_ERROR	On conversion errors.

Example

This example parses a JSON string and prints the value at position 1.

```

declare
  j          apex_json.t_values;
  l_elements apex_t_number;
begin
  apex_json.parse(j, '{ "foo": [111, 222], "bar": 333 }');
  l_elements := apex_json.get_t_number (
    p_values => j,
    p_path   => 'foo' );
  for i in 1 .. l_elements.count loop
    sys.dbms_output.put_line(i||':'||l_elements(i));
  end loop;
  l_elements := apex_json.get_t_number (
    p_values => j,
    p_path   => 'bar' );
  for i in 1 .. l_elements.count loop
    sys.dbms_output.put_line(i||':'||l_elements(i));
  end loop;
end;

```

```

Output:
1:111
2:222
1:333

```

19.18 GET_T_VARCHAR2 Function

This function returns the varchar2 attributes of an array.

Syntax

```

function get_t_varchar2 (
  p_path          in varchar2,
  p0              in varchar2 default null,
  p1              in varchar2 default null,
  p2              in varchar2 default null,
  p3              in varchar2 default null,
  p4              in varchar2 default null,
  p_values        in t_values default g_values )
return wwv_flow_t_varchar2;

```

Parameters

Table 19-19 GET_T_VARCHAR2 Function Parameters

Parameter	Description
p_path	Index into p_values.
p[0-4]	Each %N in p_path is replaced by pN and every i-th %s or %d is replaced by the p[i-1].
p_values	Parsed JSON members. The default is g_values.

Returns

Array member values if the referenced t_value is an array. An array with just the referenced value if it's type can be converted to a varchar2.

Raises

Table 19-20 GET_T_VARCHAR2 Function Raised Errors

Return	Description
VALUE_ERROR	On conversion errors.

Example

This example parses a JSON and prints the value at position 1.

```

declare
    j          apex_json.t_values;
    l_elements apex_t_varchar2;
begin
    apex_json.parse(j, '{ "foo": ["one", "two"], "bar": "three" }');
    l_elements := apex_json.get_t_varchar2 (
        p_values => j,
        p_path   => 'foo' );
    for i in 1 .. l_elements.count loop
        sys.dbms_output.put_line(i||':'||l_elements(i));
    end loop;
    l_elements := apex_json.get_t_varchar2 (
        p_values => j,
        p_path   => 'bar' );
    for i in 1 .. l_elements.count loop
        sys.dbms_output.put_line(i||':'||l_elements(i));
    end loop;
end;
```

```

Output:
1:one
2:two
1:three
```

19.19 GET_VARCHAR2 Function

This function returns a varchar2 member value. This function converts boolean and number values to varchar2 values.

Syntax

```
APEX_JSON.GET_VARCHAR2 (
  p_path          IN VARCHAR2,
  p0              IN VARCHAR2 DEFAULT NULL,
  p1              IN VARCHAR2 DEFAULT NULL,
  p2              IN VARCHAR2 DEFAULT NULL,
  p3              IN VARCHAR2 DEFAULT NULL,
  p4              IN VARCHAR2 DEFAULT NULL,
  p_default       IN BOOLEAN  DEFAULT NULL,
  p_values        IN t_values  DEFAULT g_values )
RETURN VARCHAR2;
```

Parameters

Table 19-21 GET_VARCHAR2 Function Parameters

Parameter	Description
p_path	Index into p_values.
p[0-4]	Each %N in p_path is replaced by pN and every i-th %s or %d is replaced by the p[i-1].
p_default	The default value if the member does not exist.
p_values	Parsed JSON members. The default is g_values.

Returns/Raised Errors

Table 19-22 GET_VARCHAR2 Function Returns and Raised Errors

Return	Description
VARCHAR2	This is the value at the given path position.
VALUE_ERROR	Raises this error if p_values(p_path) is not an array or object.

Example

This example parses a JSON string and prints the value at a position.

```
DECLARE
  j apex_json.t_values;
BEGIN
  apex_json.parse(j, '{ "items": [ 1, 2, { "foo": 42 } ] }');
  dbms_output.put_line(apex_json.get_varchar2(p_path=>'items[%d].foo',p0=>
3,p_values=>j));
END;
```

19.20 GET_CLOB Function

This function returns clob member value. This function auto-converts `varchar2`, boolean and number values.

Syntax

```
get_clob (
  p_path      in varchar2,
  p0          in varchar2 default null,
  p1          in varchar2 default null,
  p2          in varchar2 default null,
  p3          in varchar2 default null,
  p4          in varchar2 default null,
  p_default  in clob default null,
  p_values    in t_values default g_values )
return clob
```

Parameters

Table 19-23 GET_CLOB Function Parameters

Parameter	Description
<code>p_values</code>	Parsed json members. defaults to <code>g_values</code> .
<code>p_path</code>	Index into <code>p_values</code> .
<code>p[0-4]</code>	Each <code>%N</code> in <code>p_path</code> will be replaced by <code>pN</code> and every <code>i</code> -th <code>%s</code> or <code>%d</code> will be replaced by the <code>p[i-1]</code> .
<code>p_default</code>	Default value if the member does not exist.

Returns/Raised Errors

Table 19-24 GET_CLOB Function Returns and Raised Errors

Return/Raised Errors	Description
a clob	Value at the given path position
VALUE_ERROR	If <code>p_values(p_path)</code> is an array or an object

Example

Parse a JSON string and print the value at a position.

```
declare
  j apex_json.t_values;
begin
  apex_json.parse(j, '{ "items": [ 1, 2, { "foo": 42 } ] }');
  dbms_output.put_line(apex_json.get_clob (
    p_values => j,
    p_path => 'items[%d].foo',
    p0 => 3));
end;
```

19.21 INITIALIZE_CLOB_OUTPUT Procedure

This procedure initializes the output interface to write to a temporary CLOB. The default is to write to `SYS.HTP`. If using CLOB output, you should call `FREE_OUTPUT()` at the end to free the CLOB.

Syntax

```
APEX_JSON.INITIALIZE_CLOB_OUTPUT (
  p_dur          in pls_integer default sys.dbms_lob.call,
  p_cache        in boolean      default true,
  p_indent       in pls_integer default null );
```

Parameters

Table 19-25 INITIALIZE_CLOB_OUTPUT Procedure Parameters

Parameter	Description
<code>p_dur</code>	Duration of the temporary CLOB. This can be <code>DBMS_LOB.SESSION</code> or <code>DBMS_LOB.CALL</code> (the default).
<code>p_cache</code>	Specifies if the lob should be read into buffer cache or not.
<code>p_indent</code>	Indent level. Defaults to 2 if debug is turned on, 0 otherwise.

Example

This example configures `APEX_JSON` for CLOB output, generate JSON, print the CLOB with `DBMS_OUTPUT`, and finally free the CLOB.

```
BEGIN
  apex_json.initialize_clob_output;

  apex_json.open_object;
  apex_json.write('hello', 'world');
  apex_json.close_object;

  dbms_output.put_line(apex_json.get_clob_output);

  apex_json.free_output;
END;
```

19.22 INITIALIZE_OUTPUT Procedure

This procedure initializes the output interface. You only have to call this procedure if you want to modify the parameters below. Initially, output is already configured with the defaults mentioned in the parameter table.

Syntax

```
APEX_JSON.INITIALIZE_OUTPUT (
  p_http_header  in boolean      default true,
  p_http_cache   in boolean      default false,
  p_http_cache_etag in varchar2  default null,
  p_indent       in pls_integer default null );
```

Parameters

Table 19-26 INITIALIZE_OUTPUT Procedure Parameters

Parameter	Description
p_http_header	If TRUE (the default), write an application/JSON mime type header.
p_http_cache	This parameter is only relevant if p_write_header is TRUE. If TRUE, writes Cache-Control: max-age=315360000. If FALSE (the default), writes Cache-Control: no-cache. Otherwise, does not write Cache-Control.
http_cache_etag	If not null, writes an etag header. This parameter is only used if P_HTTP_CACHE is true.
p_indent	Indent level. Defaults to 2, if debug is turned on, otherwise defaults to 0.

Example

This example configures APEX_JSON to not emit default headers, because they are written directly.

```

BEGIN
  apex_json.initialize_output (
    p_http_header => false );

  sys.owa_util.mime_header('application/json', false);
  sys.owa_util.status_line(429, 'Too Many Requests');
  sys.owa_util.http_header_close;
  --
  apex_json.open_object;
  apex_json.write('maxRequestsPerSecond', 10);
  apex_json.close_object;
END;
```

19.23 OPEN_ARRAY Procedure

This procedure writes an open bracket symbol as follows:

```
[
```

Syntax

```
APEX_JSON.OPEN_ARRAY (
  p_name      IN VARCHAR2 DEFAULT NULL );
```

Parameters

Table 19-27 OPEN_ARRAY Procedure Parameters

Parameter	Description
p_name	If not null, write an object attribute name and colon before the opening bracket.

Example

This example performs a write { "array":[1 ,[]] }.

```

BEGIN
  apex_json.open_object; -- {
  apex_json.open_array('array'); -- "array": [
  apex_json.write(1); -- 1
  apex_json.open_array; -- , [
  apex_json.close_array; -- ]
  apex_json.close_array; -- ]
  apex_json.close_object; -- }
END;

```

19.24 OPEN_OBJECT Procedure

This procedure writes an open curly bracket symbol as follows:

```
{
```

Syntax

```

APEX_JSON.OPEN_OBJECT (
  p_name      IN VARCHAR2 DEFAULT NULL );

```

Parameters

Table 19-28 OPEN_OBJECT Procedure Parameters

Parameter	Description
p_name	If not null, write an object attribute name and colon before the opening brace.

Example

This example performs a write { "obj": { "obj-attr": "value" } }.

```

BEGIN
  apex_json.open_object; -- {
  apex_json.open_object('obj'); -- "obj": {
  apex_json.write('obj-attr', 'value'); -- "obj-attr": "value"
  apex_json.close_all; -- }}
END;

```

19.25 PARSE Procedure Signature 1

This procedure parses a JSON-formatted varchar2 or clob and puts the members into p_values.

Syntax

```

APEX_JSON.PARSE (
  p_values  in out nocopy t_values,
  p_source  in varchar2,
  p_strict  in boolean default true );

```

```
APEX_JSON.PARSE (
  p_values  in out nocopy t_values,
  p_source  in clob,
  p_strict  in boolean default true );
```

Parameters

Table 19-29 PARSE Procedure Parameters

Parameter	Description
p_values	An index by varchar2 result array which contains the JSON members and values. The default is g_values.
p_source	The JSON source (varchar2 or clob)
p_strict	If TRUE (default), enforce strict JSON rules

Example

This example parses JSON and prints member values.

```
DECLARE
  l_values apex_json.t_values;
BEGIN
  apex_json.parse (
    p_values => l_values,
    p_source => '{ "type": "circle", "coord": [10, 20] }' );
  sys.http.p('Point at ' ||
    apex_json.get_number (
      p_values => l_values,
      p_path   => 'coord[1]') ||
    ', ' ||
    apex_json.get_number (
      p_values => l_values,
      p_path   => 'coord[2]'));
END;
```

19.26 PARSE Procedure Signature 2

This procedure parses a JSON-formatted `varchar2` or `clob` and puts the members into the package global `g_values`. This simplified API works similar to the `parse()` procedure for signature 1, but saves the developer from declaring a local variable for parsed JSON data and passing it to each JSON API call.

Syntax

```
APEX_JSON.PARSE (
  p_source  IN VARCHAR2,
  p_strict  IN BOOLEAN DEFAULT TRUE );

APEX_JSON.PARSE (
  p_source  IN CLOB,
  p_strict  IN BOOLEAN DEFAULT TRUE );
```

Parameters

Table 19-30 PARSE Procedure Parameters

Parameter	Description
p_source	The JSON source (varchar2 or clob).
p_strict	If TRUE (default), enforce strict JSON rules.

Example

This example parses JSON and prints member values.

```
apex_json.parse('{ "type": "circle", "coord": [10, 20] }');
sys.http.p('Point at '||
  apex_json.get_number(p_path=>'coord[1]')||
  ', '||
  apex_json.get_number(p_path=>'coord[2]'));
```

19.27 STRINGIFY Function Signature 1

This function converts a string to an escaped JSON value.

Syntax

```
APEX_JSON.STRINGIFY (
  p_value IN VARCHAR2 )
RETURN VARCHAR2;
```

Parameters

Table 19-31 STRINGIFY Function Parameters

Parameter	Description
p_value	The string to be converted.

Returns

Table 19-32 STRINGIFY Function Returns

Return	Description
VARCHAR2	The converted and escaped JSON value.

Example

This example is a query that returns a JSON varchar2 value.

```
select apex_json.stringify('line 1'||chr(10)||'line 2') from dual;
```

19.28 STRINGIFY Function Signature 2

This function converts a number to an escaped JSON value.

Syntax

```
APEX_JSON.STRINGIFY (
    p_value IN NUMBER )
RETURN VARCHAR2;
```

Parameters**Table 19-33** STRINGIFY Function Parameters

Parameter	Description
p_value	The number to be converted.

Returns**Table 19-34** STRINGIFY Function Returns

Return	Description
VARCHAR2	The converted and escaped JSON value.

Example

This example is a query that returns a JSON number value.

```
select apex_json.stringify(-1/10) from dual
```

19.29 STRINGIFY Function Signature 3

This function converts a date to an escaped JSON value.

Syntax

```
APEX_JSON.STRINGIFY (
    p_value IN DATE,
    p_format IN VARCHAR2 DEFAULT c_date_iso8601 )
RETURN VARCHAR2;
```

Parameters**Table 19-35** STRINGIFY Function Parameters

Parameter	Description
p_value	The date value to be converted.

Returns**Table 19-36** STRINGIFY Function Returns

Return	Description
VARCHAR2	The converted and escaped JSON value.

Example

This example is a query that returns a JSON `varchar2` value that is suitable to be converted to dates.

```
select apex_json.stringify(sysdate) from dual
```

19.30 STRINGIFY Function Signature 4

This function converts a boolean value to an escaped JSON value.

Syntax

```
APEX_JSON.STRINGIFY (
    p_value IN BOOLEAN )
RETURN VARCHAR2;
```

Parameters**Table 19-37** STRINGIFY Function Parameters

Parameter	Description
<code>p_value</code>	The boolean value to be converted.

Returns**Table 19-38** STRINGIFY Function Returns

Return	Description
<code>VARCHAR2</code>	The converted and escaped JSON value.

Example

This example demonstrates printing JSON boolean values.

```
BEGIN
    sys.http.p(apex_json.stringify(true));
    sys.http.p(apex_json.stringify(false));
END;
```

19.31 TO_MEMBER_NAME Function

This function converts the given string to a JSON member name, usable for accessing values via the `get_*` functions. Unless member names are simple identifiers (A-Z, 0-9, "_"), they need to be quoted.

Syntax

```
function to_member_name (
    p_string in varchar2 )
return varchar2
```

Parameters

Table 19-39 TO_MEMBER_NAME Function Parameters

Parameter	Description
p_string	The raw member name.

Returns

A valid member name for `get_%` functions.

Example

Print various converted strings.

```
begin
  sys.dbms_output.put_line('Unquoted: ' || apex_json.to_member_name('member_name'));
  sys.dbms_output.put_line('Quoted:   ' || apex_json.to_member_name('Hello"World'));
end;
```

Output:

```
Unquoted: member_name
Quoted:   "Hello\"World"
```

19.32 TO_XMLTYPE Function

This procedure parses a JSON-formatted `varchar2` or `CLOB` and converts it to an `xmltype`.

Syntax

```
APEX_JSON.TO_XMLTYPE (
  p_source  IN VARCHAR2,
  p_strict  IN BOOLEAN DEFAULT TRUE )
RETURN sys.xmltype;
```

```
APEX_JSON.TO_XMLTYPE (
  p_source  IN CLOB,
  p_strict  IN BOOLEAN DEFAULT TRUE )
RETURN sys.xmltype;
```

Parameters

Table 19-40 TO_XMLTYPE Function Parameters

Parameter	Description
p_source	The JSON source (<code>VARCHAR2</code> or <code>CLOB</code>)
p_strict	If <code>TRUE</code> (default), enforce strict JSON rules

Returns

Table 19-41 TO_XMLTYPE Function Returns

Return	Description
sys.xmltype	An xmltype representation of the JSON data.

Example

This example parses JSON and prints the XML representation.

```
DECLARE
    l_xml xmltype;
BEGIN
    l_xml := apex_json.to_xmltype('{ "items": [ 1, 2, { "foo": true } ] }');
    dbms_output.put_line(l_xml.getstringval);
END;
```

19.33 TO_XMLTYPE_SQL Function

This function parses a JSON-formatted `varchar2` or `CLOB` and converts it to an `xmltype`. This function overload has the `p_strict` parameter as `VARCHAR2` in order to allow invoking from within a SQL query and having JSON parsing in LAX mode.

Syntax

```
function to_xmltype_sql (
    p_source   IN VARCHAR2,
    p_strict   IN BOOLEAN DEFAULT 'Y' )
RETURN sys.xmltype;

function to_xmltype_sql (
    p_source   IN CLOB,
    p_strict   IN BOOLEAN DEFAULT 'Y' )
RETURN sys.xmltype;
```

Parameters

Table 19-42 TO_XMLTYPE_SQL Function Parameters

Parameter	Description
p_source	The JSON source (<code>VARCHAR2</code> or <code>CLOB</code>)
p_strict	If Y (default), enforce strict JSON rules

Returns

An `xmltype` representation of the json data

Example

This example SQL query converts JSON to `XMLTYPE` and uses the `XMLTABLE SQL` function to extract data. The `p_strict` argument is set to `N`, so the JSON can successfully be parsed in lax mode, although the items attribute is not enquoted.

```

select
  attr_1
from
  xmltable(
    '/json/items/row'
    passing apex_json.to_xmltype_sql( '{ items: [ 1, 2, { "foo": true } ] }',
    p_strict => 'N' )
    columns
      attr_1 varchar2(20) path 'foo/text()'
  );

```

19.34 WRITE Procedure Signature 1

This procedure writes an array attribute of type `VARCHAR2`.

Syntax

```

APEX_JSON.WRITE (
  p_value    IN VARCHAR2 );

```

Parameters

Table 19-43 WRITE Procedure Parameters

Parameter	Description
<code>p_value</code>	The value to be written.

Example

This example writes an array containing 1, "two", "long text", false, the current date and a JSON representation of an xml document.

```

DECLARE
  l_clob clob := 'long text';
  l_xml sys.xmltype := sys.xmltype('<obj><foo>1</foo><bar>2</bar></obj>');
BEGIN
  apex_json.open_array; -- [
  apex_json.write(1); -- 1
  apex_json.write('two'); -- , "two"
  apex_json.write(l_clob); -- , "long text"
  apex_json.write(false); -- , false
  apex_json.write(sysdate); -- , "2014-05-05T05:36:08Z"
  apex_json.write(localtimestamp); -- , "2014-05-05T05:36:08.5434Z"
  apex_json.write(current_timestamp); -- , "2014-05-05T05:36:08.5434+02:00"
  apex_json.write(l_xml); -- , { "foo": 1, "bar": 2 }
  apex_json.close_array; -- ]
END;

```

19.35 WRITE Procedure Signature 2

This procedure writes an array attribute. of type `clob`.

Syntax

```

APEX_JSON.WRITE (
  p_value    IN CLOB );

```


Parameters

Table 19-44 WRITE Procedure Parameters

Parameter	Description
p_value	The value to be written.

Example

See "[WRITE Procedure Signature 1](#) (page 19-28)".

19.36 WRITE Procedure Signature 3

This procedure writes an array attribute of type NUMBER.

Syntax

```
APEX_JSON.WRITE (
  p_value    IN NUMBER );
```

Parameters

Table 19-45 WRITE Procedure Parameters

Parameter	Description
p_value	The value to be written.

Example

See "[WRITE Procedure Signature 1](#) (page 19-28)".

19.37 WRITE Procedure Signature 4

This procedure writes an array attribute. of type date

Syntax

```
APEX_JSON.WRITE (
  p_value    IN DATE,
  p_format   IN VARCHAR2 DEFAULT c_date_iso8601 );
```

Parameters

Table 19-46 WRITE Procedure Parameters

Parameter	Description
p_value	The value to be written.
p_format	The date format mask (default c_date_iso8601).

Example

See ["WRITE Procedure Signature 1 \(page 19-28\)"](#).

19.38 WRITE Procedure Signature 5

This procedure writes an array attribute of type `boolean`.

Syntax

```
APEX_JSON.WRITE (
    p_value    IN BOOLEAN );
```

Parameters**Table 19-47** WRITE Procedure Parameters

Parameter	Description
<code>p_value</code>	The value to be written.

Example

See ["WRITE Procedure Signature 1 \(page 19-28\)"](#).

19.39 WRITE Procedure Signature 6

This procedure writes an array attribute of type `sys.xmltype`. The procedure uses a XSL transformation to generate JSON. To determine the JSON type of values, it uses the following rules:

- If the value is empty, it generates a `NULL` value.
- If `upper(value)` is `TRUE`, it generates a boolean true value.
- If `upper(value)` is `FALSE`, it generates a boolean false value.
- If the `XPath` number function returns `TRUE`, it emits the value as is. Otherwise, it quotes the value (that is, treats it as a JSON string).

Syntax

```
APEX_JSON.WRITE (
    p_value    IN sys.xmltype );
```

Parameters**Table 19-48** WRITE Procedure Parameters

Parameter	Description
<code>p_value</code>	The value to be written.

Example

See ["WRITE Procedure Signature 1 \(page 19-28\)"](#).

19.40 WRITE Procedure Signature 7

This procedure writes an array with all rows that the cursor returns. Each row is a separate object. If the query contains object type, collection, or cursor columns, the procedure uses `write(xmltype)` to generate JSON. Otherwise, it uses `DBMS_SQL` to fetch rows and the `write()` procedures for the appropriate column data types for output. If the column type is `varchar2` and the uppercase value is 'TRUE' or 'FALSE', it generates boolean values.

Syntax

```
APEX_JSON.WRITE (  
    p_cursor      IN OUT NOCOPY sys_refcursor );
```

Parameters

Table 19-49 WRITE Procedure Parameters

Parameter	Description
<code>p_cursor</code>	The cursor.

Example 1

This example writes an array containing JSON objects for departments 10 and 20.

```
DECLARE  
    c sys_refcursor;  
BEGIN  
    open c for select deptno, dname, loc from dept where deptno in (10, 20);  
    apex_json.write(c);  
END;
```

This is the output:

```
[ { "DEPTNO":10 , "DNAME":"ACCOUNTING" , "LOC":"NEW YORK" }  
  , { "DEPTNO":20 , "DNAME":"RESEARCH" , "LOC":"DALLAS" } ]
```

19.41 WRITE Procedure Signature 8

This procedure writes an object attribute of type `VARCHAR2`.

Syntax

```
APEX_JSON.WRITE (  
    p_name      IN VARCHAR2,  
    p_value     IN VARCHAR2,  
    p_write_null IN BOOLEAN DEFAULT FALSE );
```

Parameters

Table 19-50 WRITE Procedure Parameters

Parameter	Description
p_name	The attribute name.
p_value	The attribute value to be written.
p_write_null	If true, write NULL values. If false (the default), do not write NULLS.

Example

This example writes an object with named member attributes of various types. The comments to the right of the statements show the output that they generate.

```

DECLARE
  l_clob clob := 'long text';
  l_xml sys.xmltype := sys.xmltype('<obj><foo>1</foo><bar>2</bar></obj>');
BEGIN
  apex_json.open_object; -- {
  apex_json.write('a1', 1); -- "a1": 1
  apex_json.write('a2', 'two'); -- ,"a2": "two"
  apex_json.write('a3', l_clob); -- ,"a3": "long text"
  apex_json.write('a4', false); -- ,"a4": false
  apex_json.write('a5', sysdate); -- ,"a5": "2014-05-05T05:36:08Z"
  apex_json.write('a6', l_xml); -- ,"a6": { "foo": 1, "bar": 2 }
  apex_json.close_object; -- }
END;

```

19.42 WRITE Procedure Signature 9

This procedure writes an object attribute of type CLOB.

Syntax

```

APEX_JSON.WRITE (
  p_name          IN VARCHAR2,
  p_value         IN CLOB,
  p_write_null    IN BOOLEAN DEFAULT FALSE );

```

Parameters

Table 19-51 WRITE Procedure Parameters

Parameter	Description
p_name	The attribute name.
p_value	The attribute value to be written.
p_write_null	If true, write NULL values. If false (the default), do not write NULLS.

Example

See example for "[WRITE Procedure Signature 8](#) (page 19-31)".

19.43 WRITE Procedure Signature 10

This procedure writes an object attribute of type `NUMBER`.

Syntax

```
APEX_JSON.WRITE (
  p_name      IN VARCHAR2,
  p_value     IN NUMBER,
  p_write_null IN BOOLEAN DEFAULT FALSE );
```

Parameters

Table 19-52 WRITE Procedure Parameters

Parameter	Description
<code>p_name</code>	The attribute name.
<code>p_value</code>	The attribute value to be written.
<code>p_write_null</code>	If true, write <code>NULL</code> values. If false (the default), do not write <code>NULLS</code> .

Example

See example for "[WRITE Procedure Signature 8](#) (page 19-31)".

19.44 WRITE Procedure Signature 11

This procedure writes an object attribute of type `date`.

Syntax

```
APEX_JSON.WRITE (
  p_name      IN VARCHAR2,
  p_value     IN DATE,
  p_format    IN VARCHAR2 DEFAULT c_date_iso8691,
  p_write_null IN BOOLEAN DEFAULT FALSE );
```

Parameters

Table 19-53 WRITE Procedure Parameters

Parameter	Description
<code>p_name</code>	The attribute name.
<code>p_value</code>	The attribute value to be written.
<code>p_format</code>	The date format mask (default <code>apex_json.c_date_iso8601</code>).
<code>p_write_null</code>	If true, write <code>NULL</code> values. If false (the default), do not write <code>NULL</code> .

Example

See example for "[WRITE Procedure Signature 8](#) (page 19-31)".

19.45 WRITE Procedure Signature 12

This procedure writes an object attribute of type `boolean`.

Syntax

```
APEX_JSON.WRITE (
    p_name          IN VARCHAR2,
    p_value         IN BOOLEAN,
    p_write_null    IN BOOLEAN DEFAULT FALSE );
```

Parameters

Table 19-54 WRITE Procedure Parameters

Parameter	Description
<code>p_name</code>	The attribute name.
<code>p_value</code>	The attribute value to be written.
<code>p_write_null</code>	If true, write <code>NULL</code> values. If false (the default), do not write <code>NULL</code> .

Example

See example for "[WRITE Procedure Signature 8](#) (page 19-31)".

19.46 WRITE Procedure Signature 13

This procedure writes an attribute where the value is an array that contains all rows that the cursor returns. Each row is a separate object.

If the query contains object type, collection, or cursor columns, the procedure uses `write(p_name, <xmltype>)`. See "[WRITE Procedure Signature 14](#) (page 19-35)". Otherwise, it uses `DBMS_SQL` to fetch rows and the `write()` procedures for the appropriate column data types for output. If the column type is `varchar2` and the uppercase value is `'TRUE'` or `'FALSE'`, it generates boolean values.

Syntax

```
APEX_JSON.WRITE (
    p_name          IN VARCHAR2,
    p_cursor        IN OUT NOCOPY sys_refcursor );
```

Parameters

Table 19-55 WRITE Procedure Parameters

Parameter	Description
<code>p_name</code>	The attribute name.
<code>p_cursor</code>	The cursor.

Example

This example writes an array containing JSON objects for departments 10 and 20, as an object member attribute.

```

DECLARE
  c sys_refcursor;
BEGIN
  open c for select deptno,
                dname,
                cursor(select empno,
                          ename
                          from emp e
                          where e.deptno=d.deptno) emps
                from dept d;
  apex_json.open_object;
  apex_json.write('departments', c);
  apex_json.close_object;
END;

{ "departments": [
  { "DEPTNO": 10,
    "DNAME": "ACCOUNTING",
    "EMPS": [ { "EMPNO": 7839, "ENAME": "KING" } ],
    ...
  }, { "DEPTNO": 40, "DNAME": "OPERATIONS", "EMPS": null } ] }

```

19.47 WRITE Procedure Signature 14

This procedure writes an array attribute of type `sys.xmltype`. The procedure uses a XSL transformation to generate JSON. To determine the JSON type of values, it uses the following rules:

- If the value is empty, it generates a `NULL` value.
- If `upper(value)` is `TRUE`, it generates a boolean true value.
- If `upper(value)` is `FALSE`, it generates a boolean false value.
- If the `XPath` number function returns true, it emits the value as is. Otherwise, it quotes the value (that is, treats it as a JSON string).

Syntax

```

APEX_JSON.WRITE (
  p_name          IN VARCHAR2,
  p_value         IN sys.xmltype,
  p_write_null    IN BOOLEAN DEFAULT FALSE );

```

Parameters

Table 19-56 WRITE Procedure Parameters

Parameter	Description
<code>p_name</code>	The attribute name.
<code>p_value</code>	The value to be written. The XML is converted to JSON
<code>p_write_null</code>	If true, write <code>NULL</code> values. If false (the default), do not write <code>NULLS</code> .

Example

See example for "[WRITE Procedure Signature 13](#) (page 19-34)".

19.48 WRITE Procedure Signature 15

This procedure writes parts of a parsed `APEX_JSON.t_values` table.

Syntax

```
APEX_JSON.WRITE (
  p_values          IN t_values,
  p_path            IN VARCHAR2 DEFAULT '.',
  p0                IN VARCHAR2 DEFAULT NULL,
  p1                IN VARCHAR2 DEFAULT NULL,
  p2                IN VARCHAR2 DEFAULT NULL,
  p3                IN VARCHAR2 DEFAULT NULL,
  p4                IN VARCHAR2 DEFAULT NULL );
```

Parameters**Table 19-57** WRITE Procedure Parameters

Parameter	Description
<code>p_values</code>	The parsed JSON members.
<code>p_path</code>	The index into <code>p_values</code> .
<code>p[0-4]</code>	Each <code>%N</code> in <code>p_path</code> will be replaced by <code>pN</code> and every <code>i</code> -th <code>%s</code> or <code>%d</code> is replaced by <code>p[i-1]</code> .

Example

This example parses a JSON string and writes parts of it.

```
DECLARE
  j apex_json.t_values;
BEGIN
  apex_json.parse(j, '{ "foo": 3, "bar": { "x": 1, "y": 2 } }');
  apex_json.write(j, 'bar');
END;
```

19.49 WRITE Procedure Signature 16

This procedure writes parts of a parsed `APEX_JSON.t_values` table as an object member attribute.

Syntax

```
APEX_JSON.WRITE (
  p_name            IN VARCHAR2,
  p_values          IN t_values,
  p_path            IN VARCHAR2 DEFAULT '.',
  p0                IN VARCHAR2 DEFAULT NULL,
  p1                IN VARCHAR2 DEFAULT NULL,
  p2                IN VARCHAR2 DEFAULT NULL,
  p3                IN VARCHAR2 DEFAULT NULL,
```



```

p4                IN VARCHAR2 DEFAULT NULL,
p_write_null     IN BOOLEAN  DEFAULT FALSE );

```

Parameters

Table 19-58 WRITE Procedure Parameters

Parameter	Description
p_name	The attribute name.
p_values	The parsed JSON members.
p_path	The index into p_values.
p[0-4]	Each %N in p_path will be replaced by pN and every i-th %s or %d is replaced by p[i-1].
p_write_null	If true, write NULL values. If false (the default), do not write NULLS.

Example

This example parses a JSON string and writes parts of it as an object member.

```

DECLARE
  j apex_json.t_values;
BEGIN
  apex_json.parse(j, '{ "foo": 3, "bar": { "x": 1, "y": 2 }}');
  apex_json.open_object; -- {
  apex_json.write('parsed-bar', j, 'bar'); -- "parsed-bar":{ "x":1 , "y":2 }
  apex_json.close_object; -- }
END;

```

19.50 WRITE Procedure Signature 17

This procedure writes an array attribute of type VARCHAR2.

Syntax

```

procedure write (
  p_name          in varchar2,
  p_values        in apex_t_varchar2,
  p_write_null   in boolean default false );

```

Parameters

Table 19-59 WRITE Procedure Parameters

Parameter	Description
p_name	The attribute name.
p_values	The VARCHAR2 array values to be written.
p_write_null	If true, write an empty array. If false (the default), do not -- write an empty array.

Example

This example writes an array containing a, b, c.

```

declare
  l_values apex_t_varchar2 := apex_t_varchar2( 'a', 'b', 'c' );
begin
  apex_json.open_object;                -- {
  apex_json.write('array', l_values );  --  "array": [ "a", "b", "c" ]
  apex_json.close_object;              -- }
end;

```

19.51 WRITE Procedure Signature 18

This procedure writes an array attribute of type `NUMBER`.

Syntax

```

procedure write (
  p_name      in varchar2,
  p_values    in apex_t_number,
  p_write_null in boolean default false );

```

Parameters

Table 19-60 WRITE Procedure Parameters

Parameter	Description
<code>p_name</code>	The attribute name.
<code>p_values</code>	The <code>NUMBER</code> array values to be written.
<code>p_write_null</code>	If true, write an empty array. If false (the default), do not -- write an empty array.

Example

This example writes an array containing 1, 2, 3.

```

declare
  l_values apex_t_number := apex_t_number( 1, 2, 3 );
begin
  apex_json.open_object;                -- {
  apex_json.write('array', l_values );  --  "array": [ 1, 2, 3 ]
  apex_json.close_object;              -- }
end;

```

20

APEX_JWT

This package provides APIs to work with JSON Web Tokens (JWT). JWTs can be used to pass a number of signed claims between client and server. Token values are URL-safe strings that consist of 3 parts, separated by '. '. The header part identifies the algorithm used for the signature part. The payload part contains the claims to make.

For more details on JWT, see RFC 7519.

- [T_TOKEN](#) (page 20-1)
- [ENCODE Function](#) (page 20-1)
- [DECODE Function](#) (page 20-2)
- [VALIDATE Procedure](#) (page 20-4)

20.1 T_TOKEN

A `t_token` record contains the decoded parts of a JSON Web Token.

Syntax

```
type t_token is record (  
    header varchar2(32767),  
    payload varchar2(32767),  
    signature varchar2(32767) );
```

Parameters

Table 20-1 T_TOKEN Parameters

Parameter	Description
header	The Javascript Object Signing and Encryption (JOSE) header contains cryptographic parameters.
payload	The claims which the token asserts.
signature	The signature of header and payload.

20.2 ENCODE Function

This function encodes and optionally encrypts payload.

Syntax

```
function encode (  
    p_iss          in varchar2          default null,  
    p_sub          in varchar2          default null,  
    p_aud          in varchar2          default null,
```

```

p_nbf_ts      in timestamp with time zone default null,
p_iat_ts      in timestamp with time zone default systimestamp,
p_exp_sec     in pls_integer              default null,
p_jti         in varchar2                default null,
p_other_claims in varchar2              default null,
p_signature_key in raw                  default null )
return varchar2

```

Parameters

Table 20-2 ENCODE Function Parameters

Parameter	Description
p_iss	Optional "iss" (Issuer) claim.
p_sub	Optional "sub" (Subject) claim.
p_aud	Optional "aud" (Audience) claim.
p_nbf_ts	Optional "nbf" (Not Before) claim.
p_iat_ts	Optional "iat" (Issued At) claim (default systimestamp).
p_exp_sec	Optional "exp" (Expiration Time) claim, in seconds. The start time is taken from "nbf", "iat" or current time.
p_jti	Optional "jti" (JWT ID) Claim.
p_other_claims	Optional raw JSON with additional claims.
p_signature_key	Optional MAC key for the signature. If not null, a 'HS256' signature is added. This requires 12c or higher.

Returns

A varchar2, the encoded token value.

Example

This example creates and prints a JWT value for Example User, intended to be used by Example JWT Recipient. The token is valid for 5 minutes.

```

declare
  l_jwt_value varchar2(32767);
begin
  l_jwt_value := apex_jwt.encode (
    p_iss => 'Example Issuer',
    p_sub => 'Example User',
    p_aud => 'Example JWT Recipient',
    p_exp_sec => 60*5,
    p_other_claims => '"name1": '||apex_json.stringify('value1')||
                    ', "name2": '||apex_json.stringify('value2')',
    p_signature_key => ... encryption key ... );
  sys.dbms_output.put_line(l_jwt_value);
end;

```

20.3 DECODE Function

This function decodes a raw token value.

Syntax

```
function decode (
    p_value          in varchar2,
    p_signature_key  in raw      default null )
return t_token;
```

Parameters

Table 20-3 DECODE Function Parameters

Parameter	Description
p_value	A raw token value contains 3 base64-encoded parts, which are separated by '.'. The parts are header, payload and signature.
p_signature_key	If not null, validate p_value's signature using this key and the algorithm specified in header. The algorithms 'HS256' and 'none' are supported, but 'HS256' requires 12c or higher.

Returns

A t_token.

Raises

VALUE_ERROR: The input value is invalid.

WWW_FLOW_CRYPTO.UNSUPPORTED_FUNCTION: The token is signed using an unsupported function.

Example

This example decodes an encoded token and print it's contents.

```
declare
    l_token apex_jwt.t_token;
    l_keys apex_t_varchar2;
begin
    l_token := apex_jwt.decode (
        p_value =>
'eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJsb2dnZWRRJbkFzIjoieWVWRtaW4iLCJpYXQiOiJlM0MjI3Nzk2Mzh9.gzSraSYS8EXBxLN_oWnFSRgCzcmJmMjLiuy5CSpyHI' );
    sys.dbms_output.put_line('--- Header ---');
    apex_json.parse(l_token.header);
    l_keys := apex_json.get_members('.');
    for i in 1 .. l_keys.count loop
        sys.dbms_output.put_line(l_keys(i)||'='||apex_json.get_varchar2(l_keys(i)));
    end loop;
    sys.dbms_output.put_line('--- Payload ---');
    apex_json.parse(l_token.payload);
    l_keys := apex_json.get_members('.');
    for i in 1 .. l_keys.count loop
        sys.dbms_output.put_line(l_keys(i)||'='||apex_json.get_varchar2(l_keys(i)));
    end loop;
end;
```

Output:

```

--- Header ---
alg=HS256
typ=JWT
--- Payload ---
loggedInAs=admin
iat=1422779638

```

20.4 VALIDATE Procedure

This procedure validates the given token.

Syntax

```

procedure validate (
    p_token          in t_token,
    p_iss            in varchar2  default null,
    p_aud            in varchar2  default null,
    p_leeway_seconds in pls_integer default 0 );

```

Parameters

Table 20-4 VALIDATE Procedure Parameters

Parameter	Description
p_token	The JWT.
p_iss	If not null, verify that the "iss" claim equals p_iss.
p_aud	If not null, verify that the single "aud" value equals p_aud. If "aud" is an array, verify that the "azp" (Authorized Party) claim equals p_aud. This is an OpenID extension.
p_leeway_seconds	Fudge factor (in seconds) for comparing "exp" (Expiration Time), "nbf" (Not Before) and "iat" (Issued At) claims.

Raises

APEX.ERROR.INTERNAL: Validation failed, check debug log for details.

Example

Verify that l_value is a valid OpenID ID token.

```

declare
    l_value varchar2(4000) := 'eyJ0 ... NiJ9.eyJlc ... I6IjIifX0.DeWt4Qu ... ZXso';
    l_oauth2_client_id varchar2(30) := '...';
    l_token apex_jwt.t_token;
begin
    l_token := apex_jwt.decode (
        p_value => l_value );
    apex_jwt.validate (
        p_token => l_token,
        p_aud => l_oauth2_client_id );
end;

```

21

APEX_LANG

You can use `APEX_LANG` API to translate messages.

- [CREATE_LANGUAGE_MAPPING Procedure](#) (page 21-1)
- [DELETE_LANGUAGE_MAPPING Procedure](#) (page 21-2)
- [EMIT_LANGUAGE_SELECTOR_LIST Procedure](#) (page 21-4)
- [LANG Function](#) (page 21-4)
- [MESSAGE Function](#) (page 21-5)
- [PUBLISH_APPLICATION Procedure](#) (page 21-6)
- [SEED_TRANSLATIONS Procedure](#) (page 21-7)
- [UPDATE_LANGUAGE_MAPPING Procedure](#) (page 21-8)
- [UPDATE_MESSAGE Procedure](#) (page 21-10)
- [UPDATE_TRANSLATED_STRING Procedure](#) (page 21-11)

21.1 CREATE_LANGUAGE_MAPPING Procedure

Use this procedure to create the language mapping for the translation of an application. Translated applications are published as new applications, but are not directly editable in the App Builder.

 **Note:**

This procedure is available in Application Express release 4.2.3 and later.

Syntax

```
APEX_LANG.CREATE_LANGUAGE_MAPPING (  
  p_application_id IN NUMBER,  
  p_language IN VARCHAR2,  
  p_translation_application_id IN NUMBER )
```

Parameters

Table 21-1 CREATE_LANGUAGE_MAPPING Parameters

Parameter	Description
<code>p_application_id</code>	The ID of the application for which you want to create the language mapping. This is the ID of the primary language application.

Table 21-1 (Cont.) CREATE_LANGUAGE_MAPPING Parameters

Parameter	Description
p_language	The IANA language code for the mapping. Examples include en-us, fr-ca, ja, he.
p_translation_application_id	Unique integer value for the ID of the underlying translated application. This number cannot end in 0.

Example

The following example demonstrates the creation of the language mapping for an existing Application Express application.

```

begin
  --
  -- If running from SQL*Plus, we need to set the environment
  -- for the Application Express workspace associated with this schema. The
  -- call to apex_util.set_security_group_id is not necessary if
  -- you're running within the context of the App Builder
  -- or an Application Express application.
  --
  for c1 in (select workspace_id
             from apex_workspaces) loop
    apex_util.set_security_group_id( c1.workspace_id );
    exit;
  end loop;

  -- Now, actually create the language mapping
  apex_lang.create_language_mapping(
    p_application_id => 63969,
    p_language => 'ja',
    p_translation_application_id => 778899 );
  commit;
  --
  -- Print what we just created to confirm
  --
  for c1 in (select *
            from apex_application_trans_map
            where primary_application_id = 63969) loop
    dbms_output.put_line( 'translated_application_id: ' ||
c1.translated_application_id );
    dbms_output.put_line( 'translated_app_language: ' ||
c1.translated_app_language );
  end loop;
end;
/

```

21.2 DELETE_LANGUAGE_MAPPING Procedure

Use this procedure to delete the language mapping for the translation of an application. This procedure deletes all translated strings in the translation repository for the specified language and mapping. Translated applications are published as new applications, but are not directly editable in the App Builder.

 **Note:**

This procedure is available in Application Express release 4.2.3 and later.

Syntax

```
APEX_LANG.DELETE_LANGUAGE_MAPPING (
  p_application_id IN NUMBER,
  p_language IN VARCHAR2 )
```

Parameters**Table 21-2 DELETE_LANGUAGE_MAPPING Parameters**

Parameter	Description
p_application_id	The ID of the application for which you want to delete the language mapping. This is the ID of the primary language application.
p_language	The IANA language code for the existing mapping. Examples include en-us, fr-ca, ja, he.

Example

The following example demonstrates the deletion of the language mapping for an existing Application Express application and existing translation mapping.

```
begin
  --
  -- If running from SQL*Plus, we need to set the environment
  -- for the Application Express workspace associated with this schema. The
  -- call to apex_util.set_security_group_id is not necessary if
  -- you're running within the context of the App Builder
  -- or an Application Express application.
  --
  for c1 in (select workspace_id
             from apex_workspaces) loop
    apex_util.set_security_group_id( c1.workspace_id );
    exit;
  end loop;
  -- Now, delete the language mapping
  apex_lang.delete_language_mapping(
    p_application_id => 63969,
    p_language => 'ja' );
  commit;
  --
  -- Print what we just updated to confirm
  --
  for c1 in (select count(*) thecount
             from apex_application_trans_map
             where primary_application_id = 63969) loop
    dbms_output.put_line( 'Translation mappings found: ' || c1.thecount );
  end loop;
end;
/
```

21.3 EMIT_LANGUAGE_SELECTOR_LIST Procedure

This procedure determines which languages the current application is translated into and prints language selector. You can use this procedure from a PL/SQL region to include language selector.

Syntax

```
APEX_LANG.EMIT_LANGUAGE_SELECTOR_LIST;
```

Example

The following example shows how to use the `EMIT_LANGUAGE_SELECTOR_LIST` procedure to display language selector.

```
begin
APEX_LANG.EMIT_LANGUAGE_SELECTOR_LIST;
end;
```

21.4 LANG Function

Use this function to return a translated text string for translations defined in dynamic translations.

Syntax

```
APEX_LANG.LANG (
  p_primary_text_string IN VARCHAR2 DEFAULT NULL,
  p0 IN VARCHAR2 DEFAULT NULL,
  p1 IN VARCHAR2 DEFAULT NULL,
  p2 IN VARCHAR2 DEFAULT NULL,
  ...
  p9 IN VARCHAR2 DEFAULT NULL,
  p_primary_language IN VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;
```

Parameters

Table 21-3 LANG Parameters

Parameter	Description
<code>p_primary_text_string</code>	Text string of the primary language. This is the value of the Translate From Text in the dynamic translation.
<code>p0</code> through <code>p9</code>	Dynamic substitution value: <code>p0</code> corresponds to <code>%0</code> in the translation string; <code>p1</code> corresponds to <code>%1</code> in the translation string; <code>p2</code> corresponds to <code>%2</code> in the translation string, and so on.
<code>p_primary_language</code>	Language code for the message to be retrieved. If not specified, Oracle Application Express uses the current language for the user as defined in the Application Language Derived From attribute. See also: Specifying the Primary Language for an Application in the <i>Oracle Application Express App Builder User's Guide</i> .

Example

Suppose you have a table that defines all primary colors. You could define a dynamic message for each color and then apply the LANG function to the defined values in a query. For example:

```
SELECT APEX_LANG.LANG(color)
FROM my_colors
```

If you were running the application in German, RED was a value for the color column in the `my_colors` table, and you defined the German word for red, the previous example would return ROT.

21.5 MESSAGE Function

Use this function to translate text strings (or messages) generated from PL/SQL stored procedures, functions, triggers, packaged procedures, and functions.

Syntax

```
APEX_LANG.MESSAGE (
    p_name          IN VARCHAR2 DEFAULT NULL,
    p0              IN VARCHAR2 DEFAULT NULL,
    p1              IN VARCHAR2 DEFAULT NULL,
    p2              IN VARCHAR2 DEFAULT NULL,
    ...
    p9              IN VARCHAR2 DEFAULT NULL,
    p_lang          IN VARCHAR2 DEFAULT NULL,
    p_application_id IN NUMBER   DEFAULT NULL)
RETURN VARCHAR2;
```

Parameters

Table 21-4 MESSAGE Parameters

Parameter	Description
<code>p_name</code>	Name of the message as defined in Text Messages under Shared Components of your application in Oracle Application Express.
<code>p0</code> through <code>p9</code>	Dynamic substitution value: <code>p0</code> corresponds to <code>%0</code> in the translation string; <code>p1</code> corresponds to <code>%1</code> in the translation string; <code>p2</code> corresponds to <code>%2</code> in the translation string, and so on.
<code>p_lang</code>	Language code for the message to be retrieved. If not specified, Oracle Application Express uses the current language for the user as defined in the Application Language Derived From attribute. See also: Specifying the Primary Language for an Application in the <i>Oracle Application Express App Builder User's Guide</i> .
<code>p_application_id</code>	Used to specify the application ID within the current workspace that owns the translated message you wish to return. Useful when coding packages that might be called outside of the scope of Oracle Application Express such as packages called from a database job.

Example

The following example assumes you have defined a message called `GREETING_MSG` in your application in English as "Good morning %0" and in German as "Guten Tag %1". The following example demonstrates how you could invoke this message from PL/SQL:

```
BEGIN
--
-- Print the greeting
--
HTP.P(APEX_LANG.MESSAGE('GREETING_MSG', V('APP_USER')));
END;
```

How the `p_lang` attribute is defined depends on how the Application Express engine derives the Application Primary Language. For example, if you are running the application in German and the previous call is made to the `APEX_LANG.MESSAGE` API, the Application Express engine first looks for a message called `GREETING_MSG` with a `LANG_CODE` of `de`. If it does not find anything, then it is reverted to the Application Primary Language attribute. If it still does not find anything, the Application Express engine looks for a message by this name with a language code of `en`.

See also:

Specifying the Primary Language for an Application in the *Oracle Application Express App Builder User's Guide*.

21.6 PUBLISH_APPLICATION Procedure

Use this procedure to publish the translated version of an application. This procedure creates an underlying, hidden replica of the primary application and merges the strings from the translation repository in this new application. Perform a seed and publish process each time you want to update the translated version of your application and synchronize it with the primary application.

This application is not visible in the App Builder. It can be published and exported, but not directly edited.

Note:

This procedure is available in Application Express release 4.2.3 and later.

Syntax

```
APEX_LANG.PUBLISH_APPLICATION (
  p_application_id IN NUMBER,
  p_language IN VARCHAR2 )
```

Parameters

Table 21-5 PUBLISH_APPLICATION Parameters

Parameter	Description
p_application_id	The ID of the application for which you want to publish and create the translated version. This is the ID of the primary language application.
p_language	The IANA language code for the existing translation mapping. Examples include en-us, fr-ca, ja, he.

Example

The following example demonstrates the publish process for an Application Express application and language.

```
begin
  --
  -- If running from SQL*Plus, we need to set the environment
  -- for the Application Express workspace associated with this schema. The
  -- call to apex_util.set_security_group_id is not necessary if
  -- you're running within the context of the App Builder
  -- or an Application Express application.
  --
  for c1 in (select workspace_id
             from apex_workspaces) loop
    apex_util.set_security_group_id( c1.workspace_id );
    exit;
  end loop;
  -- Now, publish the translated version of the application
  apex_lang.publish_application(
    p_application_id => 63969,
    p_language => 'ja' );
  commit;
end;
/
```

21.7 SEED_TRANSLATIONS Procedure

Use this procedure to seed the translation repository for the specified application and language. This procedure populates the translation repository with all of the new, updated and removed translatable strings from your application. Perform a seed and publish process each time you want to update the translated version of your application and synchronize it with the primary application.

Syntax

```
APEX_LANG.SEED_TRANSLATIONS (
  p_application_id IN NUMBER,
  p_language IN VARCHAR2 )
```

Parameters

Table 21-6 SEED_TRANSLATIONS Parameters

Parameter	Description
p_application_id	The ID of the application for which you want to update the translation repository. This is the ID of the primary language application.
p_language	The IANA language code for the existing translation mapping. Examples include en-us, fr-ca, ja, he.

Example

The following example demonstrates the seeding process of the translation repository for an Application Express application and language.

```
begin
  --
  -- If running from SQL*Plus, we need to set the environment
  -- for the Application Express workspace associated with this schema. The
  -- call to apex_util.set_security_group_id is not necessary if
  -- you're running within the context of the App Builder
  -- or an Application Express application.
  --
  for c1 in (select workspace_id
             from apex_workspaces) loop
    apex_util.set_security_group_id( c1.workspace_id );
    exit;
  end loop;
  -- Now, seed the translation repository
  apex_lang.seed_translations(
    p_application_id => 63969,
    p_language => 'ja' );
  commit;
  -- Print out the total number of potentially translatable strings
  --
  for c1 in (select count(*) thecount
             from apex_application_trans_repos
             where application_id = 63969) loop
    dbms_output.put_line( 'Potentially translatable strings found: ' ||
c1.thecount );
  end loop;
end;
/
```

21.8 UPDATE_LANGUAGE_MAPPING Procedure

Use this procedure to update the language mapping for the translation of an application. Translated applications are published as new applications, but are not directly editable in the App Builder.

 **Note:**

This procedure is available in Application Express release 4.2.3 and later.

Syntax

```
APEX_LANG.UPDATE_LANGUAGE_MAPPING (
  p_application_id IN NUMBER,
  p_language IN VARCHAR2,
  p_new_trans_application_id IN NUMBER )
```

Parameters

Table 21-7 UPDATE_LANGUAGE_MAPPING Parameters

Parameters	Description
p_application_id	The ID of the application for which you want to update the language mapping. This is the ID of the primary language application.
p_language	The IANA language code for the existing mapping. Examples include en-us, fr-ca, ja, he. The language of the mapping cannot be updated with this procedure, only the new translation application ID.
p_new_trans_application_id	New unique integer value for the ID of the underlying translated application. This number cannot end in 0.

Example

The following example demonstrates the update of the language mapping for an existing Application Express application and existing translation mapping.

```
begin
  --
  -- If running from SQL*Plus, we need to set the environment
  -- for the Application Express workspace associated with this schema. The
  -- call to apex_util.set_security_group_id is not necessary if
  -- you're running within the context of the App Builder
  -- or an Application Express application.
  --
  for c1 in (select workspace_id
             from apex_workspaces) loop
    apex_util.set_security_group_id( c1.workspace_id );
    exit;
  end loop;
  -- Now, update the language mapping
  apex_lang.update_language_mapping(
    p_application_id => 63969,
    p_language => 'ja',
    p_new_trans_application_id => 881188 );
  commit;
  --
  -- Print what we just updated to confirm
  --
  for c1 in (select *
             from apex_application_trans_map
             where primary_application_id = 63969) loop
    dbms_output.put_line( 'translated_application_id: ' ||
c1.translated_application_id );
    dbms_output.put_line( 'translated_app_language: ' ||
c1.translated_app_language );
  end loop;
```

```
end;
/
```

21.9 UPDATE_MESSAGE Procedure

Use this procedure to update a translatable text message for the specified application.



Note:

This procedure is available in Application Express release 4.2.3 and later.

Syntax

```
APEX_LANG.UPDATE_MESSAGE (
  p_id IN NUMBER,
  p_message_text IN VARCHAR2 )
```

Parameters

Table 21-8 UPDATE_MESSAGE Parameters

Parameter	Description
p_id	The ID of the text message.
p_message_text	The new text for the translatable text message.

Example

The following example demonstrates an update of an existing translatable text message.

```
begin
  --
  -- If running from SQL*Plus, we need to set the environment
  -- for the Application Express workspace associated with this schema. The
  -- call to apex_util.set_security_group_id is not necessary if
  -- you're running within the context of the App Builder
  -- or an Application Express application.
  --
  for c1 in (select workspace_id
             from apex_workspaces) loop
    apex_util.set_security_group_id( c1.workspace_id );
    exit;
  end loop;
  -- Locate the ID of the specific message and update it with the new text
  for c1 in (select translation_entry_id
             from apex_application_translations
             where application_id = 63969
               and translatable_message = 'TOTAL_COST'
               and language_code = 'ja') loop
    apex_lang.update_message(
      p_id => c1.translation_entry_id,
      p_message_text => 'The total cost is: %0');
    commit;
  end loop;
end;
```



```

        end loop;
    end;
/

```

21.10 UPDATE_TRANSLATED_STRING Procedure

Use this procedure to update a translated string in the seeded translation repository.

Note:

This procedure is available in Application Express release 4.2.3 and later.

Syntax

```

APEX_LANG.UPDATE_TRANSLATED_STRING (
    p_id IN NUMBER,
    p_language IN VARCHAR2
    p_string IN VARCHAR2 )

```

Parameters

Table 21-9 UPDATE_TRANSLATED_STRING Parameters

Parameter	Description
p_id	The ID of the string in the translation repository.
p_language	The IANA language code for the existing translation mapping. Examples include en-us, fr-ca, ja, he. The language of the mapping cannot be updated with this procedure, only the new translation application ID.
p_string	The new value for the string in the translation repository.

Example

The following example demonstrates an update of an existing string in the translation repository.

```

begin
    --
    -- If running from SQL*Plus, we need to set the environment
    -- for the Application Express workspace associated with this schema. The
    -- call to apex_util.set_security_group_id is not necessary if
    -- you're running within the context of the App Builder
    -- or an Application Express application.
    --
    for c1 in (select workspace_id
               from apex_workspaces) loop
        apex_util.set_security_group_id( c1.workspace_id );
        exit;
    end loop;
    -- Locate all strings in the repository for the specified application
    -- which are 'Search' and change to 'Find'
    for c1 in (select id
               from apex_application_trans_repos

```

```
        where application_id = 63969
              and dbms_lob.compare(from_string, to_nclob('Search')) = 0
              and language_code = 'ja') loop
apex_lang.update_translated_string(
    p_id => cl.id,
    p_language => 'ja',
    p_string => 'Find');
commit;
exit;
end loop;
end;
/
```

22

APEX_LDAP

You can use `APEX_LDAP` to perform various operations related to Lightweight Directory Access Protocol (LDAP) authentication.

- [AUTHENTICATE Function](#) (page 22-1)
- [GET_ALL_USER_ATTRIBUTES Procedure](#) (page 22-2)
- [GET_USER_ATTRIBUTES Procedure](#) (page 22-3)
- [IS_MEMBER Function](#) (page 22-4)
- [MEMBER_OF Function](#) (page 22-5)
- [MEMBER_OF2 Function](#) (page 22-6)
- [SEARCH Function](#) (page 22-7)

22.1 AUTHENTICATE Function

The `AUTHENTICATE` function returns a boolean `TRUE` if the user name and password can be used to perform a `SIMPLE_BIND_S`, call using the provided search base, host, and port.

Syntax

```
APEX_LDAP.AUTHENTICATE(  
  p_username      IN VARCHAR2 DEFAULT NULL,  
  p_password      IN VARCHAR2 DEFAULT NULL,  
  p_search_base   IN VARCHAR2,  
  p_host          IN VARCHAR2,  
  p_port         IN VARCHAR2 DEFAULT 389,  
  p_use_ssl       IN VARCHAR2 DEFAULT 'N')  
RETURN BOOLEAN;
```

Parameters

Table 22-1 AUTHENTICATE Parameters

Parameter	Description
<code>p_username</code>	Login name of the user.
<code>p_password</code>	Password for <code>p_username</code> .
<code>p_search_base</code>	LDAP search base, for example, <code>dc=users,dc=my,dc=org</code> .
<code>p_host</code>	LDAP server host name.
<code>p_port</code>	LDAP server port number.
<code>p_use_ssl</code>	Set to 'Y' to use SSL in bind to LDAP server. Set to 'A' to use SSL with one way authentication (requires LDAP server certificate configured in an Oracle wallet). Set to 'N' to not use SSL (default).

Example

The following example demonstrates how to use the `APEX_LDAP.AUTHENTICATE` function to verify user credentials against an LDAP Server.

```

IF APEX_LDAP.AUTHENTICATE(
    p_username =>'firstname.lastname',
    p_password =>'abcdef',
    p_search_base =>'cn=user,l=amer,dc=my_company,dc=com',
    p_host =>'our_ldap_sever.my_company.com',
    p_port => 389) THEN
    dbms_output.put_line('authenticated');
ELSE
    dbms_output.put_line('authentication failed');
END IF;

```

22.2 GET_ALL_USER_ATTRIBUTES Procedure

The `GET_ALL_USER_ATTRIBUTES` procedure returns two OUT arrays of `user_attribute` names and values for the user name designated by `p_username` (with password if required) using the provided auth base, host, and port.

Syntax

```

APEX_LDAP.GET_ALL_USER_ATTRIBUTES(
    p_username          IN VARCHAR2 DEFAULT NULL,
    p_pass              IN VARCHAR2 DEFAULT NULL,
    p_auth_base         IN VARCHAR2 DEFAULT NULL,
    p_host              IN VARCHAR2,
    p_port              IN VARCHAR2 DEFAULT 389,
    p_use_ssl           IN VARCHAR2 DEFAULT 'N',
    p_attributes        OUT apex_application_global.vc_arr2,
    p_attribute_values  OUT apex_application_global.vc_arr2);

```

Parameters

Table 22-2 GET_ALL_USER_ATTRIBUTES Parameters

Parameter	Description
<code>p_username</code>	Login name of the user.
<code>p_pass</code>	Password for <code>p_username</code> .
<code>p_auth_base</code>	LDAP search base, for example, <code>dc=users,dc=my,dc=org</code> .
<code>p_host</code>	LDAP server host name.
<code>p_port</code>	LDAP server port number.
<code>p_use_ssl</code>	Set to 'Y' to use SSL in bind to LDAP server. Set to 'A' to use SSL with one way authentication (requires LDAP server certificate configured in an Oracle wallet). Set to 'N' to not use SSL (default).
<code>p_attributes</code>	An array of attribute names returned.
<code>p_attribute_values</code>	An array of values returned for each corresponding attribute name returned in <code>p_attributes</code> .

Example

The following example demonstrates how to use the `APEX_LDAP.GET_ALL_USER_ATTRIBUTES` procedure to retrieve all attribute value's associated to a user.

```

DECLARE
    L_ATTRIBUTES      apex_application_global.vc_arr2;
    L_ATTRIBUTE_VALUES apex_application_global.vc_arr2;
BEGIN
    APEX_LDAP.GET_ALL_USER_ATTRIBUTES(
        p_username      => 'firstname.lastname',
        p_pass          => 'abcdef',
        p_auth_base     => 'cn=user,l=amer,dc=my_company,dc=com',
        p_host          => 'our_ldap_sever.my_company.com',
        p_port          => '389',
        p_attributes    => L_ATTRIBUTES,
        p_attribute_values => L_ATTRIBUTE_VALUES);

    FOR i IN L_ATTRIBUTES.FIRST..L_ATTRIBUTES.LAST LOOP
        htp.p('attribute name: '||L_ATTRIBUTES(i));
        htp.p('attribute value: '||L_ATTRIBUTE_VALUES(i));
    END LOOP;
END;
```

22.3 GET_USER_ATTRIBUTES Procedure

The `GET_USER_ATTRIBUTES` procedure returns an OUT array of `user_attribute` values for the user name designated by `p_username` (with password if required) corresponding to the attribute names passed in `p_attributes` using the provided auth base, host, and port.

Syntax

```

APEX_LDAP.GET_USER_ATTRIBUTES(
    p_username      IN VARCHAR2 DEFAULT NULL,
    p_pass          IN VARCHAR2 DEFAULT NULL,
    p_auth_base     IN VARCHAR2,
    p_host          IN VARCHAR2,
    p_port          IN VARCHAR2 DEFAULT 389,
    p_use_ssl       IN VARCHAR2 DEFAULT 'N',
    p_attributes    IN apex_application_global.vc_arr2,
    p_attribute_values OUT apex_application_global.vc_arr2);
```

Parameters

Table 22-3 GET_USER_ATTRIBUTES Parameters

Parameter	Description
<code>p_username</code>	Login name of the user.
<code>p_pass</code>	Password for <code>p_username</code> .
<code>p_auth_base</code>	LDAP search base, for example, <code>dc=users,dc=my,dc=org</code> .
<code>p_host</code>	LDAP server host name.
<code>p_port</code>	LDAP server port number.

Table 22-3 (Cont.) GET_USER_ATTRIBUTES Parameters

Parameter	Description
p_use_ssl	Set to 'Y' to use SSL in bind to LDAP server. Set to 'A' to use SSL with one way authentication (requires LDAP server certificate configured in an Oracle wallet). Set to 'N' to not use SSL (default).
p_attributes	An array of attribute names for which values are to be returned.
p_attribute_values	An array of values returned for each corresponding attribute name in p_attributes.

Example

The following example demonstrates how to use the `APEX_LDAP.GET_USER_ATTRIBUTES` procedure to retrieve a specific attribute value associated to a user.

```

DECLARE
  L_ATTRIBUTES apex_application_global.vc_arr2;
  L_ATTRIBUTE_VALUES apex_application_global.vc_arr2;
BEGIN
  L_ATTRIBUTES(1) := 'xxxxxxxxx'; /* name of the employee number attribute */
  APEX_LDAP.GET_USER_ATTRIBUTES(
    p_username => 'firstname.lastname',
    p_pass => NULL,
    p_auth_base => 'cn=user,l=amer,dc=my_company,dc=com',
    p_host => 'our_ldap_sever.my_company.com',
    p_port => '389',
    p_attributes => L_ATTRIBUTES,
    p_attribute_values => L_ATTRIBUTE_VALUES);
END;
```

22.4 IS_MEMBER Function

The `IS_MEMBER` function returns a boolean `TRUE` if the user named by `p_username` (with password if required) is a member of the group specified by the `p_group` and `p_group_base` parameters using the provided auth base, host, and port.

Syntax

```

APEX_LDAP.IS_MEMBER(
  p_username      IN VARCHAR2,
  p_pass          IN VARCHAR2 DEFAULT NULL,
  p_auth_base     IN VARCHAR2,
  p_host          IN VARCHAR2,
  p_port          IN VARCHAR2 DEFAULT 389,
  p_use_ssl       IN VARCHAR2 DEFAULT 'N',
  p_group         IN VARCHAR2,
  p_group_base    IN VARCHAR2)
RETURN BOOLEAN;
```

Parameters

Table 22-4 IS_MEMBER Parameters

Parameter	Description
p_username	Login name of the user.
p_pass	Password for p_username.
p_auth_base	LDAP search base, for example, dc=users,dc=my,dc=org.
p_host	LDAP server host name.
p_port	LDAP server port number.
p_use_ssl	Set to 'Y' to use SSL in bind to LDAP server. Set to 'A' to use SSL with one way authentication (requires LDAP server certificate configured in an Oracle wallet). Set to 'N' to not use SSL.
p_group	Name of the group to be search for membership.
p_group_base	The base from which the search should be started.

Example

The following example demonstrates how to use the `APEX_LDAP.IS_MEMBER` function to verify whether a user is a member of a group against an LDAP server.

```

DECLARE
    L_VAL boolean;
BEGIN
    L_VAL := APEX_LDAP.IS_MEMBER(
        p_username => 'firstname.lastname',
        p_pass => 'abcdef',
        p_auth_base => 'cn=user,l=amer,dc=my_company,dc=com',
        p_host => 'our_ldap_sever.my_company.com',
        p_port => 389,
        p_group => 'group_name',
        p_group_base => 'group_base');
    IF L_VAL THEN
        htp.p('Is a member.');
```

```

    ELSE
        htp.p('Not a member.');
```

```

    END IF;
END;
```

22.5 MEMBER_OF Function

The `MEMBER_OF` function returns an array of groups the user name designated by `p_username` (with password if required) belongs to, using the provided auth base, host, and port.

Syntax

```

APEX_LDAP.MEMBER_OF(
    p_username      IN VARCHAR2 DEFAULT NULL,
    p_pass          IN VARCHAR2 DEFAULT NULL,
    p_auth_base     IN VARCHAR2,
    p_host          IN VARCHAR2,
    p_port          IN VARCHAR2 DEFAULT 389,
```

```

    p_use_ssl      IN VARCHAR2 DEFAULT 'N')
RETURN apex_application_global.vc_arr2;

```

Parameters

Table 22-5 MEMBER_OF Parameters

Parameter	Description
p_username	Login name of the user.
p_pass	Password for p_username.
p_auth_base	LDAP search base, for example, dc=users,dc=my,dc=org.
p_host	LDAP server host name.
p_port	LDAP server port number.
p_use_ssl	Set to 'Y' to use SSL in bind to LDAP server. Set to 'A' to use SSL with one way authentication (requires LDAP server certificate configured in an Oracle wallet). Set to 'N' to not use SSL (default).

Example

The following example demonstrates how to use the `APEX_LDAP.MEMBER_OF` function to retrieve all the groups designated by the specified username.

```

DECLARE
    L_MEMBERSHIP      apex_application_global.vc_arr2;
BEGIN
    L_MEMBERSHIP := APEX_LDAP.MEMBER_OF(
        p_username      => 'firstname.lastname',
        p_pass          => 'abcdef',
        p_auth_base     => 'cn=user,l=amer,dc=my_company,dc=com',
        p_host          => 'our_ldap_sever.my_company.com',
        p_port          => '389');
    FOR i IN L_MEMBERSHIP.FIRST..L_MEMBERSHIP.LAST LOOP
        htp.p('Member of: '||L_MEMBERSHIP(i));
    END LOOP;
END;

```

22.6 MEMBER_OF2 Function

The `MEMBER_OF2` function returns a `VARCHAR2` colon delimited list of groups the user name designated by `p_username` (with password if required) belongs to, using the provided auth base, host, and port.

Syntax

```

APEX_LDAP.MEMBER_OF2(
    p_username      IN VARCHAR2 DEFAULT NULL,
    p_pass          IN VARCHAR2 DEFAULT NULL,
    p_auth_base     IN VARCHAR2,
    p_host          IN VARCHAR2,
    p_port          IN VARCHAR2 DEFAULT 389,
    p_use_ssl       IN VARCHAR2 DEFAULT 'N')
RETURN VARCHAR2;

```


Parameters

Table 22-6 MEMBER_OF2 Parameters

Parameter	Description
p_username	Login name of the user.
p_pass	Password for p_username.
p_auth_base	LDAP search base, for example, dc=users,dc=my,dc=org.
p_host	LDAP server host name.
p_port	LDAP server port number.
p_use_ssl	Set to 'Y' to use SSL in bind to LDAP server. Set to 'A' to use SSL with one way authentication (requires LDAP server certificate configured in an Oracle wallet). Set to 'N' to not use SSL (default).

Example

The following example demonstrates how to use the `APEX_LDAP.MEMBER_OF2` function to retrieve all the groups designated by the specified username.

```
DECLARE
  L_VAL varchar2(4000);
BEGIN
  L_VAL := APEX_LDAP.MEMBER_OF2(
    p_username => 'firstname.lastname',
    p_pass => 'abcdef',
    p_auth_base => 'cn=user,l=amer,dc=my_company,dc=com',
    p_host => 'our_ldap_sever.my_company.com',
    p_port => 389);
  htp.p('Is Member of: '||L_VAL);
END;
```

22.7 SEARCH Function

The `SEARCH` function searches the LDAP repository. The result is an object table of (dn, name, val) that can be used in table queries.

Syntax

```
function search (
  p_username          IN VARCHAR2 DEFAULT NULL,
  p_pass             IN VARCHAR2 DEFAULT NULL,
  p_auth_base        IN VARCHAR2 DEFAULT NULL,
  p_host             IN VARCHAR2,
  p_port            IN NUMBER DEFAULT 389,
  p_use_ssl          IN VARCHAR2 DEFAULT 'N',
  p_search_base      IN VARCHAR2,
  p_search_filter    IN VARCHAR2,
  p_scope            IN BINARY_INTEGER DEFAULT SYS.DBMS_LDAP.SCOPE_SUBTREE,
  p_timeout_sec      IN BINARY_INTEGER DEFAULT 3,
  p_attribute_names IN VARCHAR2 )
RETURN APEX_T_LDAP_ATTRIBUTES PIPELINED;
```

Parameters

Table 22-7 Search Parameters

Parameter	Descriptions
p_username	Login name of the user (can be NULL for anonymous binds).
p_pass	The password for p_username (can be NULL for anonymous binds)
p_auth_base	The authentication base dn for p_username (for example, dc=users,dc=my,dc=org). Can be NULL for anonymous binds.
p_host	The LDAP server host name.
p_port	The LDAP server port number.
p_use_ssl	Set to 'Y' to use SSL in bind to LDAP server. Set to 'A' to use SSL with one way authentication (requires LDAP server certificate configured in an Oracle wallet). Set to 'N' to not use SSL (default).
p_search_base	dn base for the search.
p_search_filter	LDAP search filter expression.
p_scope	Search scope (default descends into subtrees).
p_timeout_sec	Timeout for the search (default is 3 seconds)
p_attribute_names	Comma separated list of return attribute names

Example 1

```
SELECT val group_dns
FROM table(apex_ldap.search (
    p_host          => 'ldap.example.com',
    p_search_base   => 'dc=example,dc=com',
    p_search_filter => 'uid=||apex_escape.ldap_search_filter(:APP_USER)',
    p_attribute_names => 'memberof' ));
```

Example 2

```
SELECT dn, mail, dispname, phone
from ( select dn, name, val
      from table(apex_ldap.search (
          p_host          => 'ldap.example.com',
          p_search_base   => 'dc=example,dc=com',
          p_search_filter => '&(objectClass=person)(ou=Test)',
          p_attribute_names => 'mail,displayname,telephonenumber' )))
pivot (min(val) for name in ( 'mail'          mail,
                             'displayname'   dispname,
                             'telephonenumber' phone ));
```

APEX_MAIL

You can use the `APEX_MAIL` package to send an email from an Oracle Application Express application. This package is built on top of the Oracle supplied `UTL_SMTP` package. Because of this dependence, the `UTL_SMTP` package must be installed and functioning to use `APEX_MAIL`.

`APEX_MAIL` contains three procedures. Use `APEX_MAIL.SEND` to send an outbound email message from your application. Use `APEX_MAIL.PUSH_QUEUE` to deliver mail messages stored in `APEX_MAIL_QUEUE`. Use `APEX_MAIL.ADD_ATTACHMENT` to send an outbound email message from your application as an attachment.

Note:

Oracle Application Express installs the database job `ORACLE_APEX_MAIL_QUEUE`, which periodically sends all mail messages stored in the active mail queue. In order to call the `APEX_MAIL` package from outside the context of an Application Express application, you must call `apex_util.set_security_group_id` as in the following example:

```
for c1 in (
  select workspace_id
         from apex_applications
         where application_id = p_app_id )
loop
  apex_util.set_security_group_id(p_security_group_id =>
c1.workspace_id);
end loop;
```

- [Configuring Oracle Application Express to Send Email](#) (page 23-2)
- [ADD_ATTACHMENT Procedure](#) (page 23-2)
- [GET_IMAGES_URL Function](#) (page 23-3)
- [GET_INSTANCE_URL Function](#) (page 23-4)
- [PREPARE_TEMPLATE Procedure](#) (page 23-5)
- [PUSH_QUEUE Procedure](#) (page 23-6)
- [SEND Procedure](#) (page 23-6)
- [SEND Function](#) (page 23-8)
- [SEND Procedure](#) (page 23-9)
- [SEND Function](#) (page 23-12)

 **See Also:**

- "Oracle Database PL/SQL Packages and Types Reference" for more information about the UTL_SMTP package
- "Sending Email from an Application" in *Oracle Application Express App Builder User's Guide*

23.1 Configuring Oracle Application Express to Send Email

Before you can send email from an App Builder application, you must:

1. Log in to Oracle Application Express Administration Services and configure the email settings on the Instance Settings page. See "Configuring Email" in *Oracle Application Express Administration Guide*.
2. If you are running Oracle Application Express with Oracle Database 11g release 1 (11.1), you must enable outbound mail. In Oracle Database 11g release 1 (11.1), the ability to interact with network services is disabled by default. See "Enabling Network Service in Oracle Database 11g" in *Oracle Application Express App Builder User's Guide*.

 **Tip:**

You can configure Oracle Application Express to automatically email users their login credentials when a new workspace request has been approved. To learn more, see "Selecting a Provisioning Mode" in *Oracle Application Express Administration Guide*.

23.2 ADD_ATTACHMENT Procedure

This procedure sends an outbound email message from an application as an attachment. To add multiple attachments to a single email, `APEX_MAIL.ADD_ATTACHMENT` can be called repeatedly for a single email message.

Syntax

```
APEX_MAIL.ADD_ATTACHMENT(  
    p_mail_id           IN    NUMBER,  
    p_attachment        IN    BLOB,  
    p_filename          IN    VARCHAR2,  
    p_mime_type         IN    VARCHAR2);
```

Parameters

Table 23-1 ADD_ATTACHMENT Parameters

Parameter	Description
p_mail_id	The numeric ID associated with the email. This is the numeric identifier returned from the call to APEX_MAIL.SEND to compose the email body.
p_attachment	A BLOB variable containing the binary content to be attached to the email message.
p_filename	The filename associated with the email attachment.
p_mime_type	A valid MIME type (or Internet media type) to associate with the email attachment.

Examples

The following example demonstrates how to access files stored in APEX_APPLICATION_FILES and add them to an outbound email message

```

DECLARE
    l_id NUMBER;
BEGIN
    l_id := APEX_MAIL.SEND(
        p_to      => 'fred@flintstone.com',
        p_from    => 'barney@rubble.com',
        p_subj    => 'APEX_MAIL with attachment',
        p_body    => 'Please review the attachment.',
        p_body_html => '<b>Please</b> review the attachment');
    FOR c1 IN (SELECT filename, blob_content, mime_type
               FROM APEX_APPLICATION_FILES
               WHERE ID IN (123,456)) LOOP

        APEX_MAIL.ADD_ATTACHMENT(
            p_mail_id => l_id,
            p_attachment => c1.blob_content,
            p_filename => c1.filename,
            p_mime_type => c1.mime_type);
    END LOOP;
    COMMIT;
END;
/

```

23.3 GET_IMAGES_URL Function

Use this function to get the image prefixed URL, if the email includes Application Express instance images.

Syntax

```
APEX_MAIL.GET_IMAGES_URL return VARCHAR2;
```

Parameters

None.

Example

The following example sends an Order Confirmation email which includes the Oracle Logo image.

```

declare
    l_body          clob;
    l_body_html    clob;
begin
    l_body := 'To view the content of this message, please use an HTML enabled mail
client.' || utl_tcp.crlf;

    l_body_html := '<html><body>' || utl_tcp.crlf ||
        '<p>Please confirm your order on the <a href="' ||
        apex_mail.get_instance_url || 'f?p=100:10">Order Confirmation</a>
page.</p>' || utl_tcp.crlf ||
        '<p>Sincerely,<br />' || utl_tcp.crlf ||
        'The Application Express Dev Team<br />' || utl_tcp.crlf ||
        '</p>' || utl_tcp.crlf ||
        '</body></html>';
    apex_mail.send (
        p_to          => 'some_user@somewhere.com', -- change to your email address
        p_from        => 'some_sender@somewhere.com', -- change to a real senders
        email address
        p_body        => l_body,
        p_body_html   => l_body_html,
        p_subj        => 'Order Confirmation' );
end;

```

23.4 GET_INSTANCE_URL Function

If an email includes a link to an Application Express instance, use this function to get the instance URL.



Note:

This function requires that the instance setting Application Express Instance URL for emails is set.

Syntax

```
APEX_MAIL.GET_INSTANCE_URL return VARCHAR2;
```

Parameters

None.

Example

The following example sends an Order Confirmation email which includes an absolute URL to page 10 of application 100.

```

declare
    l_body          clob;

```

```

        l_body_html clob;
begin
    l_body := 'To view the content of this message, please use an HTML enabled mail
client.' || utl_tcp.crlf;

    l_body_html := '<html><body>' || utl_tcp.crlf ||
        '<p>Please confirm your order on the <a href="' ||
        apex_mail.get_instance_url || 'f?p=100:10">Order Confirmation</a>
page.</p>' || utl_tcp.crlf ||
        '</body></html>';
    apex_mail.send (
        p_to      => 'some_user@somewhere.com', -- change to your email address
        p_from    => 'some_sender@somewhere.com', -- change to a real senders
        email address
        p_body     => l_body,
        p_body_html => l_body_html,
        p_subj     => 'Order Confirmation' );
end;

```

23.5 PREPARE_TEMPLATE Procedure

Procedure to return a formatted mail based on an e-mail template where the placeholders specified as json string are substituted.

Syntax

```

PROCEDURE PREPARE_TEMPLATE (
    P_STATIC_ID      IN      VARCHAR2,
    P_PLACEHOLDERS  IN      CLOB,
    P_APPLICATION_ID IN      NUMBER DEFAULT,
    P_SUBJECT        OUT     VARCHAR2,
    P_HTML           OUT     CLOB,
    P_TEXT           OUT     CLOB );

```

Parameters

Table 23-2 PREPARE_TEMPLATE Parameters

Parameters	Description
p_static_id	
p_placeholders	
p_application_id	
p_subject	
p_html	
p_text	

Example

```

declare
    l_subject varchar2( 4000 );
    l_html    clob;
    l_text    clob;
begin
    apex_mail.prepare_template (
        p_static_id => 'ORDER',

```

```

    p_placeholders => '{ "ORDER_NUMBER": 5321, "ORDER_DATE": "01-Feb-2018",
"ORDER_TOTAL": "$12,000" }',
    p_subject      => l_subject,
    p_html         => l_html,
    p_text         => l_text );
end;
```

23.6 PUSH_QUEUE Procedure

Oracle Application Express stores unsent email messages in a table named `APEX_MAIL_QUEUE`. You can manually deliver mail messages stored in this queue to the specified SMTP gateway by invoking the `APEX_MAIL.PUSH_QUEUE` procedure.

Oracle Application Express logs successfully submitted message in the table `APEX_MAIL_LOG` with the timestamp reflecting your server's local time.

Syntax

```

APEX_MAIL.PUSH_QUEUE(
    p_smtp_hostname      IN    VARCHAR2 DEFAULT NULL,
    p_smtp_portno       IN    NUMBER   DEFAULT NULL);
```

Parameters

Table 23-3 PUSH_QUEUE Parameters

Parameters	Description
<code>p_smtp_hostname</code>	SMTP gateway host name
<code>p_smtp_portno</code>	SMTP gateway port number

Note that these parameter values are provided for backward compatibility, but their respective values are ignored. The SMTP gateway hostname and SMTP gateway port number are exclusively derived from values entered on the Manage Environment Settings when sending email.

Example

The following example demonstrates the use of the `APEX_MAIL.PUSH_QUEUE` procedure using a shell script. This example only applies to UNIX/LINUX installations.

```

SQLPLUS / <<EOF
APEX_MAIL.PUSH_QUEUE;
DISCONNECT
EXIT
EOF
```

23.7 SEND Procedure

This procedure is used to add a mail to the mail queue of Application Express. The mail is based on an e-mail template where the placeholder values specified as json string are substituted.

Syntax

```
PROCEDURE SEND (
    P_TEMPLATE_STATIC_ID IN VARCHAR2,
    P_PLACEHOLDERS       IN CLOB,
    p_to                 IN VARCHAR2,
    p_cc                 IN VARCHAR2 DEFAULT NULL,
    p_bcc                IN VARCHAR2 DEFAULT NULL,
    p_from               IN VARCHAR2 DEFAULT NULL,
    p_replyto            IN VARCHAR2 DEFAULT NULL,
    p_application_id     IN NUMBER   DEFAULT wwv_flow_security.g_flow_id );
```

Parameters

Table 23-4 SEND Procedure Parameters

Parameter	Description
<code>p_template_static_id</code>	Static identifier string, used to identify the shared component email template.
<code>p_placeholders</code>	JSON string representing the placeholder names along with the values, to be substituted.
<code>p_to</code>	Valid email address to which the email is sent (required). For multiple email addresses, use a comma-separated list.
<code>p_cc</code>	Valid email addresses to which the email is copied. For multiple email addresses, use a comma-separated list.
<code>p_bcc</code>	Valid email addresses to which the email is blind copied. For multiple email addresses, use a comma-separated list.
<code>p_from</code>	Email address from which the email is sent (required). This email address must be a valid address. Otherwise, the message is not sent.
<code>p_replyto</code>	Address of the Reply-To mail header. You can use this parameter as follows: <ul style="list-style-type: none"> If you omit the <code>p_replyto</code> parameter, the Reply-To mail header is set to the value specified in the <code>p_from</code> parameter If you include the <code>p_replyto</code> parameter, but provide a NULL value, the Reply-To mail header is set to NULL. This results in the suppression of automatic email replies If you include <code>p_replyto</code> parameter, but provide a non-null value (for example, a valid email address), you send these messages, but the automatic replies go to the value specified (for example, the email address)
<code>p_application_id</code>	Application ID where the email template is defined. Defaults to the current application (if called from within an application).

Examples

```
begin
    apex_mail.send (
        p_template_static_id => 'ORDER',
        p_placeholders       => '{ "ORDER_NUMBER": 5321, "ORDER_DATE": "01-
Feb-2018", "ORDER_TOTAL": "$12,000" }',
        p_to                 => 'some_user@somewhere.com' );
end;
```

23.8 SEND Function

This function returns a mail id after adding the mail to the mail queue of Application Express. The mail id can be used in a call to `add_attachment` to add attachments to an existing mail.

The mail is based on an e-mail template where the placeholder values specified as json string are substituted.

Syntax

```
FUNCTION SEND (
  P_TEMPLATE_STATIC_ID IN VARCHAR2,
  P_PLACEHOLDERS       IN CLOB,
  P_TO                 IN VARCHAR2,
  P_CC                 IN VARCHAR2 DEFAULT NULL,
  P_BCC                IN VARCHAR2 DEFAULT NULL,
  P_FROM               IN VARCHAR2 DEFAULT NULL,
  P_REPLYTO            IN VARCHAR2 DEFAULT NULL,
  P_APPLICATION_ID     IN NUMBER   DEFAULT wwv_flow_security.g_flow_id )
RETURN NUMBER;
```

Parameters

Table 23-5 SEND Function Parameters

Parameter	Description
<code>p_template_static_id</code>	Static identifier string, used to identify the shared component email template.
<code>p_placeholders</code>	JSON string representing the placeholder names along with the values, to be substituted.
<code>p_to</code>	Valid email address to which the email is sent (required). For multiple email addresses, use a comma-separated list.
<code>p_cc</code>	Valid email addresses to which the email is copied. For multiple email addresses, use a comma-separated list.
<code>p_bcc</code>	Valid email addresses to which the email is blind copied. For multiple email addresses, use a comma-separated list.
<code>p_from</code>	Email address from which the email is sent (required). This email address must be a valid address. Otherwise, the message is not sent.
<code>p_replyto</code>	Address of the Reply-To mail header. You can use this parameter as follows: <ul style="list-style-type: none"> If you omit the <code>p_replyto</code> parameter, the Reply-To mail header is set to the value specified in the <code>p_from</code> parameter If you include the <code>p_replyto</code> parameter, but provide a NULL value, the Reply-To mail header is set to NULL. This results in the suppression of automatic email replies If you include <code>p_replyto</code> parameter, but provide a non-null value (for example, a valid email address), you send these messages, but the automatic replies go to the value specified (for example, the email address)
<code>p_application_id</code>	Application ID where the email template is defined. Defaults to the current application (if called from within an application).

Examples

```
declare
  l_mail_id number;
begin
  l_mail_id := apex_mail.send (
    p_template_static_id => 'ORDER',
    p_placeholders       => '{ "ORDER_NUMBER": 5321, "ORDER_DATE":
"01-Feb-2018", "ORDER_TOTAL": "$12,000" }',
    p_to                 => 'some_user@somewhere.com' );

  apex_mail.add_attachment (
    p_mail_id   => l_mail_id,
    p_attachment => ... );
end;
```

23.9 SEND Procedure

This procedure sends an outbound email message from an application. Although you can use this procedure to pass in either a `VARCHAR2` or a `CLOB` to `p_body` and `p_body_html`, the data types must be the same. In other words, you cannot pass a `CLOB` to `P_BODY` and a `VARCHAR2` to `p_body_html`.

When using `APEX_MAIL.SEND`, remember the following:

- **No single line may exceed 1000 characters.** The SMTP/MIME specification dictates that no single line shall exceed 1000 characters. To comply with this restriction, you must add a carriage return or line feed characters to break up your `p_body` or `p_body_html` parameters into chunks of 1000 characters or less. Failing to do so results in erroneous email messages, including partial messages or messages with extraneous exclamation points.
- **Plain text and HTML email content.** Passing a value to `p_body`, but not `p_body_html` results in a plain text message. Passing a value to `p_body` and `p_body_html` yields a multi-part message that includes both plain text and HTML content. The settings and capabilities of the recipient's email client determine what displays. Although most modern email clients can read an HTML formatted email, remember that some users disable this functionality to address security issues.
- **Avoid images.** When referencing images in `p_body_html` using the `` tag, remember that the images must be accessible to the recipient's email client in order for them to see the image.

For example, suppose you reference an image on your network called `hello.gif` as follows:

```

```

In this example, the image is not attached to the email, but is referenced by the email. For the recipient to see it, they must be able to access the image using a web browser. If the image is inside a firewall and the recipient is outside of the firewall, the image is not displayed. For this reason, avoid using images. If you must include images, be sure to include the ALT attribute to provide a textual description in the event the image is not accessible.

Syntax

```

APEX_MAIL.SEND(
    p_to           IN    VARCHAR2,
    p_from         IN    VARCHAR2,
    p_body         IN    [ VARCHAR2 | CLOB ],
    p_body_html    IN    [ VARCHAR2 | CLOB ] DEFAULT NULL,
    p_subj         IN    VARCHAR2 DEFAULT NULL,
    p_cc           IN    VARCHAR2 DEFAULT NULL,
    p_bcc          IN    VARCHAR2 DEFAULT NULL,
    p_replyto      IN    VARCHAR2);

```

Parameters

Table 23-6 SEND Parameters

Parameter	Description
p_to	Valid email address to which the email is sent (required). For multiple email addresses, use a comma-separated list
p_from	Email address from which the email is sent (required). This email address must be a valid address. Otherwise, the message is not sent
p_body	Body of the email in plain text, not HTML (required). If a value is passed to p_body_html, then this is the only text the recipient sees. If a value is not passed to p_body_html, then this text only displays for email clients that do not support HTML or have HTML disabled. A carriage return or line feed (CRLF) must be included every 1000 characters.
p_body_html	Body of the email in HTML format. This must be a full HTML document including the <html> and <body> tags. A single line cannot exceed 1000 characters without a carriage return or line feed (CRLF)
p_subj	Subject of the email
p_cc	Valid email addresses to which the email is copied. For multiple email addresses, use a comma-separated list
p_bcc	Valid email addresses to which the email is blind copied. For multiple email addresses, use a comma-separated list
p_replyto	Address of the Reply-To mail header. You can use this parameter as follows: <ul style="list-style-type: none"> If you omit the p_replyto parameter, the Reply-To mail header is set to the value specified in the p_from parameter If you include the p_replyto parameter, but provide a NULL value, the Reply-To mail header is set to NULL. This results in the suppression of automatic email replies If you include p_replyto parameter, but provide a non-null value (for example, a valid email address), you send these messages, but the automatic replies go to the value specified (for example, the email address)

Examples

The following example demonstrates how to use `APEX_MAIL.SEND` to send a plain text email message from an application.

```

-- Example One: Plain Text only message
DECLARE
    l_body      CLOB;
BEGIN
    l_body := 'Thank you for your interest in the APEX_MAIL
package.'||utl_tcp.crlf||utl_tcp.crlf;
    l_body := l_body || ' Sincerely,'||utl_tcp.crlf;
    l_body := l_body || ' The Application Express Dev Team' ||utl_tcp.crlf;
    apex_mail.send(
        p_to      => 'some_user@somewhere.com', -- change to your email address
        p_from    => 'some_sender@somewhere.com', -- change to a real senders email
address
        p_body    => l_body,
        p_subj    => 'APEX_MAIL Package - Plain Text message');
END;
/

```

The following example demonstrates how to use `APEX_MAIL.SEND` to send an HTML email message from an application. Remember, you must include a carriage return or line feed (CRLF) every 1000 characters. The example that follows uses `utl_tcp.crlf`.

```

-- Example Two: Plain Text / HTML message
DECLARE
    l_body      CLOB;
    l_body_html CLOB;
BEGIN
    l_body := 'To view the content of this message, please use an HTML enabled mail
client.'||utl_tcp.crlf;

    l_body_html := '<html>
<head>
    <style type="text/css">
        body{font-family: Arial, Helvetica, sans-serif;
font-size:10pt;
margin:30px;
background-color:#ffffff;}

        span.sig{font-style:italic;
font-weight:bold;
color:#811919;}
    </style>
</head>
    <body>'||utl_tcp.crlf;
    l_body_html := l_body_html || '<p>Thank you for your interest in the
<strong>APEX_MAIL</strong> package.</p>'||utl_tcp.crlf;
    l_body_html := l_body_html || ' Sincerely,<br />'||utl_tcp.crlf;
    l_body_html := l_body_html || ' <span class="sig">The Application Express Dev
Team</span><br />' ||utl_tcp.crlf;
    l_body_html := l_body_html || '</body></html>';
    apex_mail.send(
        p_to      => 'some_user@somewhere.com', -- change to your email address
        p_from    => 'some_sender@somewhere.com', -- change to a real senders email address
        p_body    => l_body,
        p_body_html => l_body_html,
        p_subj    => 'APEX_MAIL Package - HTML formatted message');
END;
/

```

23.10 SEND Function

This function sends an outbound email message from an application. Although you can use this function to pass in either a `VARCHAR2` or a `CLOB` to `p_body` and `p_body_html`, the data types must be the same. In other words, you cannot pass a `CLOB` to `P_BODY` and a `VARCHAR2` to `p_body_html`.

This function returns a `NUMBER`. The `NUMBER` returned is the unique numeric identifier associated with the mail message.

When using `APEX_MAIL.SEND`, remember the following:

- **No single line may exceed 1000 characters.** The SMTP/MIME specification dictates that no single line shall exceed 1000 characters. To comply with this restriction, you must add a carriage return or line feed characters to break up your `p_body` or `p_body_html` parameters into chunks of 1000 characters or less. Failing to do so results in erroneous email messages, including partial messages or messages with extraneous exclamation points.
- **Plain text and HTML email content.** Passing a value to `p_body`, but not `p_body_html` results in a plain text message. Passing a value to `p_body` and `p_body_html` yields a multi-part message that includes both plain text and HTML content. The settings and capabilities of the recipient's email client determine what displays. Although most modern email clients can read an HTML formatted email, remember that some users disable this functionality to address security issues.
- **Avoid images.** When referencing images in `p_body_html` using the `` tag, remember that the images must be accessible to the recipient's email client in order for them to see the image.

For example, suppose you reference an image on your network called `hello.gif` as follows:

```

```

In this example, the image is not attached to the email, but is referenced by the email. For the recipient to see it, they must be able to access the image using a web browser. If the image is inside a firewall and the recipient is outside of the firewall, the image is not displayed. For this reason, avoid using images. If you must include images, be sure to include the ALT attribute to provide a textual description in the event the image is not accessible.

Syntax

```
APEX_MAIL.SEND(  
  p_to           IN   VARCHAR2,  
  p_from         IN   VARCHAR2,  
  p_body         IN   [ VARCHAR2 | CLOB ],  
  p_body_html    IN   [ VARCHAR2 | CLOB ] DEFAULT NULL,  
  p_subj        IN   VARCHAR2 DEFAULT NULL,  
  p_cc          IN   VARCHAR2 DEFAULT NULL,  
  p_bcc         IN   VARCHAR2 DEFAULT NULL,  
  p_replyto     IN   VARCHAR2)  
return NUMBER;
```

Parameters

Table 23-7 SEND Parameters

Parameter	Description
<code>p_to</code>	Valid email address to which the email is sent (required). For multiple email addresses, use a comma-separated list
<code>p_from</code>	Email address from which the email is sent (required). This email address must be a valid address. Otherwise, the message is not sent
<code>p_body</code>	Body of the email in plain text, not HTML (required). If a value is passed to <code>p_body_html</code> , then this is the only text the recipient sees. If a value is not passed to <code>p_body_html</code> , then this text only displays for email clients that do not support HTML or have HTML disabled. A carriage return or line feed (CRLF) must be included every 1000 characters.
<code>p_body_html</code>	Body of the email in HTML format. This must be a full HTML document including the <code><html></code> and <code><body></code> tags. A single line cannot exceed 1000 characters without a carriage return or line feed (CRLF)
<code>p_subj</code>	Subject of the email
<code>p_cc</code>	Valid email addresses to which the email is copied. For multiple email addresses, use a comma-separated list
<code>p_bcc</code>	Valid email addresses to which the email is blind copied. For multiple email addresses, use a comma-separated list
<code>p_replyto</code>	Address of the Reply-To mail header. You can use this parameter as follows: <ul style="list-style-type: none"> If you omit the <code>p_replyto</code> parameter, the Reply-To mail header is set to the value specified in the <code>p_from</code> parameter If you include the <code>p_replyto</code> parameter, but provide a NULL value, the Reply-To mail header is set to NULL. This results in the suppression of automatic email replies If you include <code>p_replyto</code> parameter, but provide a non-null value (for example, a valid email address), you send these messages, but the automatic replies go to the value specified (for example, the email address)

Examples

The following example demonstrates how to use `APEX_MAIL.SEND` to send a plain text email message from an application and return the unique message ID.

```
-- Example One: Plain Text only message
DECLARE
    l_body      CLOB;
    l_id NUMBER;
BEGIN
    l_body := 'Thank you for your interest in the APEX_MAIL
package.'||utl_tcp.crlf||utl_tcp.crlf;
    l_body := l_body || ' Sincerely,'||utl_tcp.crlf;
    l_body := l_body || ' The Application Express Dev Team' ||utl_tcp.crlf;
    l_id := apex_mail.send(
        p_to      => 'some_user@somewhere.com', -- change to your email address
        p_from    => 'some_sender@somewhere.com', -- change to a real senders email
```

```

address
    p_body    => l_body,
    p_subj    => 'APEX_MAIL Package - Plain Text message');
END;
/

```

The following example demonstrates how to use `APEX_MAIL.SEND` to send an HTML email message from an application. Remember, you must include a carriage return or line feed (CRLF) every 1000 characters. The example that follows uses `utl_tcp.crlf`.

```

-- Example Two: Plain Text / HTML message
DECLARE
    l_body    CLOB;
    l_body_html CLOB;
    l_id NUMBER;
BEGIN
    l_body := 'To view the content of this message, please use an HTML enabled mail
client.'||utl_tcp.crlf;

    l_body_html := '<html>
<head>
    <style type="text/css">
        body{font-family: Arial, Helvetica, sans-serif;
font-size:10pt;
margin:30px;
background-color:#ffffff;}

        span.sig{font-style:italic;
font-weight:bold;
color:#811919;}
    </style>
</head>
<body>'||utl_tcp.crlf;
    l_body_html := l_body_html || '<p>Thank you for your interest in the
<strong>APEX_MAIL</strong> package.</p>'||utl_tcp.crlf;
    l_body_html := l_body_html || ' Sincerely,<br />'||utl_tcp.crlf;
    l_body_html := l_body_html || ' <span class="sig">The Application Express Dev
Team</span><br />'||utl_tcp.crlf;
    l_body_html := l_body_html || '</body></html>';
    l_id := apex_mail.send(
        p_to => 'some_user@somewhere.com', -- change to your email address
        p_from => 'some_sender@somewhere.com', -- change to a real senders
        email address
        p_body => l_body,
        p_body_html => l_body_html,
        p_subj => 'APEX_MAIL Package - HTML formatted message');
END;
/

```


APEX_PKG_APP_INSTALL

The `APEX_PKG_APP_INSTALL` package provides utilities you can use to manage Packaged Applications. You can use `APEX_PKG_APP_INSTALL` package to install, upgrade, and deinstall packaged application from the command line. Before using the package, the `security_group_id` must be set by calling either `APEX_UTIL.SET_WORKSPACE` or `APEX_UTIL.SET_SECURITY_GROUP_ID`. The related APEX views to get more information on packaged applications are `APEX_PKG_APP_AUTHENTICATIONS`, `APEX_PKG_APPS`, and `APEX_PKG_APP_ACTIVITY`.

Note:

`APEX_PKG_APP_INSTALL` supports managing database packaged applications and does not support websheet packaged applications.

- [DEINSTALL Procedure Signature 1](#) (page 24-1)
- [DEINSTALL Procedure Signature 2](#) (page 24-2)
- [INSTALL Function Signature 1](#) (page 24-2)
- [INSTALL Function Signature 2](#) (page 24-3)
- [UPGRADE Procedure Signature 1](#) (page 24-4)
- [UPGRADE Procedure Signature 2](#) (page 24-5)

24.1 DEINSTALL Procedure Signature 1

This procedure deinstalls specified packaged application. If invalid packaged application ID passed, the procedure raises an error.

Syntax

```
APEX_PKG_APP_INSTALL.DEINSTALL(
  p_app_id in number );
```

Parameters

Table 24-1 DEINSTALL Procedure Signature 1 Parameters

Parameter	Description
<code>p_app_id</code>	The packaged application ID.

Example

The following example shows how to use `DEINSTALL` procedure to deinstall packaged application ID 7060 from `DEMO` workspace.

```
begin
  APEX_UTIL.SET_WORKSPACE( 'DEMO' );
  APEX_PKG_APP_INSTALL.DEINSTALL(
    p_app_id => 7060 );
end;
```

24.2 DEINSTALL Procedure Signature 2

This procedure deinstalls specified packaged application. If invalid packaged application ID passed, the procedure raises an error.

Syntax

```
APEX_PKG_APP_INSTALL.DEINSTALL(
  p_app_name in varchar2 );
```

Parameters

Table 24-2 DEINSTALL Procedure Signature 2 Parameters

Parameter	Description
p_app_name	The case insensitive packaged application name.

Example

The following example shows how to use `DEINSTALL` procedure to deinstall packaged application 'Bug Tracking' from `DEMO` workspace.

```
begin
  APEX_UTIL.SET_WORKSPACE( 'DEMO' );
  APEX_PKG_APP_INSTALL.DEINSTALL(
    p_app_name => 'Bug Tracking' );
end;
```

24.3 INSTALL Function Signature 1

This function installs specified packaged application and returns installed application ID. If any of the following are `true`, the function raises an error:

- Invalid packaged application ID passed.
- Invalid authentication type passed. For list of available authentication types, query `APEX_PKG_APP_AUTHENTICATIONS` view.

Syntax

```
APEX_PKG_APP_INSTALL.INSTALL(
  p_app_id          in number,
  p_authentication_type in wwv_flow_authentication_api.t_authentication_type
  default null,
  p_schema          in varchar2 default null ) return number;
```

Parameters

Table 24-3 INSTALL Function Signature 1 Parameters

Parameter	Description
p_app_id	The packaged application ID.
p_authentication_type	The type of authentication to use. If NULL, Oracle APEX builder authentication is used. The value must be apex_authentication.t_authentication_type.
p_schema	The database schema the application parses SQL statements as. If NULL, it defaults to the workspace schema. If there are more than one workspace schema, it defaults to the first schema provisioned for the workspace.

Example

The following example shows how to use `INSTALL` function to install packaged application ID 7060 in DEMO workspace with 'Application Express Account' authentication using 'SCOTT' schema.

```
declare
  l_installed_app_id  number;
begin
  APEX_UTIL.SET_WORKSPACE( 'DEMO' );
  l_installed_app_id := APEX_PKG_APP_INSTALL.INSTALL(
    p_app_id           => 7060,
    p_authentication_type =>
APEX_AUTHENTICATION.C_TYPE_APEX_ACCOUNTS,
    p_schema           => 'SCOTT' );
end;
```

24.4 INSTALL Function Signature 2

This function installs specified packaged application and returns installed application ID. If any of the following are `true`, the function raises an error:

- Invalid packaged application ID passed.
- Invalid authentication type passed. For list of available authentication types, query `APEX_PKG_APP_AUTHENTICATIONS` view.

Syntax

```
APEX_PKG_APP_INSTALL.INSTALL(
  p_app_name           in varchar2,
  p_authentication_type in wwv_flow_authentication_api.t_authentication_type
default null,
  p_schema             in varchar2 default null ) return number;
```

Parameters

Table 24-4 INSTALL Function Signature 2 Parameters

Parameter	Description
p_app_name	The case insensitive packaged application name.
p_authentication_type	The type of authentication to use. If NULL, Oracle APEX builder authentication is used. The value must be <code>apex_authentication.t_authentication_type</code> .
p_schema	The database schema the application parses SQL statements as. If NULL, it defaults to the workspace schema. If there are more than one workspace schema, it defaults to the first schema provisioned for the workspace.

Example

The following example shows how to use `INSTALL` function to install packaged application named 'Bug Tracking' in DEMO workspace with 'Application Express Account' authentication using 'SCOTT' schema.

```

declare
    l_installed_app_id    number;
begin
    APEX_UTIL.SET_WORKSPACE( 'DEMO' );
    l_installed_app_id := APEX_PKG_APP_INSTALL.INSTALL(
        p_app_name          => 'Bug Tracking',
        p_authentication_type =>
APEX_AUTHENTICATION.C_TYPE_APEX_ACCOUNTS,
        p_schema            => 'SCOTT' );
end;
```

24.5 UPGRADE Procedure Signature 1

This procedure upgrades specified packaged application. If any of the following are true, the procedure raises an error:

- Invalid packaged application ID passed.
- The installed packaged application is unlocked and cannot be upgraded.
- The installed packaged application is up to date and no upgrade needed.

Syntax

```
APEX_PKG_APP_INSTALL.UPGRADE(
    p_app_id in number );
```

Parameters

Table 24-5 UPGRADE Procedure Signature 1 Parameters

Parameter	Description
p_app_id	The packaged application ID.

Example

The following example shows how to use `UPGRADE` procedure to upgrade packaged application ID 7060 in `DEMO` workspace.

```
begin
  APEX_UTIL.SET_WORKSPACE( 'DEMO' );
  APEX_PKG_APP_INSTALL.UPGRADE(
    p_app_id => 7060 );
end;
```

24.6 UPGRADE Procedure Signature 2

This procedure upgrades specified packaged application. If any of the following are true, the procedure raises an error:

- Invalid packaged application ID passed.
- The installed packaged application is unlocked and cannot be upgraded.
- The installed packaged application is up to date and no upgrade needed.

Syntax

```
APEX_PKG_APP_INSTALL.UPGRADE(
  p_app_name in varchar2 );
```

Parameters

Table 24-6 UPGRADE Procedure Signature 2 Parameters

Parameter	Description
<code>p_app_name</code>	The case insensitive packaged application name.

Example

The following example shows how to use `UPGRADE` procedure to upgrade packaged application 'Bug Tracking' in `DEMO` workspace.

```
begin
  APEX_UTIL.SET_WORKSPACE( 'DEMO' );
  APEX_PKG_APP_INSTALL.UPGRADE(
    p_app_name => 'Bug Tracking' );
end;
```

25

APEX_PAGE

The `APEX_PAGE` package is the public API for handling pages.

- [Global Constants](#) (page 25-1)
- [IS_DESKTOP_UI Function](#) (page 25-1)
- [IS_JQM_SMARTPHONE_UI Function](#) (page 25-1)
- [IS_JQM_TABLET_UI Function](#) (page 25-2)
- [GET_UI_TYPE Function](#) (page 25-2)
- [IS_READ_ONLY Function](#) (page 25-2)
- [GET_PAGE_MODE Function](#) (page 25-2)
- [PURGE_CACHE Procedure](#) (page 25-3)
- [GET_URL Function](#) (page 25-3)

25.1 Global Constants

The following constants are used by this package.

```
c_ui_type_desktop          constant varchar2(10) := 'DESKTOP';  
c_ui_type_jqm_smartphone  constant varchar2(15) := 'JQM_SMARTPHONE';
```

25.2 IS_DESKTOP_UI Function

This function returns TRUE if the current page has been designed for desktop browsers.

Syntax

```
FUNCTION IS_DESKTOP_UI  
RETURN BOOLEAN;
```

25.3 IS_JQM_SMARTPHONE_UI Function

This function returns TRUE if the current page has been designed for smartphone devices using jQuery Mobile.

Syntax

```
FUNCTION IS_JQM_SMARTPHONE_UI  
RETURN BOOLEAN;
```

25.4 IS_JQM_TABLET_UI Function

This function returns TRUE if the current page has been designed for tablet devices using jQuery Mobile.

Syntax

```
FUNCTION IS_JQM_TABLET_UI  
RETURN BOOLEAN;
```

25.5 GET_UI_TYPE Function

This function returns the user interface (UI) type for which the current page has been designed.

Syntax

```
FUNCTION GET_UI_TYPE  
RETURN VARCHAR2;
```

25.6 IS_READ_ONLY Function

This function returns TRUE if the current page is rendered read-only and FALSE if it is not.

Syntax

```
FUNCTION IS_READ_ONLY  
RETURN BOOLEAN;
```

25.7 GET_PAGE_MODE Function

This function returns the page mode for the current page.

Syntax

```
FUNCTION GET_PAGE_MODE (  
    p_application_id IN NUMBER,  
    p_page_id        IN NUMBER)  
RETURN VARCHAR2;
```

Parameters

Table 25-1 GET_PAGE_MODE Parameters

Parameter	Description
p_application_id	ID of the application. Defaults to the current application.
p_page_id	ID of the page. Defaults to the current page.

25.8 PURGE_CACHE Procedure

This procedure purges the cache of the specified application, page, and region for the specified user. If the user is not specified, the procedure purges all cached versions of the page.

Syntax

```
PROCEDURE PURGE_CACHE (
  p_application_id      IN NUMBER DEFAULT apex.g_flow_id,
  p_page_id            IN NUMBER DEFAULT apex.g_flow_step_id,
  p_user_name          IN VARCHAR2 DEFAULT NULL,
  p_current_session_only IN BOOLEAN  DEFAULT FALSE );
```

Parameters

Table 25-2 PURGE_CACHE Parameters

Parameter	Description
p_application_id	ID of the application. Defaults to the current application.
p_page_id	ID of the page. Defaults to the current page. If you pass NULL, Oracle Application Express purges the cache on all pages of the application.
p_user_name	Specify a user name if you only want to purge entries that were saved for the given user.
p_current_session_only	Specify TRUE if you only want to purge entries that were saved for the current session. Defaults to FALSE.

Example

This example purges session specific cache on the current page.

```
BEGIN
  APEX_PAGE.PURGE_CACHE (
    p_current_session_only => true );
END;
```

25.9 GET_URL Function

This function returns an Oracle Application Express `f?p= URL`. It is sometimes clearer to read a function call than a concatenated URL. See the example below for a comparison.

Syntax

```
FUNCTION GET_URL (
  p_application      IN VARCHAR2 DEFAULT NULL,
  p_page            IN VARCHAR2 DEFAULT NULL,
  p_session         IN NUMBER   DEFAULT APEX.G_INSTANCE,
  p_request         IN VARCHAR2 DEFAULT NULL,
  p_debug          IN VARCHAR2 DEFAULT NULL,
  p_clear_cache    IN VARCHAR2 DEFAULT NULL,
  p_items          IN VARCHAR2 DEFAULT NULL,
  p_values         IN VARCHAR2 DEFAULT NULL,
```



```

p_printer_friendly IN VARCHAR2 DEFAULT NULL,
p_trace            IN VARCHAR2 DEFAULT NULL )
RETURN VARCHAR2;

```

Parameters

Table 25-3 GET_URL Parameters

Parameter	Description
p_application	The application ID or alias. Defaults to the current application.
p_page	Page ID or alias. Defaults to the current page.
p_session	Session ID. Defaults to the current session ID.
p_request	URL request parameter.
p_debug	URL debug parameter. Defaults to the current debug mode.
p_clear_cache	URL clear cache parameter.
p_items	Comma-delimited list of item names to set session state.
p_values	Comma-delimited list of item values to set session state.
p_printer_friendly	URL printer friendly parameter. Defaults to the current request's printer friendly mode.
p_trace	SQL trace parameter.

Example

This query uses `APEX_PAGE.GET_URL` and its alternative `APEX_UTIL.PREPARE_URL` to produce two identical URLs.

```

SELECT APEX_PAGE.GET_URL (
    p_page => 1,
    p_items => 'P1_X,P1_Y',
    p_values => 'somevalue,othervalue' ) f_url_1,
    APEX_UTIL.PREPARE_URL('f?p=&APP_ID.:
1:&APP_SESSION.::::P1_X,P1_Y:somevalue,othervalue')
FROM DUAL

```

26

APEX_PLUGIN

The `APEX_PLUGIN` package provides the interface declarations and some utility functions to work with plug-ins.

- [Data Types](#) (page 26-1)
- [GET_AJAX_IDENTIFIER Function](#) (page 26-8)
- [GET_INPUT_NAME_FOR_PAGE_ITEM Function](#) (page 26-9)

26.1 Data Types

The data types used by the `APEX_PLUGIN` package are described in this section.

Data Types:

- [c_*](#) (page 26-2)
- [t_authentication](#) (page 26-2)
- [t_authentication_ajax_result](#) (page 26-2)
- [t_authentication_auth_result](#) (page 26-2)
- [t_authentication_inval_result](#) (page 26-3)
- [t_authentication_logout_result](#) (page 26-3)
- [t_authentication_sentry_result](#) (page 26-3)
- [t_authorization](#) (page 26-3)
- [t_authorization_exec_result](#) (page 26-3)
- [t_dynamic_action](#) (page 26-3)
- [t_dynamic_action_ajax_result](#) (page 26-4)
- [t_dynamic_action_render_result](#) (page 26-4)
- [t_page_item](#) (page 26-4)
- [t_page_item_ajax_result](#) (page 26-5)
- [t_page_item_render_result](#) (page 26-5)
- [t_page_item_validation_result](#) (page 26-5)
- [t_plugin](#) (page 26-6)
- [t_process](#) (page 26-6)
- [t_process_exec_result](#) (page 26-6)
- [type t_region_column \(](#) (page 26-7)
- [type t_region_columns is table of t_region_column index by pls_integer;](#) (page 26-7)
- [type t_region_column \(](#) (page 26-7)

- [type t_region_columns](#) is table of [t_region_column](#) index by [pls_integer](#); (page 26-7)
- [t_region](#) (page 26-7)
- [t_region_ajax_result](#) (page 26-8)
- [t_region_render_result](#) (page 26-8)

c_*

The following constants are used for `display_location` in the page item validation function result type `t_page_item_validation_result`.

```
c_inline_with_field          constant varchar2(40) := 'INLINE_WITH_FIELD';
c_inline_with_field_and_notif constant varchar2(40) :=
'INLINE_WITH_FIELD_AND_NOTIFICATION';
c_inline_in_notification     constant varchar2(40) := 'INLINE_IN_NOTIFICATION';
c_on_error_page              constant varchar2(40) := 'ON_ERROR_PAGE';
```

t_authentication

```
type t_authentication is record (
  id                number,
  name              varchar2(255),
  invalid_session_url varchar2(4000),
  logout_url        varchar2(4000),
  plssql_code       clob,
  attribute_01      varchar2(32767),
  attribute_02      varchar2(32767),
  attribute_03      varchar2(32767),
  attribute_04      varchar2(32767),
  attribute_05      varchar2(32767),
  attribute_06      varchar2(32767),
  attribute_07      varchar2(32767),
  attribute_08      varchar2(32767),
  attribute_09      varchar2(32767),
  attribute_10      varchar2(32767),
  attribute_11      varchar2(32767),
  attribute_12      varchar2(32767),
  attribute_13      varchar2(32767),
  attribute_14      varchar2(32767),
  attribute_15      varchar2(32767),
  --
  session_id        number,
  username           varchar2(255) );
```

t_authentication_ajax_result

```
type t_authentication_ajax_result is record (
  dummy           boolean );
```

t_authentication_auth_result

```
type t_authentication_auth_result is record (
  is_authenticated boolean,
  redirect_url      varchar2(4000),
  log_code          number,
  log_text          varchar2(4000),
  display_text      varchar2(4000) );
```

t_authentication_inval_result

```
type t_authentication_inval_result is record (  
    redirect_url      varchar2(4000) );
```

t_authentication_logout_result

```
type t_authentication_logout_result is record (  
    redirect_url      varchar2(4000) );
```

t_authentication_sentry_result

```
type t_authentication_sentry_result is record (  
    is_valid          boolean );
```

t_authorization

The following type is passed to all authorization plug-in functions and contains information about the current authorization.

```
type t_authorization is record (  
    id                number,  
    name              varchar2(255),  
    username          varchar2(255),  
    caching           varchar2(20),  
    component         apex.t_component,  
    attribute_01      varchar2(32767),  
    attribute_02      varchar2(32767),  
    attribute_03      varchar2(32767),  
    attribute_04      varchar2(32767),  
    attribute_05      varchar2(32767),  
    attribute_06      varchar2(32767),  
    attribute_07      varchar2(32767),  
    attribute_08      varchar2(32767),  
    attribute_09      varchar2(32767),  
    attribute_10      varchar2(32767),  
    attribute_11      varchar2(32767),  
    attribute_12      varchar2(32767),  
    attribute_13      varchar2(32767),  
    attribute_14      varchar2(32767),  
    attribute_15      varchar2(32767),
```

t_authorization_exec_result

The `t_authorization_exec_result` data type has been added to the `APEX_PLUGIN` package.

```
type t_authorization_exec_result is record (  
    is_authorized     boolean  
);
```

t_dynamic_action

The following type is passed into all dynamic action plug-in functions and contains information about the current dynamic action.

```
type t_dynamic_action is record (  
    id                number,  
    action            varchar2(50),  
    attribute_01      varchar2(32767),  
    attribute_02      varchar2(32767),
```

```
attribute_03 varchar2(32767),
attribute_04 varchar2(32767),
attribute_05 varchar2(32767),
attribute_06 varchar2(32767),
attribute_07 varchar2(32767),
attribute_08 varchar2(32767),
attribute_09 varchar2(32767),
attribute_10 varchar2(32767),
attribute_11 varchar2(32767),
attribute_12 varchar2(32767),
attribute_13 varchar2(32767),
attribute_14 varchar2(32767),
attribute_15 varchar2(32767) );
```

t_dynamic_action_ajax_result

The following type is used as the result type for the Ajax function of a dynamic action type plug-in.

```
type t_dynamic_action_ajax_result is record (
    dummy boolean /* not used yet */
);
```

t_dynamic_action_render_result

The following type is used as the result type for the rendering function of a dynamic action plug-in.

```
type t_dynamic_action_render_result is record (
    javascript_function varchar2(32767),
    ajax_identifier      varchar2(255),
    attribute_01         varchar2(32767),
    attribute_02         varchar2(32767),
    attribute_03         varchar2(32767),
    attribute_04         varchar2(32767),
    attribute_05         varchar2(32767),
    attribute_06         varchar2(32767),
    attribute_07         varchar2(32767),
    attribute_08         varchar2(32767),
    attribute_09         varchar2(32767),
    attribute_10         varchar2(32767),
    attribute_11         varchar2(32767),
    attribute_12         varchar2(32767),
    attribute_13         varchar2(32767),
    attribute_14         varchar2(32767),
    attribute_15         varchar2(32767) );
```

t_page_item

The following type is passed into all item type plug-in functions and contains information about the current page item.

```
type t_page_item is record (
    id                number,
    name              varchar2(255),
    label             varchar2(4000),
    plain_label       varchar2(4000),
    label_id          varchar2(255), /* label id is set if 'Standard Form
Element' = no and label template uses #LABEL_ID# substitution */
    placeholder       varchar2(255),
    format_mask       varchar2(255),
```

```

is_required                boolean,
lov_definition              varchar2(4000),
lov_display_extra          boolean,
lov_display_null           boolean,
lov_null_text               varchar2(255),
lov_null_value              varchar2(255),
lov_cascade_parent_items   varchar2(255),
ajax_items_to_submit       varchar2(255),
ajax_optimize_refresh      boolean,
element_width              number,
element_max_length         number,
element_height             number,
element_css_classes        varchar2(255),
element_attributes         varchar2(2000),
element_option_attributes  varchar2(4000),
escape_output              boolean,
attribute_01               varchar2(32767),
attribute_02               varchar2(32767),
attribute_03               varchar2(32767),
attribute_04               varchar2(32767),
attribute_05               varchar2(32767),
attribute_06               varchar2(32767),
attribute_07               varchar2(32767),
attribute_08               varchar2(32767),
attribute_09               varchar2(32767),
attribute_10               varchar2(32767),
attribute_11               varchar2(32767),
attribute_12               varchar2(32767),
attribute_13               varchar2(32767),
attribute_14               varchar2(32767),
attribute_15               varchar2(32767) );

```

t_page_item_ajax_result

The following type is used as the result type for the Ajax function of an item type plug-in.

```

type t_page_item_ajax_result is record (
    dummy boolean /* not used yet */
);

```

t_page_item_render_result

The following type is used as the result type for the rendering function of an item type plug-in.

```

type t_page_item_render_result is record (
    is_navigable          boolean default false,
    navigable_dom_id      varchar2(255)          /* should only be set if navigable
element is not equal to item name */
);

```

t_page_item_validation_result

The following type is used as the result type for the validation function of an item type plug-in.

```

type t_page_item_validation_result is record (
    message                varchar2(32767),
    display_location       varchar2(40),      /* if not set the application default is used

```

```
*/  
    page_item_name    varchar2(255) ); /* if not set the validated page item name is  
used */
```

t_plugin

The following type is passed into all plug-in functions and contains information about the current plug-in.

```
type t_plugin is record (  
    name                varchar2(45),  
    file_prefix         varchar2(4000),  
    attribute_01        varchar2(32767),  
    attribute_02        varchar2(32767),  
    attribute_03        varchar2(32767),  
    attribute_04        varchar2(32767),  
    attribute_05        varchar2(32767),  
    attribute_06        varchar2(32767),  
    attribute_07        varchar2(32767),  
    attribute_08        varchar2(32767),  
    attribute_09        varchar2(32767),  
    attribute_10        varchar2(32767),  
    attribute_11        varchar2(32767),  
    attribute_12        varchar2(32767),  
    attribute_13        varchar2(32767),  
    attribute_14        varchar2(32767),  
    attribute_15        varchar2(32767) );
```

t_process

The following type is passed into all process type plug-in functions and contains information about the current process.

```
type t_process is record (  
    id                  number,  
    name                varchar2(255),  
    success_message     varchar2(32767),  
    attribute_01        varchar2(32767),  
    attribute_02        varchar2(32767),  
    attribute_03        varchar2(32767),  
    attribute_04        varchar2(32767),  
    attribute_05        varchar2(32767),  
    attribute_06        varchar2(32767),  
    attribute_07        varchar2(32767),  
    attribute_08        varchar2(32767),  
    attribute_09        varchar2(32767),  
    attribute_10        varchar2(32767),  
    attribute_11        varchar2(32767),  
    attribute_12        varchar2(32767),  
    attribute_13        varchar2(32767),  
    attribute_14        varchar2(32767),  
    attribute_15        varchar2(32767) );
```

t_process_exec_result

The following type is used as the result type for the execution function of a process type plug-in.

```
type t_process_exec_result is record (  
    success_message     varchar2(32767)  
    execution_skipped   boolean default false /* set to TRUE if process execution has
```

```
been skipped by plug-in because of additional condition checks */  
);
```

type t_region_column (

The following type is passed into all region type plug-in functions and contains information about the current region.

```
type t_region_column is record (  
    id                number,  
    name              t_region_column_name,  
    is_displayed      boolean,  
    heading           apex_region_columns.heading%type,  
    heading_alignment apex_region_columns.heading_alignment%type,  
    value_alignment   apex_region_columns.value_alignment%type,  
    value_css_classes apex_region_columns.value_css_classes%type,  
    value_attributes  apex_region_columns.value_attributes%type,  
    format_mask       apex_region_columns.format_mask%type,  
    escape_output     boolean,  
    attribute_01      varchar2(32767),  
    attribute_02      varchar2(32767),  
    attribute_03      varchar2(32767),  
    attribute_04      varchar2(32767),  
    attribute_05      varchar2(32767),  
    attribute_06      varchar2(32767),  
    attribute_07      varchar2(32767),  
    attribute_08      varchar2(32767),  
    attribute_09      varchar2(32767),  
    attribute_10      varchar2(32767),  
    attribute_11      varchar2(32767),  
    attribute_12      varchar2(32767),  
    attribute_13      varchar2(32767),  
    attribute_14      varchar2(32767),  
    attribute_15      varchar2(32767),  
    attribute_16      varchar2(32767),  
    attribute_17      varchar2(32767),  
    attribute_18      varchar2(32767),  
    attribute_19      varchar2(32767),  
    attribute_20      varchar2(32767),  
    attribute_21      varchar2(32767),  
    attribute_22      varchar2(32767),  
    attribute_23      varchar2(32767),  
    attribute_24      varchar2(32767),  
    attribute_25      varchar2(32767);
```

type t_region_columns is table of t_region_column index by pls_integer;

t_region

The following type is passed into all region type plug-in functions and contains information about the current region.

```
type t_region is record (  
    id                number,  
    static_id         varchar2(255),  
    name              varchar2(255),  
    type              varchar2(255),  
    source            varchar2(32767),  
    ajax_items_to_submit varchar2(32767),  
    fetched_rows      pls_integer,
```



```

escape_output          boolean,
error_message          varchar2(32767), /* obsolete */
no_data_found_message varchar2(32767),
attribute_01          varchar2(32767),
attribute_02          varchar2(32767),
attribute_03          varchar2(32767),
attribute_04          varchar2(32767),
attribute_05          varchar2(32767),
attribute_06          varchar2(32767),
attribute_07          varchar2(32767),
attribute_08          varchar2(32767),
attribute_09          varchar2(32767),
attribute_10          varchar2(32767),
attribute_11          varchar2(32767),
attribute_12          varchar2(32767),
attribute_13          varchar2(32767),
attribute_14          varchar2(32767),
attribute_15          varchar2(32767),
attribute_16          varchar2(32767),
attribute_17          varchar2(32767),
attribute_18          varchar2(32767),
attribute_19          varchar2(32767),
attribute_20          varchar2(32767),
attribute_21          varchar2(32767),
attribute_22          varchar2(32767),
attribute_23          varchar2(32767),
attribute_24          varchar2(32767),
attribute_25          varchar2(32767),
region_columns        t_region_columns );

```

t_region_ajax_result

The following type is used as result type for the Ajax function of a region type plug-in.

```

type t_region_ajax_result is record (
    dummy boolean /* not used yet */
);

```

t_region_render_result

The following type is used as the result type for the rendering function of a region type plug-in.

```

type t_region_render_result is record (
    navigable_dom_id varchar2(255) /* can be used to put focus to an input field
(that is, search field) the region renders as part of the plug-in output */
);

```

26.2 GET_AJAX_IDENTIFIER Function

This function returns the Ajax identifier used to call the Ajax callback function defined for the plug-in.

 **Note:**

This function only works in the context of a plug-in rendering function call and only if the plug-in has defined an Ajax function callback in the plug-in definition.

Syntax

```
APEX_PLUGIN.GET_AJAX_IDENTIFIER
RETURN VARCHAR2;
```

Parameters

None.

Example

This is an example of a dynamic action plug-in rendering function that supports an Ajax callback.

```
function render_set_value (
    p_dynamic_action in apex_plugin.t_dynamic_action )
return apex_plugin.t_dynamic_action_render_result
is
    l_result          apex_plugin.t_dynamic_action_render_result;
begin
    l_result.javascript_function := 'com_oracle_apex_set_value';
    l_result.ajax_identifier     := apex_plugin.get_ajax_identifier;
    return l_result;
end;
```

26.3 GET_INPUT_NAME_FOR_PAGE_ITEM Function

Use this function when you want to render an HTML input element in the rendering function of an item type plug-in. For the HTML input element, for example, `<input type="text" id="P1_TEST" name="xxx">`, you have to provide a value for the `name` attribute so that Oracle Application Express can map the submitted value to the actual page item in session state. This function returns the mapping `name` for your page item. If the HTML input element has multiple values, such as a select list with `multiple="multiple"`, then set `p_is_multi_value` to `TRUE`.

 **Note:**

This function is only useful when called in the rendering function of an item type plug-in.

Syntax

```
APEX_PLUGIN.GET_INPUT_NAME_FOR_PAGE_ITEM (
    p_is_multi_value IN BOOLEAN)
RETURN VARCHAR2;
```

Parameters

Table 26-1 GET_INPUT_NAME_FOR_PAGE_ITEM Parameters

Parameter	Description
<code>p_is_multi_value</code>	Set to <code>TRUE</code> if the HTML input element has multiple values. If not, set to <code>FALSE</code> . HTML input elements with multiple values can be checkboxes and multi select lists.

Example

The following example outputs the necessary HTML code to render a text field where the value gets stored in session state when the page is submitted.

```
sys.htp.prn (
  '<input type="text" id="' || p_item.name || '" ' ||
  'name="' || apex_plugin.get_input_name_for_page_item(false) || '" ' ||
  'value="' || sys.htf.escape_sc(p_value) || '" ' ||
  'size="' || p_item.element_width || '" ' ||
  'maxlength="' || p_item.element_max_length || '" ' ||
  coalesce(p_item.element_attributes, 'class="text_field"') || ' />' );
```

27

APEX_PLUGIN_UTIL

The `APEX_PLUGIN_UTIL` package provides utility functions that solve common problems when writing a plug-in.

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- [DEBUG_DYNAMIC_ACTION Procedure](#) (page 27-2)
- [DEBUG_PAGE_ITEM Procedure Signature 1](#) (page 27-2)
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- [REPLACE_SUBSTITUTIONS Function](#) (page 27-31)
- [SET_COMPONENT_VALUES Procedure](#) (page 27-32)

27.1 CLEAR_COMPONENT_VALUES Procedure

This procedure clears the component specific Session State set by `apex_plugin_util.set_component_values`.

Syntax

```
procedure clear_component_values;
```

Example

See `apex_plugin_util.set_component_values`

27.2 DEBUG_DYNAMIC_ACTION Procedure

This procedure writes the data of the dynamic action meta data to the debug output if debugging is enabled.

Syntax

```
APEX_PLUGIN_UTIL.DEBUG_DYNAMIC_ACTION (  
    p_plugin          IN apex_plugin.t_plugin,  
    p_dynamic_action IN apex_plugin.t_dynamic_action);
```

Parameters

Table 27-1 DEBUG_DYNAMIC_ACTION Parameters

Parameter	Description
<code>p_plugin</code>	This is the <code>p_plugin</code> parameter of your plug-in function.
<code>p_dynamic_action</code>	This is the <code>p_dynamic_action</code> parameter of your plug-in function.

Example

This example shows how to collect helpful debug information during the plug-in development cycle to see what values are actually passed into the rendered function or Ajax callback function of the plug-in.

```
apex_plugin_util.debug_dynamic_action (  
    p_plugin          => p_plugin,  
    p_dynamic_action => p_dynamic_action );
```

27.3 DEBUG_PAGE_ITEM Procedure Signature 1

This procedure writes the data of the page item meta data to the debug output if debugging is enabled.

Syntax

```
APEX_PLUGIN_UTIL.DEBUG_PAGE_ITEM (
    p_plugin      IN apex_plugin.t_plugin,
    p_page_item  IN apex_plugin.t_page_item);
```

Parameters

Table 27-2 DEBUG_PAGE_ITEM Parameters

Parameter	Description
p_plugin	This is the p_plugin parameter of your plug-in function.
p_page_item	This is the p_page_item parameter of your plug-in function.

Example

This example shows how to collect helpful debug information during the plug-in development cycle to see what values are actually passed into the renderer, Ajax callback or validation function.

```
apex_plugin_util.debug_page_item (
    p_plugin      => p_plugin,
    p_page_item => p_page_item );
```

27.4 DEBUG_PAGE_ITEM Procedure Signature 2

This procedure writes the data of the page item meta data to the debug output if debugging is enabled.

Syntax

```
APEX_PLUGIN_UTIL.DEBUG_PAGE_ITEM (
    p_plugin      IN apex_plugin.t_plugin,
    p_page_item  IN apex_plugin.t_page_item,
    p_value      IN VARCHAR2,
    p_is_readonly IN BOOLEAN,
    p_is_printer_friendly IN BOOLEAN);
```

Parameters

Table 27-3 DEBUG_PAGE_ITEM Parameters

Parameter	Description
p_plugin	This is the p_plugin parameter of your plug-in function.
p_page_item	This is the p_page_item parameter of your plug-in function.
p_value	This is the p_value parameter of your plug-in function.
p_is_readonly	This is the p_is_readonly parameter of your plug-in function.
p_is_printer_friendly	This is the p_is_printer_friendly parameter of your plug-in function.

Example

This example shows how to collect helpful debug information during the plug-in development cycle to see what values are actually passed into the renderer, Ajax callback or validation function.

```
apex_plugin_util.debug_page_item (
    p_plugin      => p_plugin,
    p_page_item   => p_page_item,
    p_value       => p_value,
    p_is_readonly => p_is_readonly,
    p_is_printer_friendly => p_is_printer_friendly);
```

27.5 DEBUG_PROCESS Procedure

This procedure writes the data of the process meta data to the debug output if debugging is enabled.

Syntax

```
APEX_PLUGIN_UTIL.DEBUG_PROCESS (
    p_plugin      IN apex_plugin.t_plugin,
    p_process     IN apex_plugin.t_process);
```

Parameters

Table 27-4 DEBUG_PROCESS Parameters

Parameter	Description
p_plugin	This is the p_plugin parameter of your plug-in function.
p_process	This is the p_process parameter of your plug-in function.

Example

This example shows how to collect helpful debug information during the plug-in development cycle to see what values are actually passed into the execution function of the plug-in.

```
apex_plugin_util.debug_process (
    p_plugin      => p_plugin,
    p_process     => p_process);
```

27.6 DEBUG_REGION Procedure Signature 1

This procedure writes the data of the region meta data to the debug output if debugging is enabled.

Syntax

```
APEX_PLUGIN_UTIL.DEBUG_REGION (
    p_plugin      IN apex_plugin.t_plugin,
    p_region     IN apex_plugin.t_region);
```

Parameters

Table 27-5 DEBUG_REGION Signature 1 Parameters

Parameter	Description
p_plugin	This is the p_plugin parameter of your plug-in function.
p_region	This is the p_region parameter of your plug-in function.

Example

This example shows how to collect helpful debug information during the plug-in development cycle to see what values are actually passed into the render function or Ajax callback function of the plug-in.

```
apex_plugin_util.debug_process (
  p_plugin      => p_plugin,
  p_region      => p_region);
```

27.7 DEBUG_REGION Procedure Signature 2

This procedure writes the data of the region meta data to the debug output if debugging is enabled. This is the advanced version of the debugging procedure which is used for the rendering function of a region plug-in.

Syntax

```
APEX_PLUGIN_UTIL.DEBUG_REGION (
  p_plugin      IN apex_plugin.t_plugin,
  p_region      IN apex_plugin.t_region,
  p_is_printer_friendly IN BOOLEAN);
```

Parameters

[Table 27-6](#) (page 27-5) describes the parameters available in the DEBUG_REGION procedure.

Table 27-6 DEBUG_REGION Signature 2 Parameters

Parameter	Description
p_plugin	This is the p_plugin parameter of your plug-in function
p_region	This is the p_region parameter of your plug-in function
p_is_printer_friendly	This is the p_is_printer_friendly parameter of your plug-in function

Example

This example shows how to collect helpful debug information during the plug-in development cycle to see what values are actually passed into the render function or Ajax callback function of the plug-in.

```
apex_plugin_util.debug_region (
  p_plugin      => p_plugin,
```



```
p_region          => p_region,
p_is_printer_friendly => p_is_printer_friendly);
```

27.8 ESCAPE Function

This function is used if you have checked the standard attribute "Has Escape Output Attribute" option for your item type plug-in which allows a developer to decide if the output should be escaped or not.

Syntax

```
APEX_PLUGIN_UTIL.ESCAPE (
    p_value IN VARCHAR2,
    p_escape IN BOOLEAN)
RETURN VARCHAR2;
```

Parameters

Table 27-7 ESCAPE Parameters

Parameter	Description
p_value	This is the value you want to escape depending on the p_escape parameter.
p_escape	If set to TRUE, the return value is escaped. If set to FALSE, the value is not escaped.

Example

This example outputs all values of the array `l_display_value_list` as a HTML list and escapes the value of the array depending on the setting the developer as picked when using the plug-in.

```
for i in 1 .. l_display_value_list.count
loop
    sys.htp.prn (
        '<li>' ||
        apex_plugin_util.escape (
            p_value => l_display_value_list(i),
            p_escape => p_item.escape_output ) ||
        '</li>' );
end loop;
```

27.9 EXECUTE_PLSQL_CODE Procedure

This procedure executes a PL/SQL code block and performs binding of bind variables in the provided PL/SQL code. This procedure is usually used for plug-in attributes of type PL/SQL Code.

Syntax

```
APEX_PLUGIN_UTIL.EXECUTE_PLSQL_CODE (
    p_plsql_code IN VARCHAR2);
```

Parameters

Table 27-8 EXECUTE_PLSQL_CODE Parameters

Parameter	Description
p_plsql_code	PL/SQL code to be executed.

Example

Text which should be escaped and then printed to the HTTP buffer.

```
declare
  l_plsql_code VARCHAR(32767) := p_process.attribute_01;
begin
  apex_plugin_util.execute_plsql_code (
    p_plsql_code => l_plsql_code );
end;
```

27.10 GET_ATTRIBUTE_AS_NUMBER Function

This function returns the value of a plug-in attribute as a number, taking into account NLS decimal separator effective for the current database session. Use this function in plug-in PL/SQL source for custom attributes of type `NUMBER` instead of the built-in `to_number` function.

Syntax

```
APEX_PLUGIN_UTIL.GET_ATTRIBUTE_AS_NUMBER (
  p_value IN VARCHAR2 ),
  p_attribute_label IN VARCHAR2 )
return NUMBER;
```

Parameters

Table 27-9 GET_ATTRIBUTE_AS_NUMBER Function Parameters

Parameter	Description
p_attribute_label	The label of the custom plug-in attribute.
p_value	The value of a custom attribute of type <code>NUMBER</code> .

Example

```
declare
  l_value number;
begin
  -- The following may fail for languages that don't use dot as the NLS decimal
  separator
  l_value := to_number( p_region.attribute_04 );

  -- The following will work correctly regardless of the effective NLS decimal
  separator
  l_value := apex_plugin_util.get_attribute_as_number( p_region.attribute_04,
  'Minimum Amount' );
```

```
end;
/
```

27.11 GET_DATA Function Signature 1

Executes the specified SQL query restricted by the provided search string (optional) and returns the values for each column. All column values are returned as a string, independent of their data types. The search column is identified by providing a column number in the `p_search_column_no` parameter. This function takes into account character value comparison globalization attributes defined for the application.

Syntax

```
APEX_PLUGIN_UTIL.GET_DATA (
    p_sql_statement      IN VARCHAR2,
    p_min_columns       IN NUMBER,
    p_max_columns       IN NUMBER,
    p_component_name    IN VARCHAR2,
    p_search_type       IN VARCHAR2 DEFAULT 2,
    p_search_column_no  IN VARCHAR2 DEFAULT 2,
    p_search_string     IN VARCHAR2 DEFAULT NULL,
    p_first_row        IN NUMBER DEFAULT NULL,
    p_max_rows         IN NUMBER DEFAULT NULL)
RETURN t_column_value_list;
```

Parameters

Table 27-10 GET_DATA Function Signature 1 Parameters

Parameters	Description
<code>p_sql_statement</code>	SQL statement used for the lookup.
<code>p_min_columns</code>	Minimum number of return columns.
<code>p_max_columns</code>	Maximum number of return columns.
<code>p_component_name</code>	In case an error is returned, this is the name of the page item or report column used to display the error message.
<code>p_search_type</code>	Must be one of the <code>c_search_*</code> constants. They are as follows: <code>c_search_contains_case</code> , <code>c_search_contains_ignore</code> , <code>c_search_exact_case</code> , <code>c_search_exact_ignore</code>
<code>p_search_column_no</code>	Number of the column used to restrict the SQL statement. Must be within the <code>p_min_columns</code> through <code>p_max_columns</code> range.
<code>p_search_string</code>	Value used to restrict the query.
<code>p_first_row</code>	Start query at the specified row. All rows before the specified row are skipped.
<code>p_max_rows</code>	Maximum number of return rows allowed.

Return

Table 27-11 GET_DATA Function Signature 1 Return

Return	Description
t_column_value_list	Table of apex_application_global.vc_arr2 indexed by column number.

Example

The following example shows a simple item type plug-in rendering function which executes the LOV defined for the page item and does a case sensitive LIKE filtering with the current value of the page item. The result is then generated as a HTML list.

```
function render_list (
    p_item          in apex_plugin.t_page_item,
    p_value         in varchar2,
    p_is_readonly   in boolean,
    p_is_printer_friendly in boolean )
    return apex_plugin.t_page_item_render_result
is
    l_column_value_list apex_plugin_util.t_column_value_list;
begin
    l_column_value_list :=
        apex_plugin_util.get_data (
            p_sql_statement => p_item.lov_definition,
            p_min_columns   => 2,
            p_max_columns   => 2,
            p_component_name => p_item.name,
            p_search_type    => apex_plugin_util.c_search_contains_case,
            p_search_column_no => 1,
            p_search_string  => p_value );

    sys.htp.p('<ul>');
    for i in 1 .. l_column_value_list(1).count
    loop
        sys.htp.p(
            '<li>' ||
            sys.htf.escape_sc(l_column_value_list(1)(i)) || -- display column
            '-' ||
            sys.htf.escape_sc(l_column_value_list(2)(i)) || -- return column
            '</li>');
    end loop;
    sys.htp.p('</ul>');
end render_list;
```

27.12 GET_DATA Function Signature 2

Executes the specified SQL query restricted by the provided search string (optional) and returns the values for each column. All column values are returned as a string, independent of their data types. The search column is identified by providing a column name in the `p_search_column_name` parameter. This function takes into account character value comparison globalization attributes defined for the application.

Syntax

```
APEX_PLUGIN_UTIL.GET_DATA (
    p_sql_statement      IN VARCHAR2,
    p_min_columns        IN NUMBER,
    p_max_columns        IN NUMBER,
    p_component_name     IN VARCHAR2,
    p_search_type        IN VARCHAR2 DEFAULT NULL,
    p_search_column_name IN VARCHAR2 DEFAULT NULL,
    p_search_string      IN VARCHAR2 DEFAULT NULL,
    p_first_row          IN NUMBER DEFAULT NULL,
    p_max_rows           IN NUMBER DEFAULT NULL)
RETURN t_column_value_list;
```

Parameters

Table 27-12 GET_DATA Function Signature 2 Parameters

Parameters	Description
p_sql_statement	SQL statement used for the lookup.
p_min_columns	Minimum number of return columns.
p_max_columns	Maximum number of return columns.
p_component_name	In case an error is returned, this is the name of the page item or report column used to display the error message.
p_search_type	Must be one of the c_search_* constants. They are as follows: c_search_contains_case, c_search_contains_ignore, c_search_exact_case, c_search_exact_ignore
p_search_column_name	This is the column name used to restrict the SQL statement.
p_search_string	Value used to restrict the query.
p_first_row	Start query at the specified row. All rows before the specified row are skipped.
p_max_rows	Maximum number of return rows allowed.

Return

Table 27-13 GET_TABLE Function Signature 2

Parameter	Description
t_column_value_list	Table of apex_application_global.vc_arr2 indexed by column number.

Example

The following example shows a simple item type plug-in rendering function which executes the LOV defined for the page item and does a case sensitive LIKE filtering with the current value of the page item. The result is then generated as a HTML list.

```
function render_list (
    p_item          in apex_plugin.t_page_item,
    p_value         in varchar2,
    p_is_readonly   in boolean,
    p_is_printer_friendly in boolean )
```

```

        return apex_plugin.t_page_item_render_result
    is
        l_column_value_list apex_plugin_util.t_column_value_list;
    begin
        l_column_value_list :=
            apex_plugin_util.get_data (
                p_sql_statement => p_item.lov_definition,
                p_min_columns   => 2,
                p_max_columns   => 2,
                p_component_name => p_item.name,
                p_search_type    => apex_plugin_util.c_search_contains_case,
                p_search_column_name => 'ENAME',
                p_search_string  => p_value );

        sys.htp.p('<ul>');
        for i in 1 .. l_column_value_list(1).count
        loop
            sys.htp.p(
                '<li>' ||
                sys.htf.escape_sc(l_column_value_list(1)(i)) || -- display column
                '- ' ||
                sys.htf.escape_sc(l_column_value_list(2)(i)) || -- return column
                '</li>');
        end loop;
        sys.htp.p('</ul>');
    end render_list;

```

27.13 GET_DATA2 Function Signature 1

Executes the specified SQL query restricted by the provided search string (optional) and returns the values for each column. All column values are returned along with their original data types. The search column is identified by providing a column number in the `p_search_column_no` parameter. This function takes into account character value comparison globalization attributes defines for the application.

Syntax

```

APEX_PLUGIN_UTIL.GET_DATA2 (
    p_sql_statement      IN VARCHAR2,
    p_min_columns        IN NUMBER,
    p_max_columns        IN NUMBER,
    p_data_type_list     IN WWV_GLOBAL.VC_ARR2 DEFAULT C_EMPTY_DATA_TYPE_LIST,
    p_component_name     IN VARCHAR2,
    p_search_type        IN VARCHAR2 DEFAULT 2,
    p_search_column_no   IN VARCHAR2 DEFAULT 2,
    p_search_string      IN VARCHAR2 DEFAULT NULL,
    p_first_row          IN NUMBER DEFAULT NULL,
    p_max_rows           IN NUMBER DEFAULT NULL)
RETURN t_column_value_list2;

```

Parameters

Table 27-14 GET_DATA2 Parameters

Parameter	Description
<code>p_sql_statement</code>	SQL statement used for the lookup.
<code>p_min_columns</code>	Minimum number of return columns.

Table 27-14 (Cont.) GET_DATA2 Parameters

Parameter	Description
p_max_columns	Maximum number of return columns.
p_data_type_list	If provided, checks to make sure the data type for each column matches the specified data type in the array. Use the constants c_data_type_* for available data types.
p_component_name	In case an error is returned, this is the name of the page item or report column used to display the error message.
p_search_type	Must be one of the c_search_* constants. They are as follows: c_search_contains_case, c_search_contains_ignore, c_search_exact_case, c_search_exact_ignore
p_search_column_no	Number of the column used to restrict the SQL statement. Must be within the p_min_columns through p_max_columns range.
p_search_string	Value used to restrict the query.
p_first_row	Start query at the specified row. All rows before the specified row are skipped.
p_max_rows	Maximum number of return rows allowed.

Return**Table 27-15 GET_DATA2 Return**

Return	Description
t_column_value_list2	Table of t_column_values indexed by column number.

Example

The following example is a simple item type plug-in rendering function which executes the LOV defined for the page item and does a case sensitive LIKE filtering with the current value of the page item. The result is then generated as a HTML list. This time, the first column of the LOV SQL statement is checked if it is of type VARCHAR2 and the second is of type number.

```
function render_list (
    p_item          in apex_plugin.t_page_item,
    p_value         in varchar2,
    p_is_readonly   in boolean,
    p_is_printer_friendly in boolean )
return apex_plugin.t_page_item_render_result
is
    l_data_type_list apex_application_global.vc_arr2;
    l_column_value_list apex_plugin_util.t_column_value_list2;
begin
    -- The first LOV column has to be a string and the second a number
    l_data_type_list(1) := apex_plugin_util.c_data_type_varchar2;
    l_data_type_list(2) := apex_plugin_util.c_data_type_number;
    --
    l_column_value_list :=
        apex_plugin_util.get_data2 (
            p_sql_statement => p_item.lov_definition,
            p_min_columns   => 2,
```

```

        p_max_columns      => 2,
        p_data_type_list   => l_data_type_list,
        p_component_name   => p_item.name,
        p_search_type      => apex_plugin_util.c_search_contains_case,
        p_search_column_no => 1,
        p_search_string    => p_value );
    --
    sys.htp.p('<ul>');
    for i in 1 .. l_column_value_list.count(1)
    loop
        sys.htp.p(
            '<li>' ||
            sys.htf.escape_sc(l_column_value_list(1).value_list(i).varchar2_value) ||
-- display column
            '-' ||
            sys.htf.escape_sc(l_column_value_list(2).value_list(i).number_value) ||
-- return column
            '</li>');
        end loop;
    sys.htp.p('</ul>');
end render_list;

```

The following example is a simple region type plug-in rendering function which executes the SQL query defined for the region. The result is then generated as a HTML list. This example demonstrates the advanced handling of object type columns like SDO_GEOMETRY.

```

function render (
    p_region in apex_plugin.t_region,
    p_plugin in apex_plugin.t_plugin,
    p_is_printer_friendly in boolean )
return apex_plugin.t_region_render_result
is
    l_column_value_list apex_plugin_util.t_column_value_list2;
    l_geometry sdo_geometry;
    l_value varchar2(32767);
    l_dummy pls_integer;
begin
    l_column_value_list :=
        apex_plugin_util.get_data2 (
            p_sql_statement => p_region.source,
            p_min_columns => 1,
            p_max_columns => null,
            p_component_name => p_region.name );
    --
    sys.htp.p('<ul>');
    for row in 1 .. l_column_value_list(1).value_list.count loop

        sys.htp.p('<li>');

        for col in 1 .. l_column_value_list.count loop
            if l_column_value_list(col).data_type = 'SDO_GEOMETRY' then

                -- Object Type columns are always returned using ANYDATA and we have
to
                -- use GETOBJECT to transform them back into the original object type
                l_dummy :=
l_column_value_list(col).value_list(row).anydata_value.getobject(
l_geometry );
                l_value := '( type=' || l_geometry.sdo_gtype || ' srid=' ||
l_geometry.sdo_srid ||

```



```

        case when l_geometry.sdo_point is not null then
            ',x=' || l_geometry.sdo_point.x ||
            ',y=' || l_geometry.sdo_point.y ||
            ',z=' || l_geometry.sdo_point.z
        end ||
        ' ');
    else
        l_value := apex_plugin_util.get_value_as_varchar2(
            p_data_type => l_column_value_list(col).data_type,
            p_value =>
l_column_value_list(col).value_list(row) );
    end if;

    sys.htp.p( case when col > 1 then ' - ' end || l_value );
end loop;

    sys.htp.p('<li>');
end loop;
sys.htp.p('<ul>');

return null;
end;
```

27.14 GET_DATA2 Function Signature 2

Executes the specified SQL query restricted by the provided search string (optional) and returns the values for each column. All column values are returned along with their original data types. The search column is identified by providing a column number in the `p_search_column_no` parameter. This function takes into account character value comparison globalization attributes defines for the application.

Syntax

```

APEX_PLUGIN_UTIL.GET_DATA2 (
    p_sql_statement      IN VARCHAR2,
    p_min_columns        IN NUMBER,
    p_max_columns        IN NUMBER,
    p_data_type_list     IN WWV_GLOBAL.VC_ARR2 DEFAULT C_EMPTY_DATA_TYPE_LIST,
    p_component_name     IN VARCHAR2,
    p_search_type        IN VARCHAR2 DEFAULT 2,
    p_search_column_name IN VARCHAR2 DEFAULT 2,
    p_search_string      IN VARCHAR2 DEFAULT NULL,
    p_first_row          IN NUMBER DEFAULT NULL,
    p_max_rows           IN NUMBER DEFAULT NULL)
RETURN t_column_value_list2;
```

Parameters

Table 27-16 GET_DATA2 Function Signature 2

Parameter	Description
<code>p_sql_statement</code>	SQL statement used for the lookup.
<code>p_min_columns</code>	Minimum number of return columns.
<code>p_max_columns</code>	Maximum number of return columns.

Table 27-16 (Cont.) GET_DATA2 Function Signature 2

Parameter	Description
p_data_type_list	If provided, checks to make sure the data type for each column matches the specified data type in the array. Use the constants c_data_type_* for available data types.
p_component_name	In case an error is returned, this is the name of the page item or report column used to display the error message.
p_search_type	Must be one of the c_search_* constants. They are as follows: c_search_contains_case, c_search_contains_ignore, c_search_exact_case, c_search_exact_ignore
p_search_column_name	The column name used to restrict the SQL statement.
p_search_string	Value used to restrict the query.
p_first_row	Start query at the specified row. All rows before the specified row are skipped.
p_max_rows	Maximum number of return rows allowed.

Return**Table 27-17 GET_DATA2 Function Signature 2 Return**

Parameter	Description
t_column_value_list2	Table of t_column_values indexed by column number.

Example

The following example is a simple item type plug-in rendering function which executes the LOV defined for the page item and does a case sensitive LIKE filtering with the current value of the page item. The result is then generated as a HTML list. This time, the first column of the LOV SQL statement is checked if it is of type VARCHAR2 and the second is of type number.

```
function render_list (
    p_item          in apex_plugin.t_page_item,
    p_value         in varchar2,
    p_is_readonly   in boolean,
    p_is_printer_friendly in boolean )
    return apex_plugin.t_page_item_render_result
is
    l_data_type_list apex_application_global.vc_arr2;
    l_column_value_list apex_plugin_util.t_column_value_list2;
begin
    -- The first LOV column has to be a string and the second a number
    l_data_type_list(1) := apex_plugin_util.c_data_type_varchar2;
    l_data_type_list(2) := apex_plugin_util.c_data_type_number;
    --
    l_column_value_list :=
        apex_plugin_util.get_data2 (
            p_sql_statement => p_item.lov_definition,
            p_min_columns   => 2,
            p_max_columns   => 2,
            p_data_type_list => l_data_type_list,
            p_component_name => p_item.name,
```

```

        p_search_type      => apex_plugin_util.c_search_contains_case,
        p_search_column_name => 'ENAME',
        p_search_string    => p_value );
    --
    sys.htp.p('<ul>');
    for i in 1 .. l_column_value_list.count(1)
    loop
        sys.htp.p(
            '<li>' ||
            sys.htf.escape_sc(l_column_value_list(1).value_list(i).varchar2_value) ||
-- display column
            '-' ||
            sys.htf.escape_sc(l_column_value_list(2).value_list(i).number_value) ||
-- return column
            '</li>');
    end loop;
    sys.htp.p('</ul>');
end render_list;

```

27.15 GET_DISPLAY_DATA Function Signature 1

This function gets the display lookup value for the value specified in `p_search_string`.

Syntax

```

APEX_PLUGIN_UTIL.GET_DISPLAY_DATA (
    p_sql_statement      IN VARCHAR2,
    p_min_columns       IN NUMBER,
    p_max_columns       IN NUMBER,
    p_component_name    IN VARCHAR2,
    p_display_column_no IN BINARY_INTEGER DEFAULT 1,
    p_search_column_no  IN BINARY_INTEGER DEFAULT 2,
    p_search_string     IN VARCHAR2 DEFAULT NULL,
    p_display_extra     IN BOOLEAN DEFAULT TRUE)
RETURN VARCHAR2;

```

Parameters

Table 27-18 GET_DISPLAY_DATA Signature 1 Parameters

Parameter	Description
<code>p_sql_statement</code>	SQL statement used for the lookup.
<code>p_min_columns</code>	Minimum number of return columns.
<code>p_max_columns</code>	Maximum number of return columns.
<code>p_component_name</code>	In case an error is returned, this is the name of the page item or report column used to display the error message.
<code>p_display_column_no</code>	Number of the column returned from the SQL statement. Must be within the <code>p_min_columns</code> through <code>p_max_columns</code> range.
<code>p_search_column_no</code>	Number of the column used to restrict the SQL statement. Must be within the <code>p_min_columns</code> through <code>p_max_columns</code> range.
<code>p_search_string</code>	Value used to restrict the query.
<code>p_display_extra</code>	If set to <code>TRUE</code> , and a value is not found, the search value is added to the result instead.

Return**Table 27-19 GET_DISPLAY_DATA Signature 1 Return**

Return	Description
VARCHAR2	Value of the first record of the column specified by <code>p_display_column_no</code> . If no record was found it contains the value of <code>p_search_string</code> if the parameter <code>p_display_extra</code> is set to TRUE. Otherwise NULL is returned.

Example

The following example does a lookup with the value provided in `p_value` and returns the display column of the LOV query.

```
function render_value (
    p_item          in apex_plugin.t_page_item,
    p_value         in varchar2,
    p_is_readonly   in boolean,
    p_is_printer_friendly in boolean )
    return apex_plugin.t_page_item_render_result
is
begin
    sys.htp.p(sys.htf.escape_sc(
        apex_plugin_util.get_display_data (
            p_sql_statement => p_item.lov_definition,
            p_min_columns  => 2,
            p_max_columns  => 2,
            p_component_name => p_item.name,
            p_display_column_no => 1,
            p_search_column_no => 2,
            p_search_string  => p_value )));
end render_value;
```

27.16 GET_DISPLAY_DATA Function Signature 2

This function looks up all the values provided in the `p_search_value_list` instead of just a single value lookup.

Syntax

```
APEX_PLUGIN_UTIL.GET_DISPLAY_DATA (
    p_sql_statement    IN VARCHAR2,
    p_min_columns     IN NUMBER,
    p_max_columns     IN NUMBER,
    p_component_name  IN VARCHAR2,
    p_display_column_no IN BINARY_INTEGER DEFAULT 1,
    p_search_column_no IN BINARY_INTEGER DEFAULT 2,
    p_search_value_list IN ww_flow_global.vc_arr2,
    p_display_extra   IN BOOLEAN DEFAULT TRUE)
RETURN apex_application_global.vc_arr2;
```

Parameters

Table 27-20 GET_DISPLAY_DATA Signature 2 Parameters

Parameter	Description
<code>p_sql_statement</code>	SQL statement used for the lookup.
<code>p_min_columns</code>	Minimum number of return columns.
<code>p_max_columns</code>	Maximum number of return columns.
<code>p_component_name</code>	In case an error is returned, this is the name of the page item or report column used to display the error message.
<code>p_display_column_no</code>	Number of the column returned from the SQL statement. Must be within the <code>p_min_columns</code> through <code>p_max_columns</code> range.
<code>p_search_column_no</code>	Number of the column used to restrict the SQL statement. Must be within the <code>p_min_columns</code> through <code>p_max_columns</code> range.
<code>p_search_value_list</code>	Array of values to look up.
<code>p_display_extra</code>	If set to <code>TRUE</code> , and a value is not found, the search value is added to the result instead.

Return

Table 27-21 GET_DISPLAY_DATA Signature 2 Return

Return	Description
<code>apex_application_global.vc_arr2</code>	List of VARCHAR2 indexed by <code>pls_integer</code> . For each entry in <code>p_search_value_list</code> the resulting array contains the value of the first record of the column specified by <code>p_display_column_no</code> in the same order as in <code>p_search_value_list</code> . If no record is found it contains the value of <code>p_search_string</code> if the parameter <code>p_display_extra</code> is set to <code>TRUE</code> . Otherwise the value is skipped.

Example

Looks up the values 7863, 7911 and 7988 and generates a HTML list with the value of the corresponding display column in the LOV query.

```
function render_list (
    p_plugin          in apex_plugin.t_plugin,
    p_item            in apex_plugin.t_page_item,
    p_value           in varchar2,
    p_is_readonly     in boolean,
    p_is_printer_friendly in boolean )
    return apex_plugin.t_page_item_render_result
is
    l_search_list apex_application_global.vc_arr2;
    l_result_list apex_application_global.vc_arr2;
begin
    l_search_list(1) := '7863';
    l_search_list(2) := '7911';
    l_search_list(3) := '7988';
    --
    l_result_list :=
```

```

apex_plugin_util.get_display_data (
    p_sql_statement      => p_item.lov_definition,
    p_min_columns       => 2,
    p_max_columns       => 2,
    p_component_name    => p_item.name,
    p_search_column_no  => 1,
    p_search_value_list => l_search_list );
--
sys.htp.p('<ul>');
for i in 1 .. l_result_list.count
loop
    sys.htp.p(
        '<li>' ||
        sys.htf.escape_sc(l_result_list(i)) ||
        '</li>');
end loop;
sys.htp.p('</ul>');
end render_list;

```

27.17 GET_ELEMENT_ATTRIBUTES Function

This function returns some of the standard attributes of an HTML element (for example, id, name, required, placeholder, aria-error-attributes, class) which is used if a HTML input/select/textarea/... tag is generated to get a consistent set of attributes.

Syntax

```

APEX_PLUGIN_UTIL.GET_ELEMENT_ATTRIBUTES (
    p_item in apex_plugin.t_page_item,
    p_name in varchar2 default null,
    p_default_class in varchar2 default null,
    p_add_id in boolean default true,
    p_add_labelledby in boolean default true
    p_aria_describedby_id in varchar2 default null )
return varchar2;

```

Parameters

Table 27-22 GET_ELEMENT_ATTRIBUTES Function Parameters

Parameters	Description
p_item	This is the p_item parameter of your plug-in function.
p_name	This is the value which has been return by apex_plugin.get_input_name_or_page_item
p_default_class	Default CSS class which which should be contained in the result string.
p_add_id	If set to TRUE then the id attribute is also contained in the result string.

Table 27-22 (Cont.) GET_ELEMENT_ATTRIBUTES Function Parameters

Parameters	Description
p_add_labelled_by	Returns some of the general attributes of an HTML element (for example, the ID, name, required, placeholder, aria-error-attributes, class) which should be used if an HTML input, select, or textarea tag is generated to get a consistent set of attributes. Set to FALSE if you render a HTML input element like input, select, or textarea which does not require specifying the aria-labelledby attribute because the label's <code>for</code> attribute works for those HTML input elements. Set it to TRUE for all 'non-standard form element widgets (that is, those using div, span, and so on.) which do allow focus to make them accessible to screen readers. Note: Inclusion of aria-labelledby is also dependent on the item plug-in having Standard Form Element set to No and that there is a #LABEL_ID# substitution defined in the item's corresponding label template.
p_aria_describedby_id	Pass additional IDs here that you would like <code>get_element_attributes</code> to include in the value it renders for the 'aria-describedby' attribute on the form element. This can be useful if you would like to convey additional information to users of Assistive Technology, when they are focused on the form field.

Example

This example emits an INPUT tag of type text which uses `apex_plugin_util.get_element_attributes` to automatically include the most common attributes.

```
sys.http.prn (
    '<input type="text" ' ||
    apex_plugin_util.get_element_attributes(p_item, l_name, 'text_field') ||
    'value="' || l_escaped_value || '"' ||
    'size="' || p_item.element_width || '"' ||
    'maxlength="' || p_item.element_max_length || '"' ||
    ' />');
```

27.18 GET_PLSQL_EXPRESSION_RESULT Function

This function executes a PL/SQL expression and returns a result. This function also performs the binding of any bind variables in the provided PL/SQL expression. This function is usually used for plug-in attributes of type PL/SQL Expression.

Syntax

```
APEX_PLUGIN_UTIL.GET_PLSQL_EXPRESSION_RESULT (
    p_plsql_expression IN VARCHAR2)
RETURN VARCHAR2;
```

Parameters

Table 27-23 GET_PLSQL_EXPRESSION_RESULT Parameters

Parameter	Description
p_plsql_expression_result	A PL/SQL expression that returns a string.

Return

Table 27-24 GET_PLSQL_EXPRESSION_RESULT Return

Return	Description
VARCHAR2	String result value returned by the PL/SQL Expression.

Example

This example executes and returns the result of the PL/SQL expression which is specified in `attribute_03` of an item type plug-in attribute of type "PL/SQL Expression".

```
l_result := apex_plugin_util.get_plsql_expression_result (
    p_plsql_expression => p_item.attribute_03 );
```

27.19 GET_PLSQL_FUNCTION_RESULT Function

This function executes a PL/SQL function block and returns the result. This function also performs binding of bind variables in the provided PL/SQL Function Body. This function is usually used for plug-in attributes of type PL/SQL Function Body.

Syntax

```
APEX_PLUGIN_UTIL.GET_PLSQL_FUNCTION_RESULT (
    p_plsql_function IN VARCHAR2)
RETURN VARCHAR2;
```

Parameters

Table 27-25 GET_PLSQL_FUNCTION_RESULT Parameters

Parameter	Description
p_plsql_function	A PL/SQL function block that returns a result of type string.

Return

Table 27-26 GET_PLSQL_FUNCTION_RESULT Return

Return	Description
VARCHAR2	String result value returned by the PL/SQL function block.

Example

The following example executes and returns the result of the PL/SQL function body that is specified in `attribute_03` of an item type plug-in attribute of type PL/SQL Function Body.

```
l_result := apex_plugin_util.get_plsql_function_result (
    p_plsql_function => p_item.attribute_03 );
```

27.20 GET_POSITION_IN_LIST Function

This function returns the position in the list where `p_value` is stored. If it is not found, null is returned.

Syntax

```
APEX_PLUGIN_UTIL.GET_POSITION_IN_LIST(
    p_list IN apex_application_global.vc_arr2,
    p_value IN VARCHAR2)
RETURN NUMBER;
```

Parameters**Table 27-27 GET_POSITION_IN_LIST Parameters**

Parameter	Description
<code>p_list</code>	Array of type <code>apex_application_global.vc_arr2</code> that contains entries of type <code>VARCHAR2</code> .
<code>p_value</code>	Value located in the <code>p_list</code> array.

Return**Table 27-28 GET_POSITION_IN_LIST Return**

Return	Description
NUMBER	Returns the position of <code>p_value</code> in the array <code>p_list</code> . If it is not found <code>NULL</code> is returned.

Example

The following example searches for "New York" in the provided list and returns 2 into `l_position`.

```
declare
    l_list apex_application_global.vc_arr2;
    l_position number;
begin
    l_list(1) := 'Rome';
    l_list(2) := 'New York';
    l_list(3) := 'Vienna';

    l_position := apex_plugin_util.get_position_in_list (
        p_list => l_list,
```

```

                                p_value => 'New York' );
end;
```

27.21 GET_SEARCH_STRING Function

Based on the provided value in `p_search_type` the passed in value of `p_search_string` is returned unchanged or is converted to uppercase. Use this function with the `p_search_string` parameter of `get_data` and `get_data2`.

Syntax

```

APEX_PLUGIN_UTIL.GET_SEARCH_STRING(
    p_search_type IN VARCHAR2,
    p_search_string IN VARCHAR2)
RETURN VARCHAR2;
```

Parameters

Table 27-29 GET_SEARCH_STRING Parameters

Parameter	Description
<code>p_search_type</code>	Type of search when used with <code>get_data</code> and <code>get_data2</code> . Use one of the <code>c_search_*</code> constants.
<code>p_search_string</code>	Search string used for the search with <code>get_data</code> and <code>get_data2</code> .

Return

Table 27-30 GET_SEARCH_STRING Return

Return	Description
VARCHAR2	Returns <code>p_search_string</code> unchanged or in uppercase if <code>p_search_type</code> is of type <code>c_search_contains_ignore</code> or <code>c_search_exact_ignore</code> .

Example

This example uses a call to `get_data` or `get_data2` to make sure the search string is using the correct case.

```

l_column_value_list :=
  apex_plugin_util.get_data (
    p_sql_statement => p_item.lov_definition,
    p_min_columns  => 2,
    p_max_columns  => 2,
    p_component_name => p_item.name,
    p_search_type   => apex_plugin_util.c_search_contains_ignore,
    p_search_column_no => 1,
    p_search_string => apex_plugin_util.get_search_string (
      p_search_type => apex_plugin_util.c_search_contains_ignore,
      p_search_string => p_value ) );
```

27.22 GET_VALUE_AS_VARCHAR2 Function

This function can be used if you use `GET_DATA2` to read the column values along with their original data types. It will convert and return the passed in `p_value` as `VARCHAR2`.

Syntax

```
function get_value_as_varchar2 (
  p_data_type in varchar2,
  p_value in t_value,
  p_format_mask in varchar2 default null )
return varchar2;
```

Parameters

Table 27-31 GET_VALUE_AS_VARCHAR2 Function Parameters

Parameter	Description
<code>p_data_type</code>	The data type of the value stored in <code>p_value</code> .
<code>p_value</code>	The value of type <code>t_value</code> which contains the value to be converted and returned as <code>VARCHAR2</code> .
<code>p_format_mask</code>	The format mask used to convert the value into a <code>VARCHAR2</code> .

Example

The following example emits all values stored in the data type aware `l_column_value_list` array as `VARCHAR2`.

```
declare
  l_column_value_list apex_plugin_util.t_column_value_list2;
begin
  -- Populate l_column_value_list by calling apex_plugin_util.get_data2
  ...
  -- Emit returned data
  sys.htp.p( '<table>' );
  for l_row in 1 .. l_column_value_list( 1 ).value_list.count
  loop
    sys.htp.p( '<tr>' );
    for l_column in 1 .. l_column_value_list.count loop
      sys.htp.p (
        '<td>' ||
        apex_plugin_util.get_value_as_varchar2 (
          p_data_type => l_column_value_list( l_column ).data_type,
          p_value => l_column_value_list( l_column ).value_list( l_row )
        ) ||
        '</td>' );
    end loop;
    sys.htp.p( '</tr>' );
  end loop;
  sys.htp.p( '</table>' );
end;
```

27.23 IS_EQUAL Function

This function returns `TRUE` if both values are equal and `FALSE` if not. If both values are `NULL`, `TRUE` is returned.

Syntax

```
APEX_PLUGIN_UTIL.IS_EQUAL (  
    p_value1 IN VARCHAR2  
    p_value2 IN VARCHAR2)  
RETURN BOOLEAN;
```

Parameters

Table 27-32 IS_EQUAL Parameters

Parameter	Description
<code>p_value1</code>	First value to compare.
<code>p_value2</code>	Second value to compare.

Return

Table 27-33 IS_EQUAL Return

Return	Description
<code>BOOLEAN</code>	Returns <code>TRUE</code> if both values are equal or both values are <code>NULL</code> , otherwise it returns <code>FALSE</code> .

Example

In the following example, if the value in the database is different from what is entered, the code in the if statement is executed.

```
if NOT apex_plugin_util.is_equal(l_database_value, l_current_value) then  
    -- value has changed, do something  
    null;  
end if;
```

27.24 PAGE_ITEM_NAMES_TO_JQUERY Function

This function returns a jQuery selector based on a comma delimited string of page item names. For example, you could use this function for a plug-in attribute called "Page Items to Submit" where the JavaScript code has to read the values of the specified page items.

Syntax

```
APEX_PLUGIN_UTIL.PAGE_ITEM_NAMES_TO_JQUERY (  
    p_page_item_names IN VARCHAR2)  
RETURN VARCHAR2;
```

Parameters

Table 27-34 PAGE_ITEM_NAMES_TO_JQUERY Parameters

Parameter	Description
p_page_item_names	Comma delimited list of page item names.

Return

Table 27-35 PAGE_ITEM_NAMES_TO_JQUERY Return

Return	Description
VARCHAR2	Transforms the page items specified in p_page_item_names into a jQuery selector.

Example

The following example shows the code to construct the initialization call for a JavaScript function called `myOwnWidget`. This function gets an object with several attributes where one attribute is `pageItemsToSubmit` which is expected to be a jQuery selector.

```
apex_javascript.add_onload_code (
    p_code => 'myOwnWidget('||
        '"#'||p_item.name||"', '||
        '{' ||
        apex_javascript.add_attribute('ajaxIdentifier',
apex_plugin.get_ajax_identifier)||
        apex_javascript.add_attribute('dependingOnSelector',
apex_plugin_util.page_item_names_to_jquery(p_item.lov_cascade_parent_items))||
        apex_javascript.add_attribute('optimizeRefresh',
p_item.ajax_optimize_refresh)||
        apex_javascript.add_attribute('pageItemsToSubmit',
apex_plugin_util.page_item_names_to_jquery(p_item.ajax_items_to_submit))||
        apex_javascript.add_attribute('nullValue',
p_item.lov_null_value, false, false)||
        '});' );
```

27.25 PRINT_DISPLAY_ONLY Procedure

This procedure outputs a SPAN tag for a display only field.

Syntax

```
APEX_PLUGIN_UTIL.PRINT_DISPLAY_ONLY (
    p_item_name          IN VARCHAR2,
    p_display_value      IN VARCHAR2,
    p_show_line_breaks  IN BOOLEAN,
    p_attributes         IN VARCHAR2,
    p_id_postfix         IN VARCHAR2 DEFAULT '_DISPLAY');
```

Parameters

Table 27-36 PRINT_DISPLAY_ONLY Parameter

Parameter	Description
p_item_name	Name of the page item. This parameter should be called with p_item.name.
p_display_value	Text to be displayed.
p_show_line_breaks	If set to TRUE line breaks in p_display_value are changed to so that the browser renders them as line breaks.
p_attributes	Additional attributes added to the SPAN tag.
p_id_postfix	Postfix which is getting added to the value in p_item_name to get the ID for the SPAN tag. Default is _DISPLAY.

Example

The following code could be used in an item type plug-in to render a display only page item.

```
apex_plugin_util.print_display_only (
  p_item_name      => p_item.name,
  p_display_value  => p_value,
  p_show_line_breaks => false,
  p_escape         => true,
  p_attributes     => p_item.element_attributes );
```

27.26 PRINT_ESCAPED_VALUE Procedure

This procedure outputs the value in an escaped form and chunks big strings into smaller outputs.

Syntax

```
APEX_PLUGIN_UTIL.PRINT_ESCAPED_VALUE (
  p_value IN VARCHAR2);
```

Parameters

Table 27-37 PRINT_ESCAPED_VALUE Parameter

Parameter	Description
p_value	Text which should be escaped and then printed to the HTTP buffer.

Example

Prints a hidden field with the current value of the page item.

```
sys.http.prn('<input type="hidden" name="'||l_name||'" id="'||p_item_name||'"
value="');
print_escaped_value(p_value);
sys.http.prn('>');
```

27.27 PRINT_HIDDEN_IF_READONLY Procedure

This procedure outputs a hidden field to store the page item value if the page item is rendered as readonly and is not printer friendly. If this procedure is called in an item type plug-in, the parameters of the plug-in interface should directly be passed in.

Syntax

```
APEX_PLUGIN_UTIL.PRINT_HIDDEN_IF_READ_ONLY (
  p_item_name  IN VARCHAR2,
  p_value      IN VARCHAR2,
  p_is_readonly IN BOOLEAN,
  p_is_printer_friendly IN BOOLEAN,
  p_id_postfix IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 27-38 PRINT_HIDDEN_IF_READONLY Parameters

Parameter	Description
p_item_name	Name of the page item. For this parameter the p_item.name should be passed in.
p_value	Current value of the page item. For this parameter p_value should be passed in.
p_is_readonly	Is the item rendered readonly. For this parameter p_is_readonly should be passed in.
p_is_printer_friendly	Is the item rendered in printer friendly mode. For this parameter p_is_printer_friendly should be passed in.
p_id_postfix	Used to generate the ID attribute of the hidden field. It is build based on p_item_name and the value in p_id_postfix.

Example

Writes a hidden field with the current value to the HTTP output if p_is_readonly is TRUE and p_printer_friendly is FALSE.

```
apex_plugin_util.print_hidden_if_readonly (
  p_item_name      => p_item.name,
  p_value          => p_value,
  p_is_readonly    => p_is_readonly,
  p_is_printer_friendly => p_is_printer_friendly );
```

27.28 PRINT_JSON_HTTP_HEADER Procedure

This procedure outputs a standard HTTP header for a JSON output.

Syntax

```
APEX_PLUGIN_UTIL.PRINT_JSON_HTTP_HEADER;
```

Parameters

None.

Example

This example shows how to use this procedure in the Ajax callback function of a plugin. This code outputs a JSON structure in the following format: [{"d":"Display 1","r":"Return 1"}, {"d":"Display 2","r":"Return 2"}]

```

-- Write header for the JSON stream.
apex_plugin_util.print_json_http_header;
-- initialize the JSON structure
sys.htp.p('');
-- loop through the value array
for i in 1 .. l_values.count
loop
  -- add array entry
  sys.htp.p (
    case when i > 1 then ',' end||
    '{' ||
    apex_javascript.add_attribute('d',
sys.htf.escape_sc(l_values(i).display_value), false, true)||
    apex_javascript.add_attribute('r',
sys.htf.escape_sc(l_values(i).return_value), false, false)||
    '}' );
end loop;
-- close the JSON structure
sys.htp.p('');

```

27.29 PRINT_LOV_AS_JSON Procedure

This procedure outputs a JSON response based on the result of a two column LOV in the format:

```
[{"d":"display","r":"return"}, {"d": "...", "r": "..."}, ...]
```

Note:

The HTTP header is initialized with MIME type "application/json" as well.

Syntax

```

APEX_PLUGIN_UTIL.PRINT_LOV_AS_JSON (
  p_sql_statement          IN VARCHAR2,
  p_component_name        IN VARCHAR2,
  p_escape                 IN BOOLEAN,
  p_replace_substitutions IN BOOLEAN DEFAULT FALSE);

```


Parameters

Table 27-39 PRINT_LOV_AS_JSON Parameters

Parameter	Description
p_sql_statement	A SQL statement which returns two columns from the SELECT.
p_component_name	The name of the page item or report column that is used in case an error is displayed.
p_escape	If set to TRUE the value of the display column is escaped, otherwise it is output as is.
p_replace_substitutions	If set to TRUE, apex_plugin_util.replace_substitutions is called for the value of the display column, otherwise, it is output as is.

Example

This example shows how to use the procedure in an Ajax callback function of an item type plug-in. The following call writes the LOV result as a JSON array to the HTTP output.

```
apex_plugin_util.print_lov_as_json (
  p_sql_statement => p_item.lov_definition,
  p_component_name => p_item.name,
  p_escape        => true );
```

27.30 PRINT_OPTION Procedure

This procedure outputs an OPTION tag.

Syntax

```
APEX_PLUGIN_UTIL.PRINT_OPTION (
  p_display_value      IN VARCHAR2,
  p_return_value       IN VARCHAR2,
  p_is_selected        IN BOOLEAN,
  p_attributes         IN VARCHAR2,
  p_escape             IN BOOLEAN DEFAULT TRUE);
```

Parameters

Table 27-40 PRINT_OPTION Parameters

Parameter	Description
p_display_value	Text which is displayed by the option.
p_return_value	Value which is set when the option is picked.
p_is_selected	Set to TRUE if the selected attribute should be set for this option.
p_attributes	Additional HTML attributes which should be set for the OPTION tag.

Table 27-40 (Cont.) PRINT_OPTION Parameters

Parameter	Description
p_escape	Set to TRUE if special characters in p_display_value should be escaped.

Example

The following example could be used in an item type plug-in to create a SELECT list. Use apex_plugin_util.is_equal to find out which list entry should be marked as current.

```
sys.htp.p('<select id=""||p_item.name||" size=""||nvl(p_item.element_height, 5)||"
'||coalesce(p_item.element_attributes, 'class="new_select_list"')||'>');
-- loop through the result and add list entries
for i in 1 .. l_values.count
loop
  apex_plugin_util.print_option (
    p_display_value => l_values(i).display_value,
    p_return_value  => l_values(i).return_value,
    p_is_selected   => apex_plugin_util.is_equal(l_values(i).return_value,
p_value),
    p_attributes    => p_item.element_option_attributes,
    p_escape        => true );
end loop;
sys.htp.p('</select>');
```

27.31 REPLACE_SUBSTITUTIONS Function

This function replaces any &ITEM. substitution references with their actual value. If p_escape is set to TRUE, any special characters contained in the value of the referenced item are escaped to prevent Cross-site scripting (XSS) attacks.

Syntax

```
apex_plugin_util.replace_substitutions (
  p_value   in varchar2,
  p_escape  in boolean default true )
return varchar2;
```

Parameters**Table 27-41 REPLACE_SUBSTITUTION Parameters**

Parameter	Description
p_value	This value is a string which can contain several &ITEM. references which are replaced by their actual page item values.
p_escape	If set to TRUE any special characters contained in the value of the referenced item are escaped to prevent Cross-site scripting (XSS) attacks. If set to FALSE, the referenced items are not escaped.

Example

The following example replaces any substitution syntax references in the region plug-in `attribute_05` with their actual values. Any special characters in the values are escaped.

```
l_advanced_formatting := apex_plugin_util.replace_substitutions (
    p_value => p_region.attribute_05,
    p_escape => true );
```

27.32 SET_COMPONENT_VALUES Procedure

This procedure extends `Session State` to include the column values of a specific row number. By doing so, columns can be referenced using `substitution syntax` or the `v` function in the same way as you can reference page or application items.



Note:

Always call `apex_plugin_util.clear_component_values` after you are done processing the current row!

Syntax

```
procedure set_component_values (
    p_column_value_list in t_column_list,
    p_row_num           in pls_integer );
```

Parameters

Table 27-42 SET_COMPONENT_VALUES Parameters

Parameter	Description
<code>p_column_value_list</code>	Table of <code>t_column_values</code> returned by the call to <code>apex_plugin_util.get_data2</code> .
<code>p_row_num</code>	Row number in <code>p_column_value_list</code> for which the column values should be set in <code>Session State</code> .

Example

This example is the skeleton of a simple item type plug-in rendering function which renders a link list based on a provided SQL query. Instead of a fixed SQL query format where the first column contains the link and the second contains the link label, it allows a developer using this plug-in to enter any SQL statement and then use substitution syntax to reference the values of the executed SQL query.

```
function render_link_list (
    p_item           in apex_plugin.t_page_item,
    p_value          in varchar2,
    p_is_readonly    in boolean,
    p_is_printer_friendly in boolean )
return apex_plugin.t_page_item_render_result
is
```

```
-- The link target plug-in attribute 01 would allow that a developer can enter a
link which references columns
-- of the provided SQL query using substitution syntax.
-- For example: f?p=&APP_ID.:1:&APP_SESSION.::&DEBUG.::P1_EMPNO:&EMPNO.
-- where &EMPNO. references the column EMPNO in the SQL query.
c_link_target      constant varchar2(4000) := p_item.attribute_01;
-- The link label column plug-in attribute 02 would allow a developer to
reference a column of the SQL query
-- which should be used as the text for the link.
c_link_label_column constant varchar2(128) := p_item.attribute_02;
--
l_column_value_list apex_plugin_util.t_column_value_list2;
begin
  l_column_value_list :=
    apex_plugin_util.get_data2 (
      p_sql_statement =>
        ... );
  --
  sys.htp.p('<ul>');
  for i in 1 .. l_column_value_list.count(1)
  loop
    -- Set all column values of the current row
    apex_plugin_util.set_component_values (
      p_column_value_list => l_column_value_list,
      p_row_num           => i );
    --
    sys.htp.p(
      '<li><a href="' ||
      apex_escape.html_attribute( apex_util.prepare_url( c_link_target )) ||
      '>' ||
      apex_escape.html( v( c_link_label_column )) ||
      '</a></li>');
    --
    apex_plugin_util.clear_component_values;
  end loop;
  sys.htp.p('<ul>');
end;
```

28

APEX_REGION

The `APEX_REGION` package is the public API for handling regions.

- [IS_READ_ONLY Function](#) (page 28-1)
- [PURGE_CACHE Procedure](#) (page 28-1)

28.1 IS_READ_ONLY Function

This function returns `TRUE` if the current region is rendered read-only and `FALSE` if region is not rendered read-only. If the function is called from a context where no region is currently processed, it returns `NULL`. For example, you can use this function in conditions of a region or its underlying items and buttons.

Syntax

```
FUNCTION IS_READ_ONLY  
RETURN BOOLEAN;
```

Parameters

None.

Example

This examples purges the session for a specific region cache for the whole application.

```
RETURN APEX_REGION.IS_READ_ONLY;
```

28.2 PURGE_CACHE Procedure

This procedure purges the region cache of the specified application, page, and region.

Syntax

```
PROCEDURE PURGE_CACHE (  
    p_application_id IN NUMBER DEFAULT apex.g_flow_id,  
    p_page_id        IN NUMBER DEFAULT NULL,  
    p_region_id      IN NUMBER DEFAULT NULL,  
    p_current_session_only IN BOOLEAN DEFAULT FALSE );
```

Parameters

Table 28-1 PURGE_CACHE Parameters

Parameter	Description
<code>p_application_id</code>	ID of the application where the region caches should be purged. Defaults to the current application.

Table 28-1 (Cont.) PURGE_CACHE Parameters

Parameter	Description
p_page_id	ID of the page where the region caches should be purged. If no value is specified (which is the default), all regions of the application are purged.
p_region_id	ID of a specific region on a page. If no value is specified, all regions of the specified page are purged.
p_current_session_only	Specify true if you only want to purge entries that were saved for the current session. Defaults to false.

Example

This example purges session specific region cache for the whole application.

```
BEGIN
  APEX_REGION.PURGE_CACHE (
    p_current_session_only => true );
END;
```

29

APEX_SESSION

The package enables you to configure Application Express sessions.

- [SET_DEBUG Procedure](#) (page 29-4)
- [SET_TRACE Procedure](#) (page 29-4)
- [CREATE_SESSION Procedure](#) (page 29-1)
- [DELETE_SESSION Procedure](#) (page 29-2)
- [ATTACH Procedure](#) (page 29-2)
- [DETACH Procedure](#) (page 29-3)

29.3 CREATE_SESSION Procedure

This procedure creates a new session for the given application, set environment and run the application's Initialization PL/SQL Code.

Syntax

```
procedure create_session (  
    p_app_id in number,  
    p_page_id in number,  
    p_username in varchar2 );
```

Parameters

Table 29-1 CREATE_SESSION Procedure Parameters

Parameters	Description
p_app_id	The application id.
p_page_id	The application page.
p_username	The session user.

Raises

WWV_FLOW.APP_NOT_FOUND_ERR: The application does not exist or the caller has no access to the workspace.

Example

This example creates a session for EXAMPLE USER in application 100 page 1, then print the app id and session id.

```
begin  
    apex_session.create_session (  
        p_app_id => 100,  
        p_page_id => 1,  
        p_username => 'EXAMPLE USER' );
```

```
sys.dbms_output.put_line (
  'App is '||v('APP_ID)||', session is '||v('APP_SESSION')');
end;
```

29.4 DELETE_SESSION Procedure

This procedure deletes the session with the given ID. If the session is currently attached, call the application's Cleanup PL/SQL Code and reset the environment. This procedure does nothing if the given session does not exist or if the caller can not access the session's workspace.

Syntax

```
procedure delete_session (
  p_session_id in number default wwv_flow.g_instance );
```

Parameters

Table 29-2 DELETE_SESSION Procedure Parameters

Parameters	Description
p_session_id	The session id.

Raises

- APEX.SESSION.EXPIRED: The session does not exist.
- SECURITY_GROUP_ID_INVALID: Current workspace does not match session workspace.

Example

Delete session 12345678.

```
begin
  apex_session.delete_session (
    p_session_id => 12345678 );
end;
```

29.5 ATTACH Procedure

This procedure based on the given application and session current, sets environment and runs the Initialization PL/SQL Code.

Syntax

```
procedure attach (
  p_app_id      in number,
  p_page_id     in number,
  p_session_id  in number );
```


Parameters

Table 29-3 Attach Procedure Parameters

Parameters	Description
p_app_id	The application id.
p_page_id	The application page.
p_session_id	The session id.

Raises

- `WWV_FLOW.APP_NOT_FOUND_ERR`: Application does not exist or caller has no access to the workspace.
- `APEX.SESSION.EXPIRED`: The session does not exist.
- `SECURITY_GROUP_ID_INVALID`: Current workspace does not match session workspace.

Example

Attach to session 12345678 for application 100 page 1, then print the app id and session id.

```
begin
  apex_session.attach (
    p_app_id      => 100,
    p_page_id     => 1,
    p_session_id => 12345678 );
  sys.dbms_output.put_line (
    'App is '||v('APP_ID')||', session is '||v('APP_SESSION'));
end;
```

29.6 DETACH Procedure

This procedure detaches from the current session, resets the environment and runs the application's Cleanup PL/SQL Code. This procedure does nothing if no session is attached.

Syntax

```
procedure detach;
```

Example

Detach from the current session..

```
begin
  apex_session.detach;
end;
```

29.1 SET_DEBUG Procedure

This procedure sets debug level for all future requests in a session.

Syntax

```
procedure set_debug (  
    p_session_id in number default apex.g_instance,  
    p_level in apex_debug_api.t_log_level );
```

Parameters

Table 29-4 SET_DEBUG Procedure Parameters

Parameters	Description
p_session_id	The session id. Note : The session must belong to the current workspace or the caller must be able to set the session's workspace.
p_level	The debug level. NULL disables debug, 1-9 sets a debug level.

Example 1

This example shows how to set debug for session 1234 to INFO level.

```
apex_session.set_debug (  
    p_session_id => 1234,  
    p_level => apex_debug.c_log_level_info );  
commit;
```

Example 2

This example shows how to disable debug in session 1234.

```
apex_session.set_debug (  
    p_session_id => 1234,  
    p_level => null );  
commit;
```

29.2 SET_TRACE Procedure

This procedure sets trace mode in all future requests of a session.

Syntax

```
procedure set_trace (  
    p_session_id in number default apex.g_instance,  
    p_mode in varchar2 );
```

Parameters

Table 29-5 SET_TRACE Procedure Parameters

Parameters	Description
p_session_id	The session id. Note : The session must belong to the current workspace or the caller must be able to set the session's workspace.
p_level	The trace mode. NULL disables trace, SQL enables SQL trace.

Example 1

This example shows how to enable trace in requests for session 1234.

```
apex_session.set_trace (  
    p_session_id => 1234,  
    p_mode => 'SQL' );  
commit;
```

Example 2

This example shows how to disable trace in requests for session 1234.

```
apex_session.set_trace (  
    p_session_id => 1234,  
    p_mode => null );  
commit;
```

30

APEX_SPATIAL

This package enables you to use Oracle Locator and the Spatial Option within Application Express. In an Application Express context, the logon user of the database session is typically `APEX_PUBLIC_USER` or `ANONYMOUS`. Spatial developers can not directly use DML on `USER_SDO_GEOM_METADATA` within such a session, for example, in SQL Commands within SQL Workshop. The Spatial view's trigger performs DML as the logon user, but it has to run as the application owner or workspace user. With the `APEX_SPATIAL` API, developers can use the procedures and functions below to insert, update and delete rows of `USER_SDO_GEOM_METADATA` as the current Application Express user. The package also provides a few utilities that simplify the use of Spatial in Application Express.

- [Data Types](#) (page 30-1)
- [CHANGE_GEOM_METADATA Procedure](#) (page 30-1)
- [CIRCLE_POLYGON Function](#) (page 30-2)
- [DELETE_GEOM_METADATA Procedure](#) (page 30-3)
- [INSERT_GEOM_METADATA Procedure](#) (page 30-4)
- [INSERT_GEOM_METADATA_LONLAT Procedure](#) (page 30-5)
- [POINT Function](#) (page 30-6)
- [RECTANGLE Function](#) (page 30-6)

30.1 Data Types

The data types used by this package are described in this section.

t_srid

```
subtype t_srid is number;
```

c_no_reference_system

```
c_no_reference_system constant t_srid := null;
```

c_wgs_84

```
c_wgs_84 constant t_srid := 4326; -- World Geodetic System, EPSG:4326
```

30.2 CHANGE_GEOM_METADATA Procedure

This procedure modifies a spatial metadata record.

Syntax

```
APEX_SPATIAL.CHANGE_GEOM_METADATA (  
    p_table_name      IN VARCHAR2,  
    p_column_name     IN VARCHAR2,
```

```

p_new_table_name    IN VARCHAR2 DEFAULT NULL,
p_new_column_name   IN VARCHAR2 DEFAULT NULL,
p_diminfo           IN mdsys.sdo_dim_array,
p_srid              IN t_srid );

```

Parameters

Table 30-1 CHANGE_GEOM_METADATA Parameters

Parameter	Description
p_table_name	Name of the feature table.
p_column_name	Name of the column of type <code>mdsys.sdo_geometry</code> .
p_new_table_name	New name of a feature table (or null, to keep the current value).
p_new_column_name	New name of the column of type <code>mdsys.sdo_geometry</code> (or null, to keep the current value).
p_diminfo	SDO_DIM_ELEMENT array, ordered by dimension, with one entry for each dimension.
p_srid	SRID value for the coordinate system for all geometries in the column.

Example

The code below modifies the dimensions of column `CITIES.SHAPE`.

```

begin
  for l_meta in ( select *
                  from user_sdo_geom_metadata
                  where table_name = 'CITIES'
                    and column_name = 'SHAPE' )
  loop
    apex_spatial.change_geom_metadata (
      p_table_name => l_meta.table_name,
      p_column_name => l_meta.column_name,
      p_diminfo    => SDO_DIM_ARRAY (
        SDO_DIM_ELEMENT('X', -180, 180, 0.1),
        SDO_DIM_ELEMENT('Y', -90, 90, 0.1) ),
      p_srid       => l_meta.srid );
  end loop;
end;

```

30.3 CIRCLE_POLYGON Function

This function creates a polygon that approximates a circle at (p_lon, p_lat) with radius of p_radius. See `mdsys.sdo_util.circle_polygon` for details.

Syntax

```

APEX_SPATIAL.CIRCLE_POLYGON (
  p_lon      IN NUMBER,
  p_lat      IN NUMBER,
  p_radius   IN NUMBER,
  p_arc_tolerance IN NUMBER DEFAULT 20,
  p_srid     IN t_srid DEFAULT c_wgs_84 )
RETURN mdsys.sdo_geometry;

```

Parameters

Table 30-2 CIRCLE_POLYGON Parameters

Parameter	Description
p_lon	Longitude position of the lower left point.
p_lat	Latitude position of the lower left point.
p_radius	Radius of the circle in meters.
p_arc_tolerance	Arc tolerance (default 20).
p_srid	Reference system (default c_wgs_84).

Returns

Table 30-3 CIRCLE_POLYGON Function Returns

Return	Description
mdsys.sdo_geometry	The geometry for the polygon that approximates the circle.

Example

This example is a query that returns a polygon that approximates a circle at (0, 0) with radius 1.

```
select apex_spatial.circle_polygon(0, 0, 1) from dual
```

30.4 DELETE_GEOM_METADATA Procedure

This procedure deletes a spatial metadata record.

Syntax

```
APEX_SPATIAL.DELETE_GEOM_METADATA (
  p_table_name      IN VARCHAR2,
  p_column_name     IN VARCHAR2,
  p_drop_index      IN BOOLEAN DEFAULT FALSE );
```

Parameters

Table 30-4 DELETE_GEOM_METADATA Parameters

Parameter	Description
p_table_name	Name of the feature table.
p_column_name	Name of the column of type mdsys.sdo_geometry.
p_drop_index	If TRUE (default is FALSE), drop the spatial index on the column.

Example

This example deletes metadata on column `CITIES.SHAPE` and drops the spatial index on this column.

```
begin
  apex_spatial.delete_geom_metadata (
    p_table_name => 'CITIES',
    p_column_name => 'SHAPE',
    p_drop_index => true );
end;
```

30.5 INSERT_GEOM_METADATA Procedure

This procedure inserts a spatial metadata record and optionally creates a spatial index.

Syntax

```
APEX_SPATIAL.INSERT_GEOM_METADATA (
  p_table_name      IN VARCHAR2,
  p_column_name     IN VARCHAR2,
  p_diminfo         in mdsys.sdo_dim_array,
  p_srid            in t_srid,
  p_create_index_name IN VARCHAR2 DEFAULT NULL );
```

Parameters

Table 30-5 INSERT_GEOM_METADATA Parameters

Parameter	Description
<code>p_table_name</code>	The name of the feature table.
<code>p_column_name</code>	The name of the column of type <code>mdsys.sdo_geometry</code> .
<code>p_diminfo</code>	The <code>SDO_DIM_ELEMENT</code> array, ordered by dimension, with one entry for each dimension.
<code>p_srid</code>	The SRID value for the coordinate system for all geometries in the column.
<code>p_create_index_name</code>	If not null, a spatial index on the column is created with this name. Only simple column names are supported, function based indexes or indexes on object attributes cause an error. For more complex requirements, leave this parameter null (the default) and manually create the index.

Example

This example creates table `CITIES`, spatial metadata and an index on column `CITIES.SHAPE`.

```
create table cities (
  city_id  number primary key,
  city_name varchar2(30),
  shape    mdsys.sdo_geometry )
/
begin
  apex_spatial.insert_geom_metadata (
```

```

    p_table_name    => 'CITIES',
    p_column_name   => 'SHAPE',
    p_diminfo       => SDO_DIM_ARRAY (
        SDO_DIM_ELEMENT('X', -180, 180, 1),
        SDO_DIM_ELEMENT('Y', -90, 90, 1) ),
    p_srid          => apex_spatial.c_wgs_84 );
end;
/
create index cities_idx_shape on cities(shape) indextype is mdsys.spatial_index
/

```

30.6 INSERT_GEOM_METADATA_LONLAT Procedure

This procedure inserts a spatial metadata record that is suitable for longitude/latitude and optionally creates a spatial index.

Syntax

```

APEX_SPATIAL.INSERT_GEOM_METADATA_LONLAT (
    p_table_name      IN VARCHAR2,
    p_column_name     IN VARCHAR2,
    p_tolerance       IN NUMBER DEFAULT 1,
    p_create_index_name IN VARCHAR2 DEFAULT NULL );

```

Parameters

Table 30-6 INSERT_GEOM_METADATA_LONLAT Parameters

Parameter	Description
p_table_name	Name of the feature table.
p_column_name	Name of the column of type <code>mdsys.sdo_geometry</code> .
p_tolerance	Tolerance value in each dimension, in meters (default 1).
p_create_index_name	if not null, a spatial index on the column is created with this name. Only simple column names are supported, function based indexes or indexes on object attributes cause an error. For more complex requirements, leave this parameter null (the default) and manually create the index.

Example

The code below creates table `CITIES` and spatial metadata for the column `CITIES.SHAPE`. By passing `CITIES_IDX_SHAPE` to `p_create_index_name`, the API call automatically creates an index on the spatial column.

```

create table cities (
    city_id number primary key,
    city_name varchar2(30),
    shape mdsys.sdo_geometry )
/
begin
    apex_spatial.insert_geom_metadata_lonlat (
        p_table_name    => 'CITIES',
        p_column_name    => 'SHAPE',
        p_create_index_name => 'CITIES_IDX_SHAPE' );
end;
/

```


30.7 POINT Function

This function creates a point at (p_lon, p_lat).

Syntax

```
APEX_SPATIAL.POINT (
  p_lon      IN NUMBER,
  p_lat      IN NUMBER,
  p_srid     IN t_srid DEFAULT c_wgs_84 )
RETURN mdsys.sdo_geometry;
```

Parameters

Table 30-7 POINT parameters

Parameter	Description
p_lon	Longitude position.
p_lat	Latitude position.
p_srid	Reference system (default c_wgs_84).

Returns

Table 30-8 POINT Function Returns

Return	Description
mdsys.sdo_geometry	The geometry for the point.

Example

This example is a query that returns a point at (10, 50).

```
select apex_spatial.point(10, 50) from dual;
```

This example is equivalent to:

```
select mdsys.sdo_geometry(2001, 4326, sdo_point_type(10, 50, null), null, null) from
dual;
```

30.8 RECTANGLE Function

This function creates a rectangle from point at (p_lon1, p_lat1) to (p_lon2, p_lat2).

Syntax

```
APEX_SPATIAL.RECTANGLE (
  p_lon1     IN NUMBER,
  p_lat1     IN NUMBER,
  p_lon2     IN NUMBER,
  p_lat2     IN NUMBER,
  p_srid     IN t_srid DEFAULT c_wgs_84 )
RETURN mdsys.sdo_geometry;
```

Parameters

Table 30-9 RECTANGLE Parameters

Parameter	Description
p_lon1	Longitude position of the lower left point.
p_lat1	Latitude position of the lower left point.
p_lon2	Longitude position of the upper right point.
p_lat2	Latitude position of the upper right point.
p_srid	Reference system (default c_wgs_84).

Returns

Table 30-10 RECTANGLE Function Returns

Return	Description
mdsys.sdo_geometry	The geometry for the rectangle (p_lon1, p_lat1, p_lon2, p_lat2).

Example

This example is a query that returns a rectangle from (10, 50) to (11, 51).

```
select apex_spatial.rectangle(10, 50, 11, 51) from dual
```

This example is equivalent to:

```
select mdsys.sdo_geometry(  
    2003, 4326, null,  
    sdo_elem_info_array(1, 1003, 1),  
    sdo_ordinate_array(10, 50, 11, 50, 11, 51, 10, 51, 10, 50))  
from dual;
```

31

APEX_STRING

The APEX_STRING package provides utilities for `varchar2`, `clob`, `apex_t_varchar2`, and `apex_t_number` types.

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31.1 FORMAT Function

Returns a formatted string, with substitutions applied.

Returns `p_message` after replacing each `<n>`th occurrence of `%s` with `p<n>` and each occurrence of `%<n>` with `p<n>`. If `p_max_length` is not null, `substr(p<n>, 1, p_arg_max_length)` is used instead of `p<n>`.

Syntax

```
format (  
    p_message      in varchar2,  
    p0             in varchar2    default null,  
    p1             in varchar2    default null,  
    p2             in varchar2    default null,  
    p3             in varchar2    default null,
```

```

p4          in varchar2    default null,
p5          in varchar2    default null,
p6          in varchar2    default null,
p7          in varchar2    default null,
p8          in varchar2    default null,
p9          in varchar2    default null,
p10         in varchar2    default null,
p11         in varchar2    default null,
p12         in varchar2    default null,
p13         in varchar2    default null,
p14         in varchar2    default null,
p15         in varchar2    default null,
p16         in varchar2    default null,
p17         in varchar2    default null,
p18         in varchar2    default null,
p19         in varchar2    default null,
p_max_length in pls_integer default 1000 )
return varchar2

```

Parameters

Table 31-1 FORMAT Function Parameters

Parameters	Description
p_message	Message string with substitution placeholders.
p0-p19	Substitution parameters.
p_max_length	If not null (default is 1000), cap each p<n> at p_max_length characters.

Example

```

apex_string.format('%s+%s=%s', 1, 2, 'three')
-> 1+2=three

```

```

apex_string.format('%l+%l=%l', 'three', 1, 2)
-> 1+2=three

```

31.2 GET_INITIALS Function

Get N letter initials from the first N words.

Syntax

```

get_initials (
  p_str in varchar2,
  p_cnt in number default 2 )
return varchar2

```

Parameters

Table 31-2 GET_INITIALS Function Parameters

Parameters	Description
p_string	The input string.

Table 31-2 (Cont.) GET_INITIALS Function Parameters

Parameters	Description
p_cnt	The N letter initials to get from the first N words. The default is 2.

Example

Get initials from "John Doe".

```
begin
  sys.dbms_output.put_line(apex_string.get_initials('John Doe'));
end;
-> JD

begin
  sys.dbms_output.put_line(apex_string.get_initials(p_str => 'Andres Homero Lozano
Garza', p_cnt => 3));
end;
-> AHL
```

31.3 GREP Function Signature 1

Returns the values of the input table that match a regular expression.

Syntax

```
grep (
  p_table      in apex_t_varchar2,
  p_pattern    in varchar2,
  p_modifier   in varchar2    default null,
  p_subexpression in varchar2  default '0',
  p_limit      in pls_integer default null )
return apex_t_varchar2;
```

Parameters**Table 31-3 GREP Function Signature 1 Parameters**

Parameters	Description
p_table	The input table.
p_pattern	The regular expression.
p_modifier	The regular expression modifier.
p_subexpression	The subexpression which should be returned. If null, return the complete table value. If 0 (the default), return the matched expression. If > 0, return the subexpression value. You can also pass a comma separated list of numbers, to get multiple subexpressions in the result.
p_limit	Limitation for the number of elements in the return table. If null (the default), there is no limit.

Example

Collect and print basenames of sql files in input collection.

```

declare
    l_sqlfiles apex_t_varchar2;
begin
    l_sqlfiles := apex_string.grep (
        p_table => apex_t_varchar2('a.html','b.sql', 'C.SQL'),
        p_pattern => '(\w+)\.sql',
        p_modifier => 'i',
        p_subexpression => '1' );
    sys.dbms_output.put_line(apex_string.join(l_sqlfiles, ':'));
end;
-> b:C

```

31.4 GREP Function Signature 2

Returns the values of the input `varchar2` that match a regular expression.

Syntax

```

grep (
    p_str          in varchar2,
    p_pattern      in varchar2,
    p_modifier     in varchar2    default null,
    p_subexpression in varchar2    default '0',
    p_limit        in pls_integer default null )
return apex_t_varchar2;

```

Parameters

Table 31-4 GREP Function Signature 2 Parameters

Parameters	Description
<code>p_str</code>	The input <code>varchar2</code> .
<code>p_pattern</code>	The regular expression.
<code>p_modifier</code>	The regular expression modifier.
<code>p_subexpression</code>	The subexpression which should be returned. If null, return the complete table value. If 0 (the default), return the matched expression. If > 0, return the subexpression value. You can also pass a comma separated list of numbers, to get multiple subexpressions in the result.
<code>p_limit</code>	Limitation for the number of elements in the return table. If null (the default), there is no limit.

Example

Collect and print `key=value` definitions.

```

declare
    l_plist apex_t_varchar2;
begin
    l_plist := apex_string.grep (
        p_str => 'define k1=v1'||chr(10)||
                'define k2 = v2',
        p_pattern => 'define\s+(\w+)\s*=\s*([^\|chr(10)|']*)',
        p_modifier => 'i',
        p_subexpression => '1,2' );
    sys.dbms_output.put_line(apex_string.join(l_plist, ':'));

```

```
end;
-> k1:v1:k2:v2
```

31.5 GREG Function Signature 3

Returns the values of the input `clob` that match a regular expression.

Syntax

```
grep (
  p_str          in clob,
  p_pattern      in varchar2,
  p_modifier     in varchar2   default null,
  p_subexpression in varchar2   default '0',
  p_limit        in pls_integer default null )
return apex_t_varchar2;
```

Parameters

Table 31-5 GREG Function Signature 3 Parameters

Parameters	Description
<code>p_str</code>	The input <code>clob</code> .
<code>p_pattern</code>	The regular expression.
<code>p_modifier</code>	The regular expression modifier.
<code>p_subexpression</code>	The subexpression which should be returned. If null, return the complete table value. If 0 (the default), return the matched expression. If > 0, return the subexpression value. You can also pass a comma separated list of numbers, to get multiple subexpressions in the result.
<code>p_limit</code>	Limitation for the number of elements in the return table. If null (the default), there is no limit.

Example

Collect and print `key=value` definitions.

```
declare
  l_plist apex_t_varchar2;
begin
  l_plist := apex_string.grep (
    p_str => to_clob('define k1=v1'||chr(10)||
                  'define k2 = v2',
    p_pattern => 'define\s+(\w+)\s*=\s*([^\s|
chr(10)||']*)',
    p_modifier => 'i',
    p_subexpression => '1,2' );
  sys.dbms_output.put_line(apex_string.join(l_plist, ':'));
end;
-> k1:v1:k2:v2
```

31.6 JOIN_CLOB Function

Returns the values of the `apex_t_varchar2` input table `p_table` as a concatenated `clob`, separated by `p_sep`.

Syntax

```

join_clob (
  p_table in apex_t_varchar2,
  p_sep   in varchar2   default apex_application.LF,
  p_dur   in pls_integer default sys.dbms_lob.call )
return clob

```

Parameters**Table 31-6 JOIN_CLOB Function Parameters**

Parameters	Description
p_table	The input table.
p_sep	The separator, default is line feed.
p_dur	The duration of the clob, default sys.dbms_lob.call.

Example

Concatenate numbers, separated by ':'.

```

apex_string.join_clob(apex_t_varchar2(1,2,3),':')
-> 1:2:3

```

31.7 JOIN Function Signature 1

Returns the values of the apex_t_varchar2 input table p_table as a concatenated varchar2, separated by p_sep.

Syntax

```

join (
  p_table in apex_t_varchar2,
  p_sep in varchar2 default apex_application.LF)
return varchar2

```

Parameters**Table 31-7 JOIN Function Signature 1 Parameters**

Parameters	Description
p_table	The input table.
p_sep	The separator, default is line feed.

Example

Concatenate numbers, separated by ':'.

```

apex_string.join(apex_t_varchar2('a','b','c'),':')
-> a:b:c

```


31.8 JOIN Function Signature 2

Returns the values of the `apex_t_number` input table `p_table` as a concatenated `varchar2`, separated by `p_sep`.

Syntax

```
join (  
  p_table in apex_t_number,  
  p_sep in varchar2 default apex_application.LF )  
return varchar2
```

Parameters

Table 31-8 JOIN Function Signature 2 Parameters

Parameters	Description
<code>p_table</code>	The input table.
<code>p_sep</code>	The separator, default is line feed.

Example

Concatenate numbers, separated by ':':

```
apex_string.join(apex_t_number(1,2,3),':')  
-> 1:2:3
```

31.9 PLIST_DELETE Procedure

This procedure removes the property list key from the table, by setting it to null.

Syntax

```
plist_delete (  
  p_table in out nocopy apex_t_varchar2,  
  p_key in varchar2 );
```

Parameters

Table 31-9 PLIST_DELETE Procedure Parameters

Parameters	Description
<code>p_table</code>	The input table.
<code>p_key</code>	The input key.

Raised Errors

Table 31-10 PLIST_DELETE Procedure Raised Errors

Parameters	Description
NO_DATA_FOUND	Given key does not exist in table.

Example

Remove value of property "key2".

```
declare
  l_plist apex_t_varchar2 := apex_t_varchar2('key1','foo','key2','bar');
begin
  apex_string.plist_delete(l_plist,'key2');
  sys.dbms_output.put_line(apex_string.join(l_plist,':'));
end;
-> key1:foo::
```

31.10 PLIST_GET Function

This function gets the property list value for a key.

Syntax

```
plist_get (
  p_table in apex_t_varchar2,
  p_key in varchar2 )
return varchar2
```

Parameters

Table 31-11 PLIST_GET Function Parameters

Parameters	Description
p_table	The input table.
p_key	The input key.

Raised Errors

Table 31-12 PLIST_GET Function Raised Errors

Parameters	Description
NO_DATA_FOUND	Given key does not exist in table.

Example

Get value of property "key2".

```
declare
  l_plist apex_t_varchar2 := apex_t_varchar2('key1','foo','key2','bar');
begin
```

```

        sys.dbms_output.put_line(apex_string.plist_get(l_plist,'key2'));
    end;
    -> bar

```

31.11 PLIST_PUT Function

This function inserts or updates property list value for a key.

Syntax

```

plist_put (
    p_table in out nocopy apex_t_varchar2,
    p_key   in varchar2,
    p_value in varchar2 );

```

Parameters

Table 31-13 PLIST_PUT Function Parameters

Parameters	Description
p_table	The input table.
p_key	The input key.
p_value	The input value.

Example

Set property value to "key2".

```

declare
    l_plist apex_t_varchar2 := apex_t_varchar2('key1','foo');
begin
    apex_string.plist_put(l_plist,'key2','bar');
    sys.dbms_output.put_line(apex_string.plist_get(l_plist,'key2'));
end;
-> bar

```

31.12 PUSH Procedure Signature 1

This procedure appends value to apex_t_varchar2 table.

Syntax

```

push (
    p_table in out nocopy apex_t_varchar2,
    p_value in varchar2 );

```

Parameters

Table 31-14 PUSH Procedure Signature 1 Parameters

Parameter	Description
p_table	Defines the table.
p_src	Specifies the value to be added.

Example

The following example demonstrates how to append 2 values, then prints the table.

```
declare
  l_table apex_t_varchar2;
begin
  apex_string.push(l_table, 'a');
  apex_string.push(l_table, 'b');
  sys.dbms_output.put_line(apex_string.join(l_table, ':'));
end;
-> a:b
```

31.13 PUSH Procedure Signature 2

This procedure appends a value to `apex_t_number` table.

Syntax

```
push (
  p_table in out nocopy apex_t_number,
  p_value in number );
```

Parameters**Table 31-15 PUSH Procedure Signature 2 Parameters**

Parameter	Description
<code>p_table</code>	Defines the table.
<code>p_src</code>	Specifies the value to be added.

Example

The following example demonstrates how to append 2 values, then prints the table.

```
declare
  l_table apex_t_number;
begin
  apex_string.push(l_table, 1);
  apex_string.push(l_table, 2);
  sys.dbms_output.put_line(apex_string.join(l_table, ':'));
end;
-> 1:2
```

31.14 PUSH Procedure Signature 3

This procedure appends collection values to `apex_t_varchar2` table.

Syntax

```
push (
  p_table in out nocopy apex_t_varchar2,
  p_values in apex_t_varchar2 );
```

Parameters

Table 31-16 PUSH Procedure Signature 3 Parameters

Parameter	Description
p_table	Defines the table.
p_values	Specifies the values that should be added to p_table.

Example

The following example demonstrates how to append a single value and multiple values, then prints the table.

```
declare
  l_table apex_t_varchar2;
begin
  apex_string.push(l_table, 'a');
  apex_string.push(l_table, apex_t_varchar2('1','2','3'));
  sys.dbms_output.put_line(apex_string.join(l_table, ':'));
end;
-> a:1:2:3
```

31.15 SHUFFLE Function

Returns the input table values, re-ordered.

Syntax

```
shuffle (
  p_table in apex_t_varchar2 )
return apex_t_varchar2;
```

Parameters

Table 31-17 SHUFFLE Function Parameters

Parameters	Description
p_table	The input table.

Example

Shuffle and print l_table.

```
declare
  l_table apex_t_varchar2 := apex_string.split('1234567890',null);
begin
  sys.dbms_output.put_line(apex_string.join(apex_string.shuffle(l_table),':'));
end;
-> a permutation of 1:2:3:4:5:6:7:8:9:0
```

31.16 SHUFFLE Procedure

This procedure randomly re-orders the values of the input table.

Syntax

```
shuffle (
    p_table in out nocopy apex_t_varchar2 );
```

Parameters

Table 31-18 SHUFFLE Procedure Parameters

Parameters	Description
p_table	The input table, which will be modified by the procedure.

Example

Shuffle and print l_table.

```
declare
    l_table apex_t_varchar2 := apex_string.split('1234567890',null);
begin
    apex_string.shuffle(l_table);
    sys.dbms_output.put_line(apex_string.join(l_table,':'));
end;
-> a permutation of 1:2:3:4:5:6:7:8:9:0
```

31.17 SPLIT Function Signature 1

Use this function to split input string at separator.

Syntax

```
split (
    p_str in varchar2,
    p_sep in varchar2 default apex_application.LF,
    p_limit in pls_integer default null )
return apex_t_varchar2;
```

Parameters

Table 31-19 SPLIT Function Signature 1 Parameters

Parameters	Description
p_str	The input string.
p_sep	The separator. If null, split after each character. If a single character, split at this character. If more than 1 character, split at regular expression. The default is to split at line feed.
p_limit	Maximum number of splits, ignored if null. If smaller than the total possible number of splits, the last table element contains the rest.

Examples

```

apex_string.split(1||chr(10)||2||chr(10)||3)
-> apex_t_varchar2('1','2','3')

apex_string.split('1:2:3',':')
-> apex_t_varchar2('1','2','3')

apex_string.split('123',null)
-> apex_t_varchar2('1','2','3')

apex_string.split('1:2:3:4',':',2)
-> apex_t_varchar2('1','2:3:4')

apex_string.split('key1=val1, key2=val2','\s*[,]\s*')
-> apex_t_varchar2('key1','val1','key2','val2')

```

31.18 SPLIT Function Signature 2

Use this function to split input clob at separator.

Syntax

```

split (
  p_str in clob,
  p_sep in varchar2 default apex_application.LF )
return apex_t_varchar2;

```

Parameters**Table 31-20 SPLIT Function Signature 2 Parameters**

Parameters	Description
p_str	The input clob.
p_sep	The separator. If null, split after each character. If a single character, split at this character. If more than 1 character, split at regular expression. The default is to split at line feed

Example

```

apex_string.split('1:2:3',':')
-> apex_t_varchar2('1','2','3')

```

31.19 SPLIT_NUMBERS Function

Use this function to split input at separator, values must all be numbers.

Syntax

```

split_numbers (
  p_str in varchar2,
  p_sep in varchar2 default apex_application.LF )
return apex_t_number;

```

Parameters

Table 31-21 SPLIT_NUMBERS Function Parameters

Parameters	Description
p_str	The input varchar2.
p_sep	The separator. If null, split after each character. If a single character, split at this character. If more than 1 character, split at regular expression. The default is to split at line feed.

Example

```
apex_string.split_numbers('1:2:3',':')  
-> apex_t_number(1,2,3)
```


32

APEX_THEME

The `APEX_THEME` package contains utility functions for working with themes and theme styles.

- [CLEAR_ALL_USERS_STYLE Procedure](#) (page 32-1)
- [CLEAR_USER_STYLE Procedure](#) (page 32-2)
- [DISABLE_USER_STYLE Procedure](#) (page 32-2)
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- [GET_USER_STYLE Function](#) (page 32-4)
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- [SET_USER_STYLE Procedure](#) (page 32-6)

32.1 CLEAR_ALL_USERS_STYLE Procedure

This procedure clears all theme style user preferences for an application and theme.

Syntax

```
procedure clear_all_users_style(  
    p_application_id IN NUMBER           DEFAULT {current application id},  
    p_theme_number   IN NUMBER           DEFAULT {current theme id}  
);
```

Parameters

Table 32-1 CLEAR_ALL_USERS_STYLE Procedure

Parameter	Description
<code>p_application_id</code>	The application to clear all user theme style preferences for.
<code>p_theme_number</code>	The theme number to clear all theme style user preferences for.

Example

The following example clears the all theme style user preferences for theme 42 in application 100.

```
apex_theme.clear_all_users_style(  
    p_application_id => 100,  
    p_theme_number  => 42  
);
```

32.2 CLEAR_USER_STYLE Procedure

This procedure clears the theme style user preference for user and application.

Syntax

```
procedure clear_user_style(
    p_application_id IN NUMBER           DEFAULT {current application id},
    p_user           IN VARCHAR2        DEFAULT {current user},
    p_theme_number   IN NUMBER           DEFAULT {current theme number}
);
```

Parameters

Table 32-2 CLEAR_USER_STYLE Procedure

Parameter	Description
p_theme_number	The theme number to clear the theme style user preference.

Example

The following example clears the theme style user preference for the ADMIN user in application 100 and theme 42.

```
apex_theme.clear_user_style(
    p_application_id => 100,
    p_user           => 'ADMIN',
    p_theme_number   => 42
);
```

32.3 DISABLE_USER_STYLE Procedure

This procedure disables theme style selection by end users. End users will not be able to customize the theme style on their own. Note that this only affects the *Customization* link for end users. APEX_THEME API calls are independent.

Syntax

```
procedure disable_user_style(
    p_application_id IN NUMBER           DEFAULT {current application id},
    p_theme_number   IN NUMBER           DEFAULT {current theme number}
);
```

Parameters

Table 32-3 DISABLE_USER_STYLE Procedure

Parameter	Description
p_application_id	The Application ID.
p_theme_number	Number of User Interface's <i>Current Theme</i> .

The following example disable end user theme style selection for the `Desktop` user interface of application 100.

```
declare
  l_theme_id apex_themes.theme_number%type;
begin
  select theme_number into l_theme_id
  from apex_appl_user_interfaces
  where application_id = 100
  and display_name = 'Desktop';

  apex_theme.disable_user_style(
    p_application_id => 100,
    p_theme_number => l_theme_id
  );
end;
```

32.4 ENABLE_USER_STYLE Procedure

This procedure enables theme style selection by end users. When enabled and there is at least one theme style marked as `Public`, end users will see a `Customize` link which allows to choose the theme style. End user theme style selection is enabled or disabled at the User Interface level. When providing a theme number, the theme must be the *Current Theme* for a user interface. Note that this only affects the *Customization* link for end users. `APEX_THEME` API calls are independent.

Syntax

```
procedure enable_user_style(
  p_application_id IN NUMBER           DEFAULT {current application id},
  p_theme_number   IN NUMBER           DEFAULT {current theme number}
);
```

Parameters

Table 32-4 ENABLE_USER_STYLE Procedure

Parameter	Description
<code>p_application_id</code>	The Application ID.
<code>p_theme_number</code>	Number of User Interface's <i>Current Theme</i> .

The following example enable end user theme style selection for the `Desktop` user interface of application 100.

```
declare
  l_theme_id apex_themes.theme_number%type;
begin
  select theme_number into l_theme_id
  from apex_appl_user_interfaces
  where application_id = 100
  and display_name = 'Desktop';

  apex_theme.enable_user_style(
    p_application_id => 100,
    p_theme_number => l_theme_id
  );
end;
```

32.5 GET_USER_STYLE Function

This function returns the theme style user preference for the user and application. If no user preference is present, NULL is returned.

Syntax

```
function get_user_style(
  p_application_id IN NUMBER           DEFAULT {current application id},
  p_user          IN VARCHAR2        DEFAULT {current user},
  p_theme_number  IN NUMBER           DEFAULT {current theme number}
) return number;
```

Parameters

Table 32-5 GET_USER_STYLE Function

Parameter	Description
p_application_id	The application to set the user style preference.
p_user	The user name to the user style preference.
p_theme_number	The theme number to set the session style.
RETURN	The theme style ID which is set as a user preference.

Example

The query returns the theme style user preference for the ADMIN user in application 100 and theme 42.

```
select apex_theme.get_user_style( 100, 'ADMIN', 42 ) from dual;
```

32.6 SET_CURRENT_STYLE Procedure

This procedure sets current theme style for the current application.

Syntax

```
procedure set_current_style (
  p_theme_number IN NUMBER,
  p_id           IN VARCHAR2
);
```

Parameters

Table 32-6 SET_CURRENT_STYLE Procedure

Parameter	Description
p_theme_number	The theme number for which to set the default style.
p_style_id	The ID of the new default theme style.

Example

The following example gets available theme styles from **Application Express Dictionary View** for the `DESKTOP` user interface.

```
select s.theme_style_id, t.theme_number
   from apex_application_theme_styles s,
        apex_application_themes t
        where s.application_id = t.application_id
              and s.theme_number = t.theme_number
              and s.application_id = :app_id
              and t.ui_type_name = 'DESKTOP'
              and s.is_current = 'Yes'
```

The following example sets the current theme style to one of values returned by the above query.

```
apex_theme.set_current_style (
    p_theme_number => {query.theme_number},
    p_id => {query.theme_style_id}
);
```

32.7 SET_SESSION_STYLE Procedure

This procedure sets the theme style dynamically for the current session. This is typically being called after successful authentication.

Syntax

```
procedure set_session_style (
    p_theme_number  IN NUMBER           DEFAULT {current theme number},
    p_name          IN VARCHAR2
);
```

Parameters

Table 32-7 SET_SESSION_STYLE Procedure

Parameter	Description
<code>p_theme_number</code>	The theme number to set the session style for, default is the current theme of the application.
<code>p_name</code>	The name of the theme style to be used in the session.

Example

The following example gets the current theme number from **Application Express Dictionary View** for the `DESKTOP` user interface.

```
select t.theme_number
   from apex_application_themes t
        where t.application_id = :app_id
              and t.ui_type_name = 'DESKTOP'
```

The following example sets the session theme style for the current theme to `vita`.

```

apex_theme.set_current_style (
  p_theme_number => {query.theme_number},
  p_name => 'Vita'
);

```

32.8 SET_SESSION_STYLE_CSS Procedure

This procedure sets the theme style CSS urls dynamically for the current session. Theme style CSS URLs are being directly passed in; a persistent style definition is not needed. This is typically being called after successful authentication.

Syntax

```

procedure set_session_style_css (
  p_theme_number IN NUMBER           DEFAULT {current theme number},
  p_css_file_urls IN VARCHAR2
);

```

Parameters

Table 32-8 SET_SESSION_STYLE_CSS Procedure

Parameter	Description
p_theme_number	The theme number to set the session style.
p_css_urls	The URLs to CSS files with style directives.

Example

The following example gets available theme styles from **Application Express Dictionary View** for the `DESKTOP` user interface.

```

select s.theme_style_id, t.theme_number
  from apex_application_theme_styles s,
  apex_application_themes t
 where s.application_id = t.application_id
       and s.theme_number = t.theme_number
       and s.application_id = :app_id
       and t.ui_type_name = 'DESKTOP'
       and s.is_current = 'Yes'

```

The following example sets the current theme style to one of values returned by the above query.

```

apex_theme.set_session_style_css(
  p_theme_number => {query.theme_number},
  p_css_urls => {URLs to theme style CSS files}
);

```

32.9 SET_USER_STYLE Procedure

This procedure sets a theme style user preference for the current user and application. Theme Style User Preferences are automatically picked up and precede any style set with `SET_SESSION_STYLE`.

Syntax

```

procedure set_user_style(
  p_application_id IN NUMBER          DEFAULT {current application id},
  p_user           IN VARCHAR2       DEFAULT {current user},
  p_theme_number  IN NUMBER          DEFAULT {current theme number},
  p_id            IN NUMBER
);

```

Parameters

Table 32-9 SET_USER_STYLE Procedure

Parameter	Description
p_application_id	The application to set the user style preference.
p_user	The user name to the user style preference.
p_theme_number	The theme number to set the user style preference.
p_id	The ID of the theme style to set as a user preference.

Example

The following example gets available theme styles from **Application Express Dictionary View** for the `DESKTOP` user interface.

```

select s.theme_style_id, t.theme_number
  from apex_application_theme_styles s,
  apex_application_themes t
  where s.application_id = t.application_id
        and s.theme_number = t.theme_number
        and s.application_id = :app_id
        and t.ui_type_name = 'DESKTOP'
        and s.is_current = 'Yes'

```

The following example sets the current theme style id's as user preference for `ADMIN` in application ID 100.

```

apex_theme.set_user_style (
  p_application_id => 100,
  p_user          => 'ADMIN',
  p_theme_number  => {query.theme_number},
  p_id           => {query.theme_style_id}
);

```

APEX_UI_DEFAULT_UPDATE

The `APEX_UI_DEFAULT_UPDATE` package provides procedures to access user interface defaults from within SQL Developer or SQL*Plus.

You can use this package to set the user interface defaults associated with a table within a schema. The package must be called from within the schema that owns the table you are updating.

User interface defaults enable you to assign default user interface properties to a table, column, or view within a specified schema. When you create a form or report using a wizard, the wizard uses this information to create default values for region and item properties. Utilizing user interface defaults can save valuable development time and has the added benefit of providing consistency across multiple pages in an application.

- [ADD_AD_COLUMN Procedure](#) (page 33-2)
- [ADD_AD_SYNONYM Procedure](#) (page 33-3)
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- [UPD_TABLE Procedure](#) (page 33-19)



See Also:

"Managing User Interface Defaults" in *Oracle Application Express SQL Workshop Guide*

33.1 ADD_AD_COLUMN Procedure

Adds a User Interface Default Attribute Dictionary entry with the provided definition. Up to three synonyms can be provided during the creation. Additional synonyms can be added post-creation using `apex_ui_default_update.add_ad_synonym`. Synonyms share the column definition of their base column.

Syntax

```
APEX_UI_DEFAULT_UPDATE.ADD_AD_COLUMN (
  p_column_name      IN  VARCHAR2,
  p_label            IN  VARCHAR2  DEFAULT NULL,
  p_help_text        IN  VARCHAR2  DEFAULT NULL,
  p_format_mask      IN  VARCHAR2  DEFAULT NULL,
  p_default_value    IN  VARCHAR2  DEFAULT NULL,
  p_form_format_mask IN  VARCHAR2  DEFAULT NULL,
  p_form_display_width IN VARCHAR2  DEFAULT NULL,
  p_form_display_height IN VARCHAR2  DEFAULT NULL,
  p_form_data_type   IN  VARCHAR2  DEFAULT NULL,
  p_report_format_mask IN VARCHAR2  DEFAULT NULL,
  p_report_col_alignment IN VARCHAR2  DEFAULT NULL,
  p_syn_name1        IN  VARCHAR2  DEFAULT NULL,
  p_syn_name2        IN  VARCHAR2  DEFAULT NULL,
  p_syn_name3        IN  VARCHAR2  DEFAULT NULL);
```

Parameters

Table 33-1 ADD_AD_COLUMN Parameters

Parameter	Description
<code>p_column_name</code>	Name of column to be created.
<code>p_label</code>	Used for item label and report column heading.
<code>p_help_text</code>	Used for help text for items and interactive report columns
<code>p_format_mask</code>	Used as the format mask for items and report columns. Can be overwritten by report for form specific format masks.
<code>p_default_value</code>	Used as the default value for items.
<code>p_form_format_mask</code>	If provided, used as the format mask for items, overriding any value for the general format mask.
<code>p_form_display_width</code>	Used as the width of any items using this Attribute Definition.
<code>p_form_display_height</code>	Used as the height of any items using this Attribute Definition (only used by item types such as text areas and shuttles).

Table 33-1 (Cont.) ADD_AD_COLUMN Parameters

Parameter	Description
p_form_data_type	Used as the data type for items (results in an automatic validation). Valid values are VARCHAR, NUMBER and DATE.
p_report_format_mask	If provided, used as the format mask for report columns, overriding any value for the general format mask.
p_report_col_alignment	Used as the alignment for report column data (for example, number are usually right justified). Valid values are LEFT, CENTER, and RIGHT.
p_syn_name1	Name of synonym to be created along with this column. For more than 3, use APEX_UI_DEFAULT_UPDATE.ADD_AD_SYNONYM.
p_syn_name2	Name of second synonym to be created along with this column. For more than 3, use APEX_UI_DEFAULT_UPDATE.ADD_AD_SYNONYM.
p_syn_name3	Name of third synonym to be created along with this column. For more than 3, use APEX_UI_DEFAULT_UPDATE.ADD_AD_SYNONYM.

Example

The following example creates a new attribute to the UI Defaults Attribute Dictionary within the workspace associated with the current schema. It also creates a synonym for that attribute.

```
BEGIN
  apex_ui_default_update.add_ad_column (
    p_column_name      => 'CREATED_BY',
    p_label            => 'Created By',
    p_help_text        => 'User that created the record.',
    p_form_display_width => 30,
    p_form_data_type   => 'VARCHAR',
    p_report_col_alignment => 'LEFT',
    p_syn_name1        => 'CREATED_BY_USER' );
END;
```

33.2 ADD_AD_SYNONYM Procedure

If the column name is found within the User Interface Default Attribute Dictionary, the synonym provided is created and associated with that column. Synonyms share the column definition of their base column.

Syntax

```
APEX_UI_DEFAULT_UPDATE.ADD_AD_SYNONYM (
  p_column_name      IN VARCHAR2,
  p_syn_name         IN VARCHAR2);
```

Parameters

Table 33-2 ADD_AD_SYNONYM Parameters

Parameter	Description
p_column_name	Name of column with the Attribute Dictionary that the synonym is being created for.
p_syn_name	Name of synonym to be created.

Example

The following example add the synonym `CREATED_BY_USER` to the `CREATED_BY` attribute of the UI Defaults Attribute Dictionary within the workspace associated with the current schema.

```
BEGIN
  apex_ui_default_update.add_ad_synonym (
    p_column_name => 'CREATED_BY',
    p_syn_name    => 'CREATED_BY_USER' );
END;
```

33.3 DEL_AD_COLUMN Procedure

If the column name is found within the User Interface Default Attribute Dictionary, the column, along with any associated synonyms, is deleted.

Syntax

```
APEX_UI_DEFAULT_UPDATE.DEL_AD_COLUMN (
  p_column_name      IN VARCHAR2);
```

Parameters

Table 33-3 DEL_AD_COLUMN Parameters

Parameter	Description
p_column_name	Name of column to be deleted

Example

The following example deletes the attribute `CREATED_BY` from the UI Defaults Attribute Dictionary within the workspace associated with the current schema.

```
BEGIN
  apex_ui_default_update.del_ad_column (
    p_column_name => 'CREATED_BY' );
END;
```

33.4 DEL_AD_SYNONYM Procedure

If the synonym name is found within the User Interface Default Attribute Dictionary, the synonym name is deleted.

Syntax

```
APEX_UI_DEFAULT_UPDATE.DEL_AD_SYNONYM (
    p_syn_name          IN VARCHAR2);
```

Parameters**Table 33-4 DEL_AD_SYNONYM Parameters**

Parameter	Description
p_syn_name	Name of synonym to be deleted

Example

The following example deletes the synonym `CREATED_BY_USER` from the UI Defaults Attribute Dictionary within the workspace associated with the current schema.

```
BEGIN
    apex_ui_default_update.del_ad_synonym (
        p_syn_name => 'CREATED_BY_USER' );
END;
```

33.5 DEL_COLUMN Procedure

If the provided table and column exists within the user's schema's table based User Interface Defaults, the UI Defaults for it are deleted.

Syntax

```
APEX_UI_DEFAULT_UPDATE.DEL_COLUMN (
    p_table_name        IN VARCHAR2,
    p_column_name       IN VARCHAR2);
```

Parameters**Table 33-5 DEL_COLUMN Parameters**

Parameter	Description
p_table_name	Name of table whose column's UI Defaults are to be deleted.
p_column_name	Name of columns whose UI Defaults are to be deleted.

Example

The following example deletes the column `CREATED_BY` from the `EMP` table definition within the UI Defaults Table Dictionary within the current schema.

```
BEGIN
    apex_ui_default_update.del_column (
        p_table_name => 'EMP',
        p_column_name => 'CREATED_BY' );
END;
```

33.6 DEL_GROUP Procedure

If the provided table and group exists within the user's schema's table based User Interface Defaults, the UI Defaults for it are deleted and any column within the table that references that group has the group_id set to null.

Syntax

```
APEX_UI_DEFAULT_UPDATE.DEL_GROUP (
  p_table_name      IN VARCHAR2,
  p_group_name      IN VARCHAR2);
```

Parameters

Table 33-6 DEL_GROUP Parameters

Parameter	Description
p_table_name	Name of table whose group UI Defaults are to be deleted
p_group_name	Name of group whose UI Defaults are to be deleted

Example

The following example deletes the group `AUDIT_INFO` from the `EMP` table definition within the UI Defaults Table Dictionary within the current schema.

```
BEGIN
  apex_ui_default_update.del_group (
    p_table_name => 'EMP',
    p_group_name => 'AUDIT_INFO' );
END;
```

33.7 DEL_TABLE Procedure

If the provided table exists within the user's schema's table based User Interface Defaults, the UI Defaults for it is deleted. This includes the deletion of any groups defined for the table and all the columns associated with the table.

Syntax

```
APEX_UI_DEFAULT_UPDATE.DEL_TABLE (
  p_table_name      IN VARCHAR2);
```

Parameters

Table 33-7 DEL_TABLE Parameters

Parameter	Description
p_table_name	Table name

Example

The following example removes the UI Defaults for the EMP table that are associated with the current schema.

```
begin
  apex_ui_default_update.del_table (
    p_table_name => 'EMP' );
end;
/
```

33.8 SYNCH_TABLE Procedure

If the Table Based User Interface Defaults for the table do not already exist within the user's schema, they are defaulted. If they do exist, they are synchronized, meaning, the columns in the table is matched against the column in the UI Defaults Table Definitions. Additions and deletions are used to make them match.

Syntax

```
APEX_UI_DEFAULT_UPDATE.SYNCH_TABLE (
  p_table_name          IN VARCHAR2);
```

Parameters

Table 33-8 SYNCH_TABLE Parameters

Parameter	Description
p_table_name	Table name

Example

The following example synchronizes the UI Defaults for the EMP table that are associated with the current schema.

```
BEGIN
  apex_ui_default_update.synch_table (
    p_table_name => 'EMP' );
END;
```

33.9 UPD_AD_COLUMN Procedure

If the column name is found within the User Interface Default Attribute Dictionary, the column entry is updated using the provided parameters. If 'null%' is passed in, the value of the associated parameter is set to null.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_AD_COLUMN (
  p_column_name          IN  VARCHAR2,
  p_new_column_name      IN  VARCHAR2  DEFAULT NULL,
  p_label                IN  VARCHAR2  DEFAULT NULL,
  p_help_text            IN  VARCHAR2  DEFAULT NULL,
  p_format_mask          IN  VARCHAR2  DEFAULT NULL,
  p_default_value        IN  VARCHAR2  DEFAULT NULL,
```

```

p_form_format_mask      IN VARCHAR2 DEFAULT NULL,
p_form_display_width    IN VARCHAR2 DEFAULT NULL,
p_form_display_height   IN VARCHAR2 DEFAULT NULL,
p_form_data_type        IN VARCHAR2 DEFAULT NULL,
p_report_format_mask    IN VARCHAR2 DEFAULT NULL,
p_report_col_alignment  IN VARCHAR2 DEFAULT NULL);

```

Parameters

Table 33-9 UPD_AD_COLUMN Parameters

Parameter	Description
p_column_name	Name of column to be updated
p_new_column_name	New name for column, if column is being renamed
p_label	Used for item label and report column heading
p_help_text	Used for help text for items and interactive report columns
p_format_mask	Used as the format mask for items and report columns. Can be overwritten by report for form specific format masks.
p_default_value	Used as the default value for items.
p_form_format_mask	If provided, used as the format mask for items, overriding any value for the general format mask.
p_form_display_width	Used as the width of any items using this Attribute Definition.
p_form_display_height	Used as the height of any items using this Attribute Definition (only used by item types such as text areas and shuttles).
p_form_data_type	Used as the data type for items (results in an automatic validation). Valid values are VARCHAR, NUMBER and DATE.
p_report_format_mask	If provided, used as the format mask for report columns, overriding any value for the general format mask.
p_report_col_alignment	Used as the alignment for report column data (for example, number are usually right justified). Valid values are LEFT, CENTER, and RIGHT.

Note:

If p_label through p_report_col_alignment are set to 'null%', the value is nullified. If no value is passed in, that column is not updated.

Example

The following example updates the `CREATED_BY` column in the UI Defaults Attribute Dictionary within the workspace associated with the current schema, setting the `form_format_mask` to null.

```

BEGIN
  apex_ui_default_update.upd_ad_column (
    p_column_name      => 'CREATED_BY',
    p_form_format_mask => 'null%');
END;

```

33.10 UPD_AD_SYNONYM Procedure

If the synonym name is found within the User Interface Default Attribute Dictionary, the synonym name is updated.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_AD_SYNONYM (
    p_syn_name          IN VARCHAR2,
    p_new_syn_name      IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 33-10 UPD_AD_SYNONYM Parameters

Parameter	Description
p_syn_name	Name of synonym to be updated
p_new_syn_name	New name for synonym

Example

The following example updates the `CREATED_BY_USER` synonym in the UI Defaults Attribute Dictionary within the workspace associated with the current schema.

```
BEGIN
    apex_ui_default_update.upd_ad_synonym (
        p_syn_name      => 'CREATED_BY_USER',
        p_new_syn_name => 'USER_CREATED_BY');
END;
```

33.11 UPD_COLUMN Procedure

If the provided table and column exists within the user's schema's table based User Interface Defaults, the provided parameters are updated. If 'null%' is passed in, the value of the associated parameter is set to null.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_COLUMN (
    p_table_name          IN VARCHAR2,
    p_column_name         IN VARCHAR2,
    p_group_id            IN VARCHAR2 DEFAULT NULL,
    p_label               IN VARCHAR2 DEFAULT NULL,
    p_help_text           IN VARCHAR2 DEFAULT NULL,
    p_display_in_form     IN VARCHAR2 DEFAULT NULL,
    p_display_seq_form    IN VARCHAR2 DEFAULT NULL,
    p_mask_form           IN VARCHAR2 DEFAULT NULL,
    p_default_value       IN VARCHAR2 DEFAULT NULL,
    p_required            IN VARCHAR2 DEFAULT NULL,
    p_display_width       IN VARCHAR2 DEFAULT NULL,
    p_max_width           IN VARCHAR2 DEFAULT NULL,
    p_height              IN VARCHAR2 DEFAULT NULL,
    p_display_in_report   IN VARCHAR2 DEFAULT NULL,
    p_display_seq_report  IN VARCHAR2 DEFAULT NULL,
```



```

p_mask_report      IN VARCHAR2 DEFAULT NULL,
p_alignment        IN VARCHAR2 DEFAULT NULL);

```

Parameters

Table 33-11 UPD_COLUMN Parameters

Parameter	Description
p_table_name	Name of table whose column's UI Defaults are being updated
p_column_name	Name of column whose UI Defaults are being updated
p_group_id	id of group to be associated with the column
p_label	When creating a form against this table or view, this is used as the label for the item if this column is included. When creating a report or tabular form, this is used as the column heading if this column is included.
p_help_text	When creating a form against this table or view, this becomes the help text for the resulting item.
p_display_in_form	When creating a form against this table or view, this determines whether this column is displayed in the resulting form page. Valid values are Y and N.
p_display_seq_form	When creating a form against this table or view, this determines the sequence in which the columns is displayed in the resulting form page.
p_mask_form	When creating a form against this table or view, this specifies the mask that is applied to the item, such as 999-99-9999. This is not used for character based items.
p_default_value	When creating a form against this table or view, this specifies the default value for the item resulting from this column.
p_required	When creating a form against this table or view, this specifies to generate a validation in which the resulting item must be NOT NULL. Valid values are Y and N.
p_display_width	When creating a form against this table or view, this specifies the display width of the item resulting from this column.
p_max_width	When creating a form against this table or view, this specifies the maximum string length that a user is allowed to enter in the item resulting from this column.
p_height	When creating a form against this table or view, this specifies the display height of the item resulting from this column.
p_display_in_report	When creating a report against this table or view, this determines whether this column is displayed in the resulting report. Valid values are Y and N.
p_display_seq_report	When creating a report against this table or view, this determines the sequence in which the columns are displayed in the resulting report.
p_mask_report	When creating a report against this table or view, this specifies the mask that is applied against the data, such as 999-99-9999. This is not used for character based items.
p_alignment	When creating a report against this table or view, this determines the alignment for the resulting report column. Valid values are L for Left, C for Center, and R for Right.

 **Note:**

If `p_group_id` through `p_alignment` are set to 'null%', the value is nullified. If no value is passed in, that column is not updated.

Example

The following example updates the column `DEPT_NO` within the `EMP` table definition within the UI Defaults Table Dictionary within the current schema, setting the `group_id` to null.

```
BEGIN
  apex_ui_default_update.upd_column (
    p_table_name    => 'EMP',
    p_column_name   => 'DEPT_NO',
    p_group_id      => 'null%' );
END;
```

33.12 UPD_DISPLAY_IN_FORM Procedure

The `UPD_DISPLAY_IN_FORM` procedure sets the display in form user interface defaults. This user interface default is used by wizards when you select to create a form based upon the table. It controls whether the column is included by default or not.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_DISPLAY_IN_FORM (
  p_table_name          IN VARCHAR2,
  p_column_name         IN VARCHAR2,
  p_display_in_form     IN VARCHAR2);
```

Parameters**Table 33-12 UPD_DISPLAY_IN_FORM Parameters**

Parameter	Description
<code>p_table_name</code>	Table name
<code>p_column_name</code>	Column name
<code>p_display_in_form</code>	Determines whether to display in the form by default, valid values are Y and N

Example

In the following example, when creating a Form against the `DEPT` table, the display option on the `DEPTNO` column defaults to 'No'.

```
APEX_UI_DEFAULT_UPDATE.UPD_DISPLAY_IN_FORM(
  p_table_name => 'DEPT',
  p_column_name => 'DEPTNO',
  p_display_in_form => 'N');
```

33.13 UPD_DISPLAY_IN_REPORT Procedure

The `UPD_DISPLAY_IN_REPORT` procedure sets the display in report user interface default. This user interface default is used by wizards when you select to create a report based upon the table and controls whether the column is included by default or not.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_DISPLAY_IN_REPORT (
  p_table_name      IN VARCHAR2,
  p_column_name     IN VARCHAR2,
  p_display_in_report IN VARCHAR2);
```

Parameters

Table 33-13 UPD_DISPLAY_IN_REPORT Parameters

Parameter	Description
<code>p_table_name</code>	Table name
<code>p_column_name</code>	Column name
<code>p_display_in_report</code>	Determines whether to display in the report by default, valid values are Y and N

Example

In the following example, when creating a Report against the DEPT table, the display option on the DEPTNO column defaults to 'No'.

```
APEX_UI_DEFAULT_UPDATE.UPD_DISPLAY_IN_REPORT(
  p_table_name => 'DEPT',
  p_column_name => 'DEPTNO',
  p_display_in_report => 'N');
```

33.14 UPD_FORM_REGION_TITLE Procedure

The `UPD_FORM_REGION_TITLE` procedure updates the Form Region Title user interface default. User interface defaults are used in wizards when you create a form based upon the specified table.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_FORM_REGION_TITLE (
  p_table_name      IN VARCHAR2,
  p_form_region_title IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 33-14 UPDATE_FORM_REGION_TITLE Parameters

Parameter	Description
<code>p_table_name</code>	Table name

Table 33-14 (Cont.) UPDATE_FORM_REGION_TITLE Parameters

Parameter	Description
p_form_region_title	Desired form region title

Example

This example demonstrates how to set the Forms Region Title user interface default on the DEPT table.

```
APEX_UI_DEFAULT_UPDATE.UPDATE_FORM_REGION_TITLE (
  p_table_name      => 'DEPT',
  p_form_region_title => 'Department Details');
```

33.15 UPD_GROUP Procedure

If the provided table and group exist within the user's schema's table based User Interface Defaults, the group name, description and display sequence of the group are updated. If 'null%' is passed in for p_description or p_display_sequence, the value is set to null.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPDATE_GROUP (
  p_table_name      IN VARCHAR2,
  p_group_name      IN VARCHAR2,
  p_new_group_name  IN VARCHAR2 DEFAULT NULL,
  p_description     IN VARCHAR2 DEFAULT NULL,
  p_display_sequence IN VARCHAR2 DEFAULT NULL);
```

Parameters**Table 33-15 UPD_GROUP Parameters**

Parameter	Description
p_table_name	Name of table whose group is being updated
p_group_name	Group being updated
p_new_group_name	New name for group, if group is being renamed
p_description	Description of group
p_display_sequence	Display sequence of group.

 **Note:**

If p_description or p_display_sequence are set to 'null%', the value is nullified. If no value is passed in, that column is not updated.

Example

The following example updates the description of the group `AUDIT_INFO` within the `EMP` table definition within the UI Defaults Table Dictionary within the current schema.

```
BEGIN
  apex_ui_default_update.upd_group (
    p_table_name => 'EMP',
    p_group_name => 'AUDIT_INFO',
    p_description => 'Audit columns' );
END;
```

33.16 UPD_ITEM_DISPLAY_HEIGHT Procedure

The `UPD_ITEM_DISPLAY_HEIGHT` procedure sets the item display height user interface default. This user interface default is used by wizards when you select to create a form based upon the table and include the specified column. Display height controls if the item is a text box or a text area.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_ITEM_DISPLAY_HEIGHT (
  p_table_name          IN VARCHAR2,
  p_column_name         IN VARCHAR2,
  p_display_height      IN NUMBER);
```

Parameters

Table 33-16 UPD_ITEM_DISPLAY_HEIGHT Parameters

Parameter	Description
<code>p_table_name</code>	Table name
<code>p_column_name</code>	Column name
<code>p_display_height</code>	Display height of any items created based upon this column

Example

The following example sets a default item height of 3 when creating an item on the `DNAME` column against the `DEPT` table.

```
APEX_UI_DEFAULT_UPDATE.UPD_ITEM_DISPLAY_HEIGHT(
  p_table_name => 'DEPT',
  p_column_name => 'DNAME',
  p_display_height => 3);
```

33.17 UPD_ITEM_DISPLAY_WIDTH Procedure

The `UPD_ITEM_DISPLAY_WIDTH` procedure sets the item display width user interface default. This user interface default is used by wizards when you select to create a form based upon the table and include the specified column.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_ITEM_DISPLAY_WIDTH (
  p_table_name          IN VARCHAR2,
  p_column_name         IN VARCHAR2,
  p_display_width       IN NUMBER);
```

Parameters**Table 33-17 UPD_ITEM_DISPLAY_WIDTH Parameters**

Parameter	Description
p_table_name	Table name
p_column_name	Column name
p_display_width	Display width of any items created based upon this column

Example

The following example sets a default item width of 5 when creating an item on the DEPTNO column against the DEPT table.

```
APEX_UI_DEFAULT_UPDATE.UPD_ITEM_DISPLAY_WIDTH(
  p_table_name => 'DEPT',
  p_column_name => 'DEPTNO',
  p_display_width => 5);
```

33.18 UPD_ITEM_FORMAT_MASK Procedure

The UPD_ITEM_FORMAT_MASK procedure sets the item format mask user interface default. This user interface default is used by wizards when you select to create a form based upon the table and include the specified column. Item format mask is typically used to format numbers and dates.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_ITEM_FORMAT_MASK (
  p_table_name          IN VARCHAR2,
  p_column_name         IN VARCHAR2,
  p_format_mask         IN VARCHAR2 DEFAULT NULL);
```

Parameters**Table 33-18 UPD_ITEM_FORMAT_MASK Parameters**

Parameter	Description
p_table_name	Table name
p_column_name	Column name
p_format_mask	Format mask to be associated with the column

Example

In the following example, when creating a Form against the EMP table, the default item format mask on the HIREDATE column is set to 'DD-MON-YYYY'.

```
APEX_UI_DEFAULT_UPDATE.UPD_ITEM_FORMAT_MASK(
  p_table_name => 'EMP',
  p_column_name => 'HIREDATE',
  p_format_mask=> 'DD-MON-YYYY');
```

33.19 UPD_ITEM_HELP Procedure

The `UPD_ITEM_HELP` procedure updates the help text for the specified table and column. This user interface default is used when you create a form based upon the table and select to include the specified column.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_ITEM_HELP (
  p_table_name          IN VARCHAR2,
  p_column_name         IN VARCHAR2,
  p_help_text           IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 33-19 UPD_ITEM_HELP Parameters

Parameter	Description
<code>p_table_name</code>	Table name
<code>p_column_name</code>	Column name
<code>p_help_text</code>	Desired help text

Example

This example demonstrates how to set the User Interface Item Help Text default for the DEPTNO column in the DEPT table.

```
APEX_UI_DEFAULT_UPDATE.UPD_ITEM_HELP(
  p_table_name => 'DEPT',
  p_column_name => 'DEPTNO',
  p_help_text => 'The number assigned to the department.');
```

33.20 UPD_LABEL Procedure

The `UPD_LABEL` procedure sets the label used for items. This user interface default is used when you create a form or report based on the specified table and include a specific column.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_LABEL (
  p_table_name          IN VARCHAR2,
  p_column_name         IN VARCHAR2,
  p_label               IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 33-20 UPD__LABEL Parameters

Parameter	Description
p_table_name	Table name
p_column_name	Column name
p_label	Desired item label

Example

This example demonstrates how to set the User Interface Item Label default for the DEPTNO column in the DEPT table.

```
APEX_UI_DEFAULT_UPDATE.UPD_LABEL(
  p_table_name => 'DEPT',
  p_column_name => 'DEPTNO',
  p_label => 'Department Number');
```

33.21 UPD_REPORT_ALIGNMENT Procedure

The UPD_REPORT_ALIGNMENT procedure sets the report alignment user interface default. This user interface default is used by wizards when you select to create a report based upon the table and include the specified column and determines if the report column should be left, center, or right justified.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_REPORT_ALIGNMENT (
  p_table_name          IN VARCHAR2,
  p_column_name         IN VARCHAR2,
  p_report_alignment    IN VARCHAR2);
```

Parameters

Table 33-21 UPD_REPORT_ALIGNMENT Parameters

Parameter	Description
p_table_name	Table name.
p_column_name	Column name.
p_report_alignment	Defines the alignment of the column in a report. Valid values are L (left), C (center) and R (right).

Example

In the following example, when creating a Report against the DEPT table, the default column alignment on the DEPTNO column is set to Right justified.

```
APEX_UI_DEFAULT_UPDATE.UPD_REPORT_ALIGNMENT(
  p_table_name => 'DEPT',
  p_column_name => 'DEPTNO',
  p_report_alignment => 'R');
```


33.22 UPD_REPORT_FORMAT_MASK Procedure

The `UPD_REPORT_FORMAT_MASK` procedure sets the report format mask user interface default. This user interface default is used by wizards when you select to create a report based upon the table and include the specified column. Report format mask is typically used to format numbers and dates.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_REPORT_FORMAT_MASK (
  p_table_name      IN VARCHAR2,
  p_column_name     IN VARCHAR2,
  p_format_mask     IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 33-22 UPD_REPORT_FORMAT_MASK Parameters

Parameter	Description
<code>p_table_name</code>	Table name
<code>p_column_name</code>	Column name
<code>p_format_mask</code>	Format mask to be associated with the column whenever it is included in a report

Example

In the following example, when creating a Report against the EMP table, the default format mask on the HIREDATE column is set to 'DD-MON-YYYY'.

```
APEX_UI_DEFAULT_UPDATE.UPD_REPORT_FORMAT_MASK(
  p_table_name => 'EMP',
  p_column_name => 'HIREDATE',
  p_format_mask=> 'DD-MON-YYYY');
```

33.23 UPD_REPORT_REGION_TITLE Procedure

The `UPD_REPORT_REGION_TITLE` procedure sets the Report Region Title. User interface defaults are used in wizards when a report is created on a table.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_REPORT_REGION_TITLE (
  p_table_name      IN VARCHAR2,
  p_report_region_title  IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 33-23 UPD_REPORT_REGION_TITLE Parameters

Parameter	Description
<code>p_table_name</code>	Table name

Table 33-23 (Cont.) UPD_REPORT_REGION_TITLE Parameters

Parameter	Description
p_report_region_title	Desired report region title

Example

This example demonstrates how to set the Reports Region Title user interface default on the DEPT table.

```
APEX_UI_DEFAULT_UPDATE.UPD_REPORT_REGION_TITLE (
  p_table_name      => 'DEPT',
  p_report_region_title => 'Departments');
```

33.24 UPD_TABLE Procedure

If the provided table exists within the user's schema's table based User Interface Defaults, the form region title and report region title are updated to match those provided. If 'null%' is passed in for p_form_region_title or p_report_region_title, the value is set to null.

Syntax

```
APEX_UI_DEFAULT_UPDATE.UPD_TABLE (
  p_table_name      IN VARCHAR2,
  p_form_region_title IN VARCHAR2 DEFAULT NULL,
  p_report_region_title IN VARCHAR2 DEFAULT NULL);
```

Parameters**Table 33-24 UPD_TABLE Parameters**

Parameter	Description
p_table_name	Name of table being updated.
p_form_region_title	Region title used for forms.
p_report_region_title	Region title used for reports and tabular forms.

 **Note:**

if 'null%' is passed in for p_form_region_title or p_report_region_title, the value is set to null. If no value is passed in, that column is not updated.

Example

The following example updates the EMP table definition within the UI Defaults Table Dictionary within the current schema.

```
begin
  apex_ui_default_update.upd_table (
    p_table_name      => 'EMP',
```

```
        p_form_region_title => 'Employee Details',  
        p_report_region_title => 'Employees' );  
end;  
/
```

34

APEX_UTIL

The `APEX_UTIL` package provides utilities you can use when programming in the Oracle Application Express environment. You can use the `APEX_UTIL` package to get and set session state, get files, check authorizations for users, reset different states for users, get and purge cache information and also to get and set preferences for users.

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34.1 CACHE_GET_DATE_OF_PAGE_CACHE Function

This function returns the date and time a specified application page was cached either for the user issuing the call, or for all users if the page was not set to be cached by user.

Syntax

```
APEX_UTIL.CACHE_GET_DATE_OF_PAGE_CACHE (
    p_application IN NUMBER,
    p_page        IN NUMBER)
RETURN DATE;
```

Parameters

Table 34-1 CACHE_GET_DATE_OF_PAGE_CACHE Parameters

Parameter	Description
p_application	The identification number (ID) of the application.
p_page	The page number (ID).

Example

The following example demonstrates how to use the `CACHE_GET_DATE_OF_PAGE_CACHE` function to retrieve the cache date and time for page 9 of the currently executing application. If page 9 has been cached, the cache date and time is output using the HTP package. The page could have been cached either by the user issuing the call, or for all users if the page was not to be cached by the user.

```
DECLARE
    l_cache_date DATE DEFAULT NULL;
BEGIN
    l_cache_date := APEX_UTIL.CACHE_GET_DATE_OF_PAGE_CACHE(
        p_application => :APP_ID,
        p_page => 9);
    IF l_cache_date IS NOT NULL THEN
        HTP.P('Cached on ' || TO_CHAR(l_cache_date, 'DD-MON-YY HH24:MI:SS'));
    END IF;
END;
```

34.2 CACHE_GET_DATE_OF_REGION_CACHE Function

This function returns the date and time a specified region was cached either for the user issuing the call, or for all users if the page was not set to be cached by user.

Syntax

```
APEX_UTIL.CACHE_GET_DATE_OF_REGION_CACHE (
    p_application IN NUMBER,
    p_page        IN NUMBER,
    p_region_name IN VARCHAR2)
RETURN DATE;
```

Parameters**Table 34-2** CACHE_GET_DATE_OF_REGION_CACHE Parameters

Parameter	Description
p_application	The identification number (ID) of the application
p_page	The page number (ID).
p_region_name	The region name.

Example

The following example demonstrates how to use the `CACHE_GET_DATE_OF_REGION_CACHE` function to retrieve the cache date and time for the region named `Cached Region` on page 13 of the currently executing application. If the region has been cached, the cache date and time is output using the HTP package. The region could have been cached either by the user issuing the call, or for all users if the page was not to be cached by user.

```
DECLARE
    l_cache_date DATE DEFAULT NULL;
BEGIN
    l_cache_date := APEX_UTIL.CACHE_GET_DATE_OF_REGION_CACHE(
        p_application => :APP_ID,
        p_page => 13,
        p_region_name => 'Cached Region');
    IF l_cache_date IS NOT NULL THEN
        HTP.P('Cached on ' || TO_CHAR(l_cache_date, 'DD-MON-YY HH24:MI:SS'));
    END IF;
END;
```

34.3 CACHE_PURGE_BY_APPLICATION Procedure

This procedure purges all cached pages and regions for a given application.

Syntax

```
APEX_UTIL.CACHE_PURGE_BY_APPLICATION (
    p_application IN NUMBER);
```

Parameters

Table 34-3 CACHE_PURGE_BY_APPLICATION Parameters

Parameter	Description
p_application	The identification number (ID) of the application.

Example

The following example demonstrates how to use the `CACHE_PURGE_BY_APPLICATION` procedure to purge all the cached pages and regions for the application currently executing.

```
BEGIN
  APEX_UTIL.CACHE_PURGE_BY_APPLICATION(p_application => :APP_ID);
END;
```

34.4 CACHE_PURGE_BY_PAGE Procedure

This procedure purges the cache for a given application and page. If the page itself is not cached but contains one or more cached regions, then the cache for these is also purged.

Syntax

```
APEX_UTIL.CACHE_PURGE_BY_PAGE (
  p_application IN NUMBER,
  p_page       IN NUMBER,
  p_user_name  IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 34-4 CACHE_PURGE_BY_PAGE Parameters

Parameter	Description
p_application	The identification number (ID) of the application.
p_page	The page number (ID).
p_user_name	The user associated with cached pages and regions.

Example

The following example demonstrates how to use the `CACHE_PURGE_BY_PAGE` procedure to purge the cache for page 9 of the application currently executing. Additionally, if the `p_user_name` parameter is supplied, this procedure would be further restricted by a specific users cache (only relevant if the cache is set to be by user).

```
BEGIN
  APEX_UTIL.CACHE_PURGE_BY_PAGE(
    p_application => :APP_ID,
    p_page => 9);
END;
```

34.5 CACHE_PURGE_STALE Procedure

This procedure deletes all cached pages and regions for a specified application that have passed the defined active time period. When you cache a page or region, you specify an active time period (or Cache Timeout). Once that period has passed, the cache is no longer used, thus removing those unusable pages or regions from the cache.

Syntax

```
APEX_UTIL.CACHE_PURGE_STALE (  
    p_application IN NUMBER);
```

Parameters

Table 34-5 CACHE_PURGE_STALE Parameters

Parameter	Description
p_application	The identification number (ID) of the application.

Example

The following example demonstrates how to use the CACHE_PURGE_STALE procedure to purge all the stale pages and regions in the application currently executing.

```
BEGIN  
    APEX_UTIL.CACHE_PURGE_STALE(p_application => :APP_ID);  
END;
```

34.6 CHANGE_CURRENT_USER_PW Procedure

This procedure changes the password of the currently authenticated user, assuming Application Express user accounts are in use.

Syntax

```
APEX_UTIL.CHANGE_CURRENT_USER_PW(  
    p_new_password IN VARCHAR2);
```

Parameters

Table 34-6 CHANGE_CURRENT_USER_PW Parameters

Parameter	Description
p_new_password	The new password value in clear text.

Example

The following example demonstrates how to use the CHANGE_CURRENT_USER_PW procedure to change the password for the user who is currently authenticated, assuming Application Express accounts are in use.

```
BEGIN
  APEX_UTIL.CHANGE_CURRENT_USER_PW ('secret99');
END;
```

34.7 CHANGE_PASSWORD_ON_FIRST_USE Function

Enables a developer to check whether this property is enabled or disabled for an end user account. This function returns TRUE if the account password must be changed upon first use (after successful authentication) after the password is initially set and after it is changed on the Administration Service, Edit User page. This function returns FALSE if the account does not have this property.

This function may be run in a page request context by any authenticated user.

Syntax

```
APEX_UTIL.CHANGE_PASSWORD_ON_FIRST_USE (
  p_user_name IN VARCHAR2)
RETURN BOOLEAN;
```

Parameters

Table 34-7 CHANGE_PASSWORD_ON_FIRST_USE Parameters

Parameter	Description
p_user_name	The user name of the user account.

Example

The following example demonstrates how to use the CHANGE_PASSWORD_ON_FIRST_USE function. Use this function to check if the password of an Application Express user account (workspace administrator, developer, or end user) in the current workspace must be changed by the user the first time it is used.

```
BEGIN
  FOR c1 IN (SELECT user_name FROM apex_users) LOOP
    IF APEX_UTIL.CHANGE_PASSWORD_ON_FIRST_USE(p_user_name => c1.user_name) THEN
      htp.p('User: ' || c1.user_name || ' requires password to be changed the first
time it is used.');

```

34.8 CLOSE_OPEN_DB_LINKS Procedure

This procedure closes all open database links for the current database session. It is rare that this procedure would ever be called programmatically in an application. The primary purpose of this procedure is for the middleware technology in an Oracle Application Express environment (for example, Oracle REST Data Service, mod_plsql) to be configured such that it closes all of the open database links in a session, either before a request is made to the Application Express engine, or after a request to the Application Express engine is completed but before the database session is returned to the pool.

Syntax

```
APEX_UTIL.CLOSE_OPEN_DB_LINKS
```

Parameters

None.

Example

In this example, the configuration of Oracle REST Data Services closes any open database links both before the request is made to the Application Express engine and after the request is complete.

```
<entry key="procedure.postProcess">apex_util.close_open_db_links</entry>
<entry key="procedure.preProcess">apex_util.close_open_db_links</entry>
```

When using Oracle HTTP Server and `mod_plsql`, this configuration would look like this:

```
PlsqlBeforeProcedure    apex_util.close_open_db_links
PlsqlAfterProcedure     apex_util.close_open_db_links
```

34.9 CLEAR_APP_CACHE Procedure

This procedure removes session state for a given application for the current session.

Syntax

```
APEX_UTIL.CLEAR_APP_CACHE (
    p_app_id    IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 34-8 CLEAR_APP_CACHE Parameters

Parameter	Description
p_app_id	The ID of the application for which session state is cleared for current session.

Example

The following example demonstrates how to use the `CLEAR_APP_CACHE` procedure to clear all the current sessions state for the application with an ID of 100.

```
BEGIN
    APEX_UTIL.CLEAR_APP_CACHE('100');
END;
```

34.10 CLEAR_PAGE_CACHE Procedure

This procedure removes session state for a given page for the current session. If `p_page_id` is not specified, then the current page will be cleared.

Syntax

```
APEX_UTIL.CLEAR_PAGE_CACHE (  
    p_page_id IN NUMBER DEFAULT NULL);
```

Parameters

Table 34-9 CLEAR_PAGE_CACHE Parameters

Parameter	Description
p_page_id	The ID of the page in the current application for which session state is cleared for current session.

Example

The following example demonstrates how to use the `CLEAR_PAGE_CACHE` procedure to clear the current session state for the page with an ID of 10.

```
BEGIN  
    APEX_UTIL.CLEAR_PAGE_CACHE(10);  
END;
```

34.11 CLEAR_USER_CACHE Procedure

This procedure removes session state and application system preferences for the current user's session. Run this procedure if you reuse session IDs and want to run applications without the benefit of existing session state.

Syntax

```
APEX_UTIL.CLEAR_USER_CACHE;
```

Parameters

None.

Example

The following example demonstrates how to use the `CLEAR_USER_CACHE` procedure to clear all session state and application system preferences for the current user's session.

```
BEGIN  
    APEX_UTIL.CLEAR_USER_CACHE;  
END;
```

34.12 COUNT_CLICK Procedure

This procedure counts clicks from an application built in App Builder to an external site. You can also use the shorthand version, procedure `z`, in place of `APEX_UTIL.COUNT_CLICK`.

Syntax

```
APEX_UTIL.COUNT_CLICK (
    p_url          IN    VARCHAR2,
    p_cat          IN    VARCHAR2,
    p_id           IN    VARCHAR2    DEFAULT NULL,
    p_user         IN    VARCHAR2    DEFAULT NULL,
    p_workspace    IN    VARCHAR2    DEFAULT NULL);
```

Parameters**Table 34-10** COUNT_CLICK Parameters

Parameter	Description
p_url	The URL to which to redirect
p_cat	A category to classify the click
p_id	Secondary ID to associate with the click (optional)
p_user	The application user ID (optional)
p_workspace	The workspace associated with the application (optional)

Example

The following example demonstrates how to use the COUNT_CLICK procedure to log how many user's click on the <http://yahoo.com> link specified. Note that once this information is logged, you can view it by using the APEX_WORKSPACE_CLICKS view and in the reports on this view available to workspace and site administrators.

```
DECLARE
    l_url VARCHAR2(255);
    l_cat VARCHAR2(30);
    l_workspace_id VARCHAR2(30);
BEGIN
    l_url := 'http://yahoo.com';
    l_cat := 'yahoo';
    l_workspace_id := TO_CHAR(APEX_UTIL.FIND_SECURITY_GROUP_ID('MY_WORKSPACE'));

    HTP.P('<a href=APEX_UTIL.COUNT_CLICK?p_url=' || l_url || '&p_cat=' || l_cat ||
    '&p_workspace=' || l_workspace_id || '>Click</a>');
END;
```

34.13 CREATE_USER Procedure

This procedure creates a new account record in the Application Express user account table. To execute this procedure, the current user must have administrative privileges.

Syntax

```
APEX_UTIL.CREATE_USER(
    p_user_id          IN    NUMBER    DEFAULT NULL,
    p_user_name        IN    VARCHAR2,
    p_first_name       IN    VARCHAR2    DEFAULT NULL,
    p_last_name        IN    VARCHAR2    DEFAULT NULL,
    p_description      IN    VARCHAR2    DEFAULT NULL,
```

```

p_email_address          IN      VARCHAR2      DEFAULT NULL,
p_web_password           IN      VARCHAR2,
p_web_password_format    IN      VARCHAR2      DEFAULT 'CLEAR_TEXT',
p_group_ids              IN      VARCHAR2      DEFAULT NULL,
p_developer_privs        IN      VARCHAR2      DEFAULT NULL,
p_default_schema         IN      VARCHAR2      DEFAULT NULL,
p_allow_access_to_schemas IN    VARCHAR2      DEFAULT NULL,
p_account_expiry         IN      DATE          DEFAULT TRUNC(SYSDATE),
p_account_locked         IN      VARCHAR2      DEFAULT 'N',
p_failed_access_attempts IN      NUMBER       DEFAULT 0,
p_change_password_on_first_use IN  VARCHAR2      DEFAULT 'Y',
p_first_password_use_occurred IN  VARCHAR2      DEFAULT 'N',
p_attribute_01           IN      VARCHAR2      DEFAULT NULL,
p_attribute_02           IN      VARCHAR2      DEFAULT NULL,
p_attribute_03           IN      VARCHAR2      DEFAULT NULL,
p_attribute_04           IN      VARCHAR2      DEFAULT NULL,
p_attribute_05           IN      VARCHAR2      DEFAULT NULL,
p_attribute_06           IN      VARCHAR2      DEFAULT NULL,
p_attribute_07           IN      VARCHAR2      DEFAULT NULL,
p_attribute_08           IN      VARCHAR2      DEFAULT NULL,
p_attribute_09           IN      VARCHAR2      DEFAULT NULL,
p_attribute_10          IN      VARCHAR2      DEFAULT NULL,
p_allow_app_building_yn  IN      VARCHAR2      DEFAULT NULL,
p_allow_sql_workshop_yn IN      VARCHAR2      DEFAULT NULL,
p_allow_websheet_dev_yn IN      VARCHAR2      DEFAULT NULL,
p_allow_team_development_yn IN    VARCHAR2      DEFAULT NULL);

```

Parameters

Table 34-11 CREATE_USER Procedure Parameters

Parameter	Description
p_user_id	Numeric primary key of user account.
p_user_name	Alphanumeric name used for login.
p_first_name	Informational.
p_last_name	Informational.
p_description	Informational.
p_email_address	Email address.
p_web_password	Clear text password.
p_web_password_format	If the value your passing for the p_web_password parameter is in clear text format then use CLEAR_TEXT, otherwise use HEX_ENCODED_DIGEST_V2.
p_group_ids	Colon separated list of numeric group IDs.

Table 34-11 (Cont.) CREATE_USER Procedure Parameters

Parameter	Description
p_developer_privs	<p>Colon separated list of developer privileges. If p_developer_privs is not null, the user is given access to Team Development. If p_developer_privs contains ADMIN, the user is given App Builder and SQL Workshop access. If p_developer_privs does not contain ADMIN but contains EDIT, the user is given App Builder Access. If p_developer_privs does not contain ADMIN but contains SQL, the user is given SQL Workshop access. The following are acceptable values for this parameter:</p> <p>null - To create an end user (a user who can only authenticate to developed applications).</p> <p>CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL - To create a user with developer privileges with access to App Builder and SQL Workshop.</p> <p>ADMIN:CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL - To create a user with full workspace administrator and developer privileges with access to App Builder, SQL Workshop and Team Development.</p> <p>Note: Currently this parameter is named inconsistently between the CREATE_USER, EDIT_USER and FETCH_USER APIs, although they all relate to the DEVELOPER_ROLE field stored in the named user account record. CREATE_USER uses p_developer_privs, EDIT_USER uses p_developer_roles and FETCH_USER uses p_developer_role.</p>
p_default_schema	A database schema assigned to the user's workspace, used by default for browsing.
p_allow_access_to_schemas	Colon separated list of schemas assigned to the user's workspace to which the user is restricted (leave null for all).
p_account_expiry	Date password was last updated, which defaults to today's date on creation.
p_account_locked	'Y' or 'N' indicating if account is locked or unlocked.
p_failed_access_attempts	Number of consecutive login failures that have occurred, defaults to 0 on creation.
p_change_password_on_first_use	'Y' or 'N' to indicate whether password must be changed on first use, defaults to 'Y' on creation.
p_first_password_use_occurred	'Y' or 'N' to indicate whether login has occurred since password change, defaults to 'N' on creation.
p_attribute_01	Arbitrary text accessible with an API.
...	
p_attribute_10	
p_allow_app_building_yn	'Y' or 'N' to indicate whether access is allowed to App Builder.
p_allow_sql_workshop_yn	'Y' or 'N' to indicate whether access is allowed to SQL Workshop.

Table 34-11 (Cont.) CREATE_USER Procedure Parameters

Parameter	Description
p_allow_websheet_dev_yn	'Y' or 'N' to indicate whether access is allowed to Websheet development.
p_allow_team_development_yn	'Y' or 'N' to indicate whether access is allowed to Team Development.

Example 1

The following simple example creates an 'End User' called 'NEWUSER1' with a password of 'secret99'. Note an 'End User' can only authenticate to developed applications.

```
BEGIN
  APEX_UTIL.CREATE_USER(
    p_user_name      => 'NEWUSER1',
    p_web_password   => 'secret99');
END;
```

Example 2

The following example creates a 'Workspace Administrator' called 'NEWUSER2'. Where the user 'NEWUSER2':

- Has full workspace administration and developer privilege (p_developer_privs parameter set to 'ADMIN:CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL').
- Has access to 2 schemas, both their browsing default 'MY_SCHEMA' (p_default_schema parameter set to 'MY_SCHEMA') and also 'MY_SCHEMA2' (p_allow_access_to_schemas parameter set to 'MY_SCHEMA2').
- Does not have to change their password when they first login (p_change_password_on_first_use parameter set to 'N').
- Has their phone number stored in the first additional attribute (p_attribute_01 parameter set to '123 456 7890').

```
BEGIN
  APEX_UTIL.CREATE_USER(
    p_user_name           => 'NEWUSER2',
    p_first_name         => 'FRANK',
    p_last_name          => 'SMITH',
    p_description         => 'Description...',
    p_email_address      => 'frank@smith.com',
    p_web_password       => 'password',
    p_developer_privs    =>
'ADMIN:CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL',
    p_default_schema     => 'MY_SCHEMA',
    p_allow_access_to_schemas => 'MY_SCHEMA2',
    p_change_password_on_first_use => 'N',
    p_attribute_01      => '123 456 7890');
END;
```

34.14 CREATE_USER_GROUP Procedure

Assuming you are using Application Express authentication, this procedure creates a user group. To execute this procedure, the current user must have administrative privileges in the workspace.

Syntax

```
APEX_UTIL.CREATE_USER_GROUP(
  p_id                IN NUMBER default null,
  p_group_name        IN ARCHAR2,
  p_security_group_id IN NUMBER default null,
  p_group_desc        IN VARCHAR2 default null,);
```

Parameter

Table 34-12 CREATE_USER_GROUP Parameters

Parameter	Description
p_id	Primary key of group.
p_group_name	Name of group.
p_security_group_id	Workspace ID.
p_group_desc	Descriptive text.

Example

The following example demonstrates how to use the `CREATE_USER_GROUP` procedure to create a new group called 'Managers' with a description of 'text'. Pass null for the `p_id` parameter to allow the database trigger to assign the new primary key value. Pass null for the `p_security_group_id` parameter to default to the current workspace ID.

```
BEGIN
  APEX_UTIL.CREATE_USER_GROUP (
    p_id                => null,          -- trigger assigns PK
    p_group_name        => 'Managers',
    p_security_group_id => null,          -- defaults to current workspace ID
    p_group_desc        => 'text');
END;
```

34.15 CURRENT_USER_IN_GROUP Function

This function returns a Boolean result based on whether the current user is a member of the specified group. You can use the group name or group ID to identify the group.

Syntax

```
APEX_UTIL.CURRENT_USER_IN_GROUP(
  p_group_name IN VARCHAR2)
RETURN BOOLEAN;

APEX_UTIL.CURRENT_USER_IN_GROUP(
  p_group_id   IN NUMBER)
RETURN BOOLEAN;
```

Parameters

Table 34-13 CURRENT_USER_IN_GROUP Parameters

Parameter	Description
p_group_name	Identifies the name of an existing group in the workspace
p_group_id	Identifies the numeric ID of an existing group in the workspace

Example

The following example demonstrates how to use the `CURRENT_USER_IN_GROUP` function to check if the user currently authenticated belongs to the group 'Managers'.

```
DECLARE
    VAL BOOLEAN;
BEGIN
    VAL := APEX_UTIL.CURRENT_USER_IN_GROUP(p_group_name=>'Managers');
END;
```

34.16 CUSTOM_CALENDAR Procedure

Use this procedure to change the existing calendar view to Custom Calendar.

Syntax

```
APEX_UTIL.CUSTOM_CALENDAR(
    p_date_type_field IN VARCHAR2);
```

Parameters

Table 34-14 CUSTOM_CALENDAR Parameters

Parameter	Description
p_date_type_field	Identifies the item name used to define the type of calendar to be displayed.

Example 1

The following example defines a custom calendar based on the hidden calendar type field. Assuming the Calendar is created in Page 9, the following example hides the column called `P9_CALENDAR_TYPE`.

```
APEX_UTIL.CUSTOM_CALENDAR(
    'P9_CALENDAR_TYPE');
```

34.17 DELETE_USER_GROUP Procedure Signature 1

Assuming you are using Application Express authentication, this procedure deletes a user group by providing the primary key of the group. To execute this procedure, the current user must have administrative privileges in the workspace.

Syntax

```
APEX_UTIL.DELETE_USER_GROUP(
    p_group_id IN NUMBER);
```

Parameter**Table 34-15 DELETE_USER_GROUP Procedure Signature 1 Parameters**

Parameter	Description
p_group_id	Primary key of group.

Example

The following example demonstrates how to use the `DELETE_USER_GROUP` procedure signature 1 to remove the user group called 'Managers', by providing the user group's primary key.

```
DECLARE
    VAL NUMBER;
BEGIN
    VAL := APEX_UTIL.GET_GROUP_ID (
        p_group_name => 'Managers');
    APEX_UTIL.DELETE_USER_GROUP (
        p_group_id => VAL);
END;
```

34.18 DELETE_USER_GROUP Procedure Signature 2

Assuming you are using Application Express authentication, this procedure deletes a user group by providing the name of the group. To execute this procedure, the current user must have administrative privileges in the workspace.

Syntax

```
APEX_UTIL.DELETE_USER_GROUP(
    p_group_name IN VARCHAR2);
```

Parameter**Table 34-16 DELETE_USER_GROUP Procedure Signature 2 Parameters**

Parameter	Description
p_group_name	Name of group

Example

The following example demonstrates how to use the `DELETE_USER_GROUP` procedure signature 2 to remove the user group called 'Managers', by providing the name of the user group.

```
BEGIN
    APEX_UTIL.DELETE_USER_GROUP (
```

```

        p_group_name => 'Managers');
END;
```

34.19 DOWNLOAD_PRINT_DOCUMENT Procedure Signature 1

This procedure initiates the download of a print document using XML based report data (as a BLOB) and RTF or XSL-FO based report layout.

Syntax

```

APEX_UTIL.DOWNLOAD_PRINT_DOCUMENT (
    p_file_name          IN VARCHAR,
    p_content_disposition IN VARCHAR,
    p_report_data        IN BLOB,
    p_report_layout      IN CLOB,
    p_report_layout_type IN VARCHAR2 default 'xsl-fo',
    p_document_format    IN VARCHAR2 default 'pdf',
    p_print_server       IN VARCHAR2 default null);
```

Parameters

Table 34-17 DOWNLOAD_PRINT_DOCUMENT Parameters

Parameter	Description
p_file_name	Defines the filename of the print document.
p_content_disposition	Specifies whether to download the print document or display inline ("attachment", "inline").
p_report_data	XML based report data.
p_report_layout	Report layout in XSL-FO or RTF format.
p_report_layout_type	Defines the report layout type, that is "xsl-fo" or "rtf".
p_document_format	Defines the document format, that is "pdf", "rtf", "xls", "htm", or "xml".
p_print_server	URL of the print server. If not specified, the print server is derived from preferences.

34.20 DOWNLOAD_PRINT_DOCUMENT Procedure Signature 2

This procedure initiates the download of a print document using pre-defined report query and RTF and XSL-FO based report layout.

Syntax

```

APEX_UTIL.DOWNLOAD_PRINT_DOCUMENT (
    p_file_name          IN VARCHAR,
    p_content_disposition IN VARCHAR,
    p_application_id     IN NUMBER,
    p_report_query_name  IN VARCHAR2,
    p_report_layout      IN CLOB,
```

```
p_report_layout_type IN VARCHAR2 default 'xsl-fo',
p_document_format   IN VARCHAR2 default 'pdf',
p_print_server      IN VARCHAR2 default null);
```

Parameters

Table 34-18 DOWNLOAD_PRINT_DOCUMENT Parameters

Parameter	Description
p_file_name	Defines the filename of the print document.
p_content_disposition	Specifies whether to download the print document or display inline ("attachment", "inline").
p_application_id	Defines the application ID of the report query.
p_report_query_name	Name of the report query (stored under application's Shared Components).
p_report_layout	Report layout in XSL-FO or RTF format.
p_report_layout_type	Defines the report layout type, that is "xsl-fo" or "rtf".
p_document_format	Defines the document format, that is "pdf", "rtf", "xls", "htm", or "xml".
p_print_server	URL of the print server. If not specified, the print server is derived from preferences.

Example for Signature 2

The following example shows how to use the `DOWNLOAD_PRINT_DOCUMENT` using Signature 2 (Pre-defined report query and RTF or XSL-FO based report layout.). In this example, the data for the report is taken from a Report Query called 'ReportQueryAndXSL' stored in the current application's Shared Components > Report Queries. The report layout is taken from a value stored in a page item (P1_XSL).

```
BEGIN
  APEX_UTIL.DOWNLOAD_PRINT_DOCUMENT (
    p_file_name          => 'mydocument',
    p_content_disposition => 'attachment',
    p_application_id     => :APP_ID,
    p_report_query_name  => 'ReportQueryAndXSL',
    p_report_layout      => :P1_XSL,
    p_report_layout_type => 'xsl-fo',
    p_document_format    => 'pdf');
END;
```

34.21 DOWNLOAD_PRINT_DOCUMENT Procedure Signature 3

This procedure initiates the download of a print document using pre-defined report query and pre-defined report layout.

Syntax

```
APEX_UTIL.DOWNLOAD_PRINT_DOCUMENT (
  p_file_name          IN VARCHAR,
  p_content_disposition IN VARCHAR,
```

```

p_application_id    IN NUMBER,
p_report_query_name IN VARCHAR2,
p_report_layout_name IN VARCHAR2,
p_report_layout_type IN VARCHAR2 default 'xsl-fo',
p_document_format  IN VARCHAR2 default 'pdf',
p_print_server     IN VARCHAR2 default null);

```

Parameters

Table 34-19 DOWNLOAD_PRINT_DOCUMENT Parameters

Parameter	Description
p_file_name	Defines the filename of the print document.
p_content_disposition	Specifies whether to download the print document or display inline ("attachment", "inline").
p_application_id	Defines the application ID of the report query.
p_report_query_name	Name of the report query (stored under application's Shared Components).
p_report_layout_name	Name of the report layout (stored under application's Shared Components).
p_report_layout_type	Defines the report layout type, that is "xsl-fo" or "rtf".
p_document_format	Defines the document format, that is "pdf", "rtf", "xls", "htm", or "xml".
p_print_server	URL of the print server. If not specified, the print server is derived from preferences.

Example for Signature 3

The following example shows how to use the `DOWNLOAD_PRINT_DOCUMENT` using Signature 3 (Pre-defined report query and pre-defined report layout). In this example, the data for the report is taken from a Report Query called 'ReportQuery' stored in the current application's Shared Components > Report Queries. The report layout is taken from a Report Layout called 'ReportLayout' stored in the current application's Shared Components > Report Layouts. Note that if you want to provision dynamic layouts, instead of specifying 'ReportLayout' for the `p_report_layout_name` parameter, you could reference a page item that allowed the user to select one of multiple saved Report Layouts. This example also provides a way for the user to specify how they want to receive the document (as an attachment or inline), through passing the value of `P1_CONTENT_DISP` to the `p_content_disposition` parameter. `P1_CONTENT_DISP` is a page item of type 'Select List' with the following List of Values Definition:

```
STATIC2:In Browser;inline,Save / Open in separate Window;attachment
```

```

BEGIN
  APEX_UTIL.DOWNLOAD_PRINT_DOCUMENT (
    p_file_name          => 'myreport123',
    p_content_disposition => :P1_CONTENT_DISP,
    p_application_id     => :APP_ID,
    p_report_query_name  => 'ReportQuery',
    p_report_layout_name => 'ReportLayout',
    p_report_layout_type => 'rtf',
    p_document_format    => 'pdf');
END;

```


34.22 DOWNLOAD_PRINT_DOCUMENT Procedure Signature 4

This procedure initiates the download of a print document using XML based report data (as a CLOB) and RTF or XSL-FO based report layout.

Syntax

```
APEX_UTIL.DOWNLOAD_PRINT_DOCUMENT (
  p_file_name          IN VARCHAR,
  p_content_disposition IN VARCHAR,
  p_report_data        IN CLOB,
  p_report_layout      IN CLOB,
  p_report_layout_type IN VARCHAR2 default 'xsl-fo',
  p_document_format    IN VARCHAR2 default 'pdf',
  p_print_server       IN VARCHAR2 default null);
```

Parameters

Table 34-20 DOWNLOAD_PRINT_DOCUMENT Parameters

Parameter	Description
p_file_name	Defines the filename of the print document.
p_content_disposition	Specifies whether to download the print document or display inline ("attachment", "inline").
p_report_data	XML based report data, must be encoded in UTF-8.
p_report_layout	Report layout in XSL-FO or RTF format.
p_report_layout_type	Defines the report layout type, that is "xsl-fo" or "rtf".
p_document_format	Defines the document format, that is "pdf", "rtf", "xls", "htm", or "xml".
p_print_server	URL of the print server. If not specified, the print server is derived from preferences.

Example for Signature 4

The following example shows how to use the DOWNLOAD_PRINT_DOCUMENT using Signature 4 (XML based report data (as a CLOB) and RTF or XSL-FO based report layout). In this example both the report data (XML) and report layout (XSL-FO) are taken from values stored in page items.

```
BEGIN
  APEX_UTIL.DOWNLOAD_PRINT_DOCUMENT (
    p_file_name          => 'mydocument',
    p_content_disposition => 'attachment',
    p_report_data        => :P1_XML,
    p_report_layout      => :P1_XSL,
    p_report_layout_type => 'xsl-fo',
    p_document_format    => 'pdf');
END;
```

34.23 EDIT_USER Procedure

This procedure enables a user account record to be altered. To execute this procedure, the current user must have administrative privileges in the workspace.

Syntax

```
APEX_UTIL.EDIT_USER (
  p_user_id           IN           NUMBER,
  p_user_name        IN           VARCHAR2,
  p_first_name       IN           VARCHAR2   DEFAULT NULL,
  p_last_name        IN           VARCHAR2   DEFAULT NULL,
  p_web_password     IN           VARCHAR2   DEFAULT NULL,
  p_new_password     IN           VARCHAR2   DEFAULT NULL,
  p_email_address    IN           VARCHAR2   DEFAULT NULL,
  p_start_date       IN           VARCHAR2   DEFAULT NULL,
  p_end_date         IN           VARCHAR2   DEFAULT NULL,
  p_employee_id      IN           VARCHAR2   DEFAULT NULL,
  p_allow_access_to_schemas IN     VARCHAR2   DEFAULT NULL,
  p_person_type      IN           VARCHAR2   DEFAULT NULL,
  p_default_schema   IN           VARCHAR2   DEFAULT NULL,
  p_group_ids        IN           VARCHAR2   DEFAULT NULL,
  p_developer_roles  IN           VARCHAR2   DEFAULT NULL,
  p_description      IN           VARCHAR2   DEFAULT NULL,
  p_account_expiry   IN           DATE       DEFAULT NULL,
  p_account_locked   IN           VARCHAR2   DEFAULT 'N',
  p_failed_access_attempts IN     NUMBER     DEFAULT 0,
  p_change_password_on_first_use IN  VARCHAR2   DEFAULT 'Y',
  p_first_password_use_occurred IN   VARCHAR2   DEFAULT 'N');
```

Parameters

Table 34-21 EDIT_USER Parameters

Parameter	Description
p_user_id	Numeric primary key of the user account.
p_user_name	Alphanumeric name used for login. See Also: " SET_USERNAME Procedure (page 34-104)"
p_first_name	Informational. See Also: " SET_FIRST_NAME Procedure (page 34-93)"
p_last_name	Informational. See Also: " SET_LAST_NAME Procedure (page 34-96)"
p_web_password	Clear text password. If using this procedure to update the password for the user, values for both p_web_password and p_new_password must not be null and must be identical.
p_new_password	Clear text new password. If using this procedure to update the password for the user, values for both p_web_password and p_new_password must not be null and must be identical.

Table 34-21 (Cont.) EDIT_USER Parameters

Parameter	Description
p_email_address	Informational. See Also: " SET_EMAIL Procedure (page 34-93)"
p_start_date	Unused.
p_end_date	Unused.
p_employee_id	Unused.
p_allow_access_to_schemas	A list of schemas assigned to the user's workspace to which the user is restricted.
p_person_type	Unused.
p_default_schema	A database schema assigned to the user's workspace, used by default for browsing.
p_group_ids	Colon-separated list of numeric group IDs.
p_developer_roles	Colon-separated list of developer privileges. The following are acceptable values for this parameter: <ul style="list-style-type: none"> · null - To update the user to be an end user (a user who can only authenticate to developed applications). · · CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL - To update the user to have developer privilege. · · ADMIN:CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL - To update the user to have full workspace administrator and developer privilege. <p>Note: Currently this parameter is named inconsistently between the CREATE_USER, EDIT_USER and FETCH_USER APIs, although they all relate to the DEVELOPER_ROLE field stored in the named user account record. CREATE_USER uses p_developer_privs, EDIT_USER uses p_developer_roles and FETCH_USER uses p_developer_role.</p> <p>See Also: "GET_USER_ROLES Function (page 34-62)"</p>
p_description	Informational.
p_account_expiry	Date password was last updated. See Also: " EXPIRE_END_USER_ACCOUNT Procedure (page 34-27)", " EXPIRE_WORKSPACE_ACCOUNT Procedure (page 34-28)", " UNEXPIRE_END_USER_ACCOUNT Procedure (page 34-115)", " UNEXPIRE_WORKSPACE_ACCOUNT Procedure (page 34-116)"
p_account_locked	'Y' or 'N' indicating if account is locked or unlocked. See Also: " LOCK_ACCOUNT Procedure (page 34-74)", " UNLOCK_ACCOUNT Procedure (page 34-116)"
p_failed_access_attempts	Number of consecutive login failures that have occurred.

Table 34-21 (Cont.) EDIT_USER Parameters

Parameter	Description
p_change_password_on_first_use	'Y' or 'N' to indicate whether password must be changed on first use. See Also: " CHANGE_PASSWORD_ON_FIRST_USE Function (page 34-9)"
p_first_password_use_occurred	'Y' or 'N' to indicate whether login has occurred since password change. See Also: " PASSWORD_FIRST_USE_OCCURRED Function (page 34-75)"

Example

The following example shows how to use the `EDIT_USER` procedure to update a user account. This example shows how you can use the `EDIT_USER` procedure to change the user 'FRANK' from a user with just developer privilege to a user with workspace administrator and developer privilege. Firstly, the `FETCH_USER` procedure is called to assign account details for the user 'FRANK' to local variables. These variables are then used in the call to `EDIT_USER` to preserve the details of the account, with the exception of the value for the `p_developer_roles` parameter, which is set to 'ADMIN:CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL'.

```

DECLARE
    l_user_id                NUMBER;
    l_workspace              VARCHAR2(255);
    l_user_name              VARCHAR2(100);
    l_first_name             VARCHAR2(255);
    l_last_name              VARCHAR2(255);
    l_web_password           VARCHAR2(255);
    l_email_address          VARCHAR2(240);
    l_start_date             DATE;
    l_end_date               DATE;
    l_employee_id            NUMBER(15,0);
    l_allow_access_to_schemas VARCHAR2(4000);
    l_person_type            VARCHAR2(1);
    l_default_schema         VARCHAR2(30);
    l_groups                  VARCHAR2(1000);
    l_developer_role         VARCHAR2(60);
    l_description            VARCHAR2(240);
    l_account_expiry         DATE;
    l_account_locked         VARCHAR2(1);
    l_failed_access_attempts NUMBER;
    l_change_password_on_first_use VARCHAR2(1);
    l_first_password_use_occurred VARCHAR2(1);
BEGIN
    l_user_id := APEX_UTIL.GET_USER_ID('FRANK');

    APEX_UTIL.FETCH_USER(
        p_user_id                => l_user_id,
        p_workspace              => l_workspace,
        p_user_name              => l_user_name,
        p_first_name             => l_first_name,
        p_last_name              => l_last_name,
        p_web_password           => l_web_password,
        p_email_address          => l_email_address,
        p_start_date             => l_start_date,

```

```

p_end_date           => l_end_date,
p_employee_id       => l_employee_id,
p_allow_access_to_schemas => l_allow_access_to_schemas,
p_person_type       => l_person_type,
p_default_schema    => l_default_schema,
p_groups            => l_groups,
p_developer_role    => l_developer_role,
p_description       => l_description,
p_account_expiry    => l_account_expiry,
p_account_locked    => l_account_locked,
p_failed_access_attempts => l_failed_access_attempts,
p_change_password_on_first_use => l_change_password_on_first_use,
p_first_password_use_occurred => l_first_password_use_occurred);
APEX_UTIL.EDIT_USER (
  p_user_id          => l_user_id,
  p_user_name        => l_user_name,
  p_first_name       => l_first_name,
  p_last_name        => l_last_name,
  p_web_password     => l_web_password,
  p_new_password     => l_web_password,
  p_email_address    => l_email_address,
  p_start_date       => l_start_date,
  p_end_date         => l_end_date,
  p_employee_id      => l_employee_id,
  p_allow_access_to_schemas => l_allow_access_to_schemas,
  p_person_type      => l_person_type,
  p_default_schema   => l_default_schema,
  p_group_ids        => l_groups,
  p_developer_roles  =>
'ADMIN:CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL',
  p_description      => l_description,
  p_account_expiry   => l_account_expiry,
  p_account_locked   => l_account_locked,
  p_failed_access_attempts => l_failed_access_attempts,
  p_change_password_on_first_use => l_change_password_on_first_use,
  p_first_password_use_occurred => l_first_password_use_occurred);
END;
```

34.24 END_USER_ACCOUNT_DAYS_LEFT Function

Returns the number of days remaining before a end user account password expires. This function may be run in a page request context by any authenticated user.

Syntax

```

APEX_UTIL.END_USER_ACCOUNT_DAYS_LEFT (
  p_user_name IN VARCHAR2)
RETURN NUMBER;
```

Parameters

Table 34-22 END_USER_ACCOUNT_DAYS_LEFT Parameters

Parameter	Description
p_user_name	The user name of the user account.

Example

The following example shows how to use the `END_USER_ACCOUNT_DAYS_LEFT` function. Use this function to determine the number of days remaining before an Application Express end user account in the current workspace expires.

```
DECLARE
    l_days_left NUMBER;
BEGIN
    FOR c1 IN (SELECT user_name from apex_users) LOOP
        l_days_left := APEX_UTIL.END_USER_ACCOUNT_DAYS_LEFT(p_user_name =>
c1.user_name);
        http.p('End User Account: ' || c1.user_name || ' expires in ' || l_days_left || '
days. ');
    END LOOP;
END;
```

34.25 EXPIRE_END_USER_ACCOUNT Procedure

Expires the login account for use as a workspace end user. Must be run by an authenticated workspace administrator in a page request context.

Syntax

```
APEX_UTIL.EXPIRE_END_USER_ACCOUNT (
    p_user_name IN VARCHAR2
);
```

Parameters

Table 34-23 EXPIRE_END_USER_ACCOUNT Parameters

Parameter	Description
<code>p_user_name</code>	The user name of the user account.

Example

The following example shows how to use the `EXPIRE_END_USER_ACCOUNT` procedure. Use this procedure to expire an Oracle Application Express account (workspace administrator, developer, or end user) in the current workspace. This action specifically expires the account for its use by end users to authenticate to developed applications, but it may also expire the account for its use by developers or administrators to log in to a workspace.

Note that this procedure must be run by a user having administration privileges in the current workspace.

```
BEGIN
    FOR c1 IN (select user_name from apex_users) LOOP
        APEX_UTIL.EXPIRE_END_USER_ACCOUNT(p_user_name => c1.user_name);
        http.p('End User Account: ' || c1.user_name || ' is now expired. ');
    END LOOP;
END;
```

34.26 EXPIRE_WORKSPACE_ACCOUNT Procedure

Expires developer or workspace administrator login accounts. Must be run by an authenticated workspace administrator in a page request context.

Syntax

```
APEX_UTIL.EXPIRE_WORKSPACE_ACCOUNT (  
    p_user_name IN VARCHAR2  
);
```

Parameters

Table 34-24 EXPIRE_WORKSPACE_ACCOUNT Parameters

Parameter	Description
p_user_name	The user name of the user account.

Example

The following example shows how to use the `EXPIRE_WORKSPACE_ACCOUNT` procedure. Use this procedure to expire an Application Express account (workspace administrator, developer, or end user) in the current workspace. This action specifically expires the account for its use by developers or administrators to log in to a workspace, but it may also expire the account for its use by end users to authenticate to developed applications.

```
BEGIN  
    FOR c1 IN (SELECT user_name FROM apex_users) LOOP  
        APEX_UTIL.EXPIRE_WORKSPACE_ACCOUNT(p_user_name => c1.user_name);  
        http.p('Workspace Account: '||c1.user_name||' is now expired.');
```

```
    END LOOP;  
END;
```

34.27 EXPORT_USERS Procedure

When called from a page, this procedure produces an export file of the current workspace definition, workspace users, and workspace groups. To execute this procedure, the current user must have administrative privilege in the workspace.

Syntax

```
APEX_UTIL.EXPORT_USERS(  
    p_export_format IN VARCHAR2 DEFAULT 'UNIX');
```

Parameters

Table 34-25 EXPORT_USERS Parameters

Parameter	Description
p_export_format	Indicates how rows in the export file are formatted. Specify 'UNIX' to have the resulting file contain rows delimited by line feeds. Specify 'DOS' to have the resulting file contain rows delimited by carriage returns and line feeds.

Example

The following example shows how to use the `EXPORT_USERS` procedure. Call this procedure from a page to produce an export file containing the current workspace definition, list of workspace users and list of workspace groups. The file is formatted with rows delimited by line feeds.

```
BEGIN
  APEX_UTIL.EXPORT_USERS;
END;
```

34.28 FETCH_APP_ITEM Function

This function fetches session state for the current or specified application in the current or specified session.

Syntax

```
APEX_UTIL.FETCH_APP_ITEM(
  p_item    IN VARCHAR2,
  p_app     IN NUMBER DEFAULT NULL,
  p_session IN NUMBER DEFAULT NULL)
RETURN VARCHAR2;
```

Parameters

Table 34-26 FETCH_APP_ITEM Parameters

Parameter	Description
p_item	The name of an application-level item (not a page item) whose current value is to be fetched.
p_app	The ID of the application that owns the item (leave null for the current application).
p_session	The session ID from which to obtain the value (leave null for the current session).

Example

The following example shows how to use the `FETCH_APP_ITEM` function to obtain the value of the application item 'F300_NAME' in application 300. As no value is passed for `p_session`, this defaults to the current session state value.


```

DECLARE
    VAL VARCHAR2(30);
BEGIN
    VAL := APEX_UTIL.FETCH_APP_ITEM(
        p_item => 'F300_NAME',
        p_app => 300);
END;

```

34.29 FETCH_USER Procedure Signature 1

This procedure fetches a user account record. To execute this procedure, the current user must have administrative privileges in the workspace. Three overloaded versions of this procedure exist, each with a distinct set of allowed parameters or signatures.

Syntax for Signature 1

```

APEX_UTIL.FETCH_USER (
    p_user_id           IN           NUMBER,
    p_workspace        OUT          VARCHAR2,
    p_user_name        OUT          VARCHAR2,
    p_first_name       OUT          VARCHAR2,
    p_last_name        OUT          VARCHAR2,
    p_web_password     OUT          VARCHAR2,
    p_email_address    OUT          VARCHAR2,
    p_start_date       OUT          VARCHAR2,
    p_end_date         OUT          VARCHAR2,
    p_employee_id      OUT          VARCHAR2,
    p_allow_access_to_schemas OUT    VARCHAR2,
    p_person_type      OUT          VARCHAR2,
    p_default_schema   OUT          VARCHAR2,
    p_groups           OUT          VARCHAR2,
    p_developer_role   OUT          VARCHAR2,
    p_description      OUT          VARCHAR2 );

```

Parameters for Signature 1

Table 34-27 Fetch_User Parameters Signature 1

Parameter	Description
p_user_id	Numeric primary key of the user account.
p_workspace	The name of the workspace.
p_user_name	Alphanumeric name used for login. See Also: " GET_USERNAME Function (page 34-63)"
p_first_name	Informational. See Also: " GET_FIRST_NAME Function (page 34-46)"
p_last_name	Informational. See Also: " GET_LAST_NAME Function (page 34-51)"
p_web_password	Obfuscated account password.
p_email_address	Email address. See Also: " GET_EMAIL Function (page 34-43)"
p_start_date	Unused.
p_end_date	Unused.

Table 34-27 (Cont.) Fetch_User Parameters Signature 1

Parameter	Description
p_employee_id	Unused.
p_allow_access_to_schemas	A list of schemas assigned to the user's workspace to which user is restricted.
p_person_type	Unused.
p_default_schema	A database schema assigned to the user's workspace, used by default for browsing. See Also: " GET_DEFAULT_SCHEMA Function (page 34-42)"
p_groups	List of groups of which user is a member. See Also: " GET_GROUPS_USER_BELONGS_TO Function (page 34-47)" and " CURRENT_USER_IN_GROUP Function (page 34-16)"
p_developer_role	Colon-separated list of developer roles. The following are acceptable values for this parameter: null - Indicates an end user (a user who can only authenticate to developed applications). CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL - Indicates a user with developer privilege. ADMIN:CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL - Indicates a user with full workspace administrator and developer privilege. Note: Currently this parameter is named inconsistently between the CREATE_USER, EDIT_USER and FETCH_USER APIs, although they all relate to the DEVELOPER_ROLE field stored in the named user account record. CREATE_USER uses p_developer_privs, EDIT_USER uses p_developer_roles and FETCH_USER uses p_developer_role. See Also: " GET_USER_ROLES Function (page 34-62)"
p_description	Informational.

Example for Signature 1

The following example shows how to use the `FETCH_USER` procedure with Signature 1. This procedure is passed the ID of the currently authenticated user for the only `IN` parameter `p_user_id`. The code then stores all the other `OUT` parameter values in local variables.

```

DECLARE
    l_workspace          VARCHAR2(255);
    l_user_name          VARCHAR2(100);
    l_first_name         VARCHAR2(255);
    l_last_name          VARCHAR2(255);
    l_web_password       VARCHAR2(255);
    l_email_address      VARCHAR2(240);
    l_start_date         DATE;
    l_end_date           DATE;
    l_employee_id        NUMBER(15,0);
    l_allow_access_to_schemas VARCHAR2(4000);
    l_person_type        VARCHAR2(1);
    l_default_schema     VARCHAR2(30);
    l_groups             VARCHAR2(1000);
    l_developer_role     VARCHAR2(60);

```

```

        l_description          VARCHAR2(240);
BEGIN
    APEX_UTIL.FETCH_USER(
        p_user_id              => APEX_UTIL.GET_CURRENT_USER_ID,
        p_workspace            => l_workspace,
        p_user_name            => l_user_name,
        p_first_name           => l_first_name,
        p_last_name            => l_last_name,
        p_web_password         => l_web_password,
        p_email_address        => l_email_address,
        p_start_date           => l_start_date,
        p_end_date             => l_end_date,
        p_employee_id          => l_employee_id,
        p_allow_access_to_schemas => l_allow_access_to_schemas,
        p_person_type          => l_person_type,
        p_default_schema       => l_default_schema,
        p_groups               => l_groups,
        p_developer_role       => l_developer_role,
        p_description          => l_description);
END;
```

34.30 FETCH_USER Procedure Signature 2

This procedure fetches a user account record. To execute this procedure, the current user must have administrative privileges in the workspace. Three overloaded versions of this procedure exist, each with a distinct set of allowed parameters or signatures.

Syntax for Signature 2

```

APEX_UTIL.FETCH_USER (
    p_user_id          IN          NUMBER,
    p_user_name        OUT         VARCHAR2,
    p_first_name       OUT         VARCHAR2,
    p_last_name        OUT         VARCHAR2,
    p_email_address    OUT         VARCHAR2,
    p_groups           OUT         VARCHAR2,
    p_developer_role   OUT         VARCHAR2,
    p_description      OUT         VARCHAR2 );
```

Parameters for Signature 2

Table 34-28 Fetch_User Parameters Signature 2

Parameter	Description
p_user_id	Numeric primary key of the user account
p_user_name	Alphanumeric name used for login. See Also: " GET_USERNAME Function (page 34-63)"
p_first_name	Informational. See Also: " GET_FIRST_NAME Function (page 34-46)"
p_last_name	Informational. See Also: " GET_LAST_NAME Function (page 34-51)"
p_email_address	Email address. See Also: " GET_EMAIL Function (page 34-43)"

Table 34-28 (Cont.) Fetch_User Parameters Signature 2

Parameter	Description
p_groups	List of groups of which user is a member. See Also: " GET_GROUPS_USER_BELONGS_TO Function (page 34-47)" and " CURRENT_USER_IN_GROUP Function (page 34-16)"
p_developer_role	Colon-separated list of developer roles. The following are acceptable values for this parameter: null - Indicates an end user (a user who can only authenticate to developed applications). CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL - Indicates a user with developer privilege. ADMIN:CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL - Indicates a user with full workspace administrator and developer privilege. Note: Currently this parameter is named inconsistently between the CREATE_USER, EDIT_USER and FETCH_USER APIs, although they all relate to the DEVELOPER_ROLE field stored in the named user account record. CREATE_USER uses p_developer_privs, EDIT_USER uses p_developer_roles and FETCH_USER uses p_developer_role. See Also: " GET_USER_ROLES Function (page 34-62)"
p_description	Informational

Example for Signature 2

The following example shows how to use the `FETCH_USER` procedure with Signature 2. This procedure is passed the ID of the currently authenticated user for the only `IN` parameter `p_user_id`. The code then stores all the other `OUT` parameter values in local variables.

```

DECLARE
    l_user_name      VARCHAR2(100);
    l_first_name    VARCHAR2(255);
    l_last_name     VARCHAR2(255);
    l_email_address  VARCHAR2(240);
    l_groups         VARCHAR2(1000);
    l_developer_role VARCHAR2(60);
    l_description    VARCHAR2(240);
BEGIN
    APEX_UTIL.FETCH_USER(
        p_user_id      => APEX_UTIL.GET_CURRENT_USER_ID,
        p_user_name    => l_user_name,
        p_first_name   => l_first_name,
        p_last_name    => l_last_name,
        p_email_address => l_email_address,
        p_groups       => l_groups,
        p_developer_role => l_developer_role,
        p_description  => l_description);
END;
```

34.31 FETCH_USER Procedure Signature 3

This procedure fetches a user account record. To execute this procedure, the current user must have administrative privileges in the workspace. Three overloaded versions of this procedure exist, each with a distinct set of allowed parameters or signatures.

Syntax for Signature 3

```
APEX_UTIL.FETCH_USER (
    p_user_id           IN           NUMBER,
    p_workspace        OUT          VARCHAR2,
    p_user_name        OUT          VARCHAR2,
    p_first_name       OUT          VARCHAR2,
    p_last_name        OUT          VARCHAR2,
    p_web_password     OUT          VARCHAR2,
    p_email_address    OUT          VARCHAR2,
    p_start_date       OUT          VARCHAR2,
    p_end_date         OUT          VARCHAR2,
    p_employee_id      OUT          VARCHAR2,
    p_allow_access_to_schemas OUT    VARCHAR2,
    p_person_type      OUT          VARCHAR2,
    p_default_schema   OUT          VARCHAR2,
    p_groups           OUT          VARCHAR2,
    p_developer_role   OUT          VARCHAR2,
    p_description      OUT          VARCHAR2,
    p_account_expiry   OUT          DATE,
    p_account_locked   OUT          VARCHAR2,
    p_failed_access_attempts OUT    NUMBER,
    p_change_password_on_first_use OUT VARCHAR2,
    p_first_password_use_occurred OUT VARCHAR2 );
```

Parameters for Signature 3

Table 34-29 Fetch_User Parameters Signature 3

Parameter	Description
p_user_id	Numeric primary key of the user account.
p_workspace	The name of the workspace.
p_user_name	Alphanumeric name used for login. See Also: "GET_USERNAME Function (page 34-63)"
p_first_name	Informational. See Also: "GET_FIRST_NAME Function (page 34-46)"
p_last_name	Informational. See Also: "GET_LAST_NAME Function (page 34-51)"
p_web_password	Obfuscated account password.
p_email_address	Email address. See Also: "GET_EMAIL Function (page 34-43)"
p_start_date	Unused.
p_end_date	Unused.

Table 34-29 (Cont.) Fetch_User Parameters Signature 3

Parameter	Description
p_employee_id	Unused.
p_allow_access_to_schemas	A list of schemas assigned to the user's workspace to which user is restricted.
p_person_type	Unused.
p_default_schema	A database schema assigned to the user's workspace, used by default for browsing. See Also: "GET_DEFAULT_SCHEMA Function (page 34-42)"
p_groups	List of groups of which user is a member. See Also: "GET_GROUPS_USER_BELONGS_TO Function (page 34-47)" and "CURRENT_USER_IN_GROUP Function (page 34-16)"
p_developer_role	Colon-separated list of developer roles. The following are acceptable values for this parameter: null - Indicates an end user (a user who can only authenticate to developed applications). CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL - Indicates a user with developer privilege. ADMIN:CREATE:DATA_LOADER:EDIT:HELP:MONITOR:SQL - Indicates a user with full workspace administrator and developer privilege. Note: Currently this parameter is named inconsistently between the CREATE_USER, EDIT_USER and FETCH_USER APIs, although they all relate to the DEVELOPER_ROLE field stored in the named user account record. CREATE_USER uses p_developer_privs, EDIT_USER uses p_developer_roles and FETCH_USER uses p_developer_role. See Also: "GET_USER_ROLES Function (page 34-62)"
p_description	Informational.
p_account_expiry	Date account password was last reset. See Also: "END_USER_ACCOUNT_DAYS_LEFT Function (page 34-26)" and "WORKSPACE_ACCOUNT_DAYS_LEFT Function (page 34-118)"
p_account_locked	Locked/Unlocked indicator Y or N. See Also: "GET_ACCOUNT_LOCKED_STATUS Function (page 34-38)"
p_failed_access_attempts	Counter for consecutive login failures.
p_change_password_on_first_use	Setting to force password change on first use Y or N.
p_first_password_use_occurred	Indicates whether login with password occurred Y or N.

Example for Signature 3

The following example shows how to use the `FETCH_USER` procedure with Signature 3. This procedure is passed the ID of the currently authenticated user for the only `IN` parameter `p_user_id`. The code then stores all the other `OUT` parameter values in local variables.

```

DECLARE
    l_workspace          VARCHAR2(255);
    l_user_name          VARCHAR2(100);
    l_first_name         VARCHAR2(255);
    l_last_name          VARCHAR2(255);
    l_web_password       VARCHAR2(255);
    l_email_address      VARCHAR2(240);
    l_start_date         DATE;
    l_end_date           DATE;
    l_employee_id        NUMBER(15,0);
    l_allow_access_to_schemas VARCHAR2(4000);
    l_person_type        VARCHAR2(1);
    l_default_schema     VARCHAR2(30);
    l_groups              VARCHAR2(1000);
    l_developer_role     VARCHAR2(60);
    l_description        VARCHAR2(240);
    l_account_expiry     DATE;
    l_account_locked     VARCHAR2(1);
    l_failed_access_attempts NUMBER;
    l_change_password_on_first_use VARCHAR2(1);
    l_first_password_use_occurred VARCHAR2(1);
BEGIN
    APEX_UTIL.FETCH_USER(
        p_user_id          => APEX_UTIL.GET_CURRENT_USER_ID,
        p_workspace        => l_workspace,
        p_user_name        => l_user_name,
        p_first_name       => l_first_name,
        p_last_name        => l_last_name,
        p_web_password     => l_web_password,
        p_email_address    => l_email_address,
        p_start_date       => l_start_date,
        p_end_date         => l_end_date,
        p_employee_id      => l_employee_id,
        p_allow_access_to_schemas => l_allow_access_to_schemas,
        p_person_type      => l_person_type,
        p_default_schema   => l_default_schema,
        p_groups           => l_groups,
        p_developer_role   => l_developer_role,
        p_description      => l_description,
        p_account_expiry   => l_account_expiry,
        p_account_locked   => l_account_locked,
        p_failed_access_attempts => l_failed_access_attempts,
        p_change_password_on_first_use => l_change_password_on_first_use,
        p_first_password_use_occurred => l_first_password_use_occurred);
END;
```

34.32 FIND_SECURITY_GROUP_ID Function

This function returns the numeric security group ID of the named workspace.

Syntax

```
APEX_UTIL.FIND_SECURITY_GROUP_ID(
    p_workspace    IN VARCHAR2)
RETURN NUMBER;
```

Parameters**Table 34-30** FIND_SECURITY_GROUP_ID Parameters

Parameter	Description
p_workspace	The name of the workspace.

Example

The following example demonstrates how to use the `FIND_SECURITY_GROUP_ID` function to return the security group ID for the workspace called 'DEMOS'.

```
DECLARE
    VAL NUMBER;
BEGIN
    VAL := APEX_UTIL.FIND_SECURITY_GROUP_ID (p_workspace=>'DEMOS');
END;
```

34.33 FIND_WORKSPACE Function

This function returns the workspace name associated with a security group ID.

Syntax

```
APEX_UTIL.FIND_WORKSPACE(
    p_security_group_id  IN VARCHAR2)
RETURN VARCHAR2;
```

Parameters**Table 34-31** FIND_WORKSPACE Parameters

Parameter	Description
p_security_group_id	The security group ID of a workspace.

Example

The following example demonstrates how to use the `FIND_WORKSPACE` function to return the workspace name for the workspace with a security group ID of 20.

```
DECLARE
    VAL VARCHAR2(255);
BEGIN
    VAL := APEX_UTIL.FIND_WORKSPACE (p_security_group_id =>'20');
END;
```


34.34 GET_ACCOUNT_LOCKED_STATUS Function

Returns `TRUE` if the account is locked and `FALSE` if the account is unlocked. Must be run by an authenticated workspace administrator in a page request context.

Syntax

```
APEX_UTIL.GET_ACCOUNT_LOCKED_STATUS (
    p_user_name IN VARCHAR2
) RETURN BOOLEAN;
```

Parameters

Table 34-32 GET_ACCOUNT_LOCKED_STATUS Parameters

Parameter	Description
p_user_name	The user name of the user account.

Example

The following example shows how to use the `GET_ACCOUNT_LOCKED_STATUS` function. Use this function to check if an Application Express user account (workspace administrator, developer, or end user) in the current workspace is locked.

```
BEGIN
    FOR c1 IN (SELECT user_name FROM apex_users) loop
        IF APEX_UTIL.GET_ACCOUNT_LOCKED_STATUS(p_user_name => c1.user_name) THEN
            HTP.P('User Account: ' || c1.user_name || ' is locked. ');
        END IF;
    END LOOP;
END;
```

34.35 GET_APPLICATION_STATUS Function

This function returns the current status of the application. Status values include `AVAILABLE`, `AVAILABLE_W_EDIT_LINK`, `DEVELOPERS_ONLY`, `RESTRICTED_ACCESS`, `UNAVAILABLE`, `UNAVAILABLE_PLSQL`, and `UNAVAILABLE_URL`.

Syntax

```
APEX_UTIL.GET_APPLICATION_STATUS(
    p_application_id IN NUMBER) RETURN VARCHAR2;
```

Parameters

Table 34-33 GET_APPLICATION_STATUS Parameters

Parameter	Description
p_application_id	The Application ID.

Example

```

declare
    l_status varchar2(100);
begin
    l_status := apex_util.get_application_status(
        p_application_id => 117 );
    dbms_output.put_line( 'The current application status is: ' || l_status );
end;

```

34.36 GET_ATTRIBUTE Function

This function returns the value of one of the attribute values (1 through 10) of a named user in the Application Express accounts table. Please note these are only accessible by using the APIs.

Syntax

```

APEX_UTIL.GET_ATTRIBUTE(
    p_username           IN VARCHAR2,
    p_attribute_number  IN NUMBER)
RETURN VARCHAR2;

```

Parameters**Table 34-34** GET_ATTRIBUTE Parameters

Parameter	Description
p_username	User name in the account.
p_attribute_number	Number of attributes in the user record (1 through 10).

Example

The following example shows how to use the GET_ATTRIBUTE function to return the value for the 1st attribute for the user 'FRANK'.

```

DECLARE
    VAL VARCHAR2(4000);
BEGIN
    VAL := APEX_UTIL.GET_ATTRIBUTE (
        p_username => 'FRANK',
        p_attribute_number => 1);
END;

```

34.37 GET_AUTHENTICATION_RESULT Function

Use this function to retrieve the authentication result of the current session. Any authenticated user can call this function in a page request context.

Syntax

```

APEX_UTIL.GET_AUTHENTICATION_RESULT
RETURN NUMBER;

```

Parameters

None.

Example

The following example demonstrates how to use the post-authentication process of an application's authentication scheme to retrieve the authentication result code set during authentication.

```
APEX_UTIL.SET_SESSION_STATE('MY_AUTH_STATUS',
    'Authentication result:'||APEX_UTIL.GET_AUTHENTICATION_RESULT);
```

34.38 GET_BLOB_FILE_SRC Function

As an alternative to using the built-in methods of providing a download link, you can use the `APEX_UTIL.GET_BLOB_FILE_SRC` function. One advantage of this approach, is the ability to more specifically format the display of the image (with height and width tags). Please note that this approach is only valid if called from a valid Oracle Application Express session. Also, this method requires that the parameters that describe the BLOB to be listed as the format of a valid item within the application. That item is then referenced by the function.

Syntax

```
APEX_UTIL.GET_BLOB_FILE_SRC (
    p_item_name      IN VARCHAR2 DEFAULT NULL,
    p_v1             IN VARCHAR2 DEFAULT NULL,
    p_v2             IN VARCHAR2 DEFAULT NULL,
    p_content_disposition IN VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;
```

Parameters

Table 34-35 GET_BLOB_FILE_SRC Parameters

Parameter	Description
<code>p_item_name</code>	Name of valid application page ITEM that with type FILE that contains the source type of DB column.
<code>p_v1</code>	Value of primary key column 1.
<code>p_v2</code>	Value of primary key column 2.
<code>p_content_disposition</code>	Specify inline or attachment, all other values ignored.

Example

As a PLSQL Function Body:

```
RETURN '';
```

As a Region Source of type SQL:

```
SELECT ID, NAME,CASE WHEN NVL(dbms_lob.getlength(document),0) = 0
    THEN NULL
    ELSE CASE WHEN attach_mimetype like 'image%'
```

```

THEN '<img src=""||apex_util.get_blob_file_src('P4_DOCUMENT',id)||' " />'
ELSE
'<a href=""||apex_util.get_blob_file_src('P4_DOCUMENT',id)||'">Download</a>'
end
END new_img
FROM TEST_WITH_BLOB

```

The previous example illustrates how to display the `BLOB` within the report, if it can be displayed, and provide a download link, if it cannot be displayed.

34.39 GET_BUILD_OPTION_STATUS Function Signature 1

Use this function to get the build option status of a specified application by providing the ID of the application build option.

Syntax

```

APEX_UTIL.GET_BUILD_OPTION_STATUS(
  p_application_id IN NUMBER
  p_id             IN NUMBER;

```

Parameters

Table 34-36 GET_BUILD_OPTION_STATUS Function Signature 1 Parameters

Parameters	Description
<code>p_application_id</code>	The ID of the application that owns the build option under shared components.
<code>p_id</code>	The ID of the build option in the application.

Example

The following code retrieves the current status of the specified build option that is identified by ID.

```

DECLARE
  l_status VARCHAR2(255);
BEGIN
  l_status := APEX_UTIL.GET_BUILD_OPTION_STATUS(
    P_APPLICATION_ID => 101,
    P_ID => 245935500311121039);
END;
/

```

34.40 GET_BUILD_OPTION_STATUS Function Signature 2

Use this function to get the build option status of a specified application by providing the name of the application build option.

Syntax

```

APEX_UTIL.GET_BUILD_OPTION_STATUS(
  p_application_id IN NUMBER
  p_build_option_name IN VARCHAR2);

```

Parameters

Table 34-37 GET_BUILD_OPTION_STATUS Function Signature 2 Parameters

Parameters	Description
p_application_id	The ID of the application that owns the build option under shared components.
p_build_option_name	The name of the build option in the application.

Example

The following code retrieves the current status of the specified build option that is identified by name.

```
DECLARE
    l_status VARCHAR2(255);
BEGIN
    l_status := APEX_UTIL.GET_BUILD_OPTION_STATUS(
        P_APPLICATION_ID => 101,
        P_BUILD_OPTION_NAME => 'EXCLUDE_FROM_PRODUCTION');
END;
/
```

34.41 GET_CURRENT_USER_ID Function

This function returns the numeric user ID of the current user.

Syntax

```
APEX_UTIL.GET_CURRENT_USER_ID
RETURN NUMBER;
```

Parameters

None.

Example

This following example shows how to use the GET_CURRENT_USER_ID function. It returns the numeric user ID of the current user into a local variable.

```
DECLARE
    VAL NUMBER;
BEGIN
    VAL := APEX_UTIL.GET_CURRENT_USER_ID;
END;
```

34.42 GET_DEFAULT_SCHEMA Function

This function returns the default schema name associated with the current user.

Syntax

```
APEX_UTIL.GET_DEFAULT_SCHEMA
RETURN VARCHAR2;
```

Parameters

None.

Example

The following example shows how to use the `GET_DEFAULT_SCHEMA` function. It returns the default schema name associated with the current user into a local variable.

```
DECLARE
    VAL VARCHAR2(30);
BEGIN
    VAL := APEX_UTIL.GET_DEFAULT_SCHEMA;
END;
```

34.43 GET_EDITION Function

This function returns the edition for the current page view.

Syntax

```
APEX_UTIL.GET_EDITION
RETURN VARCHAR2;
```

Parameters

None.

Example

The following example shows how to use the `GET_EDITION` function. It returns the edition name for the current page view into a local variable.

```
DECLARE
    VAL VARCHAR2(30);
BEGIN
    VAL := APEX_UTIL.GET_EDITION;
END;
```

34.44 GET_EMAIL Function

This function returns the email address associated with the named user.

Syntax

```
APEX_UTIL.GET_EMAIL(
    p_username IN VARCHAR2);
RETURN VARCHAR2;
```

Parameters

Table 34-38 GET_EMAIL Parameters

Parameter	Description
p_username	The user name in the account.

Example

The following example shows how to use the `GET_EMAIL` function to return the email address of the user 'FRANK'.

```
DECLARE
    VAL VARCHAR2(240);
BEGIN
    VAL := APEX_UTIL.GET_EMAIL(p_username => 'FRANK');
END;
```

34.45 GET_FEEDBACK_FOLLOW_UP Function

Use this function to retrieve any remaining follow up associated with a specific feedback.

Syntax

```
APEX_UTIL.GET_FEEDBACK_FOLLOW_UP (
    p_feedback_id    IN NUMBER,
    p_row            IN NUMBER DEFAULT 1,
    p_template       IN VARCHAR2 DEFAULT '<br />#CREATED_ON# (#CREATED_BY#)
#FOLLOW_UP#')
RETURN VARCHAR2;
```

Parameters

Table 34-39 GET_FEEDBACK_FOLLOW_UP Parameters

Parameter	Description
<code>p_feedback_id</code>	The unique identifier of the feedback item.
<code>p_row</code>	Identifies which follow-up to retrieve and is ordered by <code>created_on_desc</code> .
<code>p_template</code>	The template to use to return the follow up. Given the <code>
</code> in the default template, the function can be used in a loop to return all the follow up to a feedback.

Example

The following example displays all the remaining follow-up for feedback with the ID of 123.

```
declare
    l_feedback_count number;
begin
    select count(*)
    into l_feedback_count
    from apex_team_feedback_followup
    where feedback_id = 123;

    for i in 1..l_feedback_count loop
        http.p(apex_util.get_feedback_follow_up (
            p_feedback_id => 123,
            p_row          => i,
            p_template     => '<br />#FOLLOW_UP# was created on #CREATED_ON# by
```

```
#CREATED_BY#' ) );
    end loop;
end;
/
```

34.46 GET_FILE Procedure

This procedure downloads files from the Oracle Application Express file repository. Please note if you are invoking this procedure during page processing, you must ensure that no page branch is invoked under the same condition, as it interferes with the file retrieval. This means that branches with any of the following conditions should not be set to fire:

- Branches with a 'When Button Pressed' attribute equal to the button that invokes the procedure.
- Branches with conditional logic defined that would succeed during page processing when the procedure is being invoked.
- As unconditional.

Syntax

```
APEX_UTIL.GET_FILE (
    p_file_id    IN    VARCHAR2,
    p_inline     IN    VARCHAR2 DEFAULT 'NO');
```

Parameters

Table 34-40 GET_FILE Parameters

Parameter	Description
p_file_id	ID in APEX_APPLICATION_FILES of the file to be downloaded. APEX_APPLICATION_FILES is a view on all files uploaded to your workspace. The following example demonstrates how to use APEX_APPLICATION_FILES: <pre> DECLARE l_file_id NUMBER; BEGIN SELECT id INTO l_file_id FROM APEX_APPLICATION_FILES WHERE filename = 'myxml'; -- APEX_UTIL.GET_FILE(p_file_id => l_file_id, p_inline => 'YES'); END;</pre>
p_inline	Valid values include YES and NO. YES to display inline in a browser. NO to download as attachment.

Example

The following example shows how to use the GET_FILE function to return the file identified by the ID 8675309. This is displayed inline in the browser.


```
BEGIN
  APEX_UTIL.GET_FILE(
    p_file_id => '8675309',
    p_inline  => 'YES');
END;
```

34.47 GET_FILE_ID Function

This function obtains the primary key of a file in the Oracle Application Express file repository.

Syntax

```
APEX_UTIL.GET_FILE_ID (
  p_name  IN  VARCHAR2)
RETURN NUMBER;
```

Parameters

Table 34-41 GET_FILE_ID Parameters

Parameter	Description
p_name	The NAME in APEX_APPLICATION_FILES of the file to be downloaded. APEX_APPLICATION_FILES is a view on all files uploaded to your workspace.

Example

The following example shows how to use the GET_FILE_ID function to retrieve the database ID of the file with a filename of 'F125.sql'.

```
DECLARE
  l_name VARCHAR2(255);
  l_file_id NUMBER;
BEGIN
  SELECT name
  INTO l_name
  FROM APEX_APPLICATION_FILES
  WHERE filename = 'F125.sql';
  --
  l_file_id := APEX_UTIL.GET_FILE_ID(p_name => l_name);
END;
```

34.48 GET_FIRST_NAME Function

This function returns the FIRST_NAME field stored in the named user account record.

Syntax

```
APEX_UTIL.GET_FIRST_NAME
  p_username IN VARCHAR2)
RETURN VARCHAR2;
```

Parameters

Table 34-42 GET_FIRST_NAME Parameters

Parameter	Description
p_username	Identifies the user name in the account.

Example

The following example shows how to use the GET_FIRST_NAME function to return the FIRST_NAME of the user 'FRANK'.

```
DECLARE
    VAL VARCHAR2(255);
BEGIN
    VAL := APEX_UTIL.GET_FIRST_NAME(p_username => 'FRANK');
END;
```

34.49 GET_GLOBAL_NOTIFICATION Function

This function gets the global notification message which is the message displayed in page #GLOBAL_NOTIFICATION# substitution string.

Syntax

```
APEX_UTIL.GET_GLOBAL_NOTIFICATION(
    p_application_id IN NUMBER) RETURN VARCHAR2;
```

Parameters

Table 34-43 GET_GLOBAL_NOTIFICATION Parameters

Parameter	Description
p_application_id	The Application ID.

Example

```
declare
    l_global_notification varchar2(100);
begin
    l_global_notification := apex_util.get_global_notification(
        p_application_id => 117 );
    dbms_output.put_line( 'The current global notification is: ' ||
        l_global_notification );
end;
```

34.50 GET_GROUPS_USER_BELONGS_TO Function

This function returns a comma then a space separated list of group names to which the named user is a member.

Syntax

```
APEX_UTIL.GET_GROUPS_USER_BELONGS_TO(  
    p_username IN VARCHAR2)  
RETURN VARCHAR2;
```

Parameters**Table 34-44** GET_GROUPS_USER_BELONGS_TO Parameters

Parameter	Description
p_username	Identifies the user name in the account.

Example

The following example shows how to use the GET_GROUPS_USER_BELONGS_TO to return the list of groups to which the user 'FRANK' is a member.

```
DECLARE  
    VAL VARCHAR2(32765);  
BEGIN  
    VAL := APEX_UTIL.GET_GROUPS_USER_BELONGS_TO(p_username => 'FRANK');  
END;
```

34.51 GET_GROUP_ID Function

This function returns the numeric ID of a named group in the workspace.

Syntax

```
APEX_UTIL.GET_GROUP_ID(  
    p_group_name IN VARCHAR2)  
RETURN VARCHAR2;
```

Parameters**Table 34-45** GET_GROUP_ID Parameters

Parameter	Description
p_group_name	Identifies the user name in the account.

Example

The following example shows how to use the GET_GROUP_ID function to return the ID for the group named 'Managers'.

```
DECLARE  
    VAL NUMBER;  
BEGIN  
    VAL := APEX_UTIL.GET_GROUP_ID(p_group_name => 'Managers');  
END;
```

34.52 GET_GROUP_NAME Function

This function returns the name of a group identified by a numeric ID.

Syntax

```
APEX_UTIL.GET_GROUP_NAME(  
    p_group_id IN NUMBER)  
RETURN VARCHAR2;
```

Parameters

Table 34-46 GET_GROUP_NAME Parameters

Parameter	Description
p_group_id	Identifies a numeric ID of a group in the workspace.

Example

The following example shows how to use the GET_GROUP_NAME function to return the name of the group with the ID 8922003.

```
DECLARE  
    VAL VARCHAR2(255);  
BEGIN  
    VAL := APEX_UTIL.GET_GROUP_NAME(p_group_id => 8922003);  
END;
```

34.53 GET_HASH Function

This function computes a hash value for all given values. Use this function to implement lost update detection for data records.

Syntax

```
APEX_UTIL.GET_HASH (  
    p_values in apex_t_varchar2,  
    p_saltd in boolean default true )  
RETURN VARCHAR2;
```

Parameters

Table 34-47 GET_HASH Parameters

Parameter	Description
p_values	The input values.
p_saltd	If true (the default), salt hash with internal session information.

Example

```
declare  
    l_hash varchar2(4000);  
begin
```

```

select apex_util.get_hash(apex_t_varchar2 (
    empno, sal, comm ))
    into l_hash
    from emp
    where empno = :P1_EMPNO;

if :P1_HASH <> l_hash then
    raise_application_error(-20001, 'Somebody already updated SAL/COMM');
end if;

update emp
    set sal = :P1_SAL,
        comm = :P1_COMM
    where empno = :P1_EMPNO;
exception when no_data_found then
    raise_application_error(-20001, 'Employee not found');
end;
```

34.54 GET_HIGH_CONTRAST_MODE_TOGGLE Function

This function returns a link to the current page that enables you to turn on or off, toggle, the mode. For example, if you are in standard mode, this function displays a link that when clicked switches high contrast mode on.

Syntax

```

APEX_UTIL.GET_HIGH_CONTRAST_MODE_TOGGLE (
    p_on_message IN VARCHAR2 DEFAULT NULL,
    p_off_message IN VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;
```

Parameters

Table 34-48 GET_HIGH_CONTRAST_MODE_TOGGLE Parameters

Parameter	Description
p_on_message	Optional text used for the link to switch to high contrast mode, when you are in standard mode. If this parameter is not passed, the default 'Set High Contrast Mode On' text is returned in the link.
p_off_message	Optional text used for the link to switch to standard mode, when you are in high contrast mode. If this parameter is not passed, the default 'Set High Contrast Mode Off' text is returned in the link.

Example

When running in standard mode, this function returns a link with the text 'Set High Contrast Mode On'. When the link is clicked the current page is refreshed and high contrast mode is switched on. When running in high contrast mode, a link 'Set High Contrast Mode Off' is returned. When the link is clicked the current page is refreshed and switched back to standard mode.

```

BEGIN
    http.p(apex_util.get_high_contrast_mode_toggle);
END;
```

 **Note:**

There are also 2 translatable system messages that can be overridden at application level to change the default link text that is returned for this toggle. They include:

- APEX.SET_HIGH_CONTRAST_MODE_OFF - Default text = Set High Contrast Mode Off
- APEX.SET_HIGH_CONTRAST_MODE_ON - Default text = Set High Contrast Mode On

34.55 GET_LAST_NAME Function

This function returns the `LAST_NAME` field stored in the named user account record.

Syntax

```
APEX_UTIL.GET_LAST_NAME(
    p_username IN VARCHAR2)
RETURN VARCHAR2;
```

Parameters

Table 34-49 GET_LAST_NAME Parameters

Parameter	Description
<code>p_username</code>	The user name in the user account record.

Example

The following example shows how to use the function to return the `LAST_NAME` for the user 'FRANK'.

```
DECLARE
    VAL VARCHAR2(255);
BEGIN
    VAL := APEX_UTIL.GET_LAST_NAME(p_username => 'FRANK');
END;
```

34.56 GET_NUMERIC_SESSION_STATE Function

This function returns a numeric value for a numeric item. You can use this function in Oracle Application Express applications wherever you can use PL/SQL or SQL. You can also use the shorthand, function `NV`, in place of `APEX_UTIL.GET_NUMERIC_SESSION_STATE`.

Syntax

```
APEX_UTIL.GET_NUMERIC_SESSION_STATE (
    p_item      IN VARCHAR2)
RETURN NUMBER;
```

Parameters**Table 34-50 GET_NUMERIC_SESSION_STATE Parameters**

Parameter	Description
p_item	The case insensitive name of the item for which you want to have the session state fetched.

Example

The following example shows how to use the function to return the numeric value stored in session state for the item 'my_item'.

```
DECLARE
    l_item_value    NUMBER;
BEGIN
    l_item_value := APEX_UTIL.GET_NUMERIC_SESSION_STATE('my_item');
END;
```

34.57 GET_PREFERENCE Function

This function retrieves the value of a previously saved preference for a given user.

Syntax

```
APEX_UTIL.GET_PREFERENCE (
    p_preference IN   VARCHAR2 DEFAULT NULL,
    p_user      IN   VARCHAR2 DEFAULT V('USER'))
RETURN VARCHAR2;
```

Parameters**Table 34-51 GET_PREFERENCE Parameters**

Parameter	Description
p_preference	Name of the preference to retrieve the value.
p_user	User for whom the preference is being retrieved.

Example

The following example shows how to use the GET_PREFERENCE function to return the value for the currently authenticated user's preference named default_view.

```
DECLARE
    l_default_view  VARCHAR2(255);
BEGIN
    l_default_view := APEX_UTIL.GET_PREFERENCE(
```

```

        p_preference => 'default_view',
        p_user       => :APP_USER);
END;
```

34.58 GET_PRINT_DOCUMENT Function Signature 1

This function returns a document as BLOB using XML based report data and RTF or XSL-FO based report layout.

Syntax

```

APEX_UTIL.GET_PRINT_DOCUMENT (
    p_report_data      IN BLOB,
    p_report_layout    IN CLOB,
    p_report_layout_type IN VARCHAR2 default 'xsl-fo',
    p_document_format  IN VARCHAR2 default 'pdf',
    p_print_server     IN VARCHAR2 default NULL)
RETURN BLOB;
```

Parameters

Table 34-52 GET_PRINT_DOCUMENT Signature 1 Parameters

Parameter	Description
p_report_data	XML based report data.
p_report_layout	Report layout in XSL-FO or RTF format.
p_report_layout_type	Defines the report layout type, that is "xsl-fo" or "rtf".
p_document_format	Defines the document format, that is "pdf", "rtf", "xls", "htm", or "xml".
p_print_server	URL of the print server. If not specified, the print server is derived from preferences.

For a GET_PRINT_DOCUMENT example see "[GET_PRINT_DOCUMENT Function Signature 4](#) (page 34-55)".

34.59 GET_PRINT_DOCUMENT Function Signature 2

This function returns a document as BLOB using pre-defined report query and pre-defined report layout.

Syntax

```

APEX_UTIL.GET_PRINT_DOCUMENT (
    p_application_id  IN NUMBER,
    p_report_query_name IN VARCHAR2,
    p_report_layout_name IN VARCHAR2 default null,
    p_report_layout_type IN VARCHAR2 default 'xsl-fo',
    p_document_format  IN VARCHAR2 default 'pdf',
    p_print_server     IN VARCHAR2 default null)
RETURN BLOB;
```


Parameters

Table 34-53 GET_PRINT_DOCUMENT Signature 2 Parameters

Parameter	Description
p_application_id	Defines the application ID of the report query.
p_report_query_name	Name of the report query (stored under application's shared components).
p_report_layout_name	Name of the report layout (stored under application's Shared Components).
p_report_layout_type	Defines the report layout type, that is "xsl-fo" or "rtf".
p_document_format	Defines the document format, that is "pdf", "rtf", "xls", "htm", or "xml".
p_print_server	URL of the print server. If not specified, the print server is derived from preferences.

For a GET_PRINT_DOCUMENT example see "[GET_PRINT_DOCUMENT Function Signature 4](#) (page 34-55)".

34.60 GET_PRINT_DOCUMENT Function Signature 3

This function returns a document as BLOB using a pre-defined report query and RTF or XSL-FO based report layout.

Syntax

```
APEX_UTIL.GET_PRINT_DOCUMENT (
  p_application_id      IN NUMBER,
  p_report_query_name  IN VARCHAR2,
  p_report_layout      IN CLOB,
  p_report_layout_type IN VARCHAR2 default 'xsl-fo',
  p_document_format    IN VARCHAR2 default 'pdf',
  p_print_server       IN VARCHAR2 default null)
RETURN BLOB;
```

Parameters

Table 34-54 GET_PRINT_DOCUMENT Signature 3 Parameters

Parameter	Description
p_application_id	Defines the application ID of the report query.
p_report_query_name	Name of the report query (stored under application's shared components).
p_report_layout	Defines the report layout in XSL-FO or RTF format.
p_report_layout_type	Defines the report layout type, that is "xsl-fo" or "rtf".
p_document_format	Defines the document format, that is "pdf", "rtf", "xls", "htm", or "xml".
p_print_server	URL of the print server. If not specified, the print server is derived from preferences.

For a GET_PRINT_DOCUMENT example see "[GET_PRINT_DOCUMENT Function Signature 4](#) (page 34-55)".

34.61 GET_PRINT_DOCUMENT Function Signature 4

This function returns a document as BLOB using XML based report data and RTF or XSL-FO based report layout.

Syntax

```
APEX_UTIL.GET_PRINT_DOCUMENT (
  p_report_data      IN CLOB,
  p_report_layout    IN CLOB,
  p_report_layout_type IN VARCHAR2 default 'xsl-fo',
  p_document_format  IN VARCHAR2 default 'pdf',
  p_print_server     IN VARCHAR2 default NULL)
RETURN BLOB;
```

Parameters

Table 34-55 GET_PRINT_DOCUMENT Signature 4 Parameters

Parameter	Description
p_report_data	XML based report data, must be encoded in UTF-8.
p_report_layout	Report layout in XSL-FO or RTF format.
p_report_layout_type	Defines the report layout type, that is "xsl-fo" or "rtf".
p_document_format	Defines the document format, that is "pdf", "rtf", "xls", "htm", or "xml".
p_print_server	URL of the print server. If not specified, the print server is derived from preferences.

Example for Signature 4

The following example shows how to use the GET_PRINT_DOCUMENT using Signature 4 (Document returns as a BLOB using XML based report data and RTF or XSL-FO based report layout). In this example, GET_PRINT_DOCUMENT is used with APEX_MAIL.SEND and APEX_MAIL.ADD_ATTACHMENT to send an email with an attachment of the file returned by GET_PRINT_DOCUMENT. Both the report data and layout are taken from values stored in page items (P1_XML and P1_XSL).

```
DECLARE
  l_id number;
  l_document BLOB;
BEGIN
  l_document := APEX_UTIL.GET_PRINT_DOCUMENT (
    p_report_data      => :P1_XML,
    p_report_layout    => :P1_XSL,
    p_report_layout_type => 'xsl-fo',
    p_document_format  => 'pdf');

  l_id := APEX_MAIL.SEND(
    p_to      => :P35_MAIL_TO,
    p_from    => 'noreplies@oracle.com',
    p_subj    => 'sending PDF by using print API',
    p_body    => 'Please review the attachment.',
```

```

p_body_html => 'Please review the attachment');

APEX_MAIL.ADD_ATTACHMENT (
  p_mail_id    => l_id,
  p_attachment => l_document,
  p_filename   => 'mydocument.pdf',
  p_mime_type  => 'application/pdf');
END;
```

34.62 GET_SCREEN_READER_MODE_TOGGLE Function

This function returns a link to the current page to turn on or off, toggle, the mode. For example, if you are in standard mode, this function displays a link that when clicked switches screen reader mode on.

Syntax

```

APEX_UTIL.GET_SCREEN_READER_MODE_TOGGLE (
  p_on_message IN VARCHAR2 DEFAULT NULL,
  p_off_message IN VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;
```

Parameters

Table 34-56 GET_SCREEN_READER_MODE_TOGGLE Parameters

Parameter	Description
p_on_message	Optional text used for the link to switch to screen reader mode, when you are in standard mode. If this parameter is not passed, the default 'Set Screen Reader Mode On' text is returned in the link.
p_off_message	Optional text used for the link to switch to standard mode, when you are in screen reader mode. If this parameter is not passed, the default 'Set Screen Reader Mode Off' text is returned in the link.

Example

When running in standard mode, this function returns a link with the text 'Set Screen Reader Mode On'. When the link is clicked the current page is refreshed and screen reader mode is switched on. When running in screen reader mode, a link 'Set Screen Reader Mode Off' is returned. When the link is clicked the current page is refreshed and switched back to standard mode.

```

BEGIN
  http.p(apex_util.get_screen_reader_mode_toggle);
END;
```

34.63 GET_SESSION_LANG Function

This function returns the language setting for the current user in the current Application Express session.

Syntax

```
APEX_UTIL.GET_SESSION_LANG  
RETURN VARCHAR2;
```

Parameters

None.

Example

The following example shows how to use the GET_SESSION_LANG function. It returns the session language for the current user in the current Application Express session into a local variable.

```
DECLARE  
    VAL VARCHAR2(5);  
BEGIN  
    VAL := APEX_UTIL.GET_SESSION_LANG;  
END;
```

34.64 GET_SESSION_STATE Function

This function returns the value for an item. You can use this function in your Oracle Application Express applications wherever you can use PL/SQL or SQL. You can also use the shorthand, function `v`, in place of `APEX_UTIL.GET_SESSION_STATE`.

Syntax

```
APEX_UTIL.GET_SESSION_STATE (  
    p_item IN VARCHAR2)  
RETURN VARCHAR2;
```

Parameters

Table 34-57 GET_SESSION_STATE Parameters

Parameter	Description
<code>p_item</code>	The case insensitive name of the item for which you want to have the session state fetched.

Example

The following example shows how to use the GET_SESSION_STATE function to return the value stored in session state for the item 'my_item'.

```
DECLARE  
    l_item_value VARCHAR2(255);  
BEGIN  
    l_item_value := APEX_UTIL.GET_SESSION_STATE('my_item');  
END;
```

34.65 GET_SESSION_TERRITORY Function

This function returns the territory setting for the current user in the current Application Express session.

Syntax

```
APEX_UTIL.GET_SESSION_TERRITORY  
RETURN VARCHAR2;
```

Parameters

None.

Example

The following example shows how to use the `GET_SESSION_TERRITORY` function. It returns the session territory setting for the current user in the current Application Express session into a local variable.

```
DECLARE  
    VAL VARCHAR2(30);  
BEGIN  
    VAL := APEX_UTIL.GET_SESSION_TERRITORY;  
END;
```

34.66 GET_SESSION_TIME_ZONE Function

This function returns the time zone for the current user in the current Application Express session. This value is null if the time zone is not explicitly set by using `APEX_UTIL.SET_SESSION_TIME_ZONE` or if an application's automatic time zone attribute is enabled.

Syntax

```
APEX_UTIL.GET_SESSION_TIME_ZONE  
RETURN VARCHAR2;
```

Parameters

None.

Example

The following example shows how to use the `GET_SESSION_TIME_ZONE` function. It returns the session time zone for the current user in the current Application Express session into a local variable.

```
BEGIN  
    VAL := APEX_UTIL.GET_SESSION_TIME_ZONE;  
END;
```

34.67 GET_SINCE Function

This function returns the relative date in words (for example, 2 days from now, 30 minutes ago). It also accepts a second optional `p_short` parameter and returns "in 2d",

"30m". This function is equivalent to using the `SINCE` and `SINCE_SHORT` format mask available within Oracle Application Express and is useful within SQL queries or PL/SQL routines.

Syntax

```
APEX_UTIL.GET_SINCE (
    p_date date )
    p_short in [ boolean default false | varchar2 default 'N' ] )
RETURN VARCHAR2;
```

Parameters

Table 34-58 GET_SINCE Parameters

Parameter	Description
<code>p_date</code>	The date you want formatted.
<code>p_short</code>	Boolean or 'Y' / 'N' to indicate whether to return a short version of relative date.

Example

```
select application_id, application_name, apex_util.get_since(last_updated_on)
last_update
  from apex_applications
 order by application_id
```

Syntax

```
APEX_UTIL.GET_SINCE (
    p_value in [ timestamp | timestamp with time zone | timestamp with local time
zone ],
    p_short in [ boolean default false | varchar2 default 'N' ] )
RETURN VARCHAR2;
```

Parameters

Parameter	Description
<code>p_value</code>	The <code>TIMESTAMP</code> , <code>TIMESTAMP WITH TIME ZONE</code> , <code>TIMESTAMP WITH LOCAL TIME ZONE</code> you want formatted.
<code>p_short</code>	Boolean or 'Y' / 'N' to indicate whether to return a short version of relative date.

Example

This returns the `LAST_UPDATE` column with the normal formatting.

```
select application_id, application_name, apex_util.get_since( last_updated_on )
last_update
  from apex_applications
 order by application_id;
```

This returns the `LAST_UPDATE` column with the short formatting.

```
select application_id, application_name, apex_util.get_since( last_updated_on,
p_short => 'Y' ) last_update
  from apex_applications
 order by application_id
```

34.68 GET_SUPPORTING_OBJECT_SCRIPT Function

This function gets supporting object scripts defined in an application.



Note:

The workspace ID must be set before the call.

Syntax

```
APEX_UTIL.GET_SUPPORTING_OBJECT_SCRIPT (
  p_application_id  in number,
  p_script_type     in varchar2 ) return clob;
```

Parameters

Table 34-59 GET_SUPPORTING_OBJECT_SCRIPT Function

Parameter	Description
p_application_id	The application ID to get supporting objects from.
p_script_type	The supporting objects script type. Valid values are apex_util.c_install_script, apex_util.c_upgrade_script, apex_util.c_deinstall_script.

Example

The following example shows how to set workspace ID for workspace FRED, then get supporting objects from application ID 100.

```
declare
  l_install_script  clob;
  l_upgrade_script  clob;
  l_deinstall_script clob;
begin
  apex_util.set_workspace( p_workspace => 'FRED');

  l_install_script := apex_util.get_supporting_object_script( p_application_id =>
100,
  p_script_type => apex_util.c_install_script );
  l_upgrade_script := apex_util.get_supporting_object_script( p_application_id =>
100,
  p_script_type => apex_util.c_upgrade_script );
  l_deinstall_script := apex_util.get_supporting_object_script( p_application_id
=> 100,
  p_script_type => apex_util.c_deinstall_script );
end;
```

34.69 GET_SUPPORTING_OBJECT_SCRIPT Procedure

This procedure gets supporting object scripts and outputs to `sys.dbms_output` buffer or download as a file.

 **Note:**

The workspace ID must be set before the call.

Syntax

```
APEX_UTIL.GET_SUPPORTING_OBJECT_SCRIPT(
  p_application_id in number,
  p_script_type   in varchar2,
  p_output_type   in varchar2 default c_output_as_dbms_output );
```

Parameters

Table 34-60 GET_SUPPORTING_OBJECT_SCRIPT Procedure

Parameter	Description
<code>p_application_id</code>	The application ID to get supporting objects from.
<code>p_script_type</code>	The supporting objects script type. Valid values are <code>apex_util.c_install_script</code> , <code>apex_util.c_upgrade_script</code> , <code>apex_util.c_deinstall_script</code> .
<code>p_output_type</code>	The script can be output to <code>sys.dbms_output</code> buffer or download as a file. Valid values are <code>apex_util.c_output_as_dbms_output</code> , <code>apex_util.c_output_as_file</code> . The default is <code>c_output_as_dbms_output</code> .

Examples

The following example shows how to set workspace ID for workspace `FRED`, then get install script from application ID 100 and output to the command-line buffer.

```
set serveroutput on;
begin
  apex_util.set_workspace( p_workspace => 'FRED');
  apex_util.get_supporting_object_script(
    p_application_id => 100,
    p_script_type   => apex_util.c_install_script );
end;
```

The following example shows how to download upgrade script file from application ID 100 in the browser. Useful if the script needs to be downloaded using an application process.

```
begin
  apex_util.set_workspace( p_workspace => 'FRED');
```



```

apex_util.get_supporting_object_script(
    p_application_id => 100,
    p_script_type    => apex_util.c_upgrade_script,
    p_output_type    => apex_util.c_output_as_file );
end;

```

34.70 GET_USER_ID Function

This function returns the numeric ID of a named user in the workspace.

Syntax

```

APEX_UTIL.GET_USER_ID(
    p_username IN VARCHAR2)
RETURN NUMBER;

```

Parameters

Table 34-61 GET_USER_ID Parameters

Parameter	Description
p_username	Identifies the name of a user in the workspace.

Example

The following example shows how to use the GET_USER_ID function to return the ID for the user named 'FRANK'.

```

DECLARE
    v NUMBER;
BEGIN
    v := APEX_UTIL.GET_USER_ID(p_username => 'FRANK');
END;

```

34.71 GET_USER_ROLES Function

This function returns the DEVELOPER_ROLE field stored in the named user account record. Please note that currently this parameter is named inconsistently between the CREATE_USER, EDIT_USER and FETCH_USER APIs, although they all relate to the DEVELOPER_ROLE field. CREATE_USER uses p_developer_privs, EDIT_USER uses p_developer_roles and FETCH_USER uses p_developer_role.

Syntax

```

APEX_UTIL.GET_USER_ROLES(
    p_username IN VARCHAR2)
RETURN VARCHAR2;

```

Parameters

Table 34-62 GET_USER_ROLES Parameters

Parameter	Description
p_username	Identifies a user name in the account.

Example

The following example shows how to use the `GET_USER_ROLES` function to return colon separated list of roles stored in the `DEVELOPER_ROLE` field for the user 'FRANK'.

```
DECLARE
    VAL VARCHAR2(4000);
BEGIN
    VAL := APEX_UTIL.GET_USER_ROLES(p_username=>'FRANK');
END;
```

34.72 GET_USERNAME Function

This function returns the user name of a user account identified by a numeric ID.

Syntax

```
APEX_UTIL.GET_USERNAME(
    p_userid IN NUMBER)
RETURN VARCHAR2;
```

Parameters

Table 34-63 GET_USERNAME Parameters

Parameter	Description
<code>p_userid</code>	Identifies the numeric ID of a user account in the workspace.

Example

The following example shows how to use the `GET_USERNAME` function to return the user name for the user with an ID of 228922003.

```
DECLARE
    VAL VARCHAR2(100);
BEGIN
    VAL := APEX_UTIL.GET_USERNAME(p_userid => 228922003);
END;
```

34.73 HOST_URL Function

This function returns the URL to the Application Express instance, depending on the option passed.

Syntax

```
APEX_UTIL.HOST_URL (
    p_option IN VARCHAR2 DEFAULT NULL)
RETURN VARCHAR2;
```

Parameters

Table 34-64 HOST_URL Parameters

Parameter	Description
p_option	<p>Specifies the parts of the URL to include.</p> <p>Possible values for p_option include:</p> <ul style="list-style-type: none"> • NULL - Return URL up to port number. For example: <code>http://myserver.com:7778</code> • SCRIPT - Return URL to include script name. For example: <code>https://myserver.com:7778/pls/apex/</code> • IMGPRE - Return URL to include image prefix. For example: <code>https://myserver.com:7778/i/</code>

Example

The following example demonstrates how to use the HOST_URL function to return the URL, including the script name, to the current Application Express instance.

```

declare
  l_host_url  varchar2(4000);
  l_url       varchar2(4000);
  l_application varchar2(30) := 'f?p=100:1';
  l_email_body varchar2(32000);
begin
  l_host_url := apex_util.host_url('SCRIPT');
  l_url := l_host_url||l_application;
  l_email_body := 'The URL to the application is: '||l_url;
end;

```

34.74 HTML_PCT_GRAPH_MASK Function

Use this function to scale a graph. This function can also be used by classic and interactive reports with format mask of GRAPH. This generates a <div> tag with inline styles.

Syntax

```

APEX_UTIL.HTML_PCT_GRAPH_MASK (
  p_number      IN NUMBER      DEFAULT NULL,
  p_size        IN NUMBER      DEFAULT 100,
  p_background  IN VARCHAR2    DEFAULT NULL,
  p_bar_background IN VARCHAR2  DEFAULT NULL,
  p_format      IN VARCHAR2    DEFAULT NULL)
RETURN VARCHAR2;

```

Parameters

Table 34-65 HTML_PCT_GRAPH_MASK Parameters

Parameter	Description
p_number	Number between 0 and 100.
p_size	Width of graph in pixels.
p_background	Six character hexadecimal background color of chart bar (not bar color).
p_bar_background	Six character hexadecimal background color of chart bar (bar color).
p_format	<p>If this parameter is supplied, p_size, p_background and p_bar_background are ignored.</p> <p>This parameter uses the following format:</p> <p>PCT_GRAPH:<BACKGROUND>:<FOREGROUND>:<CHART_WIDTH></p> <p>position 1: PCT_GRAPH format mask indicator</p> <p>position 2: Background color in hexadecimal, 6 characters (optional)</p> <p>position 3: Foreground "bar" color in hexadecimal, 6 characters (optional)</p> <p>position 4: Chart width in pixels. Numeric and defaults to 100.</p> <p>p_number is automatically scaled so that 50 is half of chart_width (optional).</p>

Example

The following is an SQL example.

```
select apex_util.html_pct_graph_mask(33) from dual
```

The following is a report numeric column format mask example.

```
PCT_GRAPH:777777:111111:200
```

34.75 INCREMENT_CALENDAR Procedure

Use this procedure to navigate to the next set of days in the calendar. Depending on what the calendar view is, this procedure navigates to the next month, week or day. If it is a Custom Calendar the total number of days between the start date and end date are navigated.

Syntax

```
APEX_UTIL.INCREMENT_CALENDAR;
```

Parameter

None.

Example

In this example, if you create a button called NEXT in the Calendar page and create a process that fires when the create button is clicked the following code navigates the calendar.

```
APEX_UTIL.INCREMENT_CALENDAR
```

34.76 IR_CLEAR Procedure [DEPRECATED]

 **Note:**

The use of this procedure is not recommended. This procedure has been replaced by the procedure in APEX_IR.

This procedure clears report settings.

 **Note:**

This procedure should be used only in a page submit process.

Syntax

```
APEX_UTIL.IR_CLEAR(  
    p_page_id IN NUMBER,  
    p_report_alias IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 34-66 IR_CLEAR Parameters

Parameter	Description
p_page_id	Page of the current Application Express application that contains an interactive report.
p_report_alias	Identifies the saved report alias within the current application page. To clear a Primary report, p_report_alias must be 'PRIMARY' or leave as NULL. To clear a saved report, p_report_alias must be the name of the saved report. For example, to clear report '1234', p_report_alias must be '1234'.

Example

The following example shows how to use the IR_CLEAR procedure to clear Interactive report settings with alias of '8101021' in page 1 of the current application.

```
BEGIN  
    APEX_UTIL.IR_CLEAR(  
        p_page_id => 1,  
        p_report_alias => '8101021'  
    );  
END;
```

34.77 IR_DELETE_REPORT Procedure [DEPRECATED]

 **Note:**

The use of this procedure is not recommended. This procedure has been replaced by the procedure in APEX_IR.

This procedure deletes saved Interactive reports. It deletes all saved reports except the Primary Default report.

Syntax

```
APEX_UTIL.IR_DELETE_REPORT(  
    p_report_id IN NUMBER);
```

Parameters

Table 34-67 IR_DELETE_REPORT Parameters

Parameter	Description
p_report_id	Report ID to delete within the current Application Express application.

Example

The following example shows how to use the `IR_DELETE_REPORT` procedure to delete the saved Interactive report with ID of '880629800374638220' in the current application.

```
BEGIN  
    APEX_UTIL.IR_DELETE_REPORT(  
        p_report_id => '880629800374638220');  
END;
```

34.78 IR_DELETE_SUBSCRIPTION Procedure [DEPRECATED]

 **Note:**

The use of this procedure is not recommended. This procedure has been replaced by the procedure in APEX_IR.

This procedure deletes Interactive subscriptions.

Syntax

```
APEX_UTIL.IR_DELETE_SUBSCRIPTION(  
    p_subscription_id IN NUMBER);
```

Parameters

Table 34-68 IR_DELETE_SUBSCRIPTION Parameters

Parameter	Description
p_subscription_id	Subscription ID to delete within the current workspace.

Example

The following example shows how to use the IR_DELETE_SUBSCRIPTION procedure to delete the subscription with ID of ' 880629800374638220 ' in the current workspace.

```
BEGIN  
    APEX_UTIL.IR_DELETE_SUBSCRIPTION(  
        p_subscription_id => '880629800374638220');  
END;
```

34.79 IR_FILTER Procedure [DEPRECATED]

Note:

The use of this procedure is not recommended. This procedure has been replaced by the procedure in APEX_IR.

This procedure creates a filter on an interactive report.

Note:

This procedure should be used only in a page submit process.

Syntax

```
APEX_UTIL.IR_FILTER(  
    p_page_id          IN NUMBER,  
    p_report_column    IN VARCHAR2,  
    p_operator_abbr    IN VARCHAR2 DEFAULT NULL,  
    p_filter_value      IN VARCHAR2,  
    p_report_alias     IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 34-69 IR_FILTER Parameters

Parameter	Description
<code>p_page_id</code>	Page of the current Application Express application that contains an interactive report.
<code>p_report_column</code>	Name of the report SQL column, or column alias, to be filtered.
<code>p_operator_abbr</code>	Filter type. Valid values are as follows: <ul style="list-style-type: none">• EQ = Equals• NEQ = Not Equals• LT = Less than• LTE = Less than or equal to• GT = Greater Than• GTE = Greater than or equal to• LIKE = SQL Like operator• N = Null• NN = Not Null• C = Contains• NC = Not Contains• IN = SQL In Operator• NIN = SQL Not In Operator
<code>p_filter_value</code>	Filter value. This value is not used for 'N' and 'NN'.
<code>p_report_alias</code>	Identifies the saved report alias within the current application page. To create a filter on a Primary report, <code>p_report_alias</code> must be 'PRIMARY' or leave as NULL. To create a filter on a saved report, <code>p_report_alias</code> must be the name of the saved report. For example, to create a filter on report '1234', <code>p_report_alias</code> must be '1234'.

Example

The following example shows how to use the IR_FILTER procedure to filter Interactive report with alias of '8101021' in page 1 of the current application with DEPTNO equals 30.

```
BEGIN
  APEX_UTIL.IR_FILTER (
    p_page_id      => 1,
    p_report_column => 'DEPTNO',
    p_operator_abbr => 'EQ',
    p_filter_value  => '30'
    p_report_alias  => '8101021'
  );
END;
```


34.80 IR_RESET Procedure [DEPRECATED]

 **Note:**

The use of this procedure is not recommended. This procedure has been replaced by the procedure in APEX_IR.

This procedure resets report settings back to the default report settings. Resetting a report removes any customizations you have made.

 **Note:**

This procedure should be used only in a page submit process.

Syntax

```
APEX_UTIL.IR_RESET(  
    p_page_id IN NUMBER,  
    p_report_alias IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 34-70 IR_RESET Parameters

Parameter	Description
p_page_id	Page of the current Application Express application that contains an interactive report.
p_report_alias	Identifies the saved report alias within the current application page. To reset a Primary report, p_report_alias must be 'PRIMARY' or leave as NULL. To reset a saved report, p_report_alias must be the name of the saved report. For example, to reset report '1234', p_report_alias must be '1234'.

Example

The following example shows how to use the IR_RESET procedure to reset Interactive report settings with alias of '8101021' in page 1 of the current application.

```
BEGIN  
    APEX_UTIL.IR_RESET(  
        p_page_id => 1,  
        p_report_alias => '8101021'  
    );  
END;
```

34.81 IS_HIGH_CONTRAST_SESSION Function

This function returns a boolean TRUE if the session is in high contrast mode and returns a boolean FALSE if not in high contrast mode.

Syntax

```
APEX_UTIL.IS_HIGH_CONTRAST_SESSION  
RETURN BOOLEAN;
```

Parameters

None.

Example

In this example, if the current session is running in high contrast mode, a high contrast specific CSS file 'my_app_hc.css' is added to the HTML output of the page.

```
BEGIN  
  IF apex_util.is_high_contrast_session THEN  
    apex_css.add_file (  
      p_name => 'my_app_hc');  
  END IF;  
END;
```

34.82 IS_HIGH_CONTRAST_SESSION_YN Function

This function returns Y if the session is in high contrast mode and N if not in high contrast mode.

Syntax

```
APEX_UTIL.IS_HIGH_CONTRAST_SESSION_YN  
RETURN VARCHAR2;
```

Parameters

None.

Example

In this example, if the current session is running in high contrast mode, a high contrast specific CSS file, my_app_hc.css, is added to the HTML output of the page.

```
BEGIN  
  IF apex_util.is_high_contrast_session_yn = 'Y' THEN  
    apex_css.add_file (  
      p_name => 'my_app_hc');  
  END IF;  
END;
```

34.83 IS_LOGIN_PASSWORD_VALID Function

This function returns a Boolean result based on the validity of the password for a named user account in the current workspace. This function returns TRUE if the password matches and it returns FALSE if the password does not match.

Syntax

```
APEX_UTIL.IS_LOGIN_PASSWORD_VALID(  
    p_username IN VARCHAR2,  
    p_password IN VARCHAR2)  
RETURN BOOLEAN;
```

Parameters

Table 34-71 IS_LOGIN_PASSWORD_VALID Parameters

Parameter	Description
p_username	User name in account.
p_password	Password to be compared with password stored in the account.

Example

The following example shows how to use the IS_LOGIN_PASSWORD_VALID function to check if the user 'FRANK' has the password 'tiger'. TRUE is returned if this is a valid password for 'FRANK', FALSE is returned if not.

```
DECLARE  
    VAL BOOLEAN;  
BEGIN  
    VAL := APEX_UTIL.IS_LOGIN_PASSWORD_VALID (  
        p_username=>'FRANK',  
        p_password=>'tiger');  
END;
```

34.84 IS_SCREEN_READER_SESSION Function

This function returns a boolean TRUE if the session is in screen reader mode and returns a boolean FALSE if not in screen reader mode.

Syntax

```
APEX_UTIL.IS_SCREEN_READER_SESSION  
RETURN BOOLEAN;
```

Parameters

None

Example

```
BEGIN  
    IF apex_util.is_screen_reader_session then  
        htp.p('Screen Reader Mode');
```

```
END IF;  
END;
```

34.85 IS_SCREEN_READER_SESSION_YN Function

This function returns 'Y' if the session is in screen reader mode and 'N' if not in screen reader mode.

Syntax

```
APEX_UTIL.IS_SCREEN_READER_SESSION_YN  
RETURN VARCHAR2;
```

Parameters

None

Example

```
BEGIN  
  IF apex_util.is_screen_reader_session_yn = 'Y' then  
    http.p('Screen Reader Mode');  
  END IF;  
END;
```

34.86 IS_USERNAME_UNIQUE Function

This function returns a Boolean result based on whether the named user account is unique in the workspace.

Syntax

```
APEX_UTIL.IS_USERNAME_UNIQUE(  
  p_username IN VARCHAR2)  
RETURN BOOLEAN;
```

Parameters

Table 34-72 IS_USERNAME_UNIQUE Parameters

Parameter	Description
p_username	Identifies the user name to be tested.

Example

The following example shows how to use the `IS_USERNAME_UNIQUE` function. If the user 'FRANK' already exists in the current workspace, `FALSE` is returned, otherwise `TRUE` is returned.

```
DECLARE  
  VAL BOOLEAN;  
BEGIN  
  VAL := APEX_UTIL.IS_USERNAME_UNIQUE(  
    p_username=>'FRANK');  
END;
```

34.87 KEYVAL_NUM Function

This function gets the value of the package variable (`apex_utilities.g_val_num`) set by `APEX_UTIL.SAVEKEY_NUM`.

Syntax

```
APEX_UTIL.KEYVAL_NUM  
RETURN NUMBER;
```

Parameters

None

Example

The following example shows how to use the `KEYVAL_NUM` function to return the current value of the package variable `apex_utilities.g_val_num`.

```
DECLARE  
    VAL NUMBER;  
BEGIN  
    VAL := APEX_UTIL.KEYVAL_NUM;  
END;
```

34.88 KEYVAL_VC2 Function

This function gets the value of the package variable (`apex_utilities.g_val_vc2`) set by `APEX_UTIL.SAVEKEY_VC2`.

Syntax

```
APEX_UTIL.KEYVAL_VC2;
```

Parameters

None.

Example

The following example shows how to use the `KEYVAL_VC2` function to return the current value of the package variable `apex_utilities.g_val_vc2`.

```
DECLARE  
    VAL VARCHAR2(4000);  
BEGIN  
    VAL := APEX_UTIL.KEYVAL_VC2;  
END;
```

34.89 LOCK_ACCOUNT Procedure

Sets a user account status to locked. Must be run by an authenticated workspace administrator in the context of a page request.

Syntax

```
APEX_UTIL.LOCK_ACCOUNT (
    p_user_name IN VARCHAR2);
```

Parameters**Table 34-73 LOCK_ACCOUNT Parameters**

Parameter	Description
p_user_name	The user name of the user account.

Example

The following example shows how to use the `LOCK_ACCOUNT` procedure. Use this procedure to lock an Application Express account (workspace administrator, developer, or end user) in the current workspace. This action locks the account for use by administrators, developers, and end users.

```
BEGIN
    FOR c1 IN (SELECT user_name from apex_users) LOOP
        APEX_UTIL.LOCK_ACCOUNT(p_user_name => c1.user_name);
        htp.p('End User Account: ' || c1.user_name || ' is now locked. ');
    END LOOP;
END;
```

34.90 PASSWORD_FIRST_USE_OCCURRED Function

Returns TRUE if the account's password has changed since the account was created, an Oracle Application Express administrator performs a password reset operation that results in a new password being emailed to the account holder, or a user has initiated password reset operation. This function returns FALSE if the account's password has not been changed since either of the events just described.

This function may be run in a page request context by any authenticated user.

Syntax

```
APEX_UTIL.PASSWORD_FIRST_USE_OCCURRED (
    p_user_name IN VARCHAR2)
RETURN BOOLEAN;
```

Parameters**Table 34-74 PASSWORD_FIRST_USE_OCCURRED Parameters**

Parameter	Description
p_user_name	The user name of the user account.

Example

The following example shows how to use the `PASSWORD_FIRST_USE_OCCURRED` function. Use this function to check if the password for an Application Express user account

(workspace administrator, developer, or end user) in the current workspace has been changed by the user the first time the user logged in after the password was initially set during account creation, or was changed by one of the password reset operations described above. This is meaningful only with accounts for which the `CHANGE_PASSWORD_ON_FIRST_USE` attribute is set to **Yes**.

```
BEGIN
  FOR c1 IN (SELECT user_name from apex_users) LOOP
    IF APEX_UTIL.PASSWORD_FIRST_USE_OCCURRED(p_user_name => c1.user_name) THEN
      http.p('User: ' || c1.user_name || ' has logged in and updated the password.');
```

34.91 PREPARE_URL Function

The `PREPARE_URL` function serves two purposes:

1. To return an f?p URL with the Session State Protection checksum argument (&cs=) if one is required.
2. To return an f?p URL with the session ID component replaced with zero (0) if the zero session ID feature is in use and other criteria are met.

Note:

The `PREPARE_URL` functions returns the f?p URL with `&cs=<large hex value>` appended. If you use this returned value, for example in JavaScript, it may be necessary to escape the ampersand in the URL to conform with syntax rules of the particular context.

Syntax

```
APEX_UTIL.PREPARE_URL (
  p_url          IN VARCHAR2,
  p_url_charset  IN VARCHAR2 default null,
  p_checksum_type IN VARCHAR2 default null,
  p_triggering_element IN VARCHAR2 default 'this'
  p_plain_url    IN BOOLEAN default false
)
RETURN VARCHAR2;
```

Parameters

Table 34-75 PREPARE_URL Parameters

Parameter	Description
<code>p_url</code>	An f?p relative URL with all substitutions resolved.
<code>p_url_charset</code>	The character set name (for example, UTF-8) to use when escaping special characters contained within argument values.
<code>p_checksum_type</code>	Null or any of the following six values, <code>SESSION</code> or 3, <code>PRIVATE_BOOKMARK</code> or 2, or <code>PUBLIC_BOOKMARK</code> or 1.

Table 34-75 (Cont.) PREPARE_URL Parameters

Parameter	Description
p_triggering_element	A jQuery selector (for example, #my_button , where my_button is the static ID for a button element), to identify which element to use to trigger the dialog. This is required for Modal Dialog support.
p_plain_url	Exclude any of the generated JavaScript code to close a modal dialog, if applicable. By default, if this function is called from a modal dialog, JavaScript code to close the modal dialog is included in the generated URL.

Example 1

The following example shows how to use the `PREPARE_URL` function to return a URL with a valid 'SESSION' level checksum argument. This URL sets the value of `P1_ITEM` page item to `xyz`.

```
DECLARE
    l_url varchar2(2000);
    l_app number := v('APP_ID');
    l_session number := v('APP_SESSION');
BEGIN
    l_url := APEX_UTIL.PREPARE_URL(
        p_url => 'f?p=' || l_app || ':1:' || l_session || '::NO::P1_ITEM:xyz',
        p_checksum_type => 'SESSION');
END;
```

Example 2

The following example shows how to use the `PREPARE_URL` function to return a URL with a zero session ID. In a PL/SQL Dynamic Content region that generates `f?p` URLs (anchors), call `PREPARE_URL` to ensure that the session ID is set to zero when the zero session ID feature is in use, when the user is a public user (not authenticated), and when the target page is a public page in the current application:

```
http.p(APEX_UTIL.PREPARE_URL(p_url => 'f?p=' || :APP_ID || ':10:' || :APP_SESSION
|| '::NO::P10_ITEM:ABC');
```

When using `PREPARE_URL` for this purpose, the `p_url_charset` and `p_checksum_type` arguments can be omitted. However, it is permissible to use them when both the Session State Protection and Zero Session ID features are applicable.

34.92 PUBLIC_CHECK_AUTHORIZATION Function [DEPRECATED]

 **Note:**

Use the "[IS_AUTHORIZED Function](#) (page 5-2)" instead of this deprecated function.

Given the name of a authorization scheme, this function determines if the current user passes the security check.

Syntax

```
APEX_UTIL.PUBLIC_CHECK_AUTHORIZATION (
    p_security_scheme IN VARCHAR2)
RETURN BOOLEAN;
```

Parameters

Table 34-76 PUBLIC_CHECK_AUTHORIZATION Parameters

Parameter	Description
p_security_name	The name of the authorization scheme that determines if the user passes the security check.

Example

The following example shows how to use the `PUBLIC_CHECK_AUTHORIZATION` function to check if the current user passes the check defined in the `my_auth_scheme` authorization scheme.

```
DECLARE
    l_check_security BOOLEAN;
BEGIN
    l_check_security := APEX_UTIL.PUBLIC_CHECK_AUTHORIZATION('my_auth_scheme');
END;
```

34.93 PURGE_REGIONS_BY_APP Procedure

Deletes all cached regions for an application.

Syntax

```
APEX_UTIL.PURGE_REGIONS_BY_APP (
    p_application IN NUMBER);
```

Parameters

Table 34-77 PURGE_REGIONS_BY_APP Parameters

Parameter	Description
p_application	The identification number (ID) of the application.

Example

The following example show how to use `APEX_UTIL.PURGE_REGIONS_BY_APP` to delete all cached regions for application #123.

```
BEGIN
    APEX_UTIL.PURGE_REGIONS_BY_APP(p_application=>123);
END;
```

34.94 PURGE_REGIONS_BY_NAME Procedure

Deletes all cached values for a region identified by the application ID, page number and region name.

Syntax

```
APEX_UTIL.PURGE_REGIONS_BY_NAME (  
    p_application IN NUMBER,  
    p_page        IN NUMBER,  
    p_region_name IN VARCHAR2);
```

Parameters

Table 34-78 PURGE_REGIONS_BY_NAME Parameters

Parameter	Description
p_application	The identification number (ID) of the application.
p_page	The number of the page containing the region to be deleted.
p_region_name	The region name to be deleted.

Example

The following example shows how to use the `PURGE_REGIONS_BY_NAME` procedure to delete all the cached values for the region 'my_cached_region' on page 1 of the current application.

```
BEGIN  
    APEX_UTIL.PURGE_REGIONS_BY_NAME(  
        p_application => :APP_ID,  
        p_page => 1,  
        p_region_name => 'my_cached_region');  
END;
```

34.95 PURGE_REGIONS_BY_PAGE Procedure

Deletes all cached regions by application and page.

Syntax

```
APEX_UTIL.PURGE_REGIONS_BY_PAGE (  
    p_application IN NUMBER,  
    p_page        IN NUMBER);
```

Parameters

Table 34-79 PURGE_REGIONS_BY_PAGE Parameters

Parameter	Description
p_application	The identification number (ID) of the application.
p_page	The identification number of page containing the region.

Example

The following example shows how to use the `PURGE_REGIONS_BY_PAGE` procedure to delete all the cached values for regions on page 1 of the current application.

```
BEGIN
  APEX_UTIL.PURGE_REGIONS_BY_PAGE(
    p_application => :APP_ID,
    p_page => 1);
END;
```

34.96 REDIRECT_URL Procedure

This procedure calls `owa_util.redirect_url` to tell the browser to redirect to a new URL. Afterwards, it automatically calls `apex_application.stop_apex_engine` to abort further processing of the Application Express application.

Syntax

```
APEX_UTIL.REDIRECT_URL (
  p_url          in varchar2,
  p_reset_htp_buffer in boolean default true );
```

Parameters

Table 34-80 REDIRECT_URL Parameters

Parameter	Description
<code>p_url</code>	The URL the browser requests.
<code>p_reset_htp_buffer</code>	Set to <code>TRUE</code> to reset the HTP buffer to make sure the browser understands the redirect to the new URL and is not confused by data that is already written to the HTP buffer. Set to <code>FALSE</code> if the application has it's own cookie to use in the response.

Example

The following example tells the browser to redirect to `http://www.oracle.com` and immediately stops further processing.

```
apex_util.redirect_url (
  p_url => 'http://www.oracle.com/' );
```

34.97 REMOVE_PREFERENCE Procedure

This procedure removes the preference for the supplied user.

Syntax

```
APEX_UTIL.REMOVE_PREFERENCE(
  p_preference IN VARCHAR2 DEFAULT NULL,
  p_user      IN VARCHAR2 DEFAULT V('USER'));
```

Parameters

Table 34-81 REMOVE_PREFERENCE Parameters

Parameter	Description
p_preference	Name of the preference to remove.
p_user	User for whom the preference is defined.

Example

The following example shows how to use the `REMOVE_PREFERENCE` procedure to remove the preference `default_view` for the currently authenticated user.

```
BEGIN
  APEX_UTIL.REMOVE_PREFERENCE(
    p_preference => 'default_view',
    p_user       => :APP_USER);
END;
```

34.98 REMOVE_SORT_PREFERENCES Procedure

This procedure removes the user's column heading sorting preference value.

Syntax

```
APEX_UTIL.REMOVE_SORT_PREFERENCES (
  p_user IN VARCHAR2 DEFAULT V('USER'));
```

Parameters

Table 34-82 REMOVE_SORT_PREFERENCES Parameters

Parameter	Description
p_user	Identifies the user for whom sorting preferences are removed.

Example

The following example shows how to use the `REMOVE_SORT_PREFERENCES` procedure to remove the currently authenticated user's column heading sorting preferences.

```
BEGIN
  APEX_UTIL.REMOVE_SORT_PREFERENCES(:APP_USER);
END;
```

34.99 REMOVE_USER Procedure

This procedure removes the user account identified by the primary key or a user name. To execute this procedure, the current user must have administrative privilege in the workspace.

Syntax

```
APEX_UTIL.REMOVE_USER(
  p_user_id   IN NUMBER,
  p_user_name IN VARCHAR2);
```

Parameters**Table 34-83 REMOVE_USER Parameters**

Parameter	Description
p_user_id	The numeric primary key of the user account record.
p_user_name	The user name of the user account.

Example

The following examples show how to use the `REMOVE_USER` procedure to remove a user account. Firstly, by the primary key (using the `p_user_id` parameter) and secondly by user name (using the `p_user_name` parameter).

```
BEGIN
  APEX_UTIL.REMOVE_USER(p_user_id=> 99997);
END;

BEGIN
  APEX_UTIL.REMOVE_USER(p_user_name => 'FRANK');
END;
```

34.100 RESET_AUTHORIZATIONS Procedure [DEPRECATED]

 **Note:**

Use the "[RESET_CACHE Procedure \(page 5-3\)](#)" instead of this deprecated procedure.

To increase performance, Oracle Application Express caches the results of authorization schemes after they have been evaluated. You can use this procedure to undo caching, requiring each authorization scheme be revalidated when it is next encountered during page show or accept processing. You can use this procedure if you want users to have the ability to change their responsibilities (their authorization profile) within your application.

Syntax

```
APEX_UTIL.RESET_AUTHORIZATIONS;
```

Parameters

None.

Example

The following example shows how to use the `RESET_AUTHORIZATIONS` procedure to clear the authorization scheme cache.

```
BEGIN
  APEX_UTIL.RESET_AUTHORIZATIONS;
END;
```

34.101 RESET_PASSWORD Procedure

This procedure is used to change the password of a given user name for the current workspace. This procedure changes the password of `p_user_name` in the current workspace to `p_new_password`. If `p_change_password_on_first_use` is `TRUE`, then the user has to change the password on the next login.

Syntax

```
APEX_UTIL.RESET_PASSWORD (
  p_user_name      IN VARCHAR2 DEFAULT WWW_FLOW_SECURITY.G_USER,
  p_old_password   IN VARCHAR2 DEFAULT NULL,
  p_new_password   IN VARCHAR2,
  p_change_password_on_first_use IN BOOLEAN DEFAULT TRUE );
```

Parameters

Table 34-84 RESET_PASSWORD Parameters

Parameter	Description
<code>p_user_name</code>	The user whose password should be changed. The default is the currently logged in Application Express user name.
<code>p_old_password</code>	The current password of the user. The call succeeds if the given value matches the current password or it is null and the owner of the calling PL/SQL code has <code>APEX_ADMINISTRATOR_ROLE</code> . If the value is not the user's password, an error occurs.
<code>p_new_password</code>	The new password.
<code>p_change_password_on_first_use</code>	If <code>TRUE</code> (default), the user must change the password on the next login.

Error Returns

Table 34-85 RESET_PASSWORD Parameters

Error	Description
<code>INVALID_CREDENTIALS</code>	Occurs if <code>p_user_name</code> does not match <code>p_old_password</code> ,
<code>APEX.AUTHENTICATION.LOGIN_THROTTLE.COUNTER</code>	Indicates authentication prevented by login throttle.

Table 34-85 (Cont.) RESET_PASSWORD Parameters

Error	Description
internal error	Occurs if p_old_password is NULL and caller does not have APEX_ADMINISTRATOR_ROLE.
internal error	Indicates caller is not a valid workspace schema.

Example

This example demonstrates changing the password of the currently logged in user to a new password.

```
apex_util.reset_password (
    p_old_password => :P111_OLD_PASSWORD,
    p_new_password => :P111_NEW_PASSWORD );
```

34.102 RESET_PW Procedure

This procedure resets the password for a named user and emails it in a message to the email address located for the named account in the current workspace. To execute this procedure, the current user must have administrative privilege in the workspace.

Syntax

```
APEX_UTIL.RESET_PW(
    p_user IN VARCHAR2,
    p_msg IN VARCHAR2);
```

Parameters**Table 34-86 RESET_PW Parameters**

Parameter	Description
p_user	The user name of the user account.
p_msg	Message text to be mailed to a user.

Example

The following example shows how to use the RESET_PW procedure to reset the password for the user 'FRANK'.

```
BEGIN
    APEX_UTIL.RESET_PW(
        p_user => 'FRANK',
        p_msg => 'Contact help desk at 555-1212 with questions');
END;
```

34.103 SAVEKEY_NUM Function

This function sets a package variable (apex_utilities.g_val_num) so that it can be retrieved using the function KEYVAL_NUM.

Syntax

```
APEX_UTIL.SAVEKEY_NUM(
    p_val IN NUMBER)
RETURN NUMBER;
```

Parameters**Table 34-87** SAVEKEY_NUM Parameters

Parameter	Description
p_val	The numeric value to be saved.

Example

The following example shows how to use the `SAVEKEY_NUM` function to set the `apex_utilities.g_val_num` package variable to the value of 10.

```
DECLARE
    VAL NUMBER;
BEGIN
    VAL := APEX_UTIL.SAVEKEY_NUM(p_val => 10);
END;
```

34.104 SAVEKEY_VC2 Function

This function sets a package variable (`apex_utilities.g_val_vc2`) so that it can be retrieved using the function `KEYVAL_VC2`.

Syntax

```
APEX_UTIL.SAVEKEY_VC2(
    p_val IN VARCHAR2)
RETURN VARCHAR2;
```

Parameters**Table 34-88** SAVEKEY_VC2 Parameters

Parameter	Description
p_val	The is the VARCHAR2 value to be saved.

Example

The following example shows how to use the `SAVEKEY_VC2` function to set the `apex_utilities.g_val_vc2` package variable to the value of 'XXX'.

```
DECLARE
    VAL VARCHAR2(4000);
BEGIN
    VAL := APEX_UTIL.SAVEKEY_VC2(p_val => 'XXX');
END;
```


34.105 SET_APP_BUILD_STATUS Procedure

This procedure sets the build status of the specified application.

Syntax

```
apex_util.set_app_build_status( p_application_id IN NUMBER,
                               p_build_status IN VARCHAR2 );
```

Parameters

Table 34-89 SET_APP_BUILD_STATUS Parameters

Parameter	Description
p_application_id	The ID of the application.
p_build_status	The new build status of the application. Values include: <ul style="list-style-type: none"> RUN_ONLY - The application can be run but cannot be edited by developers. RUN_AND_BUILD - The application can be run and can also be edited by developers.

Example

```
begin
  apex_util.set_app_build_status(
    p_application_id => 170,
    p_build_status  => 'RUN_ONLY' );
  commit;
end;
```

34.106 SET_APPLICATION_STATUS Procedure

This procedure changes the status of the application.

Syntax

```
APEX_UTIL.SET_APPLICATION_STATUS(
  p_application_id IN NUMBER,
  p_application_status IN VARCHAR2,
  p_unavailable_value IN VARCHAR2,
  p_restricted_user_list IN VARCHAR2);
```

Parameters

Table 34-90 SET_APPLICATION_STATUS Parameters

Parameter	Description
p_application_id	The Application ID.

Table 34-90 (Cont.) SET_APPLICATION_STATUS Parameters

Parameter	Description
p_application_status	<p>New application status .</p> <p>Values include:</p> <ul style="list-style-type: none"> • AVAILABLE - Application is available with no restrictions. • AVAILABLE_W_EDIT_LINK - Application is available with no restrictions. Developer Toolbar shown to developers • DEVELOPERS_ONLY - Application only available to developers. • RESTRICTED_ACCESS - Application only available to users in p_restricted_user_list. • UNAVAILABLE - Application unavailable. Message shown in p_unavailable_value. • UNAVAILABLE_PLSQL - Application unavailable. Message shown from PL/SQL block in p_unavailable_value. • UNAVAILABLE_URL - Application unavailable. Redirected to URL provided in p_unavailable_value.
p_unavailable_value	Value used when application is unavailable. This value has different semantics dependent upon value for p_application_status.
p_restricted_user_list	Comma separated list of users permitted to access application, when p_application_status = RESTRICTED_ACCESS.

Examples

```

begin
apex_util.set_application_status(
    p_application_id => 117,
    p_application_status => 'AVAILABLE' );
end;

begin
apex_util.set_application_status(
    p_application_id => 117,
    p_application_status => 'AVAILABLE_W_EDIT_LINK' );
end;

begin
apex_util.set_application_status(
    p_application_id => 117,
    p_application_status => 'DEVELOPERS_ONLY' );
end;

begin
apex_util.set_application_status(
    p_application_id => 117,
    p_application_status => 'RESTRICTED_ACCESS',
    p_restricted_user_list => 'xxx.xxx@abc.com' );
end;

begin
apex_util.set_application_status(

```

```

    p_application_id => 117,
    p_application_status => 'UNAVAILABLE',
    p_unavailable_value => 'Application not available, sorry' );
end;

begin
apex_util.set_application_status(
    p_application_id => 117,
    p_application_status => 'UNAVAILABLE_PLSQL',
    p_unavailable_value => 'sys.htp.p(''Application unavailable, sorry'');' );
end;

begin
apex_util.set_application_status(
    p_application_id => 117,
    p_application_status => 'UNAVAILABLE_URL',
    p_unavailable_value => 'http://www.xyz.com' );
end;

```

34.107 SET_ATTRIBUTE Procedure

This procedure sets the value of one of the attribute values (1 through 10) of a user in the Application Express accounts table.

Syntax

```

APEX_UTIL.SET_ATTRIBUTE(
    p_userid           IN NUMBER,
    p_attribute_number IN NUMBER,
    p_attribute_value  IN VARCHAR2);

```

Parameters

Table 34-91 SET_ATTRIBUTE Parameters

Parameter	Description
p_userid	The numeric ID of the user account.
p_attribute_number	Attribute number in the user record (1 through 10).
p_attribute_value	Value of the attribute located by p_attribute_number to be set in the user record.

Example

The following example shows how to use the SET_ATTRIBUTE procedure to set the number 1 attribute for user 'FRANK' with the value 'foo'.

```

DECLARE
    VAL VARCHAR2(4000);
BEGIN
    APEX_UTIL.SET_ATTRIBUTE (
        p_userid => apex_util.get_user_id(p_username => 'FRANK'),
        p_attribute_number => 1,
        p_attribute_value => 'foo');
END;

```

34.108 SET_AUTHENTICATION_RESULT Procedure

This procedure can be called from an application's custom authentication function (that is, credentials verification function). The status passed to this procedure is logged in the Login Access Log.

Syntax

```
APEX_UTIL.SET_AUTHENTICATION_RESULT(  
    p_code IN NUMBER);
```

Parameters

Table 34-92 SET_AUTHENTICATION_RESULT Parameters

Parameter	Description
p_code	Any numeric value the developer chooses. After this value is set in the session using this procedure, it can be retrieved using the APEX_UTIL.GET_AUTHENTICATION_RESULT function.

Example

One way to use this procedure is to include it in the application authentication scheme. This example demonstrates how text and numeric status values can be registered for logging. In this example, no credentials verification is performed, it just demonstrates how text and numeric status values can be registered for logging. Note that the status set using this procedure is visible in the `apex_user_access_log` view and in the reports on this view available to workspace and site administrators.

```
CREATE OR REPLACE FUNCTION MY_AUTH(  
    p_username IN VARCHAR2,  
    p_password IN VARCHAR2)  
RETURN BOOLEAN  
IS  
BEGIN  
    APEX_UTIL.SET_CUSTOM_AUTH_STATUS(p_status=>'User: '||p_username||' is back.');
```

```
    IF UPPER(p_username) = 'GOOD' THEN  
        APEX_UTIL.SET_AUTHENTICATION_RESULT(24567);  
        RETURN TRUE;  
    ELSE  
        APEX_UTIL.SET_AUTHENTICATION_RESULT(-666);  
        RETURN FALSE;  
    END IF;  
END;
```

34.109 SET_BUILD_OPTION_STATUS Procedure

Use this procedure to change the build option status of a specified application.

**Note:**

The build option status will be overwritten when the application is upgraded to a new version. To keep the status set via the API, it is necessary to set the build option attribute **On Upgrade Keep Status** to **Yes**.

Syntax

```
apex_util.set_build_option_status(p_application_id IN NUMBER,
                                p_id IN NUMBER,
                                p_build_status IN VARCHAR2);
```

Parameters**Table 34-93 SET_BUILD_OPTION_STATUS Parameters**

Parameter	Description
p_application_id	The ID of the application that owns the build option under shared components.
p_id	The ID of the build option in the application.
p_build_status	The new status of the build option. Possible values are INCLUDE, EXCLUDE both upper case.

Example

The following example demonstrates how to use the SET_BUILD_OPTION_STATUS procedure to change the current status of build option.

```
BEGIN
APEX_UTIL.SET_BUILD_OPTION_STATUS(
    P_APPLICATION_ID => 101,
    P_ID => 245935500311121039, P_BUILD_STATUS=>'INCLUDE');

END;
```

34.110 SET_CURRENT_THEME_STYLE Procedure [DEPRECATED]

This procedure sets the user interface theme style for an application. For example, if there are more than one theme styles available for the current theme, you can use this procedure to change the application theme style.

Syntax

```
APEX_UTIL.SET_CURRENT_THEME_STYLE(
    p_theme_number IN NUMBER,
    p_theme_style_id IN NUMBER
);
```

Parameters

Table 34-94 SET_CURRENT_THEME_STYLE Parameters

Parameter	Description
p_theme_number	The current theme number of the application. This can be retrieved from APEX_APPLICATION_THEMES view.
p_theme_style_id	The numeric ID of theme style. You can get available theme styles for an application from APEX_APPLICATION_THEME_STYLES view.

Example

The following example shows how to use the SET_CURRENT_THEME_STYLE procedure to set the current application desktop theme style to Blue.

```

DECLARE
    l_current_theme_number number;
    l_theme_style_id      number;

BEGIN
    select theme_number
    into l_current_theme_number
    from apex_application_themes
    where application_id = :app_id
    and ui_type_name    = 'DESKTOP'
    and is_current     = 'Yes';

    select s.theme_style_id
    into l_new_theme_style_id
    from apex_application_theme_styles s, apex_application_themes t
    where s.application_id = t.application_id
    and s.theme_number = t.theme_number
    and s.application_id = :app_id
    and t.ui_type_name    = 'DESKTOP'
    and t.is_current     = 'Yes'
    and s.name = 'Blue';

    if l_current_theme_number is not null and
    l_new_theme_style_id is not null then
        APEX_UTIL.SET_CURRENT_THEME_STYLE(
            p_theme_number => l_current_theme_number,
            p_theme_style_id => l_new_theme_style_id
        );
    end if;

END;
```

34.111 SET_CUSTOM_AUTH_STATUS Procedure

This procedure can be called from an application's custom authentication function (that is, credentials verification function). The status passed to this procedure is logged in the Login Access Log.

Syntax

```
APEX_UTIL.SET_CUSTOM_AUTH_STATUS(
    p_status IN VARCHAR2);
```

Parameters**Table 34-95 SET_CUSTOM_AUTH_STATUS Parameters**

Parameter	Description
p_status	Any text the developer chooses to denote the result of the authentication attempt (up to 4000 characters).

Example

One way to use the `SET_CUSTOM_AUTH_STATUS` procedure is to include it in the application authentication scheme. This example demonstrates how text and numeric status values can be registered for logging. Note that no credentials verification is performed. The status set using this procedure is visible in the `apex_user_access_log` view and in the reports on this view available to workspace and site administrators.

```
CREATE OR REPLACE FUNCTION MY_AUTH(
    p_username IN VARCHAR2,
    p_password IN VARCHAR2)
RETURN BOOLEAN
IS
BEGIN
    APEX_UTIL.SET_CUSTOM_AUTH_STATUS(p_status=>'User:' || p_username || ' is back. ');
    IF UPPER(p_username) = 'GOOD' THEN
        APEX_UTIL.SET_AUTHENTICATION_RESULT(24567);
        RETURN TRUE;
    ELSE
        APEX_UTIL.SET_AUTHENTICATION_RESULT(-666);
        RETURN FALSE;
    END IF;
END;
```

34.112 SET_EDITION Procedure

This procedure sets the name of the edition to be used in all application SQL parsed in the current page view or page submission.

Syntax

```
APEX_UTIL.SET_EDITION(
    p_edition IN VARCHAR2);
```

Parameters**Table 34-96 SET_EDITION Parameters**

Parameter	Description
p_edition	Edition name.

Example

The following example shows how to use the SET_EDITION procedure. It sets the edition name for the database session of the current page view.

```
BEGIN
  APEX_UTIL.SET_EDITION( P_EDITION => 'Edition1' );
END;
```

 **Note:**

Support for Edition-Based Redefinition is only available in database version 11.2.0.1 or higher.

34.113 SET_EMAIL Procedure

This procedure updates a user account with a new email address. To execute this procedure, the current user must have administrative privileges in the workspace.

Syntax

```
APEX_UTIL.SET_EMAIL(
  p_userid IN NUMBER,
  p_email  IN VARCHAR2);
```

Parameters

Table 34-97 SET_EMAIL Parameters

Parameter	Description
p_userid	The numeric ID of the user account.
p_email	The email address to be saved in user account.

Example

The following example shows how to use the SET_EMAIL procedure to set the value of EMAIL to 'frank.scott@somewhere.com' for the user 'FRANK'.

```
BEGIN
  APEX_UTIL.SET_EMAIL(
    p_userid => APEX_UTIL.GET_USER_ID('FRANK'),
    p_email  => 'frank.scott@somewhere.com');
END;
```

34.114 SET_FIRST_NAME Procedure

This procedure updates a user account with a new FIRST_NAME value. To execute this procedure, the current user must have administrative privileges in the workspace.

Syntax

```
APEX_UTIL.SET_FIRST_NAME(
    p_userid      IN NUMBER,
    p_first_name  IN VARCHAR2);
```

Parameters**Table 34-98 SET_FIRST_NAME Parameters**

Parameter	Description
p_userid	The numeric ID of the user account.
p_first_name	FIRST_NAME value to be saved in user account.

Example

The following example shows how to use the SET_FIRST_NAME procedure to set the value of FIRST_NAME to 'FRANK' for the user 'FRANK'.

```
BEGIN
    APEX_UTIL.SET_FIRST_NAME(
        p_userid      => APEX_UTIL.GET_USER_ID('FRANK'),
        p_first_name  => 'FRANK');
END;
```

34.115 SET_GLOBAL_NOTIFICATION Procedure

This procedure is used to set the global notification message which is the message displayed in page #GLOBAL_NOTIFICATION# substitution string.

Syntax

```
APEX_UTIL.SET_GLOBAL_NOTIFICATION(
    p_application_id IN NUMBER,
    p_global_notification_message IN VARCHAR2);
```

Parameters**Table 34-99 SET_GLOBAL_NOTIFICATION Parameters**

Parameter	Description
p_application_id	The Application ID.
p_global_notification_message	Text string to be used for the global notification message.

Example

```
begin
    apex_util.set_global_notification(
        p_application_id      => 117,
        p_global_notification_message => 'This application will be upgraded this
weekend at 2100 UTC' );
end;
```

34.116 SET_GROUP_GROUP_GRANTS Procedure

This procedure modifies the group grants for a given group.

Syntax

```
APEX_UTIL.SET_GROUP_GROUP_GRANTS (
    p_group_name IN VARCHAR2,
    p_granted_group_names IN apex_t_varchar2 );
```

Parameters

Table 34-100 SET_GROUP_GROUP_GRANTS Procedure Parameters

Parameter	Description
p_group_name	The target group name.
p_granted_group_names	The names of groups to grant to p_group_name.

Example

This example creates three groups (ACCTS_PAY, ACCTS_REC, MANAGER) and then grants ACCTS_PAY and ACCTS_REC to MANAGER.

```
apex_util.create_user_group (
    p_group_name => 'ACCTS_PAY' );
apex_util.create_user_group (
    p_group_name => 'ACCTS_REC' );
apex_util.create_user_group (
    p_group_name => 'MANAGER' );
apex_util.set_group_group_grants (
    p_group_name => 'MANAGER',
    p_granted_group_names => apex_t_varchar2('ACCTS_PAY', 'ACCTS_REC') );
```

34.117 SET_GROUP_USER_GRANTS Procedure

This procedure modifies the group grants for a given user.

Syntax

```
APEX_UTIL.SET_GROUP_USER_GRANTS (
    p_user_name IN VARCHAR2,
    p_granted_group_names IN apex_t_varchar2 );
```

Parameters

Table 34-101 SET_GROUP_USER_GRANTS Procedure Parameters

Parameter	Description
p_user_name	The target user name.
p_granted_group_names	The names of groups to grant to p_user_name.

Example

This example creates a user group (MANAGER) and a user (Example User) and then grants MANAGER to Example User.

```
apex_util.create_user_group (
    p_group_name => 'MANAGER' );
apex_util.create_user (
    p_user_name => 'Example User',
    p_web_password => 1_random_password );
-- grant MANAGER to Example User
apex_util.set_group_user_grants (
    p_user_name => 'Example User',
    p_granted_group_names => apex_t_varchar2('MANAGER') );
```

34.118 SET_LAST_NAME Procedure

This procedure updates a user account with a new `LAST_NAME` value. To execute this procedure, the current user must have administrative privileges in the workspace.

Syntax

```
APEX_UTIL.SET_LAST_NAME(
    p_userid      IN NUMBER,
    p_last_name   IN VARCHAR2);
```

Parameters

Table 34-102 SET_LAST_NAME Parameters

Parameter	Description
<code>p_userid</code>	The numeric ID of the user account.
<code>p_last_name</code>	<code>LAST_NAME</code> value to be saved in the user account.

Example

The following example shows how to use the `SET_LAST_NAME` procedure to set the value of `LAST_NAME` to 'SMITH' for the user 'FRANK'.

```
BEGIN
    APEX_UTIL.SET_LAST_NAME(
        p_userid      => APEX_UTIL.GET_USER_ID('FRANK'),
        p_last_name   => 'SMITH');
END;
```

34.119 SET_PARSING_SCHEMA_FOR_REQUEST Procedure

This procedure changes the parsing user for the current page view to another workspace schema. You can call this procedure only from within the application's Initialization PL/SQL Code.

Syntax

```
procedure set_parsing_schema_for_request (
    p_schema in varchar2 );
```

Parameters**Table 34-103 SET_PARSING_SCHEMA_FOR_REQUEST Parameters**

Parameter	Description
p_schema	The new parsing schema.

Raises

PROGRAM_ERROR when not called from Initialization PL/SQL Code.
 WWW_FLOW.NO_PRIV_ON_SCHEMA if p_schema is not a valid workspace schema.

Example

On pages 1-100, change the parsing schema to :G_PARSING_SCHEMA.

```
if :APP_PAGE_ID between 1 and 100 then
    apex_util.set_parsing_schema_for_request (
        p_schema => :G_PARSING_SCHEMA );
end if;
```

34.120 SET_PREFERENCE Procedure

This procedure sets a preference that persists beyond the user's current session.

Syntax

```
APEX_UTIL.SET_PREFERENCE (
    p_preference IN VARCHAR2 DEFAULT NULL,
    p_value      IN VARCHAR2 DEFAULT NULL,
    p_user       IN VARCHAR2 DEFAULT NULL);
```

Parameters**Table 34-104 SET_PREFERENCE Parameters**

Parameter	Description
p_preference	Name of the preference (case-sensitive).
p_value	Value of the preference.
p_user	User for whom the preference is being set.

Example

The following example shows how to use the SET_PREFERENCE procedure to set a preference called 'default_view' to the value 'WEEKLY' that persists beyond session for the currently authenticated user.

```
BEGIN
    APEX_UTIL.SET_PREFERENCE(
```

```

        p_preference => 'default_view',
        p_value      => 'WEEKLY',
        p_user       => :APP_USER);
END;
```

34.121 SET_SECURITY_GROUP_ID Procedure

Use this procedure with `apex_util.find_security_group_id` to ease the use of the mail package in batch mode. This procedure is especially useful when a schema is associated with more than one workspace. For example, you might want to create a procedure that is run by a nightly job to email all outstanding tasks.

Syntax

```
APEX_UTIL.SET_SECURITY_GROUP_ID (
    p_security_group_id IN NUMBER);
```

Parameters

Table 34-105 SET_SECURITY_GROUP_ID Parameters

Parameter	Description
<code>p_security_group_id</code>	This is the security group id of the workspace you are working in.

Example

The following example sends an alert to each user that has had a task assigned within the last day.

```

create or replace procedure new_tasks
is
    l_workspace_id    number;
    l_subject         varchar2(2000);
    l_body            clob;
    l_body_html       clob;
begin
    l_workspace_id := apex_util.find_security_group_id (p_workspace => 'PROJECTS');
    apex_util.set_security_group_id (p_security_group_id => l_workspace_id);

    l_body := ' ';
    l_subject := 'You have new tasks';
    for c1 in (select distinct(p.email_address) email_address, p.user_id
               from teamsp_user_profile p, teamsp_tasks t
               where p.user_id = t.assigned_to_user_id
                 and t.created_on > sysdate - 1
                 and p.email_address is not null ) loop
        l_body_html := '<p />The following tasks have been added.';
        for c2 in (select task_name, due_date
                   from teamsp_tasks
                   where assigned_to_user_id = c1.user_id
                     and created_on > sysdate - 1 ) loop
            l_body_html := l_body_html || '<p />Task: ' || c2.task_name || ', due ' ||
c2.due_date;
        end loop;
        apex_mail.send (
            p_to          => c1.email_address,
```

```
        p_from      => c1.email_address,  
        p_body      => l_body,  
        p_body_html => l_body_html,  
        p_subj      => l_subject );  
    end loop;  
end;
```

34.122 SET_SESSION_HIGH_CONTRAST_OFF Procedure

This procedure switches off high contrast mode for the current session.

Syntax

```
APEX_UTIL.SET_SESSION_HIGH_CONTRAST_OFF;
```

Parameters

None.

Example

In this example, high contrast mode is switched off for the current session.

```
BEGIN  
    apex_util.set_session_high_contrast_off;  
END;
```

34.123 SET_SESSION_HIGH_CONTRAST_ON Procedure

This procedure switches on high contrast mode for the current session.

Syntax

```
APEX_UTIL.SET_SESSION_HIGH_CONTRAST_ON;
```

Parameters

None.

Example

In this example, the current session is put into high contrast mode.

```
BEGIN  
    apex_util.set_session_high_contrast_on;  
END;
```

34.124 SET_SESSION_LANG Procedure

This procedure sets the language to be used for the current user in the current Application Express session. The language must be a valid IANA language name.

Syntax

```
APEX_UTIL.SET_SESSION_LANG(
    p_lang IN VARCHAR2);
```

Parameters**Table 34-106 SET_SESSION_LANG Parameters**

Parameter	Description
p_lang	This is an IANA language code. Some examples include: en, de, de-at, zh-cn, and pt-br.

Example

The following example shows how to use the `SET_SESSION_LANG` procedure. It sets the language for the current user for the duration of the Application Express session.

```
BEGIN
    APEX_UTIL.SET_SESSION_LANG( P_LANG => 'en' );
END;
```

34.125 SET_SESSION_LIFETIME_SECONDS Procedure

This procedure sets the current session's Maximum Session Length in Seconds value, overriding the corresponding application attribute. This allows developers to dynamically shorten or lengthen the session life based on criteria determined after the user authenticates.

Syntax

```
APEX_UTIL.SET_SESSION_LIFETIME_SECONDS (
    p_seconds IN    NUMBER,
    p_scope   IN    VARCHAR2 DEFAULT 'SESSION');
```

Parameters**Table 34-107 SET_SESSION_LIFETIME_SECONDS Parameters**

Parameter	Description
p_seconds	A positive integer indicating the number of seconds the session used by this application is allowed to exist.
p_scope	This parameter is obsolete. The procedure always sets the lifetime for the whole session.

Example 1

The following example shows how to use the `SET_SESSION_LIFETIME_SECONDS` procedure to set the current application's Maximum Session Length in Seconds attribute to 7200 seconds (two hours).

By allowing the `p_scope` input parameter to use the default value of 'SESSION', the following example would actually apply to all applications using the current session. This would be the most common use case when multiple Application Express

applications use a common authentication scheme and are designed to operate as a suite in a common session.

```
BEGIN
  APEX_UTIL.SET_SESSION_LIFETIME_SECONDS(p_seconds => 7200);
END;
```

Example 2

The following example shows how to use the SET_SESSION_LIFETIME_SECONDS procedure to set the current application's Maximum Session Length in Seconds attribute to 3600 seconds (one hour).

```
BEGIN
  APEX_UTIL.SET_SESSION_LIFETIME_SECONDS(p_seconds => 3600);
END;
```

34.126 SET_SESSION_MAX_IDLE_SECONDS Procedure

Sets the current application's Maximum Session Idle Time in Seconds value for the current session, overriding the corresponding application attribute. This allows developers to dynamically shorten or lengthen the maximum idle time allowed between page requests based on criteria determined after the user authenticates.

Syntax

```
APEX_UTIL.SET_SESSION_MAX_IDLE_SECONDS (
  p_seconds IN NUMBER,
  p_scope IN VARCHAR2 DEFAULT 'SESSION');
```

Parameters

Table 34-108 SET_SESSION_MAX_IDLE_SECONDS Parameters

Parameter	Description
p_seconds	A positive integer indicating the number of seconds allowed between page requests.
p_scope	This parameter is obsolete. The procedure always sets the lifetime for the whole session

Example 1

The following example shows how to use the SET_SESSION_MAX_IDLE_SECONDS procedure to set the current application's Maximum Session Idle Time in Seconds attribute to 1200 seconds (twenty minutes). The following example applies to all applications using the current session.

```
BEGIN
  APEX_UTIL.SET_SESSION_MAX_IDLE_SECONDS(p_seconds => 1200);
END;
```

Example 2

The following example shows how to use the SET_SESSION_MAX_IDLE_SECONDS procedure to set the current application's Maximum Session Idle Time in Seconds attribute to 600

seconds (ten minutes). This example applies to all applications using the current session.

```
BEGIN
    APEX_UTIL.SET_SESSION_MAX_IDLE_SECONDS(p_seconds => 600);
END;
```

34.127 SET_SESSION_SCREEN_READER_OFF Procedure

This procedure switches off screen reader mode for the current session.

Syntax

```
APEX_UTIL.SET_SESSION_SCREEN_READER_OFF;
```

Parameters

None

Example

In this example, the current session is put into standard mode.

```
BEGIN
    apex_util.set_session_screen_reader_off;
END;
```

34.128 SET_SESSION_SCREEN_READER_ON Procedure

This procedure puts the current session into screen reader mode.

Syntax

```
APEX_UTIL.SET_SESSION_SCREEN_READER_ON;
```

Parameters

None

Example

In this example, the current session is put into screen reader mode.

```
BEGIN
    apex_util.set_session_screen_reader_on;
END;
```

34.129 SET_SESSION_STATE Procedure

This procedure sets session state for a current Oracle Application Express session.

Syntax

```
APEX_UTIL.SET_SESSION_STATE (
    p_name      IN      VARCHAR2 DEFAULT NULL,
```

```
p_value  IN  VARCHAR2 DEFAULT NULL);
p_commit IN  BOOLEAN  DEFAULT TRUE);
```

Parameters

Table 34-109 SET_SESSION_STATE Parameters

Parameter	Description
p_name	Name of the application-level or page-level item for which you are setting sessions state.
p_value	Value of session state to set.
p_commit	If true (the default), commit after modifying session state. If false or if the existing value in session state equals p_value, no commit is issued.

Example

The following example shows how to use the `SET_SESSION_STATE` procedure to set the value of the item 'my_item' to 'myvalue' in the current session.

```
BEGIN
  APEX_UTIL.SET_SESSION_STATE('my_item','myvalue');
END;
```

34.130 SET_SESSION_TERRITORY Procedure

This procedure sets the territory to be used for the current user in the current Application Express session. The territory name must be a valid Oracle territory.

Syntax

```
APEX_UTIL.SET_SESSION_TERRITORY(
  p_territory IN VARCHAR2);
```

Parameters

Table 34-110 SET_SESSION_TERRITORY Parameters

Parameter	Description
p_territory	A valid Oracle territory name. Examples include: AMERICA, UNITED KINGDOM, ISRAEL, AUSTRIA, and UNITED ARAB EMIRATES.

Example

The following example shows how to use the `SET_SESSION_TERRITORY` procedure. It sets the territory for the current user for the duration of the Application Express session.

```
BEGIN
  APEX_UTIL.SET_SESSION_TERRITORY( P_TERRITORY => 'UNITED KINGDOM');
END;
```

34.131 SET_SESSION_TIME_ZONE Procedure

This procedure sets the time zone to be used for the current user in the current Application Express session.

Syntax

```
APEX_UTIL.SET_SESSION_TIME_ZONE(
    p_time_zone IN VARCHAR2);
```

Parameters

Table 34-111 SET_SESSION_TIME_ZONE Parameters

Parameter	Description
p_timezone	A time zone value in the form of hours and minutes. Examples include: +09:00, 04:00, -05:00.

Example

The following example shows how to use the SET_SESSION_TIME_ZONE procedure. It sets the time zone for the current user for the duration of the Application Express session.

```
BEGIN
    APEX_UTIL.SET_SESSION_TIME_ZONE( P_TIME_ZONE => '-05:00');
END;
```

34.132 SET_USERNAME Procedure

This procedure updates a user account with a new USER_NAME value. To execute this procedure, the current user must have administrative privileges in the workspace.

Syntax

```
APEX_UTIL.SET_USERNAME(
    p_userid    IN NUMBER,
    p_username  IN VARCHAR2);
```

Parameters

Table 34-112 SET_USERNAME Parameters

Parameter	Description
p_userid	The numeric ID of the user account.
p_username	USER_NAME value to be saved in the user account.

Example

The following example shows how to use the SET_USERNAME procedure to set the value of USERNAME to 'USER-XRAY' for the user 'FRANK'.

```
BEGIN
    APEX_UTIL.SET_USERNAME(
```

```

        p_userid    => APEX_UTIL.GET_USER_ID('FRANK'),
        P_username  => 'USER-XRAY');
END;
```

34.133 SET_WORKSPACE_Procedure

This procedure sets the current workspace.

Syntax

```

procedure set_workspace (
    p_workspace in varchar2 );
```

Parameters

[Table 34-113](#) (page 34-105) describes the parameters available in SET_WORKSPACE_Procedure.

Table 34-113 SET_WORKSPACE_Procedure Parameters

Parameters	Description
p_workspace	The workspace's short name.

Example

This example shows how to Set workspace MY_WORKSPACE.

```

apex_util.set_workspace (
    p_workspace => 'MY_WORKSPACE' );
```

34.134 SHOW_HIGH_CONTRAST_MODE_TOGGLE Procedure

This procedure displays a link to the current page to turn on or off, toggle, the mode. For example, if you are in standard mode, this function displays a link that when clicked switches the high contrast mode on.

Syntax

```

APEX_UTIL.SHOW_HIGH_CONTRAST_MODE_TOGGLE (
    p_on_message in varchar2 default null,
    p_off_message in varchar2 default null);
```

Parameters

Table 34-114 SHOW_HIGH_CONTRAST_MODE_TOGGLE Parameters

Parameters	Description
p_on_message	Optional text used for the link to switch to high contrast mode, when you are in standard mode. If this parameter is not passed, the default 'Set High Contrast Mode On' text is displayed.

Table 34-114 (Cont.) SHOW_HIGH_CONTRAST_MODE_TOGGLE Parameters

Parameters	Description
p_off_message	Optional text used for the link to switch to standard mode, when you are in high contrast mode. If this parameter is not passed, the default 'Set High Contrast Mode Off' text is displayed.

Example

When running in standard mode, this procedure displays a link, Set High Contrast Mode On, that when clicked refreshes the current page and switches on high contrast mode. When running in high contrast mode, a link, Set High Contrast Mode Off, is displayed, that refreshes the current page and switches back to standard mode when clicked.

```
BEGIN
    apex_util.show_high_contrast_mode_toggle;
END;
```

 **Note:**

There are also 2 translatable system messages that can be overridden at application level to change the default link text that is returned for this toggle. They include:

- APEX.SET_HIGH_CONTRAST_MODE_OFF - Default text = Set High Contrast Mode Off
- APEX.SET_HIGH_CONTRAST_MODE_ON - Default text = Set High Contrast Mode On

 **See Also:**

["GET_HIGH_CONTRAST_MODE_TOGGLE Function \(page 34-50\)"](#)

34.135 SHOW_SCREEN_READER_MODE_TOGGLE Procedure

This procedure displays a link to the current page to turn on or off, toggle, the mode. For example, if you are in standard mode, this function displays a link that when clicked switches the screen reader mode on.

Syntax

```
APEX_UTIL.SHOW_SCREEN_READER_MODE_TOGGLE (
    p_on_message IN VARCHAR2 DEFAULT NULL,
    p_off_message IN VARCHAR2 DEFAULT NULL)
```

Parameters

Table 34-115 SHOW_SCREEN_READER_MODE_TOGGLE Parameters

Parameter	Description
p_on_message	Optional text used for the link to switch to screen reader mode, when you are in standard mode. If this parameter is not passed, the default 'Set Screen Reader Mode On' text is displayed.
p_off_message	Optional text used for the link to switch to standard mode, when you are in screen reader mode. If this parameter is not passed, the default 'Set Screen Reader Mode Off' text is displayed.

Example

When running in standard mode, this procedure displays a link 'Set Screen Reader Mode On', that when clicked refreshes the current page and switches on screen reader mode. When running in screen reader mode, a link 'Set Screen Reader Mode Off' is displayed, that when clicked refreshes the current page and switches back to standard mode.

```
BEGIN
  apex_util.show_screen_reader_mode_toggle;
END;
```

34.136 STRING_TO_TABLE Function [DEPRECATED]

Oracle recommends that you use the `SPLIT` and `SPLIT_NUMBERS` functions.

Given a string, this function returns a PL/SQL array of type `APEX_APPLICATION_GLOBAL.VC_ARR2`. This array is a `VARCHAR2(32767)` table.

Syntax

```
APEX_UTIL.STRING_TO_TABLE (
  p_string      IN VARCHAR2,
  p_separator   IN VARCHAR2 DEFAULT ':' )
RETURN APEX_APPLICATION_GLOBAL.VC_ARR2;
```

Parameters

Table 34-116 STRING_TO_TABLE Parameters

Parameter	Description
p_string	String to be converted into a PL/SQL table of type <code>APEX_APPLICATION_GLOBAL.VC_ARR2</code> .
p_separator	String separator. The default is a colon.

Example

The following example shows how to use the `STRING_TO_TABLE` function. The function is passed the string 'One:Two:Three' in the `p_string` parameter and it returns a PL/SQL array of type `APEX_APPLICATION_GLOBAL.VC_ARR2` containing 3 elements, the element at position 1 contains the value 'One', position 2 contains the

value 'Two' and position 3 contains the value 'Three'. This is then output using the HTP.P function call.

```
DECLARE
  l_vc_arr2   APEX_APPLICATION_GLOBAL.VC_ARR2;
BEGIN
  l_vc_arr2 := APEX_UTIL.STRING_TO_TABLE('One:Two:Three');
  FOR z IN 1..l_vc_arr2.count LOOP
    htp.p(l_vc_arr2(z));
  END LOOP;
END;
```

34.137 STRONG_PASSWORD_CHECK Procedure

This procedure returns `Boolean` `OUT` values based on whether a proposed password meets the password strength requirements as defined by the Oracle Application Express site administrator.

Syntax

```
APEX_UTIL.STRONG_PASSWORD_CHECK(
  p_username           IN VARCHAR2,
  p_password           IN VARCHAR2,
  p_old_password       IN VARCHAR2,
  p_workspace_name     IN VARCHAR2,
  p_use_strong_rules   IN BOOLEAN,
  p_min_length_err     OUT BOOLEAN,
  p_new_differs_by_err OUT BOOLEAN,
  p_one_alpha_err      OUT BOOLEAN,
  p_one_numeric_err    OUT BOOLEAN,
  p_one_punctuation_err OUT BOOLEAN,
  p_one_upper_err      OUT BOOLEAN,
  p_one_lower_err      OUT BOOLEAN,
  p_not_like_username_err OUT BOOLEAN,
  p_not_like_workspace_name_err OUT BOOLEAN,
  p_not_like_words_err OUT BOOLEAN,
  p_not_reusable_err   OUT BOOLEAN);
```

Parameters

Table 34-117 STRONG_PASSWORD_CHECK Parameters

Parameter	Description
<code>p_username</code>	Username that identifies the account in the current workspace.
<code>p_password</code>	Password to be checked against password strength rules.
<code>p_old_password</code>	Current password for the account. Used only to enforce "new password must differ from old" rule.
<code>p_workspace_name</code>	Current workspace name, used only to enforce "password must not contain workspace name" rule.
<code>p_use_strong_rules</code>	Pass <code>FALSE</code> when calling this API.
<code>p_min_length_err</code>	Result returns <code>TRUE</code> or <code>FALSE</code> depending upon whether the password meets minimum length requirement.

Table 34-117 (Cont.) STRONG_PASSWORD_CHECK Parameters

Parameter	Description
p_new_differs_by_err	Result returns TRUE or FALSE depending upon whether the password meets "new password must differ from old" requirements.
p_one_alpha_err	Result returns TRUE or FALSE depending upon whether the password meets requirement to contain at least one alphabetic character.
p_one_numeric_err	Result returns TRUE or FALSE depending upon whether the password meets requirements to contain at least one numeric character.
p_one_punctuation_err	Result returns TRUE or FALSE depending upon whether the password meets requirements to contain at least one punctuation character.
p_one_upper_err	Result returns TRUE or FALSE depending upon whether the password meets requirements to contain at least one upper-case character.
p_one_lower_err	Result returns TRUE or FALSE depending upon whether the password meets requirements to contain at least one lower-case character.
p_not_like_username_err	Result returns TRUE or FALSE depending upon whether the password meets requirements that it not contain the username.
p_not_like_workspace_name_err	Result returns TRUE or FALSE whether upon whether the password meets requirements that it not contain the workspace name.
p_not_like_words_err	Result returns TRUE or FALSE whether the password meets requirements that it not contain specified simple words.
p_not_reusable_err	Result returns TRUE or FALSE whether the password can be reused based on password history rules.

Example

The following example shows how to use the STRONG_PASSWORD_CHECK procedure. It checks the new password 'foo' for the user 'SOMEBODY' meets all the password strength requirements defined by the Oracle Application Express site administrator. If any of the checks fail (the associated OUT parameter returns TRUE), then the example outputs a relevant message. For example, if the Oracle Application Express site administrator has defined that passwords must have at least one numeric character and the password 'foo' was checked, then the p_one_numeric_err OUT parameter would return TRUE and the message 'Password must contain at least one numeric character' would be output.

```

DECLARE
    l_username          varchar2(30);
    l_password          varchar2(30);
    l_old_password      varchar2(30);
    l_workspace_name    varchar2(30);
    l_min_length_err    boolean;
    l_new_differs_by_err boolean;
    l_one_alpha_err     boolean;
    l_one_numeric_err   boolean;
    l_one_punctuation_err boolean;

```



```
l_one_upper_err          boolean;
l_one_lower_err          boolean;
l_not_like_username_err  boolean;
l_not_like_workspace_name_err boolean;
l_not_like_words_err     boolean;
l_not_reusable_err       boolean;
l_password_history_days  pls_integer;
BEGIN
  l_username := 'SOMEBODY';
  l_password := 'foo';
  l_old_password := 'foo';
  l_workspace_name := 'XYX_WS';
  l_password_history_days :=
    apex_instance_admin.get_parameter ('PASSWORD_HISTORY_DAYS');

  APEX_UTIL.STRONG_PASSWORD_CHECK(
    p_username          => l_username,
    p_password          => l_password,
    p_old_password      => l_old_password,
    p_workspace_name    => l_workspace_name,
    p_use_strong_rules  => false,
    p_min_length_err    => l_min_length_err,
    p_new_differs_by_err => l_new_differs_by_err,
    p_one_alpha_err     => l_one_alpha_err,
    p_one_numeric_err   => l_one_numeric_err,
    p_one_punctuation_err => l_one_punctuation_err,
    p_one_upper_err     => l_one_upper_err,
    p_one_lower_err     => l_one_lower_err,
    p_not_like_username_err => l_not_like_username_err,
    p_not_like_workspace_name_err => l_not_like_workspace_name_err,
    p_not_like_words_err => l_not_like_words_err,
    p_not_reusable_err  => l_not_reusable_err);

  IF l_min_length_err THEN
    htp.p('Password is too short');
  END IF;

  IF l_new_differs_by_err THEN
    htp.p('Password is too similar to the old password');
  END IF;

  IF l_one_alpha_err THEN
    htp.p('Password must contain at least one alphabetic character');
  END IF;

  IF l_one_numeric_err THEN
    htp.p('Password must contain at least one numeric character');
  END IF;

  IF l_one_punctuation_err THEN
    htp.p('Password must contain at least one punctuation character');
  END IF;

  IF l_one_upper_err THEN
    htp.p('Password must contain at least one upper-case character');
  END IF;

  IF l_one_lower_err THEN
    htp.p('Password must contain at least one lower-case character');
  END IF;
```

```

IF l_not_like_username_err THEN
    http.p('Password may not contain the username');
END IF;

IF l_not_like_workspace_name_err THEN
    http.p('Password may not contain the workspace name');
END IF;

IF l_not_like_words_err THEN
    http.p('Password contains one or more prohibited common words');
END IF;

IF l_not_reusable_err THEN
    http.p('Password cannot be used because it has been used for the account
within the last '||l_password_history_days||' days.');
```

```

END IF;
END;
```

34.138 STRONG_PASSWORD_VALIDATION Function

This function returns formatted HTML in a VARCHAR2 result based on whether a proposed password meets the password strength requirements as defined by the Oracle Application Express site administrator.

Syntax

```

FUNCTION STRONG_PASSWORD_VALIDATION(
    p_username          IN VARCHAR2,
    p_password          IN VARCHAR2,
    p_old_password      IN VARCHAR2 DEFAULT NULL,
    p_workspace_name    IN VARCHAR2)
RETURN VARCHAR2;
```

Parameters

Table 34-118 STRONG_PASSWORD_VALIDATION Parameters

Parameter	Description
p_username	Username that identifies the account in the current workspace.
p_password	Password to be checked against password strength rules.
p_old_password	Current password for the account. Used only to enforce "new password must differ from old" rule.
p_workspace_name	Current workspace name, used only to enforce "password must not contain workspace name" rule.

Example

The following example shows how to use the STRONG_PASSWORD_VALIDATION procedure. It checks the new password 'foo' for the user 'SOMEBODY' meets all the password strength requirements defined by the Oracle Application Express site administrator. If any of the checks fail, then the example outputs formatted HTML showing details of where the new password fails to meet requirements.

```

DECLARE
    l_username          varchar2(30);
```

```

        l_password          varchar2(30);
        l_old_password      varchar2(30);
        l_workspace_name    varchar2(30);
BEGIN
    l_username := 'SOMEBODY';
    l_password := 'foo';
    l_old_password := 'foo';
    l_workspace_name := 'XYX_WS';

    HTP.P(APEX_UTIL.STRONG_PASSWORD_VALIDATION(
        p_username          => l_username,
        p_password          => l_password,
        p_old_password      => l_old_password,
        p_workspace_name    => l_workspace_name));
END;
```

34.139 SUBMIT_FEEDBACK Procedure

This procedure enables you to write a procedure to submit feedback, rather than using the page that can be generated by create page of type feedback.

Syntax

```

APEX_UTIL.SUBMIT_FEEDBACK (
    p_comment          IN VARCHAR2 DEFAULT NULL,
    p_type             IN NUMBER   DEFAULT '1',
    p_application_id   IN VARCHAR2 DEFAULT NULL,
    p_page_id         IN VARCHAR2 DEFAULT NULL,
    p_email            IN VARCHAR2 DEFAULT NULL,
    p_screen_width     IN VARCHAR2 DEFAULT NULL,
    p_screen_height    IN VARCHAR2 DEFAULT NULL,
    p_attribute_01     IN VARCHAR2 DEFAULT NULL,
    p_attribute_02     IN VARCHAR2 DEFAULT NULL,
    p_attribute_03     IN VARCHAR2 DEFAULT NULL,
    p_attribute_04     IN VARCHAR2 DEFAULT NULL,
    p_attribute_05     IN VARCHAR2 DEFAULT NULL,
    p_attribute_06     IN VARCHAR2 DEFAULT NULL,
    p_attribute_07     IN VARCHAR2 DEFAULT NULL,
    p_attribute_08     IN VARCHAR2 DEFAULT NULL,
    p_label_01         IN VARCHAR2 DEFAULT NULL,
    p_label_02         IN VARCHAR2 DEFAULT NULL,
    p_label_03         IN VARCHAR2 DEFAULT NULL,
    p_label_04         IN VARCHAR2 DEFAULT NULL,
    p_label_05         IN VARCHAR2 DEFAULT NULL,
    p_label_06         IN VARCHAR2 DEFAULT NULL,
    p_label_07         IN VARCHAR2 DEFAULT NULL,
    p_label_08         IN VARCHAR2 DEFAULT NULL);
```

Parameters

Table 34-119 SUBMIT_FEEDBACK Parameters

Parameter	Description
p_comment	Comment to be submitted.
p_type	Type of feedback (1 is General Comment, 2 is Enhancement Request, 3 is Bug).

Table 34-119 (Cont.) SUBMIT_FEEDBACK Parameters

Parameter	Description
p_application_id	ID of application related to the feedback.
p_page_id	ID of page related to the feedback.
p_email	Email of the user providing the feedback.
p_screen_width	Width of screen at time feedback was provided.
p_screen_height	Height of screen at time feedback was provided.
p_attribute_01	Custom attribute for collecting feedback.
p_attribute_02	Custom attribute for collecting feedback.
p_attribute_03	Custom attribute for collecting feedback.
p_attribute_04	Custom attribute for collecting feedback.
p_attribute_05	Custom attribute for collecting feedback.
p_attribute_06	Custom attribute for collecting feedback.
p_attribute_07	Custom attribute for collecting feedback.
p_attribute_08	Custom attribute for collecting feedback.
p_label_01	Label for corresponding custom attribute.
p_label_02	Label for corresponding custom attribute.
p_label_03	Label for corresponding custom attribute.
p_label_04	Label for corresponding custom attribute.
p_label_05	Label for corresponding custom attribute.
p_label_06	Label for corresponding custom attribute.
p_label_07	Label for corresponding custom attribute.
p_label_08	Label for corresponding custom attribute.

Example

The following example submits a bug about page 22 within application 283.

```
begin
  apex_util.submit_feedback (
    p_comment      => 'This page does not render properly for me',
    p_type         => 3,
    p_application_id => 283,
    p_page_id      => 22,
    p_email        => 'user@xyz.corp',
    p_attribute_01 => 'Charting',
    p_label_01     => 'Component' );
end;
```

34.140 SUBMIT_FEEDBACK_FOLLOWUP Procedure

This procedure enables you to submit follow up to a feedback.

Syntax

```
APEX_UTIL.SUBMIT_FEEDBACK_FOLLOWUP (
  p_feedback_id      IN NUMBER,
  p_follow_up        IN VARCHAR2 DEFAULT NULL,
  p_email             IN VARCHAR2 DEFAULT NULL);
```

Parameters**Table 34-120** SUBMIT_FEEDBACK_FOLLOWUP Parameters

Parameter	Description
p_feedback_followup	ID of feedback that this is a follow up to.
p_follow_up	Text of follow up.
p_email	Email of user providing the follow up.

Example

The following example submits follow up to a previously filed feedback.

```
begin
  apex_util.submit_feedback_followup (
    p_feedback_id => 12345,
    p_follow_up   => 'I tried this on another instance and it does not work
there either',
    p_email       => 'user@xyz.corp' );
end;
/
```

34.141 TABLE_TO_STRING Function [DEPRECATED]

Oracle recommends that you use the JOIN and JOIN_CLOB functions.

Given a PL/SQL table of type APEX_APPLICATION_GLOBAL.VC_ARR2, this function returns a delimited string separated by the supplied separator, or by the default separator, a colon (:).

Syntax

```
APEX_UTIL.TABLE_TO_STRING (
  p_table      IN      APEX_APPLICATION_GLOBAL.VC_ARR2,
  p_string     IN      VARCHAR2 DEFAULT ':' )
RETURN VARCHAR2;
```

Parameters**Table 34-121** TABLE_TO_STRING Parameters

Parameter	Description
p_string	String separator. Default separator is a colon (:).
p_table	PL/SQL table that is to be converted into a delimited string.

Example

The following function returns a comma delimited string of contact names that are associated with the provided `cust_id`.

```

create or replace function get_contacts (
  p_cust_id in number )
  return varchar2
is
  l_vc_arr2 apex_application_global.vc_arr2;
  l_contacts varchar2(32000);
begin

  select contact_name
     bulk collect
     into l_vc_arr2
     from contacts
  where cust_id = p_cust_id
     order by contact_name;

  l_contacts := apex_util.table_to_string (
    p_table => l_vc_arr2,
    p_string => ', ');

  return l_contacts;

end get_contacts;

```

34.142 UNEXPIRE_END_USER_ACCOUNT Procedure

Makes expired end users accounts and the associated passwords usable, enabling a end user to log in to developed applications.

Syntax

```

APEX_UTIL.UNEXPIRE_END_USER_ACCOUNT (
  p_user_name IN VARCHAR2);

```

Parameters

Table 34-122 UNEXPIRE_END_USER_ACCOUNT Parameters

Parameter	Description
<code>p_user_name</code>	The user name of the user account.

Example

The following example shows how to use the `UNEXPIRE_END_USER_ACCOUNT` procedure. Use this procedure to renew (unexpire) an Application Express end user account in the current workspace. This action specifically renews the account for use by end users to authenticate to developed applications and may also renew the account for use by developers or administrators to log in to a workspace.

This procedure must be run by a user having administration privileges in the current workspace.

```

BEGIN
  FOR c1 IN (SELECT user_name from apex_users) LOOP
    APEX_UTIL.UNEXPIRE_END_USER_ACCOUNT(p_user_name => c1.user_name);
    htp.p('End User Account: '||c1.user_name||' is now valid.');
```

```

  END LOOP;
END;
```

34.143 UNEXPIRE_WORKSPACE_ACCOUNT Procedure

Unexpires developer and workspace administrator accounts and the associated passwords, enabling the developer or administrator to log in to a workspace.

Syntax

```

APEX_UTIL.UNEXPIRE_WORKSPACE_ACCOUNT (
  p_user_name IN VARCHAR2);
```

Parameters

Table 34-123 UNEXPIRE_WORKSPACE_ACCOUNT Parameters

Parameter	Description
p_user_name	The user name of the user account.

Example

The following example shows how to use the UNEXPIRE_WORKSPACE_ACCOUNT procedure. Use this procedure to renew (unexpire) an Application Express workspace administrator account in the current workspace. This action specifically renews the account for use by developers or administrators to login to a workspace and may also renew the account for its use by end users to authenticate to developed applications.

This procedure must be run by a user having administration privileges in the current workspace.

```

BEGIN
  FOR c1 IN (select user_name from apex_users) loop
    APEX_UTIL.UNEXPIRE_WORKSPACE_ACCOUNT(p_user_name => c1.user_name);
    htp.p('Workspace Account: '||c1.user_name||' is now valid.');
```

```

  END LOOP;
END;
```

34.144 UNLOCK_ACCOUNT Procedure

Sets a user account status to unlocked. Must be run by an authenticated workspace administrator in a page request context.

Syntax

```

APEX_UTIL.UNLOCK_ACCOUNT (
  p_user_name IN VARCHAR2);
```

Parameters

Table 34-124 UNLOCK_ACCOUNT Parameters

Parameter	Description
p_user_name	The user name of the user account.

Example

The following example shows how to use the UNLOCK_ACCOUNT procedure. Use this procedure to unlock an Application Express account in the current workspace. This action unlocks the account for use by administrators, developers, and end users. This procedure must be run by a user who has administration privileges in the current workspace

```
BEGIN
  FOR c1 IN (SELECT user_name from apex_users) LOOP
    APEX_UTIL.UNLOCK_ACCOUNT(p_user_name => c1.user_name);
    http.p('End User Account: ' || c1.user_name || ' is now unlocked. ');
  END LOOP;
END;
```

34.145 URL_ENCODE Function

The following special characters are encoded as follows:

Special Characters	After Encoding
%	%25
+	%2B
space	+
.	%2E
*	%2A
?	%3F
\	%5C
/	%2F
>	%3E
<	%3C
}	%7B
{	%7D
~	%7E
[%5B
]	%5D
'	%60
;	%3B
?	%3F
@	%40
&	%26
#	%23
	%7C
^	%5E
:	%3A
=	%3D
\$	%24

Syntax

```
APEX_UTIL.URL_ENCODE (
  p_url IN VARCHAR2)
RETURN VARCHAR2;
```

Parameters**Table 34-125 URL_ENCODE Parameters**

Parameter	Description
p_url	The string to be encoded.

Example

The following example shows how to use the URL_ENCODE function.

```
DECLARE
  l_url VARCHAR2(255);
BEGIN
  l_url := APEX_UTIL.URL_ENCODE('http://www.myurl.com?id=1&cat=foo');
END;
```

In this example, the following URL:

```
http://www.myurl.com?id=1&cat=foo
```

Would be returned as:

```
http%3A%2F%2Fwww%2Emyurl%2Ecom%3Fid%3D1%26cat%3Dfoo
```

34.146 WORKSPACE_ACCOUNT_DAYS_LEFT Function

Returns the number of days remaining before the developer or workspace administrator account password expires. This function may be run in a page request context by any authenticated user.

Syntax

```
APEX_UTIL.WORKSPACE_ACCOUNT_DAYS_LEFT (
  p_user_name IN VARCHAR2)
RETURN NUMBER;
```

Parameters**Table 34-126 WORKSPACE_ACCOUNT_DAYS_LEFT Parameters**

Parameter	Description
p_user_name	The user name of the user account.

Example

The following example shows how to use the WORKSPACE_ACCOUNT_DAYS_LEFT function. It can be used in to find the number of days remaining before an Application Express administrator or developer account in the current workspace expires.

```
DECLARE
    l_days_left NUMBER;
BEGIN
    FOR c1 IN (SELECT user_name from apex_users) LOOP
        l_days_left := APEX_UTIL.WORKSPACE_ACCOUNT_DAYS_LEFT(p_user_name =>
c1.user_name);
        htp.p('Workspace Account:'||c1.user_name||' expires in '||l_days_left||'
days.');
```

```
        END LOOP;
    END;
```

APEX_WEB_SERVICE

The APEX_WEB_SERVICE API enables you to integrate other systems with Application Express by allowing you to interact with Web services anywhere you can use PL/SQL in your application. The API contains procedures and functions to call both SOAP and RESTful style Web services. It contains functions to parse the responses from Web services and to encode/decode into SOAP friendly base64 encoding. This API also contains package globals for managing cookies and HTTP headers when calling Web services whether from the API or by using standard processes of type Web service. Cookies and HTTP headers can be set before invoking a call to a Web service by populating the globals and the cookies and HTTP headers returned from the Web service response can be read from other globals.

- [About the APEX_WEB_SERVICE API](#) (page 35-1)
- [Invoking a SOAP Style Web Service](#) (page 35-2)
- [Invoking a RESTful Style Web Service](#) (page 35-3)
- [Retrieving Cookies and HTTP Headers](#) (page 35-4)
- [Setting Cookies and HTTP Headers](#) (page 35-5)
- [BLOB2CLOBBASE64 Function](#) (page 35-5)
- [CLOBBASE642BLOB Function](#) (page 35-6)
- [MAKE_REQUEST Procedure](#) (page 35-6)
- [MAKE_REQUEST Function](#) (page 35-8)
- [MAKE_REST_REQUEST Function](#) (page 35-9)
- [MAKE_REST_REQUEST_B Function](#) (page 35-11)
- [OAUTH_AUTHENTICATE Function](#) (page 35-12)
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- [OAUTH_SET_TOKEN Function](#) (page 35-14)
- [PARSE_RESPONSE Function](#) (page 35-14)
- [PARSE_RESPONSE_CLOB Function](#) (page 35-15)
- [PARSE_XML Function](#) (page 35-16)
- [PARSE_XML_CLOB Function](#) (page 35-17)

35.1 About the APEX_WEB_SERVICE API

Use the APEX_WEB_SERVICE API to invoke a Web service and examine the response anywhere you can use PL/SQL in Application Express.

The following are examples of when you might use the APEX_WEB_SERVICE API:

- When you want to invoke a Web service by using an On Demand Process using Ajax.

- When you want to invoke a Web service as part of an Authentication Scheme.
- When you need to pass a large binary parameter to a Web service that is base64 encoded.
- When you want to invoke a Web service as part of a validation.

35.2 Invoking a SOAP Style Web Service

There is a procedure and a function to invoke a SOAP style Web service. The procedure stores the response in the collection specified by the parameter `p_collection_name`. The function returns the results as an `XMLTYPE`. To retrieve a specific value from the response, you use either the `PARSE_RESPONSE` function if the result is stored in a collection or the `PARSE_XML` function if the response is returned as an `XMLTYPE`. To pass a binary parameter to the Web service as base64 encoded character data, use the function `BLOB2CLOBBASE64`. Conversely, to transform a response that contains a binary parameter that is base64 encoded use the function `CLOBBASE642BLOB`. The following is an example of using the `BLOB2CLOBBASE64` function to encode a parameter, `MAKE_REQUEST` procedure to call a Web service, and the `PARSE_RESPONSE` function to extract a specific value from the response.

```

declare
  l_filename varchar2(255);
  l_BLOB BLOB;
  l_CLOB CLOB;
  l_envelope CLOB;
  l_response_msg varchar2(32767);
BEGIN
  IF :P1_FILE IS NOT NULL THEN
    SELECT filename, BLOB_CONTENT
       INTO l_filename, l_BLOB
       FROM APEX_APPLICATION_FILES
       WHERE name = :P1_FILE;

    l_CLOB := apex_web_service.blob2clobbase64(l_BLOB);

    l_envelope := q'!<?xml version='1.0' encoding='UTF-8'?>!';
    l_envelope := l_envelope|| '<soapenv:Envelope xmlns:soapenv="http://
schemas.xmlsoap.org/soap/envelope/" xmlns:chec="http://www.stellent.com/CheckIn/">
<soapenv:Header/>
<soapenv:Body>
  <chec:CheckInUniversal>
    <chec:dDocName>'||l_filename||'</chec:dDocName>
    <chec:dDocTitle>'||l_filename||'</chec:dDocTitle>
    <chec:dDocType>Document</chec:dDocType>
    <chec:dDocAuthor>GM</chec:dDocAuthor>
    <chec:dSecurityGroup>Public</chec:dSecurityGroup>
    <chec:dDocAccount></chec:dDocAccount>
    <chec:CustomDocMetaData>
      <chec:property>
        <chec:name></chec:name>
        <chec:value></chec:value>
      </chec:property>
    </chec:CustomDocMetaData>
    <chec:primaryFile>
      <chec:fileName>'||l_filename||'</chec:fileName>
      <chec:fileContent>'||l_CLOB||'</chec:fileContent>
    </chec:primaryFile>
    <chec:alternateFile>

```

```

        <chec:fileName></chec:fileName>
        <chec:fileContent></chec:fileContent>
    </chec:alternateFile>
    <chec:extraProps>
        <chec:property>
            <chec:name></chec:name>
            <chec:value></chec:value>
        </chec:property>
    </chec:extraProps>
    </chec:CheckInUniversal>
</soapenv:Body>
</soapenv:Envelope>';

apex_web_service.make_request(
    p_url           => 'http://192.0.2.1/idc/idcplg',
    p_action        => 'http://192.0.2.1/CheckIn/',
    p_collection_name => 'STELLENT_CHECKIN',
    p_envelope      => l_envelope,
    p_username      => 'sysadmin',
    p_password      => 'password' );

l_response_msg := apex_web_service.parse_response(
    p_collection_name=>'STELLENT_CHECKIN',
    p_xpath=>'//idc:CheckInUniversalResponse/idc:CheckInUniversalResult/idc:StatusInfo/
idc:statusMessage/text()',
    p_ns=>'xmlns:idc="http://www.stellent.com/CheckIn/"');

:P1_RES_MSG := l_response_msg;

END IF;
END;
```

35.3 Invoking a RESTful Style Web Service

RESTful style Web services use a simpler architecture than SOAP. Typically the input to a RESTful style Web service is a collection of name/value pairs. The response can be an XML document or simply text such as a comma separated response or JSON. The following is an example of MAKE_REST_REQUEST being used in an application process that is callable by Ajax.

```

declare
    l_clob clob;
    l_buffer      varchar2(32767);
    l_amount      number;
    l_offset      number;
begin
    l_clob := apex_web_service.make_rest_request(
        p_url => 'http://us.music.yahooapis.com/ video/v1/list/published/
popular',
        p_http_method => 'GET',
        p_parm_name => apex_util.string_to_table('appid:format'),
        p_parm_value => apex_util.string_to_table(apex_application.g_x01||':'||
apex_application.g_x02));

    l_amount := 32000;
    l_offset := 1;
    begin
        loop
            dbms_lob.read( l_clob, l_amount, l_offset, l_buffer );
```

```

        http.p(l_buffer);
        l_offset := l_offset + l_amount;
        l_amount := 32000;
    end loop;
exception
    when no_data_found then
        null;
end;

end;

```

35.4 Retrieving Cookies and HTTP Headers

When you invoke a Web service using any of the supported methods in Application Express, the `g_response_cookies` and `g_headers` globals are populated if the Web service response included any cookies or HTTP headers. You can interrogate these globals and store the information in collections. The following are examples of interrogating the `APEX_WEB_SERVICE` globals to store cookie and HTTP header responses in collections.

```

declare
    i number;
    secure varchar2(1);
begin
    apex_collection.create_or_truncate_collection('P31_RESP_COOKIES');
    for i in 1.. apex_web_service.g_response_cookies.count loop
        IF (apex_web_service.g_response_cookies(i).secure) THEN
            secure := 'Y';
        ELSE
            secure := 'N';
        END IF;
        apex_collection.add_member(p_collection_name => 'P31_RESP_COOKIES',
            p_c001 => apex_web_service.g_response_cookies(i).name,
            p_c002 => apex_web_service.g_response_cookies(i).value,
            p_c003 => apex_web_service.g_response_cookies(i).domain,
            p_c004 => apex_web_service.g_response_cookies(i).expire,
            p_c005 => apex_web_service.g_response_cookies(i).path,
            p_c006 => secure,
            p_c007 => apex_web_service.g_response_cookies(i).version );
    end loop;
end;

declare
    i number;
begin
    apex_collection.create_or_truncate_collection('P31_RESP_HEADERS');

    for i in 1.. apex_web_service.g_headers.count loop
        apex_collection.add_member(p_collection_name => 'P31_RESP_HEADERS',
            p_c001 => apex_web_service.g_headers(i).name,
            p_c002 => apex_web_service.g_headers(i).value,
            p_c003 => apex_web_service.g_status_code);
    end loop;
end;

```

35.5 Setting Cookies and HTTP Headers

You set cookies and HTTP headers that should be sent along with a Web service request by populating the globals `g_request_cookies` and `g_request_headers` before the process that invokes the Web service. The following examples show populating the globals to send cookies and HTTP headers with a request.

```
for c1 in (select seq_id, c001, c002, c003, c004, c005, c006, c007
          from apex_collections
          where collection_name = 'P31_RESP_COOKIES' ) loop
  apex_web_service.g_request_cookies(c1.seq_id).name := c1.c001;
  apex_web_service.g_request_cookies(c1.seq_id).value := c1.c002;
  apex_web_service.g_request_cookies(c1.seq_id).domain := c1.c003;
  apex_web_service.g_request_cookies(c1.seq_id).expire := c1.c004;
  apex_web_service.g_request_cookies(c1.seq_id).path := c1.c005;
  if c1.c006 = 'Y' then
    apex_web_service.g_request_cookies(c1.seq_id).secure := true;
  else
    apex_web_service.g_request_cookies(c1.seq_id).secure := false;
  end if;
  apex_web_service.g_request_cookies(c1.seq_id).version := c1.c007;
end loop;

for c1 in (select seq_id, c001, c002
          from apex_collections
          where collection_name = 'P31_RESP_HEADERS' ) loop
  apex_web_service.g_request_headers(c1.seq_id).name := c1.c001;
  apex_web_service.g_request_headers(c1.seq_id).value := c1.c002;
end loop;
```

35.6 BLOB2CLOBBASE64 Function

Use this function to convert a `BLOB` datatype into a `CLOB` that is `base64` encoded. This is often used when sending a binary as an input to a Web service.

Syntax

```
APEX_WEB_SERVICE.BLOB2CLOBBASE64 (
  p_blob IN BLOB)
RETURN CLOB;
```

Parameters

Table 35-1 BLOB2CLOBBASE64 Parameters

Parameter	Description
<code>p_blob</code>	The <code>BLOB</code> to convert into <code>base64</code> encoded <code>CLOB</code> .

Example

The following example gets a file that was uploaded from the `apex_application_files` view and converts the `BLOB` into a `CLOB` that is `base64` encoded.

```
declare
  l_clob CLOB;
```

```

        l_blob    BLOB;
begin
    SELECT BLOB_CONTENT
        INTO l_BLOB
        FROM APEX_APPLICATION_FILES
        WHERE name = :P1_FILE;

    l_CLOB := apex_web_service.blob2clobbase64(l_BLOB);
end;

```

35.7 CLOBBASE642BLOB Function

Use this function to convert a CLOB datatype that is base64 encoded into a BLOB. This is often used when receiving output from a Web service that contains a binary parameter.

Syntax

```

APEX_WEB_SERVICE.CLOBBASE642BLOB (
    p_clob IN CLOB)
RETURN BLOB;

```

Parameters

Table 35-2 CLOBBASE642BLOB Parameters

Parameter	Description
p_clob	The base64 encoded CLOB to convert into a BLOB.

Example

The following example retrieves a base64 encoded node from an XML document as a CLOB and converts it into a BLOB.

```

declare
    l_base64    CLOB;
    l_blob     BLOB;
    l_xml      XMLTYPE;
begin
    l_base64 := apex_web_service.parse_xml_clob(l_xml, ' //runReportReturn/
reportBytes/text()');
    l_blob := apex_web_service.clobbase642blob(l_base64);
end;

```

35.8 MAKE_REQUEST Procedure

Use this procedure to invoke a SOAP style Web service with the supplied SOAP envelope and store the results in a collection.

Syntax

```

APEX_WEB_SERVICE.MAKE_REQUEST (
    p_url          IN VARCHAR2,
    p_action       IN VARCHAR2 default null,
    p_version      IN VARCHAR2 default '1.1',
    p_collection_name IN VARCHAR2 default null,

```



```

p_envelope          IN CLOB,
p_username          IN VARCHAR2 default null,
p_password          IN VARCHAR2 default null,
p_scheme            IN VARCHAR2 DEFAULT 'Basic',
p_proxy_override    IN VARCHAR2 default null,
p_transfer_timeout  IN NUMBER   default 180,
p_wallet_path       IN VARCHAR2 default null,
p_wallet_pwd        IN VARCHAR2 default null,
p_https_host        IN VARCHAR2 default null );

```

Parameters

[Table 35-3](#) (page 35-7) describes the parameters available in the `MAKE_REQUEST` procedure.

Table 35-3 MAKE_REQUEST Procedure Parameters

Parameter	Description
<code>p_url</code>	The URL endpoint of the Web service.
<code>p_action</code>	The SOAP Action corresponding to the operation to be invoked.
<code>p_version</code>	The SOAP version, 1.1 or 1.2. The default is 1.1.
<code>p_collection_name</code>	The name of the collection to store the response.
<code>p_envelope</code>	The SOAP envelope to post to the service.
<code>p_username</code>	The username if basic authentication is required for this service.
<code>p_password</code>	The password if basic authentication is required for this service.
<code>p_scheme</code>	The authentication scheme, Basic (default) or AWS or Digest if supported by your database release.
<code>p_proxy_override</code>	The proxy to use for the request. The proxy supplied overrides the proxy defined in the application attributes.
<code>p_transfer_timeout</code>	The amount of time in seconds to wait for a response.
<code>p_wallet_path</code>	The file system path to a wallet if the URL endpoint is https. For example, <code>file:/usr/home/oracle/WALLETS</code> . The wallet path provided overrides the wallet defined in the instance settings.
<code>p_wallet_pwd</code>	The password to access the wallet.
<code>p_https_host</code>	The host name to be matched against the common name (CN) of the remote server's certificate for an HTTPS request.

Example

The following example uses the `make_request` procedure to retrieve a list of movies from a SOAP style Web service. The response is stored in an Application Express collection named `MOVIE_LISTINGS`.

```

declare
    l_envelope CLOB;
BEGIN
    l_envelope := '<?xml version="1.0" encoding="UTF-8"?>
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:tns="http://www.ignyte.com/whatsshowing"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <soap:Body>
    <tns:GetTheatersAndMovies>
      <tns:zipCode>43221</tns:zipCode>

```

```

        <tns:radius>5</tns:radius>
    </tns:GetTheatersAndMovies>
</soap:Body>
</soap:Envelope>';

apex_web_service.make_request(
    p_url          => ' http://www.ignyte.com/webservices/
ignite.whatsshowing.webservice/moviefunctions.asmx',
    p_action       => ' http://www.ignyte.com/whatsshowing/GetTheatersAndMovies',
    p_collection_name => 'MOVIE_LISTINGS',
    p_envelope     => l_envelope
);
END;
```

35.9 MAKE_REQUEST Function

Use this function to invoke a SOAP style Web service with the supplied SOAP envelope returning the results in an XMLTYPE.

Syntax

```

APEX_WEB_SERVICE.MAKE_REQUEST (
    p_url          IN VARCHAR2,
    p_action       IN VARCHAR2 default null,
    p_version      IN VARCHAR2 default '1.1',
    p_envelope     IN CLOB,
    p_username     IN VARCHAR2 default null,
    p_password     IN VARCHAR2 default null,
    p_scheme       IN VARCHAR2 default 'Basic',
    p_proxy_override IN VARCHAR2 default null,
    p_transfer_timeout IN NUMBER default 180,
    p_wallet_path  IN VARCHAR2 default null,
    p_wallet_pwd   IN VARCHAR2 default null,
    p_https_host   IN VARCHAR2 default null,
    p_credential_static_id IN VARCHAR2 default null,
    p_token_url    IN VARCHAR2 default null )
RETURN XMLTYPE;
```

Parameters

Table 35-4 MAKE_REQUEST Function Parameters

Parameter	Description
p_url	The URL endpoint of the Web service.
p_action	The SOAP Action corresponding to the operation to be invoked.
p_version	The SOAP version, 1.1 or 1.2. The default is 1.1.
p_envelope	The SOAP envelope to post to the service.
p_username	The username if basic authentication is required for this service.
p_password	The password if basic authentication is required for this service
p_scheme	The authentication scheme, Basic (default) or AWS or Digest or OAUTH_CLIENT_CRED if supported by your database release.
p_proxy_override	The proxy to use for the request. The proxy supplied overrides the proxy defined in the application attributes.
p_transfer_timeout	The amount of time in seconds to wait for a response.

Table 35-4 (Cont.) MAKE_REQUEST Function Parameters

Parameter	Description
p_wallet_path	The file system path to a wallet if the URL endpoint is https. For example, file:/usr/home/oracle/WALLETS. The wallet path provided overrides the wallet defined in the instance settings.
p_wallet_pwd	The password to access the wallet.
p_https_host	The host name to be matched against the common name (CN) of the remote server's certificate for an HTTPS request.
p_credential_static_id	The name of a Web Credential (configured in Shared Components) to be used.
p_token_url	For token-based authentication flows (like OAuth2): The URL where to get the token from.

Example

The following example uses the `make_request` function to invoke a SOAP style Web service that returns movie listings. The result is stored in an XMLTYPE.

```

declare
    l_envelope CLOB;
    l_xml      XMLTYPE;
BEGIN
    l_envelope := ' <?xml version="1.0" encoding="UTF-8"?>
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:tns="http://www.ignyte.com/whatsshowing"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
    <soap:Body>
        <tns:GetTheatersAndMovies>
            <tns:zipCode>43221</tns:zipCode>
            <tns:radius>5</tns:radius>
        </tns:GetTheatersAndMovies>
    </soap:Body>
</soap:Envelope>';

    l_xml := apex_web_service.make_request(
        p_url => ' http://www.ignyte.com/webservices/ignyte.whatsshowing.webservice/
moviefunctions.asmx',
        p_action => ' http://www.ignyte.com/whatsshowing/GetTheatersAndMovies',
        p_envelope => l_envelope
    );
END

```

35.10 MAKE_REST_REQUEST Function

Use this function to invoke a RESTful style Web service supplying either name value pairs, a character based payload or a binary payload and returning the response in a CLOB.

Syntax

```

APEX_WEB_SERVICE.MAKE_REST_REQUEST(
    p_url          IN VARCHAR2,
    p_http_method  IN VARCHAR2,
    p_username     IN VARCHAR2 default null,

```

```

p_password          IN VARCHAR2 default null,
p_scheme           IN VARCHAR2 default 'Basic',
p_proxy_override   IN VARCHAR2 default null,
p_transfer_timeout IN NUMBER    default 180,
p_body             IN CLOB      default empty_clob(),
p_body_blob        IN BLOB      default empty_blob(),
p_parm_name        IN apex_application_global.VC_ARR2 default empty_vc_arr,
p_parm_value       IN apex_application_global.VC_ARR2 default empty_vc_arr,
p_wallet_path      IN VARCHAR2 default null,
p_wallet_pwd       IN VARCHAR2 default null,
p_https_host       IN VARCHAR2 default null,
p_credential_static_id IN VARCHAR2 default null,
p_token_url        IN VARCHAR2 default null )
RETURN CLOB;

```

Parameters

Table 35-5 MAKE_REST_REQUEST Function Parameters

Parameter	Description
p_url	The URL endpoint of the Web service.
p_http_method	The HTTP method to use, PUT, POST, GET, HEAD, or DELETE.
p_username	The username if basic authentication is required for this service.
p_password	The password if basic authentication is required for this service.
p_scheme	The authentication scheme, Basic (default) or AWS or Digest or OAUTH_CLIENT_CRED if supported by your database release.
p_proxy_override	The proxy to use for the request. The proxy supplied overrides the proxy defined in the application attributes.
p_transfer_timeout	The amount of time in seconds to wait for a response.
p_body	The HTTP payload to be sent as CLOB.
p_body_blob	The HTTP payload to be sent as binary BLOB. For example, posting a file.
p_parm_name	The name of the parameters to be used in name/value pairs.
p_parm_value	The value of the parameters to be used in name/value pairs.
p_wallet_path	The file system path to a wallet if the URL endpoint is https. For example, file:/usr/home/oracle/WALLETS. The wallet path provided overrides the wallet defined in the instance settings.
p_wallet_pwd	The password to access the wallet.
p_https_host	The host name to be matched against the common name (CN) of the remote server's certificate for an HTTPS request.
p_credential_static_id	The name of a Web Credential (configured in Shared Components) to be used.
p_token_url	For token-based authentication flows (like OAuth2): The URL where to get the token from.

Example

The following example calls a RESTful style Web service using the `make_rest_request` function passing the parameters to the service as name/value pairs. The response from the service is stored in a locally declared CLOB.

```

declare
    l_clob    CLOB;
BEGIN

    l_clob := apex_web_service.make_rest_request(
        p_url => 'http://us.music.yahooapis.com/ video/v1/list/published/popular',
        p_http_method => 'GET',
        p_parm_name => apex_util.string_to_table('appid:format'),
        p_parm_value => apex_util.string_to_table('xyz:xml'));

END;

```

35.11 MAKE_REST_REQUEST_B Function

Use this function to invoke a RESTful style Web service supplying either name value pairs, a character based payload or a binary payload and returning the response in a BLOB.

Syntax

```

APEX_WEB_SERVICE.MAKE_REST_REQUEST_B(
    p_url                IN VARCHAR2,
    p_http_method        IN VARCHAR2,
    p_username           IN VARCHAR2 default null,
    p_password           IN VARCHAR2 default null,
    p_scheme             IN VARCHAR2 default 'Basic',
    p_proxy_override     IN VARCHAR2 default null,
    p_transfer_timeout   IN NUMBER    default 180,
    p_body               IN CLOB      default empty_clob(),
    p_body_blob          IN BLOB      default empty_blob(),
    p_parm_name          IN apex_application_global.VC_ARR2 default empty_vc_arr,
    p_parm_value         IN apex_application_global.VC_ARR2 default empty_vc_arr,
    p_wallet_path        IN VARCHAR2 default null,
    p_wallet_pwd         IN VARCHAR2 default null,
    p_https_host         IN VARCHAR2 default null,
    p_credential_static_id IN VARCHAR2 default null,
    p_token_url          IN VARCHAR2 default null )
RETURN BLOB;

```

Parameters

Table 35-6 MAKE_REST_REQUEST_B Function Parameters

Parameter	Description
p_url	The URL endpoint of the Web service.
p_http_method	The HTTP method to use, PUT, POST, GET, HEAD, or DELETE.
p_username	The username if basic authentication is required for this service.
p_password	The password if basic authentication is required for this service
p_scheme	The authentication scheme, Basic (default) or AWS or Digest or OAUTH_CLIENT_CREDif supported by your database release.
p_proxy_override	The proxy to use for the request. The proxy supplied overrides the proxy defined in the application attributes.
p_transfer_timeout	The amount of time in seconds to wait for a response.

Table 35-6 (Cont.) MAKE_REST_REQUEST_B Function Parameters

Parameter	Description
p_body	The HTTP payload to be sent as CLOB.
p_body_blob	The HTTP payload to be sent as binary BLOB. For example, posting a file.
p_parm_name	The name of the parameters to be used in name/value pairs.
p_parm_value	The value of the parameters to be used in name/value pairs.
p_wallet_path	The file system path to a wallet if the URL endpoint is https. For example, file:/usr/home/oracle/WALLETS. The wallet path provided overrides the wallet defined in the instance settings.
p_wallet_pwd	The password to access the wallet.
p_https_host	The host name to be matched against the common name (CN) of the remote server's certificate for an HTTPS request.
p_credential_static_id	The name of a Web Credential (configured in Shared Components) to be used.
p_token_url	For token-based authentication flows (like OAuth2): The URL where to get the token from.

Example

The following example calls a RESTful style Web service using the `make_rest_request` function passing the parameters to the service as name/value pairs. The response from the service is stored in a locally declared BLOB.

```

declare
    l_blob      BLOB;
BEGIN

    l_blob := apex_web_service.make_rest_request_b(
        p_url => 'http://us.music.yahooapis.com/video/v1/list/published/popular',
        p_http_method => 'GET',
        p_parm_name => apex_util.string_to_table('appid:format'),
        p_parm_value => apex_util.string_to_table('xyz:xml'));

END;
```

35.12 OAUTH_AUTHENTICATE Function

This function performs OAUTH authentication and requests an OAuth access token. The token and its expiry date are stored in the global variable `g_oauth_token`.

```

type oauth_token is record(
    token      varchar2(255),
    expires    date );
```

**Note:**

Currently only the Client Credentials flow is supported.

Syntax

```
APEX_WEB_SERVICE.OAUTH_AUTHENTICATE(
  p_token_url      in varchar2,
  p_client_id      in varchar2,
  p_client_secret  in varchar2,
  p_flow_type      in varchar2 default OAUTH_CLIENT_CRED,
  p_proxy_override in varchar2 default null,
  p_transfer_timeout in number  default 180,
  p_wallet_path    in varchar2 default null,
  p_wallet_pwd     in varchar2 default null,
  p_https_host     in varchar2 default null );
```

Parameters

Table 35-7 OAUTH_AUTHENTICATE Function Parameters

Parameter	Description
p_token_url	The url endpoint of the OAuth token service.
p_client_id	OAuth Client ID to use for authentication.
p_client_secret	OAuth Client Secret to use for authentication.
p_flow_type	OAuth flow type - only OAUTH_CLIENT_CRED is supported at this time.
p_proxy_override	The proxy to use for the request.
p_transfer_timeout	The amount of time in seconds to wait for a response.
p_wallet_path	The filesystem path to a wallet if request is https. For example, file:/usr/home/oracle/WALLETS.
p_wallet_pwd	The password to access the wallet.
p_https_host	The host name to be matched against the common name (CN) of the remote server's certificate for an HTTPS request.

Example

```
begin
  apex_web_service.oauth_authenticate(
    p_token_url => '[URL to ORDS OAuth token service: http(s)://{host}:
{port}/ords/.../oauth/token]',
    p_client_id => '[client-id]',
    p_client_secret => '[client-secret]');
end;
```

35.13 OAUTH_GET_LAST_TOKEN Function

This function returns the OAuth access token received in the last OAUTH_AUTHENTICATE call. Returns NULL when the token is already expired or OAUTH_AUTHENTICATE has not been called.

Returns

The OAuth access token from the last OAUTH_AUTHENTICATE call; NULL when the token is expired.

Syntax

```
function oauth_get_last_token return varchar2;
```

Example

```
select apex_web_service.oauth_get_last_token from dual;
```

35.14 OAUTH_SET_TOKEN Function

This function sets the OAuth Access token to be used in subsequent MAKE_REST_REQUEST calls. This procedure can be used to set a token which has been obtained by other means than with OAUTH_AUTHENTICATE (for instance, custom code).

Parameters**Table 35-8 OAUTH_SET_TOKEN Function Parameters**

Parameter	Description
p_token	The OAuth access token to be used by MAKE_REST_REQUEST calls.
p_expires	Optional: The token expiry date; NULL means: No expiration date.

Example

```
begin
  apex_web_service.oauth_set_token(
    p_token => '{oauth access token}'
  );
end;
```

35.15 PARSE_RESPONSE Function

Use this function to parse the response from a Web service that is stored in a collection and return the result as a VARCHAR2 type.

Syntax

```
APEX_WEB_SERVICE.PARSE_RESPONSE (
  p_collection_name  IN VARCHAR2,
  p_xpath            IN VARCHAR2,
  p_ns               IN VARCHAR2 default null )
RETURN VARCHAR2;
```

Parameters**Table 35-9 PARSE_RESPONSE Function Parameters**

Parameter	Description
p_collection_name	The name of the collection where the Web service response is stored.

Table 35-9 (Cont.) PARSE_RESPONSE Function Parameters

Parameter	Description
p_xpath	The XPath expression to the desired node.
p_ns	The namespace to the desired node.

Example

The following example parses a response stored in a collection called STELLENT_CHECKIN and stores the value in a locally declared VARCHAR2 variable.

```
declare
    l_response_msg VARCHAR2(4000);
BEGIN
    l_response_msg := apex_web_service.parse_response(
        p_collection_name=>'STELLENT_CHECKIN',
        p_xpath =>
        '//idc:CheckInUniversalResponse/idc:CheckInUniversalResult/idc:StatusInfo/
        idc:statusMessage/text()',
        p_ns=>'xmlns:idc="http://www.stellent.com/CheckIn/"');
END;
```

35.16 PARSE_RESPONSE_CLOB Function

Use this function to parse the response from a Web service that is stored in a collection and return the result as a CLOB type.

Syntax

```
APEX_WEB_SERVICE.PARSE_RESPONSE_CLOB (
    p_collection_name IN VARCHAR2,
    p_xpath          IN VARCHAR2,
    p_ns             IN VARCHAR2 default null )
RETURN CLOB;
```

Parameters**Table 35-10 PARSE_RESPONSE_CLOB Function Parameters**

Parameter	Description
p_collection_name	The name of the collection where the Web service response is stored.
p_xpath	The XPath expression to the desired node.
p_ns	The namespace to the desired node.

Example

The following example parses a response stored in a collection called STELLENT_CHECKIN and stores the value in a locally declared CLOB variable.

```
declare
    l_response_msg CLOB;
BEGIN
```

```

l_response_msg := apex_web_service.parse_response_clob(
    p_collection_name=>'STELLENT_CHECKIN',
    p_xpath=>
'//idc:CheckInUniversalResponse/idc:CheckInUniversalResult/idc:StatusInfo/
idc:statusMessage/text()',
    p_ns=>'xmlns:idc="http://www.stellent.com/CheckIn/"');
END;
```

35.17 PARSE_XML Function

Use this function to parse the response from a Web service returned as an XMLTYPE and return the value requested as a VARCHAR2.

Syntax

```

APEX_WEB_SERVICE.PARSE_XML (
    p_xml          IN XMLTYPE,
    p_xpath        IN VARCHAR2,
    p_ns           IN VARCHAR2 default null )
RETURN VARCHAR2;
```

Parameters

Table 35-11 PARSE_XML Function Parameters

Parameter	Description
p_xml	The XML document as an XMLTYPE to parse.
p_xpath	The XPath expression to the desired node.
p_ns	The namespace to the desired node.

Example

The following example uses the `make_request` function to call a Web service and store the results in a local XMLTYPE variable. The `parse_xml` function is then used to pull out a specific node of the XML document stored in the XMLTYPE and stores it in a locally declared VARCHAR2 variable.

```

declare
    l_envelope CLOB;
    l_xml XMLTYPE;
    l_movie VARCHAR2(4000);
BEGIN
    l_envelope := ' <?xml version="1.0" encoding="UTF-8"?>
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:tns="http://www.ignyte.com/whatsshowing"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
    <soap:Body>
        <tns:GetTheatersAndMovies>
            <tns:zipCode>43221</tns:zipCode>
            <tns:radius>5</tns:radius>
        </tns:GetTheatersAndMovies>
    </soap:Body>
</soap:Envelope>';

    l_xml := apex_web_service.make_request(
        p_url => ' http://www.ignyte.com/webservices/ignyte.whatsshowing.webservice/
```

```

moviefunctions.asmx',
  p_action => ' http://www.ignite.com/whatsshowing/GetTheatersAndMovies',
  p_envelope => l_envelope );

l_movie := apex_web_service.parse_xml(
  p_xml => l_xml,
  p_xpath => ' //GetTheatersAndMoviesResponse/GetTheatersAndMoviesResult/Theater/
Movies/Movie/Name[1]',
  p_ns => ' xmlns="http://www.ignite.com/whatsshowing" ' );

END;

```

35.18 PARSE_XML_CLOB Function

Use this function to parse the response from a Web service returned as an XMLTYPE and return the value requested as a CLOB.

Syntax

```

APEX_WEB_SERVICE.PARSE_XML_CLOB (
  p_xml          IN XMLTYPE,
  p_xpath        IN VARCHAR2,
  p_ns           IN VARCHAR2 default null )
RETURN VARCHAR2;

```

Parameters

Table 35-12 PARSE_XML_CLOB Function Parameters

Parameter	Description
p_xml	The XML document as an XMLTYPE to parse.
p_xpath	The XPath expression to the desired node.
p_ns	The namespace to the desired node.

Example

The following example uses the `make_request` function to call a Web service and store the results in a local XMLTYPE variable. The `parse_xml` function is then used to pull out a specific node of the XML document stored in the XMLTYPE and stores it in a locally declared VARCHAR2 variable.

```

declare
  l_envelope CLOB;
  l_xml XMLTYPE;
  l_movie CLOB;
BEGIN
  l_envelope := ' <?xml version="1.0" encoding="UTF-8"?>
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:tns="http://www.ignite.com/whatsshowing"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <soap:Body>
    <tns:GetTheatersAndMovies>
      <tns:zipCode>43221</tns:zipCode>
      <tns:radius>5</tns:radius>
    </tns:GetTheatersAndMovies>
  </soap:Body>

```

```
</soap:Envelope>';

    l_xml := apex_web_service.make_request(
        p_url => ' http://www.ignyte.com/webservices/ignyte.whatsshowing.webservice/
moviefunctions.asmx',
        p_action => ' http://www.ignyte.com/whatsshowing/GetTheatersAndMovies',
        p_envelope => l_envelope );

    l_movie := apex_web_service.parse_xml_clob(
        p_xml => l_xml,
        p_xpath => ' //GetTheatersAndMoviesResponse/GetTheatersAndMoviesResult/Theater/
Movies/Movie/Name[1]',
        p_ns => ' xmlns="http://www.ignyte.com/whatsshowing" ' );

END;
```

36

APEX_ZIP

This package allows to compress and to uncompress files and store them in a ZIP file.

- [Data Types](#) (page 36-1)
- [ADD_FILE Procedure](#) (page 36-1)
- [FINISH Procedure](#) (page 36-2)
- [GET_FILE_CONTENT Function](#) (page 36-2)
- [GET_FILES Function](#) (page 36-3)

36.1 Data Types

The data types used by the `APEX_ZIP` package are described in this section.

`t_files`

type `t_files` is table of `varchar2(32767)` index by `binary_integer`;

36.2 ADD_FILE Procedure

This procedure adds a single file to a zip file.

Note:

After all files are added, you must call `APEX_ZIP.FINISH`.

Syntax

```
APEX_ZIP.ADD_FILE (  
    p_zipped_blob IN OUT NOCOPY BLOB,  
    p_file_name   IN VARCHAR2,  
    p_content     IN BLOB );
```

Parameters

Table 36-1 ADD_FILE Procedure Parameters

Parameter	Description
<code>p_zipped_blob</code>	BLOB containing the zip file.
<code>p_file_name</code>	File name, including path, of the file to be added to the zip file.
<code>p_content</code>	BLOB containing the file.

Example

This example reads multiple files from a table and puts them into a single zip file.

```

declare
    l_zip_file blob;
begin
    for l_file in ( select file_name,
                        file_content
                    from my_files )
    loop
        apex_zip.add_file (
            p_zipped_blob => l_zip_file,
            p_file_name   => l_file.file_name,
            p_content     => l_file.file_content );
    end loop;

    apex_zip.finish (
        p_zipped_blob => l_zip_file );

end;
```

36.3 FINISH Procedure

This procedure completes the creation of a zip file after adding files with `APEX_ZIP.ADD_FILE`.

Syntax

```

APEX_ZIP.FINISH (
    p_zipped_blob IN OUT NOCOPY BLOB );
```

Parameters**Table 36-2 FINISH Procedure Parameters**

Parameter	Description
<code>p_zipped_blob</code>	BLOB containing the zip file.

Example

See "[ADD_FILE Procedure](#) (page 36-1)" for an example.

36.4 GET_FILE_CONTENT Function

This function returns the BLOB of a file contained in a provided zip file.

Syntax

```

APEX_ZIP.GET_FILE_CONTENT (
    p_zipped_blob IN BLOB,
    p_file_name   IN VARCHAR2,
    p_encoding    IN VARCHAR2 DEFAULT NULL )
RETURN BLOB;
```

Parameters

Table 36-3 GET_FILE_CONTENT Function Parameters

Parameter	Description
p_zipped_blob	This is the BLOB containing the zip file.
p_file_name	File name, including path, of a file located in the zip file.
p_encoding	Encoding used to zip the file.

Returns

Table 36-4 GET_FILE_CONTENT Function Returns

Return	Description
BLOB	BLOB containing the zip file.

Example

See "[GET_FILES Function](#) (page 36-3)" for an example.

36.5 GET_FILES Function

This function returns an array of file names, including the path, of a provided zip file that contains a BLOB.

Syntax

```
APEX_ZIP.GET_FILES (  
    p_zipped_blob IN BLOB,  
    p_only_files  IN BOOLEAN DEFAULT TRUE,  
    p_encoding   IN VARCHAR2 DEFAULT NULL )  
RETURN t_files;
```

Parameters

Table 36-5 GET_FILES Function Parameters

Parameter	Description
p_zipped_blob	This is the zip file containing the BLOB.
p_only_files	If set to <code>TRUE</code> , empty directory entries are not included in the returned array. Otherwise, set to <code>FALSE</code> to include empty directory entries.
p_encoding	This is the encoding used to zip the file.

Returns

Table 36-6 GET_FILES Function Returns

Return	Description
t_files	A table of file names and path. See " Data Types (page 36-1)" for more details.

Example

This example demonstrates reading a zip file from a table, extracting it and storing all files of the zip file into `my_files`.

```
declare
  l_zip_file      blob;
  l_unzipped_file blob;
  l_files         apex_zip.t_files;
begin
  select file_content
     into l_zip_file
     from my_zip_files
  where file_name = 'my_file.zip';

  l_files := apex_zip.get_files (
    p_zipped_blob => l_zip_file );

  for i in 1 .. l_files.count loop
    l_unzipped_file := apex_zip.get_file_content (
      p_zipped_blob => l_zip_file,
      p_file_name   => l_files(i) );

    insert into my_files ( file_name, file_content )
      values ( l_files(i), l_unzipped_file );
  end loop;
end;
```


37

JavaScript APIs

This section describes JavaScript functions and objects included with Oracle Application Express and available on every page. You can use these functions and objects to provide client-side functionality, such as showing and hiding page elements, or making Ajax (Asynchronous JavaScript and XML) requests.

Note:

This release introduces a prototype of the [Oracle Application Express JavaScript API Reference](#) to the Oracle Application Express library of documentation. As an introductory publication, it is likely some JavaScript APIs were excluded in this initial version.

In the future, this reference will contain all JavaScript APIs. In the interim, please see "JavaScript APIs" in the [Oracle Application Express API Reference](#).

- [apex namespace](#) (page 37-1)
- [apex.da namespace](#) (page 37-3)
- [apex.debug namespace](#) (page 37-4)
- [apex.event namespace](#) (page 37-8)
- [apex.item](#) (page 37-9)
- [apex.lang namespace](#) (page 37-26)
- [apex.message namespace](#) (page 37-30)
- [apex.navigation namespace](#) (page 37-39)
- [apex.page namespace](#) (page 37-46)
- [apex.region](#) (page 37-52)
- [apex.server namespace](#) (page 37-58)
- [apex.storage namespace](#) (page 37-69)
- [apex.util namespace](#) (page 37-74)
- [apex.widget namespace](#) (page 37-81)
- [Events](#) (page 37-81)
- [Non-namespace JavaScript APIs](#) (page 37-86)

37.1 apex namespace

The `apex namespace` contains all the apex sub namespaces such as debug, navigation, and server, and a few common apex functions and properties.

- [About apex.confirm Function](#) (page 37-2)
- [apex.confirm Signature 1](#) (page 37-2)
- [apex.confirm Signature 2](#) (page 37-2)
- [apex.gPageContext\\$ Property](#) (page 37-2)
- [apex.jQuery Property](#) (page 37-2)
- [About apex.submit Function](#) (page 37-3)
- [apex.submit Signature 1](#) (page 37-3)
- [apex.submit Signature 2](#) (page 37-3)

37.1.1 About apex.confirm Function

The `apex.confirm` function displays a confirmation and depending on the user's choice either submits the page, or cancels a page submit. This function has 2 signatures.

37.1.2 apex.confirm Signature 1

This function is an alias for `apex.page.confirm`.

37.1.3 apex.confirm Signature 2

This function is an alias for `apex.page.confirm`.

37.1.4 apex.gPageContext\$ Property

Application Express variable that stores the current page context. The current page context is different depending on whether the page is a Desktop, or jQuery Mobile page. For Desktop, this is set to the document level. For jQuery Mobile, where pages are actually represented as DIV elements in the Browser DOM and multiple page DIVs can be loaded in the Browser DOM at one time, this is set to the DIV element representing the current page. This is used to set the context for your jQuery selectors, to ensure that the selector is executing within the context of the correct page.

Example

```
jQuery( ".my_class", apex.gPageContext$ );
```

This selects all elements with a CSS class of `my_class`, in the context of the current page.

37.1.5 apex.jQuery Property

Application Express property that holds the jQuery object that Application Express uses. Ideally there is just one copy of jQuery on a page but it is possible to have multiple copies and even different versions of jQuery on a page. This is sometimes necessary when using third party plugins that only work with an older version of jQuery. Use this property in place of global variables `$` or `jQuery` to ensure you are using the same jQuery library that Application Express is using.

Example

The following function creates a local variable `$` as a convenient way to reference jQuery while ensuring that it is using the same jQuery that APEX uses.

```
function myFunction() {  
    var $ = apex.jQuery;  
    // use $ to access jQuery functionality  
}
```

37.1.6 About apex.submit Function

The `apex.submit` function submits the current page. This function has 2 signatures.

37.1.7 apex.submit Signature 1

This function is an alias for `apex.page.submit`.

37.1.8 apex.submit Signature 2

This function is an alias for `apex.page.submit`.

37.2 apex.da namespace

This namespace holds all Dynamic Action functions in Oracle Application Express.

- [apex.da.resume](#) (page 37-3)

37.2.1 apex.da.resume

This function resumes execution of a Dynamic Action. Execution of a Dynamic Action can be paused, if the action's `Wait for Result` attribute is checked. The `Wait for Result` is a Dynamic Action plug-in standard attribute designed for use with Ajax based Dynamic Actions. If a plug-in exposes this attribute, it needs to resume execution by calling this function in the relevant place in the plug-in JavaScript code, otherwise, your action breaks execution of Dynamic Actions.

Parameters

Table 37-1 `apex.da.resume`

Name	Type	Description
<code>pCallback</code>	Function	This is a required parameter that references a callback function available from the <code>this.resumeCallback</code> property.

Table 37-1 (Cont.) apex.da.resume

Name	Type	Description
pErrorOccurred	Boolean	This is a required parameter that indicates to the framework whether an error has occurred. If an error has occurred and the action's Stop Execution on Error attribute is checked, execution of the Dynamic Action is stopped.

Example 1

Resume execution of the actions indicating that no error has occurred, for example from a success callback of an Ajax based action.

```
apex.da.resume( lResumeCallback, false );
```

Example 2

Resume execution of the actions indicating that an error has occurred, for example from an error callback of an Ajax based action. If the action's

Stop Execution on Error attribute is checked, execution of the dynamic action is stopped.

```
apex.da.resume( lResumeCallback, true );
```

37.3 apex.debug namespace

This namespace stores all debug functions of Oracle Application Express.

- [Log Level Constants](#) (page 37-4)
- [apex.debug.error](#) (page 37-5)
- [apex.debug.getLevel](#) (page 37-5)
- [apex.debug.info](#) (page 37-6)
- [apex.debug.log](#) (page 37-6)
- [apex.debug.message](#) (page 37-6)
- [apex.debug.setLevel](#) (page 37-7)
- [apex.debug.trace](#) (page 37-7)
- [apex.debug.warn](#) (page 37-8)

37.3.1 Log Level Constants

LOG_LEVEL

```
apex.debug.LOG_LEVEL = {
    OFF: 0,
    ERROR: 1,
    WARN: 2,
```

```

INFO: 4,
APP_TRACE: 6,
ENGINE_TRACE: 9
};

```

Table 37-2 LOG_LEVEL Descriptions

Value	Description
OFF: 0	Logging is off.
ERROR: 1	Error logging level
WARN: 2	Warning logging level.
INFO: 4	Information logging level.
APP_TRACE: 6	Application tracing logging level.
ENGINE_TRACE: 9	Engine tracing logging level.

37.3.2 apex.debug.error

Log an error message. The error function always writes the error regardless of the log level from the server or set with `apex.debug.setLevel`. Messages are written using the browsers built-in console logging if available. If supported `console.trace` is called. Older browsers may not support the console object or all of its features.

Parameters

Table 37-3 Parameters for debug.error

Name	Type	Description
...*	any	Any number of parameters logged to the console.

Example 1

This example writes the message "Update Failed" to the console.

```
apex.debug.error("Update Failed");
```

Example 2

This example writes an exception message to the console.

```
apex.debug.error("Exception: ", ex);
```

37.3.3 apex.debug.getLevel

Method that returns the debug log level. The debug log level is synchronized with hidden item "#pdebug".

Parameters

None

Returns

Returns logging level as an integer 1 to 9 or 0 to indicate debug logging is turned off.

Example

This example retrieves the logging level, prepends "Level" and logs to the console.

```
apex.debug.log("Level=", apex.debug.getLevel());
```

37.3.4 apex.debug.info

Log an informational message. Similar to `apex.debug.message` with the level set to INFO.

Parameters**Table 37-4 Parameters for debug.info**

Name	Type	Description
...*	any	Any number of parameters logged to the console.

Example

This example prints an informational message to the console if the log level is INFO or greater.

```
apex.debug.info("Command successful");
```

37.3.5 apex.debug.log

Log a message. Similar to `apex.debug.message` with the level set to the highest level.

Parameters**Table 37-5 Parameters for debug.log**

Name	Type	Description
...*	any	Any number of parameters logged to the console.

Example

This example gets the logging level and writes it to the console, regardless of the current logging level.

```
apex.debug.log("Level=", apex.debug.getLevel());
```

37.3.6 apex.debug.message

Log a message at the given debug log level. The log level set from the server or with `apex.debug.setLevel` controls if the message is actually written. If the set log level is \geq pLevel then the message is written. Messages are written using the browsers built-in

console logging if available. Older browsers may not support the console object or all of its features.

Parameters

Table 37-6 Parameters for debug.message

Name	Type	Description
pLevel	Number	A number from 1 to 9 where level 1 is most important and level 9 is least important. Can be one of the LOG_LEVEL constants. Any other value such as 0 will turn off debug logging.
...*	any	Any number of parameters logged to the console.

Example

This example writes the message "Testing" to the console if the logging level is greater than or equal to 7.

```
apex.debug.message(7, "Testing");
```

37.3.7 apex.debug.setLevel

Method that sets the debug log level. Log messages at or below the specified level are written to the console log. It is rarely necessary to call this function because the debug log level is synchronized with the hidden item #pdebug that comes from the server.

Parameters

Table 37-7 Parameters for debug.setLevel

Name	Type	Description
pLevel	Number	A number from 1 to 9 where level 1 is most important and level 9 is least important. Can be one of the LOG_LEVEL constants. Any other value such as 0 will turn off debug logging.

Example

This example sets the logging level to application tracing.

```
apex.debug.setLevel(apex.debug.LOG_LEVEL.APP_TRACE);
```

37.3.8 apex.debug.trace

Log a trace message. Similar to `apex.debug.message` with the level set to `APP_TRACE`.

Parameters

Table 37-8 Parameters for debug.trace

Name	Type	Description
...*	any	Any number of parameters logged to the console.

Example

This example writes a log message to the console if the debug log level is `APP_TRACE` or greater.

```
apex.debug.trace("Got click event: ", event);
```

37.3.9 apex.debug.warn

Log a warning message. Similar to `apex.debug.message` with the level set to `WARN`.

Parameters

Table 37-9 Parameters for debug.warn

Name	Type	Description
...*	any	Any number of parameters logged to the console.

Example

This example writes a warning message to the console if the debug log level is `WARN` or greater.

```
apex.debug.warn("Empty string ignored");
```

37.4 apex.event namespace

The `apex.event` namespace stores all event related functions of Oracle Application Express.

- [apex.event.trigger](#) (page 37-8)

37.4.1 apex.event.trigger

Given a jQuery selector, jQuery object or DOM Node the specified `pEvent` is triggered. `pEvent` can be a browser event like "click" or "change" but also a custom event like "slidechange". This function should only be used to trigger events that are handled by the dynamic action framework. Otherwise, custom events registered by plug-ins installed in your application or any event that is already exposed in dynamic actions can be compromised.

Parameters

Table 37-10 apex.event.trigger

Name	Type	Description
pSelector	jQuery selector jQuery object DOM Node	Selector for which the event will be triggered.
pEvent	String	The name of the event.
pData	Object	Optional array of addition arguments to pass to the event.

Returns

Returns `true` if the event is canceled.

Boolean

37.5 apex.item

The `apex.item` API provides a single interface for item related functionality of Application Express. This API returns an Application Express item object, which can then be used to access item related functions and properties. Item objects can apply to either page items or column items. Page items are items on the page backed by session state in any region. Column items are created by region types such as Interactive Grid that support editable columns. The state of a column item, including its value, changes according to the editing context of the region.

- [apex.item](#) (page 37-10)
- [addValue](#) (page 37-10)
- [disable](#) (page 37-10)
- [displayValueFor](#) (page 37-11)
- [enable](#) (page 37-11)
- [getValidity](#) (page 37-12)
- [getValidationMessage](#) (page 37-12)
- [getValue](#) (page 37-13)
- [hide](#) (page 37-13)
- [isChanged](#) (page 37-14)
- [isDisabled](#) (page 37-15)
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- [Item Object Properties](#) (page 37-15)
- [setFocus](#) (page 37-16)
- [setStyle](#) (page 37-16)
- [setValue](#) (page 37-17)
- [show](#) (page 37-18)

- [apex.item.create](#) (page 37-19)

37.5.1 apex.item

This API returns an Application Express item object, which can then be used to access item related functions and properties.

Plug-in developers can override much of the behavior defined in the `apex.item` namespace, by calling `apex.item.create` with their overrides.

Parameters

Table 37-11 Parameters for pNd

Name	Type	Description
pNd	DOM Node String	Application Express item name or DOM node. This parameter can refer to either a page item or column item.

Returns

Returns the Application Express item object, which is used to access item specific functions. For example `getValue`, `setValue`, and so on.

Examples

This will not be used by itself, rather it is used to access item specific functions and properties, as documented in the following APIs

37.5.2 addValue

Adds a value to an Application Express item that supports multiple values.

Parameters

Table 37-12 Parameters for addValue

Name	Type	Description
pValue	String	The value to be added.

Examples

In this example, the page item called `P1_ITEM` will have the value `100` added to the values currently selected.

```
apex.item( "P1_ITEM" ).addValue('100') ;
```

37.5.3 disable

Disables the Application Express item value, taking into account the item type, making it unavailable for edit.

Parameters

None.

Examples

In this example, the page item called P1_ITEM will be disabled and unavailable for edit.

```
apex.item( "P1_ITEM" ).disable() ;
```

37.5.4 displayValueFor

Returns the display value corresponding to the value given by pValue for the Application Express item. If the item type does not have a display value distinct from the value then pValue is returned; meaning that the value is the display value. For item types that have a display value but don't have access to all possible values and display values then this function only works when pValue is the current value of the item. For the native items this only applies to item type Popup LOV, with the attribute Input Field = "Not Enterable, Show Display Value and Store Return Value. For item types such as select lists that have access to all their values, if pValue is not a valid value then pValue is returned.

Parameters**Table 37-13 Parameters displayValueFor**

Name	Type	Description
pValue	String	A valid value for this item.

Returns

The string display value corresponding to the given pValue as described above.

Example

This example gets a display value from a select list item called P1_ITEM and displays it in an alert.

```
alert( "The correct answer is: " +
apex.item( "P1_ITEM" ).displayValueFor( "APPLES" ) );
```

37.5.5 enable

Enables the Application Express item value, taking into account the item type, making it available for edit.

Parameters

None.

Examples

In this example, the page item called P1_ITEM will be enabled and available for edit.

```
apex.item( "P1_ITEM" ).enable() ;
```

37.5.6 getValidity

Return a `ValidityState` object as defined by the HTML5 constraint validation API for the Application Express item. If a plug-in item implements its own validation then the object may not contain all the fields defined by HTML5. At a minimum it must have the *valid* property. If the item doesn't support HTML5 validation then it is assumed to be valid.

This function does not actually validate the item value. For many item types the browser can do the validation automatically if you add HTML5 constraint attributes such as `pattern`. Validation can be done using the HTML5 constraint validation API.

Developers rarely have a need to call this function. It is used internally by the client side validation feature. Item Plug-in developers should ensure this function works with their plug-in.

Parameters

None.

Returns

A `ValidityState` object as described above.

Example

The following example displays a message in an alert dialog if the item called `P1_ITEM` is not valid.

```
var item = apex.item( "P1_ITEM" );
if ( !item.getValidity().valid ) {
    alert( "Error: " + item.getValidationMessage() );
}
```

37.5.7 getValidationMessage

Return a validation message if the Application Express item is not valid and empty string otherwise.

The message comes from the element's `validationMessage` property. An APEX extension allows specifying a custom message, which overrides the element's `validationMessage`, by adding a custom attribute named *data-valid-message*. If the item has this attribute then its value is returned if the item is not valid. As the name implies the text of the message should describe what is expected of valid input rather than what went wrong.

Parameters

None.

Returns

A validation message if the item is not valid and empty string otherwise.

Example

See the example for `getValidity` for an example of this function.

37.5.8 getValue

Returns the current value of an Application Express item on a page, taking into account the current item type. This does not return the item's current value from session state (although that could be the same), rather it will return the value as it is on the current page.

There are 2 related functions to `.getValue()`. `$v(pNd)` which returns an item's value, but in the format it will be posted. This will either be a single value, or if the item supports multiple values, will be a ':' colon separated list of values. There is also the `$v2(pNd)` function, which is just a shortcut to `.getValue()` and returns either a single value, or array of values.

Parameters

None.

Returns

Returns either a single string value or array of string values if the item supports multiple values (for example the 'Select List' with attribute 'Allow Multi Selection' set to 'Yes' or 'Shuttle' native item types).

Examples

In this example, the current value of the page item called `P1_ITEM` will be shown in an alert.

```
alert( "P1_ITEM value = " + apex.item( "P1_ITEM" ).getValue() );
```

37.5.9 hide

Hides the Application Express item value, taking into account the item type. When using the `.hide()` function, it is important to understand the following:

- If the item being hidden is rendered on a page using table layout (meaning the page references a page template with Grid Layout Type set to 'HTML Table'), and the call to hide has specified to hide the entire table row (`pHideRow = true`), then it is assumed that everything pertaining to the item is contained in that row, and the entire row will be hidden.
- If the item being hidden is rendered on a page using table layout, and the call to hide has specified not to hide the entire table row (`pHideRow = false`, or not passed), then the function will attempt to hide the item's label, where the FOR attribute matches the ID of the item.
- If the item being hidden is rendered on a page using grid layout (meaning the page references a page template with Grid Layout Type set to either 'Fixed Number of Columns', or 'Variable Number of Columns'), and the item references a Label template that includes a Field Container element with a known ID (so where the Field Container > Before Label and Item attribute includes an HTML element with `id="#CURRENT_ITEM_CONTAINER_ID#"`), then it is assumed that everything pertaining to the item is contained in the Field Container, and this will be hidden.
- If the item is a column item then just the column value is hidden. The exact behavior depends on the type of region. For example in Interactive Grid just the cell content is hidden not the whole column.

Parameters

Table 37-14 Parameters for hide

Name	Type	Description
pHideRow	Boolean	This parameter is optional. The default value is <code>false</code> . If <code>true</code> , hides the nearest containing table row (TR). This parameter is not supported for column items. Its behavior is undefined. Only applicable when item is on a page using table layout (meaning the page references a page template with Grid Layout Type set to 'HTML Table').

Examples

In this example, the page item called `P1_ITEM` will be hidden. If `P1_ITEM` is on a page using grid layout and the item references a Label template that includes a Field Container element with a known ID (as detailed above), then that container element will be hidden. Otherwise just the item and its corresponding label will be hidden.

```
apex.item( "P1_ITEM" ).hide();
```

In this example, the page item called `P1_ITEM`'s nearest containing table row (TR) will be hidden (as `pHideRow = true`). Hiding the entire table row should only be used on a page using table layout. If `P1_ITEM` is on a page using grid layout, then passing `pHideRow = true` will not work and could result in adverse consequence for the page layout, where an incorrect table row is wrongly hidden.

```
apex.item( "P1_ITEM" ).hide(true);
```

37.5.10 isChanged

Return `true` if the current value of the Application Express item has changed and `false` otherwise. Developers rarely have a need to call this function. It is used internally by the Warn on Unsaved Changes feature. Item Plug-in developers should ensure this function works so that the Warn on Unsaved Changes feature can support their plug-in.

Parameters

None.

Returns

`true` if the current value has changed and `false` otherwise.

Examples

The following example determines if the value of item `P1_ITEM` has been changed.

```
If ( apex.item( "P1_ITEM" ).isChanged() ) {
    // do something
}
```

37.5.11 isDisabled

Returns the disabled state of an item

Parameters

None.

Returns

`true` if the Application Express item is disabled and `false` otherwise.

Example

This example gets the value of an item but only if it is not disabled.

```
var value = null;
if ( !apex.item( "P1_ITEM" ).isDisabled() ) {
    value = apex.item( "P1_ITEM" ).getValue(); }
}
```

37.5.12 isEmpty

Returns `true` or `false` if an Application Express item is empty and considers any item value consisting of only whitespace including space, tab, or form-feed, as empty. This also respects if the item type uses a List of Values, and a 'Null Return Value' has defined in the List of Values. In that case, the 'Null Return Value' is used to assert if the item is empty.

Parameters

None.

Returns

`true` if the Application Express item is empty and `false` otherwise.

Examples

In this example, the call to `isEmpty()` determines if the page item called `P1_ITEM` is empty, and if so displays an alert.

```
if( apex.item( "P1_ITEM" ).isEmpty() ) {
    alert( "P1_ITEM empty!" );
}
```

37.5.13 Item Object Properties

An item object returned from `apex.item` has the properties given in the following table.

Parameters

Table 37-15 Item Object Properties

Name	Description
id	The id property of an Application Express item provides the id of the item DOM element.
node	The node property of an Application Express item provides the DOM element of the item. If the item is invalid then the value is <i>false</i> .

Example

The following code checks if the Application Express item `P1_OPTIONAL_ITEM` exists before setting its value. Use code similar to this if there is a possibility of the item not existing.

```
var item = apex.item( "P1_OPTIONAL_ITEM" );
if ( item.node ) {
    item.setValue( newValue );
}
```

37.5.14 setFocus

Places user focus on the Application Express item, taking into account how specific items are designed to receive focus.

Parameters

None.

Examples

In this example, user focus is set to the page item called `P1_ITEM`.

```
apex.item( "P1_ITEM" ).setFocus();
```

37.5.15 setStyle

Sets a style for the Application Express item, taking into account how specific items are designed to be styled.



Note:

Using `setStyle` is not a best practice. It is better to add or remove CSS classes and use CSS rules to control the style of items. Also keep in mind that the exact markup of native and plug-in items can change from one release to the next.

Parameters

Table 37-16 Parameters for `setStyle`

Name	Type	Description
<code>pPropertyName</code>	String	The CSS property name that will be set.
<code>pPropertyValue</code>	String	The value used to set the CSS property.

Example

In this example, the CSS property `color` will be set to `red` for the page item called `P1_ITEM`.

```
apex.item( "P1_ITEM" ).setStyle( "color", "red" );
```

37.5.16 setValue

Sets the Application Express item value, taking into account the item type. This function sets the current value of an Application Express item on the page, not the item's current value in session state. It also allows for the caller to suppress the 'change' event for the item being set, if desired.

See the `$(pNd, pValue, pDisplayValue, pSuppressChangeEvent)` function for a shortcut to `.setValue()`.

Parameters

Table 37-17 Parameters for `setValue`

Name	Type	Description
<code>pValue</code>	String Array	The value to be set. For items that support multiple values (for example a 'Shuttle'), an array of string values can be passed to set multiple values at once.
<code>pDisplayValue</code>	String	Optional parameter used to set the page item's display value, in the case where the return value is different. For example for the item type <code>Popup LOV</code> , with the attribute <code>Input Field = Not Enterable, Show Display Value and Store Return Value</code> , this value sets the Input Field. The value of <code>pValue</code> is then used to set the item's hidden return field.
<code>pSuppressChangeEvent</code>	Boolean	This parameter is optional. The default if not specified is <code>false</code> . Pass <code>true</code> to prevent the change event from being triggered, for the item being set.

Examples

In this example, the value of the page item called `P1_ITEM` will be set to `10`. As `pSuppressChangeEvent` has not been passed, the default behavior of the change event triggering for `P1_ITEM` will occur.

```
apex.item( "P1_ITEM" ).setValue( "10" );
```

In this example `P1_ITEM` is a Popup LOV page item with the attribute `Input Field = Not Enterable`, `Show Display Value` and `Store Return Value`, set to `Input Field`. The display value of `P1_ITEM` will be set to `SALES` and the hidden return value will be set to `10`. As `true` has been passed for the `pSuppressChangeEvent` parameter, the 'change' event will not trigger for the `P1_ITEM` item.

```
apex.item( "P1_ITEM" ).setValue( "10", "SALES", true );
```

37.5.17 show

Shows the Application Express item value, taking into account the item type. When using the `.show()` function, it is important to understand the following:

- If the item being shown is rendered on a page using table layout (meaning the page references a page template with `Grid Layout Type` set to 'HTML Table'), and the call to show has specified to show the entire table row (`pShowRow = true`), then it is assumed that everything pertaining to the item is contained in that row, and the entire row will be shown.
- If the item being shown is rendered on a page using table layout, and the call to show has specified not to show the entire table row (`pShowRow = false`, or not passed), then the function will attempt to show the item's label, where the `FOR` attribute matches the ID of the item.
- If the item being shown is rendered on a page using grid layout (meaning the page references a page template with `Grid Layout Type` set to either 'Fixed Number of Columns', or 'Variable Number of Columns'), and the item references a Label template that includes a Field Container element with a known ID (so where the `Field Container > Before Label` and `Item` attribute includes an HTML element with `id="#CURRENT_ITEM_CONTAINER_ID#"`), then it is assumed that everything pertaining to the item is contained in the Field Container, and this will be shown.
- If the item is a column item then just the column value is shown. The exact behavior depends on the type of region. For example in Interactive Grid just the cell content is shown not the whole column.

Parameters

Table 37-18 Parameters for show

Name	Type	Description
<code>pShowRow</code>	Boolean	This parameter is optional. The default if not specified is <code>false</code> . If <code>true</code> , shows the nearest containing table row (TR). This parameter is not supported for column items. Its behavior is undefined. Only applicable when item is on a page using table layout (meaning the page references a page template with <code>Grid Layout Type</code> set to 'HTML Table').

Examples

In this example, the page item called `P1_ITEM` will be shown. If `P1_ITEM` is on a page using grid layout and the item references a Label template that includes a Field Container element with a known ID (as detailed above), then that container element will be shown. Otherwise just the item and its corresponding label will be shown.

```
apex.item( "P1_ITEM" ).show();
```

In this example, the page item called P1_ITEM's nearest containing table row (TR) will be shown (as pShowRow = true). Showing the entire table row should only be used on a page using table layout. If P1_ITEM is on a page using grid layout, then passing pShowRow = true will not work and could result in adverse consequence for the page layout, where an incorrect table row is wrongly shown.

```
apex.item( "P1_ITEM" ).show(true);
```

37.5.18 apex.item.create

This function is only for item plug-in developers. It provides a plug-in specific implementation for the item. This is necessary to seamlessly integrate a plug-in item type with the built-in item related client-side functionality of Application Express.

Parameters

Table 37-19 apex.item.create Parameters

Name	Type	Description
pName	DOM Node String	Application Express page item name or DOM node. This parameter can refer to either a page item or column item.
pItemImpl	Object	<p>An object with properties that provide any functions needed to customize the Application Express item object behavior. The object returned by apex.item has default implementations for each of its functions that are appropriate for many page items particularly for items that use standard form elements. For each function of apex.item you should check if the default handling is appropriate for your item plug-in. If it isn't you can provide your own implementation of the corresponding function through this pItemImpl object. The default behavior is used for any functions omitted.</p> <p>pItemImpl can contain any of the following properties:</p> <ul style="list-style-type: none"> • displayValueFor(pValue) • enable() • getPopupSelector() • getValidity() • getValue() • setValue(pValue, pDisplayValue) • disable() • show() • hide() • isChanged() • isDisabled() • addValue() • nullValue() • setFocusTo • setStyleTo • afterModify() • loadingIndicator(pLoadingIndicator\$)

Table 37-20 Properties for the pltemImpl parameter

Name	Description
displayValueFor(pValue)	Specify a function that returns a string display value that corresponds to the given pValue.
enable()	<p>Specify a function for enabling the item, which overrides the default page item handling. This could be useful for example where the item consists of compound elements which also need enabling, or if the item is based on a widget that already has its own enable method that you want to reuse. Ensuring the item can enable correctly means certain item related client-side functionality of Application Express still works, for example when using the Enable action of a Dynamic Actions, to enable the item.</p> <p>Note: Even if this function is defined, the default handling always handles the logic associated with the <code>.afterModify()</code> function, so that is outside the scope of what a plug-in developer is concerned with.</p> <p>See the "enable (page 37-11)," for details on how to define this function.</p>
getPopupSelector()	<p>Specify a function that returns a CSS selector that locates the popup used by the item. Any plug-in item type that uses a popup (a div added near the end of the document that is positioned near the input item and floating above it) needs to provide a CSS selector that locates the top level element of the popup. This allows the item type to be used in the Interactive Grid region or any other region that needs to coordinate focus with the popup. The default implementation returns null.</p> <p>In addition the top level popup element must be focusable (have attribute <code>tabindex = -1</code>).</p> <p>For best behavior of a popup in the Interactive Grid. The popup should:</p> <ul style="list-style-type: none"> • have a way of taking focus • close on escape when it has focus • close when the element it is attached to loses focus • return focus to the element that opened the popup when it closes • manage its tab stops so they cycle in the popup or return to the element that opened the popup at the ends
getValidity()	<p>Specify a function that returns a validity object. The returned object must at a minimum have the Boolean <code>valid</code> property. It may include any of the properties defined for the HTML5 <code>ValidityState</code> object. The default implementation returns the validity object of the item element if there is one otherwise it returns <code>{ valid: true }</code>.</p> <p>See the "getValidity (page 37-12)" or details on how to define this function.</p>

Table 37-20 (Cont.) Properties for the pitemImpl parameter

Name	Description
getValue()	<p>Specify a function for getting the item's value, which overrides the default page item handling. Ensuring the item returns its value correctly means certain item related client-side functionality of Application Express still works, for example in Dynamic Actions to evaluate a When condition on the item, or when calling the JavaScript function \$v to get the item's value.</p> <p>See "getValue (page 37-13)," for details on how to define this function.</p>
setValue(pValue, pDisplayValue)	<p>Specify a function for setting the item's value, which overrides the default page item handling. Ensuring the item can set its value correctly means certain item related client-side functionality of Application Express still works, for example when using the Set Value action of a Dynamic Action to set the item's value, or when calling the JavaScript function \$s to set the item's value.</p> <p>Note: Even if this function is defined, the default handling always handles the logic associated with the <code>.afterModify()</code> function and the <code>pSuppressChangeEvent</code> parameter, so that is outside the scope of what a plug-in developer is concerned with.</p> <p>See the "setValue (page 37-17)," for details on how to define this function.</p>
disable()	<p>Specify a function for disabling the item, which overrides the default page item handling. This could be useful for example where the item consists of compound elements which also need disabling, or if the item is based on a widget that already has its own disable method that you want to reuse. Ensuring the item can disable correctly means certain item related client-side functionality of Application Express still works, for example when using the Disable action of a Dynamic Action to disable the item.</p> <p>Note: Even if this function is defined, the default handling always handles the logic associated with the <code>.afterModify()</code> function, so that is outside the scope of what a plug-in developer is concerned with.</p> <p>See the "disable (page 37-10)," for details on how to define this function.</p>
show()	<p>Specify a function for showing the item, which overrides the default page item handling. This is useful for example where the item consists of compound elements which also need showing, or if the item is based on a widget that already has its own show method that you want to reuse. Ensuring the item can show correctly means certain item related client-side functionality of Application Express still works, for example when using the Show action of a Dynamic Action, to show the item.</p> <p>See the "show (page 37-18)," for details on how to define this function.</p>

Table 37-20 (Cont.) Properties for the pitemImpl parameter

Name	Description
hide()	<p>Specify a function for hiding the item, which overrides the default page item handling. This could be useful for example where the item consists of compound elements which also needs hiding, or if the item is based on a widget that already has its own hide method that you want to reuse. Ensuring the item can hide correctly means certain item related client-side functionality of Application Express still works, for example when using the Hide action of a Dynamic Action, to hide the item.</p> <p>See the "hide (page 37-13)," for details on how this function should be defined.</p>
isChanged()	<p>Specify a function that returns <code>true</code> if the current value of the item has changed and <code>false</code> otherwise. This function allows the Warn on Unsaved Changes feature to work. The default implementation uses built-in functionality of HTML form elements to detect changes. If this function does not work correctly then changes to the plug-in item type value will not be detect and the user will not be warned when they leave the page.</p> <p>See the "isChanged (page 37-14)" for details on how this function should be defined.</p>
isDisabled()	<p>Specify a function that returns <code>true</code> if the item is disabled and <code>false</code> otherwise.</p>
addValue()	<p>Specify a function for adding a value to the item, where the item supports multiple values. Currently there is no client-side functionality of Application Express dependent on this. There is also no default page item handling.</p> <p>Note: Even if this function is defined, the default handling always handles the logic associated with the <code>.afterModify()</code> function, so that is outside the scope of what a plug-in developer is concerned with.</p> <p>See the "addValue (page 37-10)," for details on how this function should be defined.</p>

Table 37-20 (Cont.) Properties for the pitemImpl parameter

Name	Description
nullValue	<p>Specify a value that to be used to determine if the item is null. This is used when the item supports definition of a List of Values, where a developer can define a Null Return Value for the item and where the default item handling needs to know this in order to assert if the item is null or empty. This can be done by following these steps:</p> <ol style="list-style-type: none"> From the Render function in the plug-in definition, emit the value stored in <code>p_item.lov_null_value</code> as part of the item initialization JavaScript code that fires when the page loads. For example: <pre data-bbox="857 661 1453 1115"> /* Assumes that you have some JavaScript function called 'com_your_company_your_item' that accepts 2 parameters, the first being the name of the item and the second being an object storing properties (say pOptions) required by the item's client side code. */ apex_javascript.add_onload_code (p_code => 'com_your_company_your_item' apex_javascript.add_value(apex_plugin_util.page_item_names_to_jquery(p_item. name) ', {' apex_javascript.add_attribute('lovNullValue', p_item.lov_null_value, false, false) ');'); </pre> Then, in the implementation of <code>com_your_company_your_item(pName, pOptions)</code> you have the value defined for the specific item's Null Return Value in the <code>pOptions.lovNullValue</code> property. This can then be used in your call to <code>apex.widget.initPageItem</code>, to set the <code>nullValue</code> property. <p>Ensuring the <code>nullValue</code> property is set means certain item related client-side functionality of Application Express still works, for example, in Dynamic Actions to correctly evaluate an <code>is null</code> or <code>is not null</code> when condition on the item, or when calling the JavaScript function <code>apex.item(pNd).isEmpty()</code> to determine if the item is null.</p> <p>See the "isEmpty (page 37-15)", for further details of this API.</p>

Table 37-20 (Cont.) Properties for the `pltemlImpl` parameter

Name	Description
setFocusTo	<p>Specify the element to receive focus, when focus is set to the item using the <code>apex.item(pNd).setFocus()</code> API. This can be defined as either a jQuery selector, jQuery or DOM object which identifies the DOM element, or a function that returns a jQuery object referencing the element. This can be useful when the item consists of compound elements, and you do not want focus to go to the element that has an ID matching the item name, which is the default behavior. For example, the native item type <code>Popup LOV</code> when the attribute <code>Input Field</code> is set to <code>Not enterable</code>, <code>Show Display Value</code> and <code>Store Return Value</code> renders a disabled input field as the main element with an ID matching the item name and a popup selection icon next to the input. In this case, because you do not want focus to go to the disabled input, use the <code>setFocusTo</code> item property and set that to the popup selection icon.</p> <p>Ensuring the item sets focus correctly means certain item related client-side functionality of Application Express still works, for example when using the <code>Set Focus</code> action of a Dynamic Action to set focus to the item, when users follow the <code>Go to Error</code> link that displays in a validation error message to go straight to the associated item, or when the item is the first item on a page and the developer has the page level attribute <code>Cursor Focus</code> set to <code>First item on page</code>.</p> <p>See the "setFocus (page 37-16)," for further details of this API.</p>
setStyleTo	<p>Specify the element to receive style, when style is set to the item using the <code>apex.item(pNd).setStyle()</code> API. This can be defined as either a jQuery selector, jQuery- or DOM object which identifies the DOM element(s), or a function that returns a jQuery object referencing the element(s). This is useful when the item consists of compound elements, and you do not want style to be set to the element or just the element, that has an ID matching the item name which is the default behavior. Ensuring the item sets style correctly means certain item related client-side functionality of Application Express still works, for example when using the <code>Set Style</code> action of a Dynamic Action to add style to the item.</p> <p>Note: Even if this property is defined, the default handling still always handles the logic associated with the <code>.afterModify()</code> function, so that is outside the scope of what a plug-in developer is concerned with.</p> <p>See the <code>apex.item(pNd).setStyle()</code> documentation, for further details of this API.</p>
afterModify()	<p>Specify a function that is called after an item is modified. This is useful, for example as some frameworks such as jQuery Mobile need to be notified if widgets are modified, for example their value has been set, or they have been disabled in order to keep both the native and enhanced controls in sync. This callback provides the hook to do so.</p>

Table 37-20 (Cont.) Properties for the pitemImpl parameter

Name	Description
loadingIndicator(pLoadingIndicator\$)	<p>Specify a function that normalizes how the item's loading indicator is displayed during a partial page refresh of the item. This function must pass the pLoadingIndicator\$ parameter as the first parameter, which contains a jQuery object with a reference to the DOM element for the loading indicator. The function then adds this loading indicator to the appropriate DOM element on the page for the item, and also returns the jQuery object reference to the loading indicator, such that the framework has a reference to it, so it can remove it once the call is complete.</p> <p>This is used, for example, if the item is a Cascading LOV and the Cascading LOV Parent Item changes, or when setting the item's value by using one of the server-side Dynamic Actions such as Set Value - SQL Statement.</p>

Example

The following example shows a call to `apex.item.create(pNd, pItemImpl)` with all the available callbacks and properties passed. It is unlikely that any plug-in needs to supply every callback and property. This is just to illustrate the syntax.

```
apex.item.create( "P100_COMPANY_NAME", {
  displayValueFor: function( pValue ) {
    var lDisplayValue;
    // code to determine the display value for pValue
    return lDisplayValue;
  },
  enable: function() {
    // code that enables the item type
  },
  getPopupSelector: function() {
    return "<some CSS selector>";
  },
  getValidity: function() {
    var lValidity = { valid: true };
    if ( /* item is not valid */ ) {
      lValidity.valid = false;
    }
    return lValidity;
  },
  getValue: function() {
    var lValue;
    // code to determine lValue based on the item type.
    return lValue;
  },
  setValue: function( pValue, pDisplayValue ) {
    // code that sets pValue and pDisplayValue (if required), for the item type
  },
  disable: function() {
    // code that disables the item type
  },
  show: function() {
    // code that shows the item type
  },
  hide: function() {
```

```

        // code that hides the item type
    },
    isChanged: function() {
        var lChanged;
        // code to determine if the value has changed
        return lChanged;
    },
    addValue: function( pValue ) {
        // code that adds pValue to the values already in the item type
    },
    nullValue: "<null return value for the item>",
    setFocusTo: $( "<some jQuery selector>" ),
    setStyleTo: $( "<some jQuery selector>" ),
    afterModify: function(){
        // code to always fire after the item has been modified (value set,
        enabled, etc.)
    },
    loadingIndicator: function( pLoadingIndicator$ ){
        // code to add the loading indicator in the best place for the item
        return pLoadingIndicator$;
    }
});

```

37.6 apex.lang namespace

This namespace is used for localization related functions of Oracle Application Express.

- [apex.lang.addMessages](#) (page 37-26)
- [apex.lang.clearMessages](#) (page 37-27)
- [apex.lang.format](#) (page 37-27)
- [apex.lang.formatMessage](#) (page 37-28)
- [apex.lang.formatMessageNoEscape](#) (page 37-28)
- [apex.lang.formatNoEscape](#) (page 37-29)
- [apex.lang.getMessage](#) (page 37-29)

37.6.1 apex.lang.addMessages

Add messages for use by `getMessage` and the format functions. Can be called multiple times. Additional messages are merged. It is generally not necessary to call this function, because it is automatically called with all the application text messages that have Used in JavaScript set to Yes.

Parameters

Table 37-21 Parameters for `apex.lang.addMessages`

Name	Type	Description
<code>pMessages</code>	Object	An object whose properties are message keys and the values are localized message text.

Example

This example adds a message.

```
apex.lang.addMessages({
  APPLY_BUTTON_LABEL: "Apply"
});
```

37.6.2 apex.lang.clearMessages

Remove all messages.

Parameters

None.

Example

This example removes all messages.

```
apex.lang.clearMessages();
```

37.6.3 apex.lang.format

Same as formatMessage except the message pattern is given directly (already localized or isn't supposed to be). It is not a key. The replacement arguments are HTML escaped.

Parameters

Table 37-22 Parameters for apex.lang.format

Name	Type	Description
pPattern	String	The message pattern that contains one or more parameters %0 to %9.
...*	any	Optional replacement values one for each message parameter %0 to %9. Non string arguments are converted to strings.

Returns

The localized and formatted message text string.

Example

This example returns **Total cost: \$34.00** assuming the `orderTotal` variable equals **34.00**.

```
apex.lang.format("Total cost: ${0}", orderTotal);
```

37.6.4 apex.lang.formatMessage

Format a message. Parameters in the message %0 to %9 are replaced with the corresponding function argument. Use %% to include a single %. The replacement arguments are HTML escaped.

Parameters

Table 37-23 Parameters for apex.lang.formatMessage

Name	Type	Description
pKey	String	The key is used to lookup the localized message text as if with getMessage.
...*	any	Optional replacement values one for each message parameter %0 to %9. Non string arguments are converted to strings.

Returns

The localized and formatted message text string. If the key is not found then the key is returned.

Example

This example returns "Process 60% complete" when the `PROCESS_STATUS` message text is "Process %0%% complete" and the progress variable value is 60.

```
apex.lang.formatMessage("PROCESS_STATUS", progress);
```

37.6.5 apex.lang.formatMessageNoEscape

Same as `formatMessage` except the replacement arguments are not HTML escaped. They must be known to be safe or are used in a context that is safe. See ["apex.lang.formatMessage \(page 37-28\)"](#).

Parameters

Table 37-24 Parameters for apex.lang.formatMessageNoEscape

Name	Type	Description
pKey	String	The key is used to lookup the localized message text as if with getMessage.
...*	any	Optional replacement values one for each message parameter %0 to %9.

Returns

The localized and formatted message text string. If the key is not found then the key is returned.

Example

This example returns "You entered <ok>" when the CONFIRM message text is "You entered %0" and the inputValue variable value is "<ok>". Note this string must be used in a context where HTML escaping is done to avoid XSS vulnerabilities.

```
apex.lang.formatMessageNoEscape("CONFIRM", inputValue);
```

37.6.6 apex.lang.formatNoEscape

Same as format, except the replacement arguments are not HTML escaped. They must be known to be safe or are used in a context that is safe.

Parameters**Table 37-25 Parameters for apex.lang.formatNoEscape**

Name	Type	Description
pPattern	String	The message pattern that contains one or more parameters %0 to %9.
...*	any	Optional replacement values one for each message parameter %0 to %9.

Returns

The localized and formatted message text string. If the key is not found then the key is returned.

Example

This example returns "You entered <ok>" when the inputValue variable value is "<ok>". Note this string must be used in a context where HTML escaping is done to avoid XSS vulnerabilities.

```
apex.lang.formatNoEscape("You entered %0", inputValue);
```

37.6.7 apex.lang.getMessage

Return the message associated with the given key. The key is looked up in the messages added with addMessages.

Parameters**Table 37-26 Parameters for apex.lang.getMessage**

Name	Type	Description
pKey	String	The message key.

Returns

The localized message text string. If the key is not found then the key is returned.

Example

This example returns "OK" when the localized text for key `OK_BTN_LABEL` is "OK".

```
apex.lang.getMessage( "OK_BTN_LABEL" );
```

37.7 apex.message namespace

The `apex.message` namespace is used to handle client-side display and management of messages in Oracle Application Express.

- [apex.message.addVisibilityCheck](#) (page 37-30)
- [apex.message.alert](#) (page 37-31)
- [apex.message.clearErrors](#) (page 37-32)
- [apex.message.confirm](#) (page 37-32)
- [apex.message.hidePageSuccess](#) (page 37-33)
- [apex.message.setThemeHooks](#) (page 37-34)
- [apex.message.showErrors](#) (page 37-36)
- [apex.message.showPageSuccess](#) (page 37-38)
- [apex.message.TYPE](#) (page 37-38)

37.7.1 apex.message.addVisibilityCheck

This function is for APEX region plug-in developers. In order to navigate to items (page items or column items) that have an error (or anything else that can be in an error state), the error item must be visible before it is focused. Any region type that can possibly hide its contents should add a visibility check function using this method. Each function added is called for any region or item that needs to be made visible.

Syntax

```
apex.message.addVisibilityCheck( pFunction )
```

Parameters

Table 37-27 `apex.message.addVisibilityCheck`

Name	Type	Description
<code>pFunction</code>	Function	A function that is called with an element ID. The function should ensure that the element is visible if the element is managed or controlled by the region type that added the function.

Example

The following example explains a Region plug-in type called `Expander`, that can show or hide its contents and can contain page items. For purposes of example, this plug-in

adds a `t-Expander` class to its region element and also has an `expand` method available, to expand its contents.

This region should register a visibility check function as follows:

```
apex.message.addVisibilityCheck( function( id ) {
    var lExpander$ = $( "#" + id ).closest( "t-Expander" );

    // Check if lExpander$ is an 'expander' region
    if ( lExpander$.hasClass( "t-Expander" ) ) {

        // If so, expander region must show its contents
        lExpander$.expander( "expand" );
    }
});
```

37.7.2 apex.message.alert

This function displays an alert dialog with the given message and OK button. The callback function passed as the `pCallback` parameter is called when the dialog is closed. The dialog displays using the jQuery UI `Dialog` widget.

There are some differences between this function and a browser's built-in alert function:

- The dialog style will be consistent with the rest of the application.
- The dialog can be moved.
- The call to `apex.message.alert` does not block. Any code defined following the call to `apex.message.alert` will run before the user presses **OK**. Therefore code to run after the user closes the dialog must be done from within the callback, as shown in the example.

Note:

If either of the following two pre requisites are not met, the function falls back to using the browser's built-in alert:

- jQuery UI dialog widget code must be loaded on the page.
- The browser must be running in **Standards** mode. This is because if it is running in **Quirks** mode (as is the case with some older themes), this can cause issues with display position, where the dialog positions itself in the vertical center of the page, rather than the center of the visible viewport.

Syntax

```
apex.message.alert( pMessage, pCallback )
```

Parameters

Table 37-28 apex.message.alert

Name	Type	Description
pMessage	String	The message to display in the confirmation dialog.
pCallback	Function	Callback function called when dialog is closed.

Example

The following example displays an alert **Load complete**, then after the dialog closes executes the `afterLoad()` function.

This region should register a visibility check function as follows:

```
apex.message.alert( "Load complete.", function(){
    afterLoad();
});
```

37.7.3 apex.message.clearErrors

This function clears all the errors currently displayed on the page.

Syntax

```
apex.message.clearErrors()
```

Parameters

None

Example

The following example demonstrates clearing all the errors currently displayed on the page.

```
apex.message.clearErrors();
```

37.7.4 apex.message.confirm

This function displays a confirmation dialog with the given message and OK and Cancel buttons. The callback function passed as the `pCallback` parameter is called when the dialog is closed, and passes `true` if OK is pressed and `false` otherwise. The dialog displays using the jQuery UI `Dialog` widget.

There are some differences between this function and a browser's built-in alert function:

- The dialog style will be consistent with the rest of the application.
- The dialog can be moved.
- The call to `apex.message.confirm` does not block. Any code defined following the call to `apex.message.confirm` will run before the user presses **OK** or **Cancel**.

Therefore acting on the user's choice must be done from within the callback, as shown in the example.

Note:

If either of the following two pre requisites are not met, the function falls back to using the browser's built-in confirm:

- jQuery UI dialog widget code must be loaded on the page.
- The browser must be running in **Standards** mode. This is because if it is running in **Quirks** mode (as is the case with some older themes), this can cause issues with display position, where the dialog positions itself in the vertical center of the page, rather than the center of the visible viewport.

Syntax

```
apex.message.confirm( pMessage, pCallback )
```

Parameters

Table 37-29 apex.message.confirm

Name	Type	Description
pMessage	String	The message to display in the confirmation dialog.
pCallback	Function	Callback function called when dialog is closed. Function passes the following parameter: <ul style="list-style-type: none"> • OK Pressed: true if OK is pressed, false otherwise (if Cancel pressed, or the dialog was closed by some other means).

Example

The following example displays a confirmation message **Are you sure?**, and if **OK** is pressed executes the `deleteIt()` function.

This region should register a visibility check function as follows:

```
apex.message.confirm( "Are you sure?", function( okPressed ) {
    if( okPressed ) {
        deleteIt();
    }
});
```

37.7.5 apex.message.hidePageSuccess

This function hides the page-level success message.

 **Tip:**

As a theme developer, you can influence or override what happens when hiding a page-level success message. For more information, please refer to the `apex.message.setThemeHooks` function (specifically the `beforeHide` callback function, where you would need to check for `pMsgType === apex.message.TYPE.SUCCESS` to isolate when hiding a page-level success message).

Syntax

```
apex.message.hidePageSuccess()
```

Parameters

None

Example

The following example demonstrates hiding the page-level success message.

```
apex.message.hidePageSuccess();
```

37.7.6 apex.message.setThemeHooks

This function allows a theme to influence some behavior offered by the `apex.message` API. You can call this function from theme page initialization code.

Syntax

```
apex.message.setThemeHooks( pOptions )
```

Parameters**Table 37-30** `apex.message.setThemeHooks`

Name	Type	Description
<code>pOptions</code>	Object	An object with <code>pOptions</code> properties described in the following table.

Table 37-31 pOptions properties

Name	Type	Description
beforeShow	Function	<p>Callback function that will be called prior to the default show page-notification functionality. Optionally return <code>false</code> from the callback to completely override default show functionality. Callback passes the following parameters:</p> <ul style="list-style-type: none"> <code>pMsgType</code>: Identifies the message type. Use <code>apex.message.TYPE</code> to identify whether showing an error or success message <code>pElement\$</code>: jQuery object containing the element being shown.
beforeHide	Function	<p>Callback function that will be called prior to the default hide page-notification functionality. Optionally return <code>false</code> from the callback to completely override default hide functionality. Callback passes the following parameters:</p> <ul style="list-style-type: none"> <code>pMsgType</code>: Identifies the message type. Use <code>apex.message.TYPE</code> to identify showing an error or success message <code>pElement\$</code>: jQuery object containing the element being hidden.
closeNotificationSelector	String	<p>jQuery selector to identify the close buttons in notifications, defaults to that used by Universal Theme (<code>button.t-Button-closeAlert</code>). May be required by custom themes if you still want to have APEX handle the hide logic, and where messaging contains a close notification button with a different class.</p>

Example

The following example shows `beforeShow` and `beforeHide` callbacks defined. To add and remove an additional class `animate-msg` on the notification element, before the default show and hide logic. This will happen for success messages only by the quality of the check on `pMsgType`.

 **Note:**

The callbacks do not return anything, therefore the default show / hide behavior happens after the callback.

```
apex.message.setThemeHooks(
  beforeShow: function( pMsgType, pElement$ ){
    if ( pMsgType === apex.message.TYPE.SUCCESS ) {
      pElement$.addClass( "animate-msg" );
    }
  },
  beforeHide: function( pMsgType, pElement$ ){
    if ( pMsgType === apex.message.TYPE.SUCCESS ) {
      pElement$.removeClass( "animate-msg" );
    }
  }
});
```

37.7.7 apex.message.showErrors

This function displays all errors on the `apex.message` error stack. If you do not want to add to the stack, you must first call `clearErrors()`. Errors display using the current app's theme's templates. For page level messages (where `location = page`), error messages use markup from the page template's **Subtemplate > Notification** attribute. For item level messages (where `location = inline`), error messages use markup from the item's label template's **Error Display > Error Template** attribute.

 **Tip:**

Theme developers must ensure the following:

- To display errors for your theme, it must define both of the template attributes described above. In addition, for `inline` errors the label template must reference the `#ERROR_TEMPLATE#` substitution string in either the **Before Item** or **After Item** attributes of your label templates.
- As a theme developer, you can influence or override what happens when showing page-level errors. For more information, please refer to the `apex.message.setThemeHooks` function (specifically the `beforeShow` callback function, where you would need to check for `'pMsgType === apex.message.TYPE.ERROR'` to isolate when showing page level errors).

Syntax

```
apex.message.showErrors( pErrors )
```

Parameters

Table 37-32 apex.message.showErrors

Name	Type	Description
pErrors	Object or Array	An object, or array of objects with properties described in the following table

Table 37-33 pErrors

Name	Type	Description
type	String	Must pass <code>error</code> , although may support different notification types in the future.
location	String Array	Possible values are: <code>inline</code> , <code>page</code> or <code>[inline,page]</code> .
pageItem	String	Item reference where an <code>inline</code> error should display. Required when <code>location = inline</code> .
message	String	The error message.
unsafe	Boolean	Pass <code>true</code> so that the message will be escaped by <code>showErrors</code> . Pass <code>false</code> if the message is already escaped and does not need to be escaped by <code>showErrors</code> .

Examples

The following example first clears any existing errors displayed, and then displays two errors. To display the two errors, an array containing two error objects is passed to the `showErrors` call. The first error message is `Name is required!` and displays at both `page` level and `inline` with the item `P1_ENAME`. The second error messages is `Page error has occurred!` and displays just at `page` level. In both errors, the message text is considered safe and therefore will not be escaped.

```
// First clear the errors
apex.message.clearErrors();

// Now show new errors
apex.message.showErrors([
  {
    type:      "error",
    location:  [ "page", "inline" ],
    pageItem:  "P1_ENAME",
    message:   "Name is required!",
    unsafe:    false
  },
  {
    type:      "error",
    location:  "page",
```

```

        message:    "Page error has occurred!",
        unsafe:     false
    }
});

```

37.7.8 apex.message.showPageSuccess

This function displays a page-level success message. This clears any previous success messages displayed, and also assumes there are no errors and clears any errors previously displayed. Success messages display using the current app's theme's template. Specifically for page success messages, the markup from the page template's **Subtemplate > Success Message** attribute is used.

Tip:

As a theme developer, you can influence or override what happens when showing a page-level success message. For more information, refer to the `apex.message.setThemeHooks` function (specifically the `beforeShow` callback function, where you would need to check for `pMsgType === apex.message.TYPE.SUCCESS` to isolate when showing a page-level success message).

Syntax

```
apex.message.showPageSuccess( pMessage )
```

Parameters

Table 37-34 apex.message.showPageSuccess

Name	Type	Description
pMessage	String	The success message to display.

Example

The following example demonstrates a page-level success message `Changes saved!`.

```
apex.message.showPageSuccess( "Changes saved!" );
```

37.7.9 apex.message.TYPE

The `TYPE` property is an object that contains properties (constants) that can be useful when calling some `apex.message` APIs. For example `setThemeHooks`.

Properties

Table 37-35 apex.message.TYPE properties

Value	Description
SUCCESS: "success"	Identifies a success message
ERROR: "error"	Identifies an error message

Example

See [apex.message.setThemeHooks](#) (page 37-34) for an example of how this can be used.

37.8 apex.navigation namespace

The `apex.navigation` namespace contains popup and redirect related functions of Oracle Application Express.

- [apex.navigation.dialog](#) (page 37-39)
- [apex.navigation.dialog.cancel](#) (page 37-41)
- [apex.navigation.dialog.close](#) (page 37-41)
- [apex.navigation.dialog.fireCloseHandler](#) (page 37-42)
- [apex.navigation.dialog.registerCloseHandler](#) (page 37-42)
- [apex.navigation.openInNewWindow](#) (page 37-43)
- [apex.navigation.popup](#) (page 37-44)
- [apex.navigation.popup.close](#) (page 37-45)
- [apex.navigation.redirect](#) (page 37-46)

37.8.1 apex.navigation.dialog

Opens the specified page in a dialog. For mobile UI, the page is loaded using a role 'dialog' in a `mobile.changePage` call. For desktop UI, a modal page is loaded in an iframe using jQuery UI dialog widget. For desktop UI, a non-modal page is loaded in a popup browser window. The names `_self`, `_parent`, and `_top` should not be used. The window name is made unique so that it cannot be shared with other apps. Every effort is made to then focus the window.

Note:

Typically this API call is generated by the server when the page target is a modal page or by using `APEX_UTIL.PREPARE_URL`. At a minimum the url of the dialog page must be generated on the server so that the correct dialog checksum can be generated.

Parameters

Table 37-36 apex.navigation.dialog

Name	Type	Description
pUrl	String	The url of the page to load.
pOptions	Object	<p>Object to identify the attributes of the dialog, with the following properties:</p> <ul style="list-style-type: none"> • title - the title of the dialog. The default is the name of the page. • height - height of dialog content area, in pixels, default is 500. • width - width of window content area, in pixels, default 500. • maxWidth - maximum width of window content area, in pixels, default 1500. • modal - true or false. Default is true. • dialog_attributes - optional attribute, to allow the setting of any additional options supported by the underlying dialog implementation. <p>For example, to define jQuery UI Dialog attribute resizable:</p> <pre>resizable:false</pre> <p>See Also : See jQuery UI documentation of Dialog widget for all other available options for a modal dialog in a desktop user interface. http://api.jqueryui.com/</p> <p>See jQuery Mobile documentation of Dialog widget for all other available options for a modal dialog in a mobile user interface. http://jquerymobile.com/</p>
pCssClasses	String	To identify the CSS classes, if any, to be applied to the dialog, and appended on to the dialogClass attribute.
pTriggeringElement	String	jQuery selector to identify APEX page element opening the dialog.

Example

```
apex.navigation.dialog(url, {
  title:'About',
  height:'480',
  width:'800',
  maxWidth:'1200',
  modal:true,
  resizable:false },
'a-Dialog--uiDialog',
'#myregion_static_id');
```

37.8.2 apex.navigation.dialog.cancel

Closes the dialog window.

Parameters**Table 37-37** apex.navigation.dialog.cancel

Name	Type	Description
pIsModal	Boolean	To identify whether the dialog is modal.

37.8.3 apex.navigation.dialog.close

Executes an action and then closes the dialog window.

Parameters**Table 37-38** apex.navigation.dialog.close

Name	Type	Description
pIsModal	Boolean	To identify whether the dialog is modal.
pAction	String, Function, Object	This can be: <ul style="list-style-type: none"> a URL which will trigger a redirect in the parent page a function to redirect to a different dialog page false to cancel the dialog an object of page items and values which will be exposed in the 'Dialog Closed dynamic action event

Example

To handle chaining from one modal dialog page to another:

```

apex.navigation.dialog.close(true, function( pDialog ) {
    apex.navigation.dialog(url, {
        title:'About',
        height:'480',
        width:'800',
        maxWidth:'1200',
        modal:true,
        dialog:pDialog,
        resizable:false },
        'a-Dialog--uiDialog',
        '#myregion_static_id');
    });

```

37.8.4 apex.navigation.dialog.fireCloseHandler

Fires the internal `close` event of a dialog which was registered with the `registerCloseHandler` when the dialog was opened.

Parameters

Table 37-39 apex.navigation.dialog.fireCloseHandler

Name	Type	Description
<code>pOptions</code>	Object	<p><code>pOptions</code> has to contain the following attributes:</p> <ul style="list-style-type: none"> "handler\$" jQuery object where the event will be registered for. "dialog" DOM/jQuery/... object of the current dialog instance which will be passed into the open dialog call if the existing dialog should be re-used. "closeFunction" Function which is used to close the dialog.

37.8.5 apex.navigation.dialog.registerCloseHandler

Registers the internal "close" event of a dialog. The event will be triggered by `fireCloseEvent` and depending on the passed in `pAction`, it will:

- Re-use the existing dialog and navigate to a different dialog page
- Navigate to a different page in the caller
- Cancel the dialog
- Close the dialog and trigger the "apexafterclosedialog" event

Parameters

Table 37-40 apex.navigation.dialog.registerCloseHandler

Name	Type	Description
pOptions	Object	<p>pOptions has to contain the following attributes :</p> <ul style="list-style-type: none"> "handler\$" jQuery object where the event will be registered for. "dialog" DOM/jQuery/... object of the current dialog instance which will be passed into the open dialog call if the existing dialog should be re-used. "closeFunction" Function which is used to close the dialog.

37.8.6 apex.navigation.openInNewWindow

Opens the given url in a new named window or tab (the browser / browser user preference settings may control if a window or tab is used). If a window with that name already exists it is reused. The names `_self`, `_parent` and `_top` should not be used. The window name is made unique so that it cannot be shared with other apps. Every effort is made to then focus the window.

 Note:

Firefox and IE will not focus a tab if that tab is not the currently active tab in its browser window. This is why, unless `favorTabbedBrowsing` is `true`, this API forces the url to open in a new window so that it has a better chance of being focused.

 Note:

For Opera, the Advanced/content > JavaScript Options: "Allow raising of windows" must be checked in order for focus to work.

 Note:

To avoid being suppressed by a popup blocker, call this from a click event handler on a link or button.

Parameters

Table 37-41 apex.navigation.openInNewWindow

Name	Type	Description
pUrl	String	The url of the page to load.
pWindowName	String	The name of the window (optional) The default is "_blank"
pOptions	Object	Optional object with the following properties: <ul style="list-style-type: none">favorTabbedBrowsing - {Boolean} if true don't try to force a new window for the benefit of being able to focus it. This option only affects Firefox and IE.

Returns

Returns the window object of the named window or null if for some reason the window isn't opened.

Example

```
apex.navigation.openInNewWindow(url, "MyWindow");
```

37.8.7 apex.navigation.popup

Opens the given url in a new typically named popup window. If a window with that name already exists it is reused. If no name is given or the name is "_blank" then a new unnamed popup window is opened. The names _self, _parent and _top should not be used. The window name is made unique so that it cannot be shared with other applications.

Note:

To avoid being suppressed by a popup blocker, call this from a click event handler on a link or button.

Parameters

Table 37-42 apex.navigation.popup

Name	Type	Description
pOptions	Object	<p>An object with the following optional properties:</p> <ul style="list-style-type: none"> url - the page url to open in the window. The default is "about:blank". name - the name of the window. The default is "_blank", which opens a new unnamed window. height - height of window content area in pixels. Default 600. width - width of window content area in pixels. Default 600. scroll - "yes" or "no". Default is "yes". resizeable - "yes" or "no". Default is "yes". toolbar - "yes" or "no". Default is "no". location - "yes" or "no". Default is "no". statusbar - "yes" or "no". Default is "no". This controls the status feature. menubar - "yes" or "no". Default is "no".

Example

```
apex.navigation.popup ({
  url: "about:blank",
  name: "_blank",
  width: 400,
  height: 400,
  scroll: "no",
  resizable: "no",
  toolbar: "yes" });
```

37.8.8 apex.navigation.popup.close

Sets the value of the item (pItem) in the parent window, with (pValue) and then closes the popup window.

Parameters

Table 37-43 apex.navigation.popup.close

Name	Type	Description
pItem	DOM node string ID	The item to set.
pValue	string	The item value to set.

37.8.9 apex.navigation.redirect

Opens the specified page (`pWhere`) in the current window.

Parameters

Table 37-44 apex.navigation.redirect

Name	Type	Description
pWhere	String	The url of the page to open in the current window.

37.9 apex.page namespace

This namespace is used for all client-side page related functions of Oracle Application Express.

- [apex.page.cancelWarnOnUnsavedChanges](#) (page 37-46)
- [apex.page.confirm Signature 1](#) (page 37-47)
- [apex.page.confirm Signature 2](#) (page 37-47)
- [apex.page.submit Signature 1](#) (page 37-48)
- [apex.page.submit Signature 2](#) (page 37-49)
- [apex.page.validate](#) (page 37-50)
- [apex.page.isChanged](#) (page 37-51)
- [apex.page.warnOnUnsavedChanges](#) (page 37-51)

37.9.1 apex.page.cancelWarnOnUnsavedChanges

Call to remove the handler that checks for unsaved changes. This is useful to do before any kind of cancel operation where the user is intentionally choosing to loose the changes. It is not normally necessary to call this function because the declarative attribute `Warn on Unsaved Changes` with value `Do Not Check` will do it automatically. Adding the class `js-ignoreChange` to a link (anchor element) or button will cause this function to be called before the link or button action.

Parameters

None.

Example

The following sets up a handler on a custom cancel button that leaves the page without checking for changes.

```
apex.jQuery( "#custom-cancel-button" ).click( function() {
    apex.page.cancelWarnOnUnsavedChanges();
    apex.navigation.redirect( someUrl );
});
```

37.9.2 apex.page.confirm Signature 1

Displays a confirmation dialog showing a message, `pMessage`, and depending on user's choice, submits the page setting the request value to `pRequest`, or does not submit the page. Once the user chooses to submit the page the behavior is the same as for the `apex.page.submit` function. The shorter alias for this function `apex.confirm` with the same parameters can also be used.

Parameters

Table 37-45 apex.page.confirm Signature 1 Parameters

Name	Type	Description
<code>pMessage</code>	String	The confirmation message to display in the dialog.
<code>pRequest</code>	String	The request value.

Example

This example shows a confirmation dialog with the text 'Delete Department'. If the user chooses to proceed with the delete, the current page is submitted with a REQUEST value of 'DELETE'.

```
apex.page.confirm('Delete Department', 'DELETE');
```

or

```
apex.confirm('Delete Department', 'DELETE');
```

37.9.3 apex.page.confirm Signature 2

Displays a confirmation dialog showing a message, `pMessage`, and depending on user's choice, submits the page according to the options in `pRequest`, or does not submit the page. Once the user chooses to submit the page the behavior is the same as for the `apex.page.submit` function. The shorter alias for this function `apex.confirm` with the same parameters can also be used.

Parameters

Table 37-46 apex.page.confirm Signature 2 Parameters

Name	Type	Description
<code>pMessage</code>	String	The confirmation message to display in the dialog.

Table 37-46 (Cont.) apex.page.confirm Signature 2 Parameters

Name	Type	Description
pOptions	Object	Options to control how the page is submitted. See “poptions properties” in apex.page.submit Signature 2 (page 37-49).

Example

This example shows a confirmation message with the 'Save Department?' text. If the user chooses to proceed with the save, the page is submitted with a `REQUEST` value of 'SAVE' and 2 page item values are set, `P1_DEPTNO` to 10 and `P1_EMPNO` to 5433.

```
apex.page.confirm("Save Department?", {
  request:"SAVE",
  set:{"P1_DEPTNO":10, "P1_EMPNO":5433}
});
```

or

```
apex.confirm("Save Department?", {
  request:"SAVE",
  set:{"P1_DEPTNO":10, "P1_EMPNO":5433}
});
```

37.9.4 apex.page.submit Signature 1

This function submits the page with the Application Express `REQUEST` value set to `pRequest`. The shorter alias for this function `apex.submit` with the same parameters can also be used. Depending on the value of the page's `Reload on Submit` attribute the page is submitted using ajax or with a normal form submission post request.

This function triggers a “`apexbeforepagesubmit`” event on the `apex.gPageContext$` which can be canceled. If canceled the page is not submitted.

Just before the page is submitted this function triggers a “`apexpagesubmit`” event on the `apex.gPageContext$` which cannot be canceled.

Parameters**Table 37-47 apex.page.submit Signature 1 Parameters**

Name	Type	Description
pRequest	String	The request value.

Example

Submits the current page with a `REQUEST` value of 'DELETE'.

```
apex.page.submit( 'DELETE' );
```

or

```
apex.submit( 'DELETE' );
```


37.9.5 apex.page.submit Signature 2

This function submits the page using the options specified in `pOptions`. The shorter alias for this function `apex.submit` with the same parameters can also be used. Depending on the value of the page's Reload on Submit attribute the page is submitted using ajax or with a normal form submission post request.

This function triggers a “`apexbeforepagesubmit`” event on the `apex.gPageContext$` which can be canceled. If canceled the page is not submitted.

Just before the page is submitted this function triggers a “`apexpagesubmit`” event on the `apex.gPageContext$` which cannot be canceled.

Parameters

Table 37-48 apex.page.submit Signature 2 Parameters

Name	Type	Description
<code>pOptions</code>	Object	Options to control how the page is submitted. See Table <code>pOptions</code> for each option property.

Table 37-49 pOptions properties

Name	Description
<code>request</code>	The <code>REQUEST</code> value. For a confirm function the default is “Delete” for a submit function the default is <code>null</code> .
<code>set</code>	An object containing name/value pairs of items to set on the page prior to submission. The object properties are page item names and the item value is set to the property value. The default is to not set any page items.
<code>showWait</code>	If <code>true</code> a 'Wait Indicator' spinner is displayed, which can be useful when running long page operations. The defaults is <code>false</code> .
<code>submitIfEnter</code>	If you only want to submit when the <code>ENTER</code> key has been pressed, call <code>apex.submit</code> in the event callback and pass the event object as this parameter.
<code>reloadOnSubmit</code>	Override the Reload on Submit setting of the page. One of “A” (always) or “S” (success).
<code>ignoreChange</code>	If <code>true</code> (the default) and the <code>warnOnUnsavedChanges</code> feature is enabled no warning will be given if there are changes. If <code>false</code> and the <code>warnOnUnsavedChanges</code> feature is enabled and there are changes there will be a warning. If <code>warnOnUnsavedChanges</code> feature is disabled there is never a warning.

Table 37-49 (Cont.) pOptions properties

Name	Description
validate	If <code>true</code> check the validity of page items and models before submitting the page. If anything is not valid then show an alert dialog and don't submit the page. The default is <code>false</code> .

Returns

If the `submitIfEnter` option is specified, a Boolean value is returned. If the ENTER key is not pressed, `true` is returned and if the ENTER key was pressed `false` is returned. If `submitIfEnter` is not been specified, nothing is returned.

Example

This example submits the page with a `REQUEST` value of 'DELETE' and 2 page item values are set, `P1_DEPTNO` to 10 and `P1_EMPNO` to 5433 . During submit a wait icon is displayed as visual indicator for the user as well.

```
apex.page.submit({
  request:"DELETE",
  set:{"P1_DEPTNO":10, "P1_EMPNO":5433},
  showWait: true
});
```

or

```
apex.submit({
  request:"DELETE",
  set:{"P1_DEPTNO":10, "P1_EMPNO":5433},
  showWait: true
});
```

37.9.6 apex.page.validate

Check if page items and submittable Application Express models on the page are valid. Any errors are shown inline using `apex.message.showErrors` function.

Parameters

None.

Returns

`true` if the page is valid and `false` otherwise.

Example

The following example checks if the page is valid when a button with id `checkButton` is pressed.

```
apex.jquery( "#checkButton" ).click( function() {
  if ( !apex.page.validate() ) {
    alert("Please correct errors");
  }
});
```

37.9.7 apex.page.isChanged

Return true if any page items or Application Express models on this page have changed since last being sent to the server. This will call the `pExtraIsChanged` function set in `apex.page.warnOnUnsavedChanges` if one was supplied and only if no other changes are found first.

Parameters

None.

Returns

true if any page items or Application Express models on the page have changed and false otherwise.

Example

The following example checks if the page is changed before performing some action.

```
If ( apex.page.isChanged() ) {  
    // do something when the page has changed  
}
```

37.9.8 apex.page.warnOnUnsavedChanges

Initialize a handler that checks for unsaved changes anytime the page is about to unload. This is safe to call multiple times. The `pMessage` and `pExtraIsChanged` override any previous values. This function is called automatically when the page attribute Warn on Unsaved Changes is set to yes. The main reason to call this manually is to customize the parameters.

Parameters

Table 37-50 apex.page.warnOnUnsavedChanges

Name	Type	Description
<code>pMessage</code>	String	Optional message to display in the warning dialog when there are unsaved changes. If not given a default message is used. Note: Not all browsers will show this message.

Table 37-50 (Cont.) apex.page.warnOnUnsavedChanges

Name	Type	Description
pExtraIsChanged	Function	Optional additional function to be called that checks if there are any unsaved changes. It should return <code>true</code> if there are unsaved changes and <code>false</code> otherwise. It is only called if there are no changes to any models or page items. This is useful if there are non-standard state-full inputs on the page that are not Application Express items and do not keep their state in an Application Express model. It allows writing a custom function to detect if those non-standard inputs have changed.

Example

The following example enables the warn on unsaved changes feature with a custom message.

```
apex.page.warnOnUnsavedChanges( "The employee record has been changed" );
```

37.10 apex.region

The `apex.region` API provides a single interface for all common region related functionality of Application Express. This API returns an Application Express region object, which is used to access region related functions and properties.

- [apex.region](#) (page 37-52)
- [apex.region.create](#) (page 37-55)
- [apex.region.destroy](#) (page 37-56)
- [apex.region.isRegion](#) (page 37-56)
- [apex.region.findClosest](#) (page 37-57)

37.10.1 apex.region

This API returns an Application Express region object for the given region id. The returned region object can then be used to access region related functions and properties.

Plug-in developers can define the behavior of their region by calling `apex.region.create`.

Parameters

Table 37-51 apex.region

Name	Type	Description
pRegionId	String	Region id or region static id. It is a best practice to give a region a Static ID if it is going to be used from JavaScript otherwise an internally generated id is used. The region id is substituted in the region template using the #REGION_STATIC_ID# string. The region id can be found by viewing the page source in the browser.

Returns

A region object is returned or null if there is no DOM element with an id equal to pRegionId. The region object has these properties and methods:

- [focus](#) (page 37-53)
- [refresh](#) (page 37-54)
- [widget](#) (page 37-54)

It may have additional properties or functions depending on the specific region. It is up to the region plug-in to document any additional properties or functions.

Example

This will not be used by itself, rather it is used to access item specific functions and properties, as documented in the following APIs.

- [focus](#) (page 37-53)
- [refresh](#) (page 37-54)
- [widget](#) (page 37-54)



See Also:

["apex.region.create" \(page 37-55\)](#)

37.10.1.1 focus

This region object function causes the Application Express region to take focus. Not all native or plug-in regions support taking focus. It is up to the specific region to determine where focus will go. The default behavior is to set focus to the first element in the region that is capable of being tabbed to. Some regions manage focus such that

there is a single tab stop (or limited number of tab stops) and they may put focus to where the user last had focus within the region.

Parameters

None.

Example

The following example will focus the region with static id "myRegion".

```
var region = apex.region( "myRegion" );  
region.focus();
```

37.10.1.2 refresh

This region object function refreshes the Application Express region. Typically this involves getting updated content or data from the server. Not all native or plug-in regions support refresh.



Note:

This function should be used in place of the legacy way of refreshing a region which was to trigger the `apexrefresh` event on the region element. For regions that still work this old way the default implementation of refresh will trigger the `apexrefresh` event.

Parameters

None.

Example

The following example will refresh the region with static id "myRegion".

```
var region = apex.region( "myRegion" );  
region.refresh();
```

37.10.1.3 widget

This region object function returns the widget associated with the Application Express region or null if the region isn't implemented with a widget. Some advanced region types such as Calendar, Interactive Grid, or Tree are implemented using a widget. This function provides access to the widget typically by returning a jQuery object for the widget element. You can then call widget methods on the jQuery object.

Parameters

None.

Example

The following example adds a row to an interactive grid by using the region widget function to access an `interactiveGrid` widget and then invoking the `add-row` action.

```
apex.region( "myGridRegion" ).widget().interactiveGrid( "getActions" ).invoke( "add-
row" )
```

37.10.2 apex.region.create

This function is only for region plug-in developers. It provides a plug-in specific implementation for the region.

Parameters

Table 37-52 apex.region.create

Name	Type	Description
pRegionId	String	Region id or region static id. It is a best practice to give a region a Static ID if it is going to be used from JavaScript otherwise an internally generated id is used. The region id is substituted in the region template using the #REGION_STATIC_ID# string. The region id can be found by viewing the page source in the browser.
pRegionImpl	Object	An object that provides the functions and properties for the region. It should provide a string type property. It can provide any additional functions that would be useful to developers. A default implementation is provided for any standard functions or properties omitted.

Example

The following is an example of what the region initialization code for a hypothetical region plug-in would do.

```
function initFancyList( pRegionId, ... ) {
    ...
    apex.region.create( pRegionId, {
        type: "FancyList",
        focus: function() {
            /* code to focus region */
        },
        refresh: function() {
            /* code to refresh region */
        }
    });
}
```

37.10.3 apex.region.destroy

This function is only for region plug-in developers. It will destroy and remove the behaviors associated with a region element. It does not remove the region element from the DOM. It is not necessary to call this function if the region will exist for the lifetime of the page. If the region is implemented by a widget that has a destroy method then this function can be called when the widget is destroyed.

Parameters

Table 37-53 apex.region.destroy

Name	Type	Description
pRegionId	String	Region id or region static id. It is a best practice to give a region a Static ID if it is going to be used from JavaScript otherwise an internally generated id is used. The region id is substituted in the region template using the #REGION_STATIC_ID# string. The region id can be found by viewing the page source in the browser.

Example

The following is an example of when the region is destroyed but the region element will remain on the page call:

```
apex.region.destroy( someRegionId );
```

37.10.4 apex.region.isRegion

This function returns true if and only if there is a DOM element with id equal to pRegionId that has had a region created for it with apex.region.create. To support older regions that don't implement a region interface (by calling apex.region.create) the default implementation of apex.region will attempt to treat any DOM element with an id as if it were an Application Express region. This function allows you to distinguish true Application Express regions from arbitrary DOM elements.

Parameters

Table 37-54 apex.region.isRegion

Name	Type	Description
pRegionId	String	Region id or region static id. It is a best practice to give a region a Static ID if it is going to be used from JavaScript otherwise an internally generated id is used. The region id is substituted in the region template using the #REGION_STATIC_ID# string. The region id can be found by viewing the page source in the browser.

Returns

true if pRegionId is the id of an Application Express region that implements the region interface and false otherwise.

Example

The following example will only focus the region if it is an Application Express region.

```
if ( apex.region.isRegion( someId ) ) {
    apex.region( someId ).focus();
}
```

37.10.5 apex.region.findClosest

Returns the region that contains the pTarget element. Returns null if there is no pTarget element or if it is not in a region that has been initialized with a call to apex.region.create.

Parameters

Table 37-55 apex.region.findClosest

Name	Type	Description
pTarget	DOM Element String	A DOM element or CSS selector suitable as the first argument to the jQuery function.

Returns

A region object is returned or null if the element corresponding to pTarget is not inside a region. See the return value of apex.region for details about the region object.

Example

The following example will refresh the region that contains a button with class ".refresh-button" when it is clicked.

```
apex.jquery( ".refresh-button" ).click( function( event ) {  
    var region = apex.region.findClosest( event.target );  
    if ( region ) {  
        region.refresh();  
    }  
});
```

37.11 apex.server namespace

The `apex.server` namespace stores all Ajax functions to communicate with the server part of Oracle Application Express.

- [apex.server.loadScript](#) (page 37-58)
- [apex.server.plugin](#) (page 37-60)
- [apex.server.pluginUrl](#) (page 37-63)
- [apex.server.process](#) (page 37-64)
- [apex.server.url](#) (page 37-68)

37.11.1 apex.server.loadScript

This API is used to asynchronously load other JavaScript libraries that has Asynchronous Module Definition (AMD), and if `RequireJS` library is already loaded on the page.

Syntax

```
apex.server.loadScript( pConfig, callback )
```

Parameters

Table 37-56 apex.server.loadScript

Name	Type	Description
pConfig	object	JSON objects contains the following attributes: <ul style="list-style-type: none"> “path” - {String} the location of the file. “requirejs” - {Boolean} whether to use requirejs to load this file. “global” - {String} the global name introduced by this files and the existing one is overwritten. Leave this option empty if the file is generated by RequireJS optimizer.
callback	object	Function to be executed once script is loaded.

Returns

Returns a function.

Examples

The following example loads a regular library that does not need `RequireJS`:

```
apex.server.loadScript ({
  "path": "./library_1.js"
}, function() {
  console.log( 'library_1 is ready.' );
});
```

The following example loads a library that requires `RequireJS` and creates own namespace: "myModule":

```
apex.server.loadScript ({
  "path": "./library_2.js",
  "requirejs": true,
  "global": "myModule"
}, function() {
  console.log( myModule );
});
```

The following example loads a concatenated libraries generated by `RequireJS` Optimizer, assuming `requireJS` is already on the page:

```
apex.server.loadScript ({
  "path": "./library_all.js",
  "requirejs": true
}, function() {
  console.log( myModule_1, myModule_2 ... );
});
```

37.11.2 apex.server.plugin

This function calls the PL/SQL Ajax function that has been defined for a plug-in. This function is a wrapper of the `jQuery.ajax` function that supports a subset of the `jQuery.ajax` options plus additional Application Express specific options.

The plug-in PL/SQL Ajax function is identified using the value returned by the PL/SQL package `apex_plugin.get_ajax_identifier`. There are two ways to provide the plug-in Ajax identifier:

1. Provide the `pAjaxIdentifier` as the first argument
2. Provide information about the region(s) including the `ajaxIdentifier` in the `pData` object structure. See `pData` description for details.

Syntax

```
apex.server.plugin( pAjaxIdentifier, pData, pOptions ) → Promise
```

Parameters

Table 37-57 apex.server.plugin

Name	Type	Description
<code>pAjaxIdentifier</code>	String	Optional. The plug-in ajax identifier. If not given then <code>pData</code> must include a <code>regions</code> array that includes a region with property <code>ajaxIdentifier</code> .
<code>pData</code>	Object	Optional object containing data to send to the server in the Ajax request. The Object is serialized as JSON and sent to the server in parameter <code>p_json</code> . See below <code>pData</code> special properties table for a list of properties that are treated special. Data for specific regions can be sent in the following format: <pre> { "regions": [{ "id": <region-id-or-static-id>, "ajaxIdentifier": <ajaxIdentifier>, <any other data specific to the region plug-in> }], ...] } </pre>
<code>pOptions</code>	Object	Optional object that is used to set additional options to control the Ajax call including before and after processing. See below <code>pOptions</code> properties table for a list of Application Express specific options. See jQuery documentation of <code>jQuery.ajax</code> for these supported options: <code>accepts</code> , <code>dataType</code> , <code>beforeSend</code> , <code>contents</code> , <code>converters</code> , <code>dataFilter</code> , <code>headers</code> , <code>complete</code> , <code>statusCode</code> , <code>error</code> , <code>success</code> . The <code>dataType</code> option defaults to <code>json</code> . The <code>async</code> option is deprecated and will be removed in a future release. http://docs.jquery.com/

Table 37-58 pData special properties

Name	Type	Description
pageItems	String jQuery DOM element Array	Identifies the page or column items that will be included in the request. It can be a jQuery selector, jQuery or DOM object or array of item names. These items will be made available in session state on the server. If pageItems contains column items then pOptions should include the target property so that the region session state context can be determined.
x01 - x10	String	These properties are moved out of the p_json object and sent as x01 - x10 scalar parameters.
f01 - f20	String Array	These properties are moved out of the p_json object and sent as f01 - f20 array parameters.

Table 37-59 pOptions properties

Name	Type	Description
refreshObject	String jQuery DOM element	jQuery selector, jQuery or DOM object which identifies the DOM element on which the apexbeforerefresh and apexafterrefresh events are triggered. If this option is not supplied these events are not triggered.
refreshObjectData	Object Array	Only applies if refreshObject option is given. Specify data that is passed by the apexbeforerefresh and apexafterrefresh event triggering code, so that any handlers defined for these events can access this data. In Dynamic Actions defined for the Before Refresh Or After Refresh events, this can be accessed from JavaScript using the this.data property. For custom jQuery event handlers, this can be accessed through the pData parameter of the event handler.
clear	Function	JavaScript function used to clear the DOM after the apexbeforerefresh event is triggered and before the actual Ajax call is made.
loadingIndicator	String jQuery DOM object Function	Identifies the element(s) that will have a loading indicator (progress spinner) displayed next to it during the Ajax call. The element can be specified with a jQuery selector, jQuery or DOM object. loadingIndicator can also be a function which gets the loading Indicator as jQuery object and has to return the jQuery reference to the created loading indicator. For example: <pre>function(pLoadingIndicator) { return pLoadingIndicator.prependTo(apex.jQuery("td.shuttleControl", gShuttle)); }</pre>

Table 37-59 (Cont.) pOptions properties

Name	Type	Description
loadingIndicatorPosition	String	<p>Six options to define the position of the loading indicator displayed. Only considered if the value passed to <code>loadingIndicator</code> is not a function.</p> <ul style="list-style-type: none"> <code>before</code>: Displays before the DOM element(s) defined by <code>loadingIndicator</code>. <code>after</code>: Displays after the DOM element(s) defined by <code>loadingIndicator</code>. <code>prepend</code>: Displays inside at the beginning of the DOM element(s) defined by <code>loadingIndicator</code>. <code>append</code>: Displays inside at the end of the DOM element(s) defined by <code>loadingIndicator</code>. <code>centered</code>: Displays in the center of the DOM element defined by <code>loadingIndicator</code>. <code>page</code>: Displays in the center of the page.
queue	Object	<p>Object specifying the name of a queue and queue action. The name property specifies the name of the queue to add the request to. The action property can be one of the following:</p> <ul style="list-style-type: none"> <code>"wait"</code> This action is the default and is used to send requests one after the other. When the action is <code>wait</code> the request is added to the named queue. If there are no other requests in that queue in progress or waiting then this request is executed. Otherwise it waits on the named queue until the ones before it are complete. <code>"replace"</code> Action <code>replace</code> is used when this current request makes any previous requests on the named queue in progress or waiting obsolete or invalid. This current request aborts any in progress request and clears out any waiting requests on the named queue and then is executed. Waiting requests are rejected with status <code>"superseded"</code>. <code>"lazyWrite"</code> This action is used to throttle requests to the server to persist data. This should only be used to persist non critical data such as user interface settings or state. Use when the data may change frequently and only the last data values need to be saved. For example this is useful for persisting splitter position, or tree expansion and focus state etc. <p>The queue name is unique for each data unit. For example if you were saving the position of two different splitters use a unique name for each one so that latest update to one doesn't overwrite a previous lazy write of the other. When using <code>lazyWrite Queue</code> the <code>refreshObject</code>, <code>clear</code>, <code>loadingIndicator</code>, and <code>loadingIndicatorPosition</code> are most likely not useful because nothing is being loaded or refreshed.</p> <p>It is possible to mix requests with <code>wait</code> and <code>replace</code> actions on the same queue. The <code>lazyWrite</code> action should not be used with a queue name that is also used with <code>wait</code> and <code>replace</code> actions.</p>
target	String DOM element	<p>Target element (DOM element or jQuery Selector) that this request pertains to. This is used to get session state context from the enclosing region.</p>

Returns

Returns a promise object. The promise `done` method is called if the Ajax request completes successfully. This is called in the same cases as the success callback function in `pOptions`. The promise `fail` method is called if the Ajax request completes with an error including internally detected Application Express errors. This is called in

the same cases as the error callback function in `pOptions`. The promise also has an `always` method that is called after `done` and `error`. The promise is returned even when queue options are used. The promise is not a `jqXHR` object but does have an `abort` method. The `abort` method does not work for requests that use any queue options.

Example

This example demonstrates a call to `apex.server.plugin` sets the scalar value `x01` to `test` (which can be accessed from PL/SQL using `apex_application.g_x01`) and sets the page item's `P1_DEPTNO` and `P1_EMPNO` values in session state (using jQuery selector syntax). The `P1_MY_LIST` item is used as the element for which the `apexbeforerefresh` and `apexafterrefresh` events are fired. `P1_MY_LIST` is used as the element for which to display the loading indicator next to. The success callback is stubbed out and is used for developers to add their own code that fires when the call successfully returns. The value for `lAjaxIdentifier` must be set to the value returned by the server PL/SQL API `apex_plugin.get_ajax_identifier`.

The `pData` parameter to the success callback will contain any response returned by the plug-in PL/SQL Ajax function.

```
apex.server.plugin ( lAjaxIdentifier, {
  x01: "test",
  pageItems: "#P1_DEPTNO,#P1_EMPNO"
}, {
  refreshObject: "#P1_MY_LIST",
  loadingIndicator: "#P1_MY_LIST",
  success: function( pData ) {
    // do something here
  }
});
```

37.11.3 apex.server.pluginUrl

Returns the URL to issue a GET request to the PL/SQL Ajax function which has been defined for a plug-in.

Parameters

Table 37-60 apex.server.pluginUrl

Name	Type	Description
<code>pAjaxIdentifier</code>	String	Use the value returned by the PL/SQL package <code>apex_plugin.get_ajax_identifier</code> to identify your plug-in.
<code>pData</code>	Object	Optional object that is used to set additional values which are included into the URL. The special attribute <code>pageItems</code> which can be of type jQuery selector, jQuery or DOM object or array of item names identifies the page items which are included in the URL. You can also set additional parameters that the <code>apex.show</code> procedure provides (for example you can set the scalar parameters <code>x01</code> - <code>x10</code> and the arrays <code>f01</code> - <code>f20</code>).

Returns

Returns a string that is the URL to issue the GET request.

Example

This call to `apex.server.pluginUrl` returns a URL to issue a GET request to the PL/SQL Ajax function which has been defined for a plug-in, where the URL sets the scalar value `x01` to `test` (which can be accessed from PL/SQL using `apex_application.g_x01`) and will also set the page item's `P1_DEPTNO` and `P1_EMPNO` values in session state (using jQuery selector syntax). The value for `lAjaxIdentifier` must be set to the value returned by the server PL/SQL API `apex_plugin.get_ajax_identifier`.

```
var lUrl = apex.server.pluginUrl ( lAjaxIdentifier, {
  x01: "test",
  pageItems: "#P1_DEPTNO,#P1_EMPNO" } );
```

37.11.4 apex.server.process

This function calls a PL/SQL on-demand (Ajax callback) process defined on page or application level. This function is a wrapper of the `jQuery.ajax` function that supports a subset of the `jQuery.ajax` options plus additional Application Express specific options.

Syntax

```
apex.server.process( pName, pData, pOptions ) → Promise
```

Parameters

Table 37-61 apex.server.process

Name	Type	Description
<code>pName</code>	String	The name of the PL/SQL on-demand page or application process to call.
<code>pData</code>	Object	Optional object containing data to send to the server in the Ajax request. The Object is serialized as JSON and sent to the server in parameter <code>p_json</code> . See below <code>pData</code> table for a list of properties that are treated special. Data for specific regions can be sent in the following format: <pre> { "regions": [{ "id": <region-id-or-static-id>, "ajaxIdentifier": <ajaxIdentifier>, <any other data specific to the region plug-in> }, ...] }</pre>
<code>pOptions</code>	Object	Optional object that is used to set additional options to control the Ajax call including before and after processing. See <code>pOptions</code> table below for a list of Application Express specific options. See jQuery documentation of <code>jQuery.ajax</code> for these supported options: <code>accepts</code> , <code>dataType</code> , <code>beforeSend</code> , <code>contents</code> , <code>converters</code> , <code>dataFilter</code> , <code>headers</code> , <code>complete</code> , <code>statusCode</code> , <code>error</code> , <code>success</code> . The <code>dataType</code> option defaults to <code>json</code> . The <code>async</code> option is deprecated and will be removed in a future release.

Table 37-62 pData special properties

Name	Type	Description
pageItems	String jQuery DOM element Array	Identifies the page or column items that will be included in the request. It can be a jQuery selector, jQuery or DOM object or array of item names. These items will be made available in session state on the server. If pageItems contains column items then pOptions should include the target property so that the region session state context can be determined.
x01 - x10	String	These properties are moved out of the p_json object and sent as x01 - x10 scalar parameters.
f01 - f20	String Array	These properties are moved out of the p_json object and sent as f01 - f20 array parameters.

Table 37-63 pOptions properties

Name	Type	Description
refreshObject	String jQuery DOM element	jQuery selector, jQuery or DOM object which identifies the DOM element on which the apexbeforerefresh and apexafterrefresh events are triggered. If this option is not supplied these events are not triggered.
refreshObjectData	Object Array	Only applies if refreshObject option is given. Specify data that is passed by the apexbeforerefresh and apexafterrefresh event triggering code, so that any handlers defined for these events can access this data. In Dynamic Actions defined for the Before Refresh or After Refresh events, this can be accessed from JavaScript using the this.data property. For custom jQuery event handlers, this can be accessed through the pData parameter of the event handler.
clear	Function	JavaScript function used to clear the DOM after the apexbeforerefresh event is triggered and before the actual Ajax call is made.

Table 37-63 (Cont.) pOptions properties

Name	Type	Description
loadingIndicator	String jQuery DOM object Function	<p>Identifies the element(s) that will have a loading indicator (progress spinner) displayed next to it during the Ajax call. The element can be specified with a jQuery selector, jQuery or DOM object. loadingIndicator can also be a function which gets the loading Indicator as jQuery object and has to return the jQuery reference to the created loading indicator. For example:</p> <pre>function(pLoadingIndicator) { return pLoadingIndicator.prependTo(apex.jquery("td.shuttleControl", gShuttle)); }</pre>
loadingIndicatorPosition	String	<p>Six options to define the position of the loading indicator displayed. Only considered if the value passed to loadingIndicator is not a function.</p> <p>loadingIndicatorPosition - Six options to define the position of the loading indicator displayed. Only considered if the value passed to loadingIndicator is not a function.</p> <ul style="list-style-type: none"> • before: Displays before the DOM element(s) defined by loadingIndicator • after: Displays after the DOM element(s) defined by loadingIndicator • prepend: Displays inside at the beginning of the DOM element(s) defined by loadingIndicator • append: Displays inside at the end of the DOM element(s) defined by loadingIndicator • centered: Displays in the center of the DOM element defined by loadingIndicator • page: Displays in the center of the page.

Table 37-63 (Cont.) pOptions properties

Name	Type	Description
queue	Object	<p data-bbox="1024 342 1458 447">Object specifying the name of a queue and queue action. The name property specifies the name of the queue to add the request to.</p> <p data-bbox="1024 464 1458 516">The action property can be one of the following:</p> <ul data-bbox="1024 527 1458 1451" style="list-style-type: none"> <li data-bbox="1024 527 1458 810">• "wait" This action is the default and is used to send requests one after the other. When the action is wait the request is added to the named queue. If there are no other requests in that queue in progress or waiting then this request is executed. Otherwise it waits on the named queue until the ones before it are complete. <li data-bbox="1024 821 1458 1125">• "replace" Action replace is used when this current request makes any previous requests on the named queue in progress or waiting obsolete or invalid. This current request aborts any in progress request and clears out any waiting requests on the named queue and then is executed. Waiting requests are rejected with status "superseded". <li data-bbox="1024 1136 1458 1451">• "lazyWrite" This action is used to throttle requests to the server to persist data. This should only be used to persist non critical data such as user interface settings or state. Use when the data may change frequently and only the last data values need to be saved. For example this is useful for persisting splitter position, or tree expansion and focus state etc. <p data-bbox="1024 1461 1458 1776">The queue name is unique for each data unit. For example if you were saving the position of two different splitters use a unique name for each one so that latest update to one doesn't overwrite a previous lazy write of the other. When using lazyWrite Queue the refreshObject, clear, loadingIndicator, and loadingIndicatorPosition are most likely not useful because nothing is being loaded or refreshed.</p> <p data-bbox="1024 1787 1458 1921">It is possible to mix requests with wait and replace actions on the same queue. The lazyWrite action should not be used with a queue name that is also used with wait and replace actions.</p>

Table 37-63 (Cont.) pOptions properties

Name	Type	Description
target	String DOM element	Target element (DOM element or jQuery Selector) that this request pertains to. This is used to get session state context from the enclosing region.

Returns

A promise object is returned. The promise done method is called if the Ajax request completes successfully. This is called in the same cases as the success callback function in `pOptions`. The promise fail method is called if the Ajax request completes with an error including internally detected Application Express errors. This is called in the same cases as the error callback function in `pOptions`. The promise also has an always method that is called after done and error. The promise is returned even when queue options are used. The promise is not a `jqXHR` object but does have an abort method. The abort method does not work for requests that use any queue options.

Example

This example demonstrates a call to `apex.server.process` calls an on-demand process called `MY_PROCESS` and sets the scalar value `x01` to `test` (which can be accessed from PL/SQL using `apex_application.g_x01`) and sets the page item's `P1_DEPTNO` and `P1_EMPNO` values in session state (using jQuery selector syntax). The success callback is stubbed out so that developers can add their own code that fires when the call successfully returns.

Note: The `pData` parameter to the success callback contains the response returned from on-demand process.

```
apex.server.process ( "MY_PROCESS", {
    x01: "test",
    pageItems: "#P1_DEPTNO,#P1_EMPNO"
  },{
    success: function( pData ) {
        // do something here
    }
  } );
```

37.11.5 apex.server.url

This function returns the URL to issue a GET request to the current page.

Parameters

Table 37-64 apex.server.url

Name	Type	Optional/Required	Description
pData	Object	Optional	Object which can optionally be used to set additional values which are included into the URL. The special attribute <code>pageItems</code> which can be of type jQuery selector, jQuery or DOM object or array of item names identifies the page items which are included in the URL. You can also set additional parameters that the <code>apex.show</code> procedure provides (for example you can set the scalar parameters <code>x01 - x10</code> and the arrays <code>f01 - f20</code>).
pPage	String	Optional	Page ID of the current page, which can be optionally used to set the page ID in the URL being returned.

Returns

Returns the string URL to issue the GET request.

Example

This example demonstrates a call to `apex.server.url`. Returns a URL to issue a GET request to the DELETE function which has been defined for this page, where the URL sets the scalar value `x01` to `test` (which can be accessed from PL/SQL using `apex_application.g_x01`) and will also set the page item's `P1_DEPTNO` and `P1_EMPNO` values in session state (using jQuery selector syntax).

```
apex.server.url ({
  p_request: "DELETE",
  x01: "test",
  pageItems: "#P1_DEPTNO,#P1_EMPNO" });
```

37.12 apex.storage namespace

The `apex.storage` namespace contains all functions related browser storage features such as cookies and session storage.

- [About local and session storage](#) (page 37-70)
- [apex.storage.getCookie](#) (page 37-70)
- [apex.storage.hasLocalStorageSupport](#) (page 37-70)
- [apex.storage.getScopedLocalStorage](#) (page 37-71)
- [apex.storage.getScopedSessionStorage](#) (page 37-72)
- [apex.storage.hasSessionStorageSupport](#) (page 37-74)
- [apex.storage.setCookie](#) (page 37-74)

37.12.1 About local and session storage

Local storage and session storage, collectively known as web storage, are a browser feature that securely stores key value pairs associated with an origin (web site). The keys and values are strings. The amount of storage space for web storage is greater than that of cookies but it is not unlimited. Another advantage over cookies is that the key value pairs are not transmitted with each request.

Both local storage and session storage use the same API to set, get, and remove name value pairs. The difference is that session storage goes away when the browser session ends and local storage is available even when the browser restarts. Keep in mind that the browser is free to limit or delete data stored in local storage at the user's request. Unlike data stored on the server local storage is not shared between browsers on different machines or even different browsers on the same machine.

Because APEX supports multiple applications, multiple workspaces and even instances of the same application running in multiple workspaces there can arise conflicts with using web storage because all the apps from a single APEX instance (which is a single origin or web site) share the same web storage space. The `apex.storage.getScopedLocalStorage` and `apex.storage.getScopedSessionStorage` solve this problem by partitioning the storage into a scope based on application id an optionally additional information such as page id and region id. The scope is created by using a prefix on all the storage keys. This avoids conflicts when different apps or different instances of the same app use the same keys but it is not a secure partition. Consider this carefully before storing sensitive information in web storage.

37.12.2 apex.storage.getCookie

Returns the value of cookie name (`pName`).

Parameters

Table 37-65 apex.storage.getCookie

Name	Type	Description
<code>pName</code>	String	The name of the cookie.

Returns

The string value of the cookie.

37.12.3 apex.storage.hasLocalStorageSupport

Returns `true` if the browser supports the local storage API and `false` otherwise. Most modern browsers support this feature but some allow the user to turn it off.

Parameter

None.

Returns

`true` if the browser supports the local storage API and `false` otherwise.

37.12.4 apex.storage.getScopedLocalStorage

Returns a thin wrapper around the `localStorage` object that scopes all keys to a prefix defined by the `pOptions` parameter. If `localStorage` is not supported the returned object can be used but has no effect so it is not necessary test for support using `apex.storage.hasLocalStorageSupport` before calling this function.

Parameter

Table 37-66 apex.storage.getScopedLocalStorage

Name	Type	Description
<code>pOptions</code>	Object	An object that defines the scope of the local storage. This defines the storage key prefix used by the returned <code>localStorage</code> wrapper object. Refer to the following <code>pOptions</code> properties table.

Table 37-67 pOptions properties

Name	Type	Description
<code>prefix</code>	String	A static prefix string to add to all keys. The default is an empty string.
<code>useAppId</code>	Boolean	If <code>true</code> the application id will be included in the key The default is <code>true</code> .
<code>usePageId</code>	Boolean	If <code>true</code> the application page id will be included in the key. The default is <code>false</code> .
<code>regionId</code>	String	An additional string to identify a region or other part of a page.

Returns

A `localStorage` wrapper object. This object has the same properties and functions as the browser `Storage` interface.

Table 37-68 localStorage wrapper

Property	Description
<code>prefix</code>	APEX specific property. The prefix for this scoped storage object.
<code>length</code>	The number of items in the scoped storage object.
<code>key(n)</code>	Returns the <code>nth</code> key in the scoped storage object.

Table 37-68 (Cont.) localStorage wrapper

Property	Description
<code>getItem(key)</code>	Returns the value for the given key.
<code>setItem(key, data)</code>	Sets the value of the given key to data.
<code>removeItem(key)</code>	Removes the given key.
<code>clear:()</code>	Removes all keys from the scoped storage object.
<code>sync()</code>	APEX specific function. Use to ensure the length property is correct if keys may have been added or removed by means external to this object

Example

The following example creates a local storage object that scopes all the keys using a prefix “Acme” and the application id. It then sets and gets an item called “setting1”.

```
var myStorage = apex.storage.getScopedLocalStorage( {
    prefix: "Acme",
    useAppId: true
});
myStorage.setItem( "setting1", "on" );
setting = myStorage.getItem( "setting1" ); // returns "on"
```

37.12.5 apex.storage.getScopedSessionStorage

Returns a thin wrapper around the `sessionStorage` object that scopes all keys to a prefix defined by the `pOptions` parameter. If `sessionStorage` is not supported the returned object can be used but has no effect so it is not necessary test for support using `apex.storage.hasSessionStorageSupport` before calling this function.

Parameter**Table 37-69 apex.storage.getScopedSessionStorage**

Name	Type	Description
<code>pOptions</code>	Object	An object that defines the scope of the session storage. This defines the storage key prefix used by the returned <code>sessionStorage</code> wrapper object. Refer to the following <code>pOptions</code> properties table.

Table 37-70 pOptions properties

Name	Type	Description
<code>prefix</code>	String	A static prefix string to add to all keys. The default is an empty string.

Table 37-70 (Cont.) pOptions properties

Name	Type	Description
useAppId	Boolean	If <code>true</code> the application id will be included in the key. The default is <code>true</code> .
usePageId	Boolean	If <code>true</code> the application page id will be included in the key. The default is <code>false</code> .
regionId	String	An additional string to identify a region or other part of a page.

Returns

A `sessionStorage` wrapper object. This object has the same properties and functions as the browser `Storage` interface.

Table 37-71 sessionStorage

Property	Description
<code>prefix</code>	APEX specific property. The prefix for this scoped storage object.
<code>length</code>	The number of items in the scoped storage object.
<code>key(n)</code>	Returns the <code>n</code> th key in the scoped storage object.
<code>getItem(key)</code>	Returns the value for the given key.
<code>setItem(key, data)</code>	Sets the value of the given key to data.
<code>removeItem(key)</code>	Removes the given key.
<code>clear:()</code>	Removes all keys from the scoped storage object.
<code>sync()</code>	APEX specific function. Use to ensure the <code>length</code> property is correct if keys may have been added or removed by means external to this object

Example

The following example creates a session storage object that scopes all the keys using a prefix "Acme" and the application id. It then sets and gets an item called "setting1".

```
var myStorage = apex.storage.getScopedSessionStorage( {
    prefix: "Acme", useAppId: true
});
myStorage.setItem( "setting1", "on" );
setting = myStorage.getItem( "setting1" ); // returns "on"
```

37.12.6 apex.storage.hasSessionStorageSupport

Returns `true` if the browser supports the session storage API and `false` otherwise. Most modern browsers support this feature but some allow the user to turn it off.

Parameter

None.

Returns

`true` if the browser supports the session storage API and `false` otherwise.

37.12.7 apex.storage.setCookie

Sets a cookie (`pName`) to a specified value (`pValue`).

Parameters

Table 37-72 apex.storage.setCookie

Name	Type	Description
<code>pName</code>	String	The name of the cookie to set.
<code>pValue</code>	String	The value to set the cookie to.

37.13 apex.util namespace

`apex.util` namespace contains general utility functions of Oracle Application Express.

- [apex.util.escapeCSS](#) (page 37-74)
- [apex.util.escapeHTML](#) (page 37-75)
- [apex.util.showSpinner](#) (page 37-76)
- [apex.util.stripHTML](#) (page 37-76)
- [apex.util.applyTemplate](#) (page 37-77)
- [About apex.util.delayLinger](#) (page 37-79)
- [apex.util.delayLinger.start](#) (page 37-80)
- [apex.util.delayLinger.finish](#) (page 37-80)

37.13.1 apex.util.escapeCSS

Returns string `pValue` with any CSS meta-characters are escaped. Use this function when the value is used as in a CSS selector. Whenever possible constrain the value so that it cannot contain CSS meta-characters making it unnecessary to use this function.

Parameters

Table 37-73 apex.util.escapeCSS

Name	Type	Description
pValue	String	The string that may contain CSS meta-characters to be escaped.

Returns

The escaped string.

Example

This example escapes an element id that contains a (.) period character so that it finds the element with id = "my.id". Without using this function the selector would have a completely different meaning.

```
apex.jQuery( "#" + apex.util.escapeCSS( "my.id" ) );
```

37.13.2 apex.util.escapeHTML

Returns string pValue with any special HTML characters (&<>'"/>) escaped to prevent cross site scripting (XSS) attacks.

 **Note:**

This function should always be used when inserting untrusted data into the DOM.

Parameters

Table 37-74 apex.util.escapeHTML

Name	Type	Description
pValue	String	The string that may contain special HTML characters to be escaped.

Returns

The escaped string.

Example

This example appends text to a DOM element where the text comes from a page item called P1_UNTRUSTED_NAME. Data entered by the user cannot be trusted to not contain malicious markup.

```
apex.jQuery( "#show_user" ).append( apex.util.escapeHTML( $v("P1_UNTRUSTED_NAME") ) )
;
```

37.13.3 apex.util.showSpinner

Function that renders a spinning alert to show the user processing is taking place. Note that the alert is defined as an ARIA alert so that assistive technologies such as screen readers are alerted to the processing status.

Parameters

Table 37-75 util.showSpinner

Name	Type	Description
pContainer	Object	Optional jQuery selector, jQuery, or DOM object identifying the container within which you want to center the spinner. If not passed, the spinner will be centered on the whole page. The default is \$("body").
pOptions	Object	Optional object with the following options: - "alert" Alert text visually hidden, but available to assistive technologies. Defaults to Processing. The default is Processing.

Returns

jQuery object for the spinner.

Example

To show the spinner:

```
var lSpinner$ = apex.util.showSpinner( $( "#container_id" ) );
```

To remove the spinner:

```
lSpinner$.remove();
```

37.13.4 apex.util.stripHTML

Return string pText with all HTML tags removed.

Parameters

Table 37-76 apex.util.stripHTML

Name	Type	Description
pText	String	A string that may contain HTML markup that you want removed.

Returns

The input string with all HTML tags removed.

Example

This example removes HTML tags from a text string.

```
apex.util.stripHTML("Please <a href='www.example.com/ad'>click here</a>")
// result "Please click here"
```

37.13.5 apex.util.applyTemplate

This function applies data to a template. It processes the template string given in `pTemplate` by substituting values according to the options in `pOptions`. The template supports Application Express server style placeholder and item substitution syntax.

This function is intended to process Application Express style templates in the browser. However it doesn't have access to all the data that the server has. When substituting page items and column items it uses the current value stored in the browser not what is in session state on the server. It does not support the old non-exact substitutions (with no trailing dot e.g. `&ITEM`). It does not support the old column reference syntax that uses `#COLUMN_NAME#`. It cannot do `prepare_url` (this must be done on the server). Using a template to insert JavaScript into the DOM is not supported. The template after processing will have script tags removed.

The format of a template string is any text intermixed with any number of replacement tokens. Two kinds of replacement tokens are supported: placeholders and substitutions. Placeholders are processed first.

Placeholder syntax is:

```
#<placeholder-name>#
```

The `<placeholder-name>` is an uppercase alpha numeric plus `"_"`, and `"$"` string that must be a property name in option object placeholders that gets replaced with the property value. Any placeholder tokens that don't match anything in the placeholders object are left as is (searching for the next placeholder begins with the trailing `#` character).

Substitution syntax is (any of):

```
&<item-name>.
&<item-name>!<escape-filter>.
&"<quoted-item-name>".
&"<quoted-item-name>!<escape-filter>.
```

The `<item-name>` is an uppercase alpha numeric plus `"_"`, `"$"`, and `"#"` string. The `<quoted-item-name>` is a string of any characters except `"&"`, carriage return, line feed, and double quote. In both cases the item name is the name of a page item (unless option `includePageItems` is false), a column item (if model and record options are given), a built-in substitution (unless option `includeBuiltinSubstitutions` is false), or an extra substitution if option `extraSubstitutions` is given. If no replacement for a substitution can be found it is replaced with an empty string. When substituting a column item the given record of the given model is used to find a matching column name. If not found and if the model has a parent model then the parent model's columns are checked. This continues as long as there is a parent model. The order to resolve an item name is: page item, column item, column item from ancestor models, built-in substitutions, and finally extra substitutions. Column items support the `_LABEL` suffix to access the defined column label. For example if there is a column item named `NOTE` the substitution `&NOTE_LABEL.` will return the label string for column `NOTE`.

The built-in substitution names are:

- APP_ID
- APP_PAGE_ID
- APP_SESSION
- REQUEST
- DEBUG
- IMAGE_PREFIX

The escape-filter controls how the replacement value is escaped or filtered. It can be one of the following values:

- HTML the value will have HTML characters escaped.
- ATTR the value will be escaped for an HTML attribute context (currently the same as HTML)
- RAW does not change the value at all.
- STRIPHTML the value will have HTML tags removed and HTML characters escaped.

This will override any default escape filter set with option `defaultEscapeFilter` or from the column definition `escape` property.

Parameters

Table 37-77 `defaultEscapeFilter`

Name	Type	Description
<code>pTemplate</code>	String	A template string with the format described above.
<code>pOptions</code>	Object	An object that specifies how the template is to be processed. Refer to the following <code>pOptions</code> properties table.

Table 37-78 `pOptions` properties

Name	Description
<code>placeholders</code>	An object map of placeholder names to values. The default is <code>null</code> .
<code>defaultEscapeFilter</code>	One of the above escape-filter values. The default is HTML. This is the escaping/filtering that is done if the substitution token doesn't specify an escape-filter. If a model column definition has an <code>escape</code> property then it will override the default escaping.
<code>includePageItems</code>	If <code>true</code> the current value of page items are substituted. The default is <code>true</code> .
<code>model</code>	The Application Express model used to get column item values. The default is <code>null</code> .

Table 37-78 (Cont.) pOptions properties

Name	Description
record	The record in the model to get column item values from. Option model must also be provided. The default is <code>null</code> .
extraSubstitutions	An object map of extra substitutions. The default is <code>null</code> .
includeBuiltinSubstitutions	If <code>true</code> built-in substitutions such as <code>APP_ID</code> are done. The default is <code>true</code> .

Returns

A string that is the template with all the replacement tokens substituted.

Examples

This example inserts an image tag where the path to the image comes from the built-in `IMAGE_PREFIX` substitution and a page item called `P1_PROFILE_IMAGE_FILE`.

```
apex.jquery("#photo").html(
    apex.util.applyTemplate(
        "<img src='&IMAGE_PREFIX.people/&P1_PROFILE_IMAGE_FILE.'" ) );
```

This example inserts a div with a message where the message text comes from a placeholder called `MESSAGE`.

```
var options = { placeholders: { MESSAGE: "All is well" } };
apex.jquery("#notification").html( apex.util.applyTemplate( "<div>#MESSAGE#</div>",
    options ) );
```

37.13.6 About apex.util.delayLinger

The `delayLinger` singleton solves the problem of flashing progress indicators (such as spinners). For processes such as an Ajax request (and subsequent user interface update) that may take a while it is important to let the user know that something is happening. The problem is that if an async process is quick there is no need for a progress indicator. The user experiences the user interface update as instantaneous. Showing and hiding a progress indicator around an async process that lasts a very short time causes a flash of content that the user may not have time to fully perceive. At best this can be a distraction and at worse the user wonders if something is wrong or if they missed something important. Simply delaying the progress indicator doesn't solve the problem because the process could finish a short time after the indicator is shown. The indicator must be shown for at least a short but perceivable amount of time even if the request is already finished.

You can use this object to help manage the duration of a progress indication such as `apex.util.showSpinner` or with any other progress implementation. Many of the Oracle Application Express asynchronous functions such as the ones in the `apex.server` namespace already use `delayLinger` internally so you only need this API for your own custom long running asynchronous processing.

37.13.7 apex.util.delayLinger.start

Call this function when a potentially long running async process starts. For each call to start with a given `pScopeName`, you must make a corresponding call to finish with the same `pScopeName`. Calls with different `pScopeName` arguments will not interfere with each other.

Multiple calls to start for the same `pScopeName` before any calls to finish is allowed but only the `pAction` from the first call is called at most once.

Parameters

Table 37-79 apex.util.delayLinger.start Function Parameters

Name	Type	Description
<code>pScopeName</code>	String	Unique name for each unique progress indicator.
<code>pAction</code>	Function	Function called to display the progress indicator.

37.13.8 apex.util.delayLinger.finish

Call this function when a potentially long running async process finishes. For each call to start with a given `pScopeName`, you must make a corresponding call to finish with the same `pScopeName`. The `pAction` is called exactly once if and only if the corresponding start `pAction` was called. If there are multiple calls to finish, the `pAction` from the last one is called.

Parameters

Table 37-80 apex.util.delayLinger.finishFunction Parameters

Name	Type	Description
<code>pScopeName</code>	String	Unique name for each unique progress indicator
<code>pAction</code>	Function	Function to call to display the progress indicator

Example

```
var lSpinner$, lPromise;
lPromise = doLongProcess();
apex.util.delayLinger.start( "main", function() {
    lSpinner$ = apex.util.showSpinner( $( "#container_id" ) );
} );
lPromise.always( function() {
    apex.util.delayLinger.finish( "main", function() {
        lSpinner$.remove();
    } );
} );
```


37.14 apex.widget namespace

The `apex.widget` namespace stores all the general purpose widget related functions of Oracle Application Express.

- [apex.widget.initPageItem](#) (page 37-81)

37.14.1 apex.widget.initPageItem

This function provides backward compatibility for existing item plug-ins. New plug-ins should use `apex.item.create`.

37.15 Events

Application Express specific events are discussed in the following section. In most cases you will use Dynamic Actions to respond to browser and APEX specific events. This section is for advanced JavaScript programmers that want to use these events directly from their JavaScript code.

- [apexafterclosedialog](#) (page 37-81)
- [apexafterrefresh](#) (page 37-82)
- [apexbeforerefresh](#) (page 37-82)
- [apexbeforepagesubmit](#) (page 37-83)
- [apexbeginrecordedit](#) (page 37-83)
- [apexendrecordedit](#) (page 37-84)
- [apexpagesubmit](#) (page 37-85)
- [apexwindowresized](#) (page 37-85)

37.15.1 apexafterclosedialog

This event is triggered when an Application Express modal dialog page is closed by either the Dynamic Action Close Dialog action or the Close Dialog process. This is equivalent to the Dialog Closed Dynamic Action event. This event is triggered on the element that opened the dialog.

For buttons it is the button element. For links to dialog pages in lists it is the list region element. For lists used in global top or side navigation or in any other case where the triggering element cannot be determined the event is triggered on the document `apex.gPageContext$`. The event handler receives an object argument with these properties.

Table 37-81 `apexafterclosedialog`

Property	Type	Description
<code>dialogPageId</code>	String	The page number of the dialog page that closed.

Table 37-81 (Cont.) apexafterclosedialog

Property	Type	Description
*	String	For each page item listed in the Close Dialog process or dynamic action setting Items to Return there is a property with the same name as the item. The value is the value of the item.

**Note:**

This event is triggered in the parent or calling page not in the modal dialog page. If you want to know when the dialog is closed regardless of how it is closed use the jQuery UI dialogclose event.

Example

This example refreshes the region with static id `emp` when any modal dialog page closes.

```
apex.gPageContext$.on( "apexafterclosedialog", function( event, data ) {
    apex.region( "emp" ).refresh();
});
```

37.15.2 apexafterrefresh

This event is triggered by a number of page or column items just after they are refreshed with new content or data from the server. It is equivalent to the Dynamic Action event After Refresh. Specifically any item that supports the Cascading LOV Parent Item(s) attribute should trigger this event. This event can also be triggered by the `apex.server.plugin` and `apex.server.process` APIs if the `refreshObject` option is provided. The event is triggered on the item element or the element given by the `refreshObject`. The event handler receives the data given in `refreshObjectData` if any.

Example

This example disables the button with static id `B1` while any refresh is in progress.

```
apex.jquery( "body" ).on( "apexbeforerefresh", function() {
    apex.jquery( "#B1" ).prop( "disabled", true);
}).on( "apexafterrefresh", function() {
    apex.jquery( "#B1" ).prop( "disabled", false);
});
```

37.15.3 apexbeforerefresh

This event is triggered by a number of page or column items just before they are refreshed with new content or data from the server. It is equivalent to the Dynamic Action event Before Refresh. Specifically any item that supports the Cascading LOV

Parent Item(s) attribute should trigger this event. This event can also be triggered by the `apex.server.plugin` and `apex.server.process` APIs if the `refreshObject` option is provided. The event is triggered on the item element or the element given by the `refreshObject`. The event handler receives the data given in `refreshObjectData` if any.

Example

This example disables the button with static id `B1` while any refresh is in progress.

```
apex.jquery( "body" ).on( "apexbeforerefresh", function() {
    apex.jquery( "#B1" ).prop( "disabled", true);
}).on( "apexafterrefresh", function() {
    apex.jquery( "#B1" ).prop( "disabled", false);
});
```

37.15.4 apexbeforepagesubmit

This event is triggered when the page is submitted with `apex.submit` or `apex.confirm`. This includes buttons with action `Submit Page` and `Dynamic Action Submit Page` action. It is equivalent to the `Dynamic Action event Before Page Submit`. It is triggered before the page is validated. It is triggered on `apex.gPageContext$`, which is the document for Desktop UI pages and the page div for jQuery Mobile UI pages. This event can be canceled by a `Dynamic Action Confirm` or `Cancel Event` action so you cannot rely on the page actually being submitted. If you need code to run just before the page is actually submitted see the `apexpagesubmit` event.

The event handler should not do any long running or asynchronous processing. Specifically it should not make a synchronous or asynchronous Ajax request. The event handler receives a string argument that is the request value.

Example

This example performs an extra validation on page item `P1_CHECK_ME`. For this to work the `Submit` button `Execute Validations` attribute must be `Yes` and the application compatibility mode must be greater than or equal to 5.1 or the `validate` option to `apex.submit` or `apex.confirm` must be `true`.

```
apex.jquery( apex.gPageContext$ ).on( "apexbeforepagesubmit", function() {
    var item = apex.item("P1_CHECK_ME" ),
        value = item.getValue();
    if ( value !== "valid" ) { // replace with desired constraint check
        item.node.setCustomValidity( "Text field needs to be valid" );
    }else {
        item.node.setCustomValidity( "" );
    }
});
```

37.15.5 apexbeginrecordedit

This event is triggered when a region that supports column items such as `Interactive Grid` begins editing a record. In general it is simpler to use a `Dynamic Action` on a column item and set attribute `Fire on Initialization` to `Yes`. This is equivalent to the `Interactive Grid Row Initialization Dynamic Action` event.

It is triggered on the widget that is doing the editing. It is triggered after all the column items have been initialized. The event handler receives an object argument with these properties.

Table 37-82 apexbeginrecordedit

Property	Type	Description
recordId	String	The value of the primary key column. If there is more than one primary key then this is a serialized JSON array of primary key values.
model	Model	The model used by the region widget.
record	Array Object	The current record being edited. The record belongs to the model given in property model and should only be modified using the model API.



Note:

using the model or record requires using the undocumented `apex.model` API.

Example

This example responds to the `apexbeginrecordedit` event of an Interactive Grid, which edits the EMP table. The region was given a static id of `emp`. The SAL column was given a static id of `c_sal`.

```
apex.region( "emp" ).widget().on( "apexbeginrecordedit", function( event, data ) {
    var salary = apex.item( "c_sal" ).getValue();
    // use data.recordId or access any of the column items using apex.item API });
```

37.15.6 apexendrecordedit

This event is triggered when a region that supports column items such as Interactive Grid ends editing a record.

It is triggered on the widget that is doing the editing. It is triggered after all the model has been updated with any column item changes and the column items have been validated. The event handler receives an object argument with these properties.

Table 37-83 apexendrecordedit

Property	Type	Description
recordId	String	The value of the primary key column. If there is more than one primary key then this is a serialized JSON array of primary key values.

Table 37-83 (Cont.) apexendrecordedit

Property	Type	Description
model	Model	The model used by the region widget.
record	Array Object	The current record being edited. The record belongs to the model given in property model and should only be modified using the model API.

 **Note:**

using the model or record requires using the undocumented `apex.model` API.

Example

This example responds to the `apexendrecordedit` event of an Interactive Grid, which edits the EMP table. The region was given a static id of `emp`. The SAL column was given a static id of `c_sal`.

```
apex.region( "emp" ).widget().on( "apexendrecordedit", function( event, data ) {
    var salary = apex.item( "c_sal" ).getValue();
    // use data.recordId or access any of the column items using apex.item API });
```

37.15.7 apexpagesubmit

This event is triggered when the page is submitted with `apex.submit` or `apex.confirm`. This includes buttons with action Submit Page and Dynamic Action Submit Page action. It is triggered after the page is validated. It is triggered on `apex.gPageContext$`, which is the document for Desktop UI pages and the page div for jQuery Mobile UI pages. This event is the last chance to set or modify page items before the page is submitted.

The event handler should not do any long running or asynchronous processing. Specifically it should not make a synchronous or asynchronous Ajax request. The event handler receives a string argument that is the request value.

Example

This example makes the page item `P1_VALUE` upper case before the page is submitted.

```
apex.jQuery( apex.gPageContext$ ).on( "apexpagesubmit", function() {
    var item = apex.item("P1_VALUE");
    item.setValue( item.getValue().toUpperCase());
});
```

37.15.8 apexwindowresized

This event is triggered on the window a couple hundred milliseconds after the window stops resizing. Listen for this event to adjust or resize page content after the window is done resizing. In some cases this is a better alternative to the window resize event,

which is triggered many times as the window is being resized, because it is triggered just once after the window stops resizing.

Example

This example responds to the `apexwindowresized` event and updates page content based on the new height and width.

```
apex.jquery( window ).on( "apexwindowresized", function( event ) {  
    var window$ = apex.jquery( this ),  
        height = window$.height(),  
        width = window$.width();  
    // update page content based on new window height and width  
});
```

37.16 Non-namespace JavaScript APIs

All the miscellaneous, non-namespace APIs of Oracle Application Express, including shortcuts to highly used functions are discussed in the following:

- [\\$x](#) (page 37-88)
- [\\$v](#) (page 37-88)
- [\\$v2](#) (page 37-88)
- [\\$s](#) (page 37-88)
- [\\$u_Narray](#) (page 37-89)
- [\\$u_Carray](#) (page 37-89)
- [\\$nvl](#) (page 37-89)
- [\\$x_Style](#) (page 37-89)
- [\\$x_Hide](#) (page 37-90)
- [\\$x_Show](#) (page 37-90)
- [\\$x_Toggle](#) (page 37-90)
- [\\$x_Remove](#) (page 37-90)
- [\\$x_Value](#) (page 37-91)
- [\\$x_UpTill](#) (page 37-91)
- [\\$x_ItemRow](#) (page 37-91)
- [\\$x_HideItemRow](#) (page 37-91)
- [\\$x_ShowItemRow](#) (page 37-92)
- [\\$x_ToggleItemRow](#) (page 37-92)
- [\\$x_HideAllExcept](#) (page 37-92)
- [\\$x_HideSiblings](#) (page 37-92)
- [\\$x_ShowSiblings](#) (page 37-93)
- [\\$x_Class](#) (page 37-93)
- [\\$x_SetSiblingsClass](#) (page 37-93)
- [\\$x_ByClass](#) (page 37-93)

- [\\$x_ShowAllByClass](#) (page 37-94)
- [\\$x_ShowChildren](#) (page 37-94)
- [\\$x_HideChildren](#) (page 37-94)
- [\\$x_disableItem](#) (page 37-94)
- [\\$f_get_emptyys](#) (page 37-95)
- [\\$v_Array](#) (page 37-95)
- [\\$f_ReturnChecked](#) (page 37-95)
- [\\$d_ClearAndHide](#) (page 37-95)
- [\\$f_SelectedOptions](#) (page 37-96)
- [\\$f_SelectValue](#) (page 37-96)
- [\\$u_ArrayToString](#) (page 37-96)
- [\\$x_CheckImageSrc](#) (page 37-96)
- [\\$v_CheckValueAgainst](#) (page 37-97)
- [\\$f_Hide_On_Value_Item](#) (page 37-97)
- [\\$f_Show_On_Value_Item](#) (page 37-97)
- [\\$f_Hide_On_Value_Item_Row](#) (page 37-97)
- [\\$f_Show_On_Value_Item_Row](#) (page 37-98)
- [\\$f_DisableOnValue](#) (page 37-98)
- [\\$x_ClassByClass](#) (page 37-98)
- [\\$f_ValuesToArray](#) (page 37-98)
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37.16.1 \$x

Given a DOM node or string ID (pNd), this function returns a DOM node if the element is on the page, or returns *false* if it is not.

Parameters

pNd (DOM Node | string ID)

Returns

(DOM Node | false)

37.16.2 \$v

Given a DOM node or string ID (pNd), this function returns the value of an Application Express item in the same format as it would be posted.

Parameters

pNd (DOM Node | string ID)

37.16.3 \$v2

Given a DOM node or string ID (pNd), this function returns the value of an Application Express item as a string or an array. If the page item type can contain multiple values like a shuttle, checkboxes or a multi select list an array is returned, otherwise a string.

Parameters

pNd (DOM Node | string ID)

Returns

(string|array)

37.16.4 \$s

Given a DOM node or string ID (pNd), this function sets the Application Express item value taking into account the item type. The pDisplayValue is optional. If used for a page item of type *Popup LOV* where the attribute "Input Field" = "Not Enterable, Show Display Value and Store Return Value", it sets the "Input Field". The value of pValue is stored in the hidden return field. The pSuppressChangeEvent parameter is optional. Passing either *false* or not passing this parameter value results in a change event firing for the item being set. Pass *true* to prevent the change event from firing for the item being set.

Parameters

```
pNd (DOM Node | string ID)
pValue (String | Array)
pDisplayValue(String)
pSuppressChangeEvent(Boolean)
```

37.16.5 \$u_Narray

Given a DOM node or string ID or an array (pNd), this function returns a single value, if an pNd is an array but only has one element the value of that element is returned otherwise the array is returned. Used for creating DOM based functionality that can accept a single or multiple DOM nodes.

Parameters

Array or first value

Returns

```
Array (DOM Node | string ID | Array)
```

37.16.6 \$u_Carray

Given a DOM node or string ID or an array (pNd), this function returns an array. Used for creating DOM based functionality that can accept a single or multiple DOM nodes.

Parameters

Array

Returns

```
pNd (DOM Node | string ID | Array)
```

37.16.7 \$nvl

If pTest is empty or false return pDefault otherwise return pTest.

Parameters

```
pTest (String | Array)
pDefault (String | Array)
```

Returns

```
(string | Array)
```

37.16.8 \$x_Style

Sets a specific style property (pStyle) to given value (pString) of a DOM node or DOM node Array (pNd).

Parameters

pNd (DOM node | string ID | DOM node Array)
pStyle (String)
pString (String)

Returns

(DOM node | DOM Array)

37.16.9 \$x_Hide

Hides a DOM node or array of DOM nodes (pNd). This also takes into consideration which type of Application Express item is being hidden.

Parameters

pNd (DOM node | string ID | DOM node Array)

Returns

(DOM node | Array)

37.16.10 \$x_Show

Shows a DOM node or array of DOM nodes (pNd). This also takes into consideration which type of Application Express item is being hidden.

Parameters

pNd (DOM node | string ID | DOM node Array)

Returns

(DOM node | Array)

37.16.11 \$x_Toggle

Toggles a DOM node or array of DOM nodes (pNd).

Parameters

pNd (DOM node | string ID | Array)

Returns

(DOM node | Array)

37.16.12 \$x_Remove

Removes a DOM node or array of DOM nodes.

Parameters

pNd (DOM node | string ID | DOM node Array)

Returns

(DOM Node | Array)

37.16.13 \$x_Value

Sets the value (`pValue`) of a DOM node or array of DOM nodes (`pNd`).

Parameters

`pNd` (DOM node | string ID | DOM node Array)
`pValue` (String)

Returns

Not applicable.

37.16.14 \$x_UpTill

Starting from a DOM node (`pNd`), this function cascades up the DOM tree until the tag of node name (`pToTag`) is found. If the optional `pToClass` is present, the ancestor node must have a node name that equals `pToTag` and the class must equal `pToClass`.

Parameters

`pNd` (DOM Node | string ID)
String (`pToTag`)
String (`pToClass`)

Returns

(DOM Node | false)

37.16.15 \$x_ItemRow

Given DOM node or array of DOM nodes, this function (shows, hides, or toggles) the entire row that contains the DOM node or array of DOM nodes. This is most useful when using Page Items. This function only works in table layouts since it explicitly looks for a containing `tr` element.

Parameters

`pNd` (DOM Node | string ID | Dom node Array)
`pFunc` ['TOGGLE', 'SHOW', 'HIDE'] (String)

Returns

Not applicable.

37.16.16 \$x_HideItemRow

Given a page item name, this function hides the entire row that holds the item. In most cases, this is the item and its label. This function only works in table layouts since it explicitly looks for a containing `tr` element.

Parameters

pNd (DOM Node | string ID | DOM node Array)

Returns

Not applicable.

37.16.17 \$x_ShowItemRow

Given a page item name, this function shows the entire row that holds the item. In most cases, this is the item and its label. This function only works in table layouts since it explicitly looks for a containing `tr` element.

Parameters

pNd (DOM node | string ID | DOM node Array)

Returns

Not applicable.

37.16.18 \$x_ToggleItemRow

Given a page item name (pNd), this function toggles the entire row that holds the item. In most cases, this is the item and its label. This function only works in table layouts since it explicitly looks for a containing `tr` element.

Parameters

pNd (DOM node | string ID | DOM node ray)

Returns

Not applicable.

37.16.19 \$x_HideAllExcept

Hides all DOM nodes referenced in `pNdArray` and then shows the DOM node referenced by `pNd`. This is most useful when `pNd` is also a node in `pNdArray`.

Parameters

pNd (DOM node | string ID | DOM node Array)
pNdArray (DOM node | String | Array)

Returns

(DOM node | DOM Array)

37.16.20 \$x_HideSiblings

Hides all sibling nodes of given `pNd`.

Parameters

pNd (DOM node | string ID)

Returns

(DOM node)

37.16.21 \$x_ShowSiblings

Shows all sibling DOM nodes of given DOM nodes (pNd).

Parameters

pNd (DOM node | string ID)

Returns

(DOM node)

37.16.22 \$x_Class

Sets a DOM node or array of DOM nodes to a single class name.

Parameters

pNd (DOM node | string ID | DOM node Array)
pClass (String)

Returns

Not applicable.

37.16.23 \$x_SetSiblingsClass

Sets the class (pClass) of all DOM node siblings of a node (pNd). If pNdClass is not null the class of pNd is set to pNdClass.

Parameters

pNd (DOM Nnde | string ID)
pClass (String)
pThisClass (String)

Returns

(DOM node | false)

37.16.24 \$x_ByClass

Returns an array of DOM nodes by a given class name (pClass). If the pNd parameter is provided, then the returned elements are all children of that DOM node. Including the pTag parameter further narrows the list to just return nodes of that tag type.

Parameters

pClass (String)
pNd (DOM node | string ID)
pTag (String)

Returns

(Array)

37.16.25 `$x_ShowAllByClass`

Show all the DOM node children of a DOM node (pNd) that have a specific class (pClass) and tag (pTag).

Parameters

pNd (DOM node | string ID)
pClass (String)
pTag (String)

Returns

Not applicable.

37.16.26 `$x_ShowChildren`

Show all DOM node children of a DOM node (pNd).

Parameters

pNd (DOM node | string ID)

Returns

Not applicable.

37.16.27 `$x_HideChildren`

Hide all DOM node children of a DOM node (pNd).

Parameters

pNd (DOM node | string ID)

Returns

Not applicable.

37.16.28 `$x_disableItem`

Disables or enables an item or array of items based on (pTest).

Parameters

pNd (DOM node | string ID | DOM node array)
a (true | false)

Returns

Not applicable.

37.16.29 \$f_get_empty

Checks an item or an array of items to see if any are empty, set the class of all items that are empty to `pClassFail`, set the class of all items that are not empty to `pClass`.

Parameters

`pNd` (DOM node | string ID | DOM node Array)
`Sting` (`pClassFail`)
`Sting` (`pClass`)

Returns

`false`, `Array` Array of all items that are empty (`false` | `Array`)

37.16.30 \$v_Array

Returns an item value as an array. Useful for multiselects and checkboxes.

Parameters

`pId` (DOM Node | string ID)

Returns

(`Array`)

37.16.31 \$f_ReturnChecked

Returns an item value as an array. Useful for radio items and check boxes.

Parameters

`pId` (DOM node | string ID)

Returns

(`Array`)

37.16.32 \$d_ClearAndHide

Clears the content of an DOM node or array of DOM nodes and hides them.

Parameters

`pNd` (DOM node | string ID | DOM node array)

Returns

Not applicable.

37.16.33 \$f_SelectedOptions

Returns the DOM nodes of the selected options of a select item (`pNd`).

Parameters

`pNd` (DOM node | string ID)

Returns

(DOM Array)

37.16.34 \$f_SelectValue

Returns the values of the selected options of a select item (`pNd`).

Parameters

`pNd` (DOM node | string ID)

Returns

(DOM Array | String)

37.16.35 \$u_ArrayToString

Given an array (`pArray`) return a string with the values of the array delimited with a given delimiter character (`pDelim`).

Parameters

`pArray` (pArray)
`pDelim` (String)

Returns

Not applicable.

37.16.36 \$x_CheckImageSrc

Checks an image (`pId`) `source` attribute for a substring (`pSearch`). The function returns `true` if a substring (`pSearch`) is found. It returns `false` if a substring (`pSearch`) is not found.

Parameters

`pId` (DOM Node | String)
`pSearch` (pSearch)

Returns

(true | false)

37.16.37 \$v_CheckValueAgainst

Checks an page item's (`pThis`) value against a set of values (`pValue`). This function returns `true` if any value matches.

Parameters

`pThis` (DOM node | string ID)
`pValue` (Number | String | Array)

Returns

(`true` | `false`)

37.16.38 \$f_Hide_On_Value_Item

Checks page item's (`pThis`) value against a value (`pValue`). If it matches, a DOM node (`pThat`) is set to hidden. If it does not match, then the DOM node (`pThat`) is set to visible.

Parameters

`pThis` (DOM node | string ID)
`pThat` (DOM node | string ID | DOM node Array)
`pValue` (Number | String | Array)

Returns

(`true` | `false`)

37.16.39 \$f_Show_On_Value_Item

Checks page item's (`pThis`) value against a value (`pValue`). If it matches, a DOM node (`pThat`) is set to visible. If it does not match, then the DOM node (`pThat`) is set to hidden.

Parameters

`pThis` (DOM node | string ID)
`pThat` (DOM node | string ID | DOM node Array)
`pValue` (Number | String | Array)

Returns

(`true` | `false`)

37.16.40 \$f_Hide_On_Value_Item_Row

Checks the value (`pValue`) of an item (`pThis`). If it matches, this function hides the table row that holds (`pThat`). If it does not match, then the table row is shown.

Parameters

`pThis` (DOM node | string ID)
`pThat` (DOM node | string ID | DOM node Array)
`pValue` (Number | String | Array)

Returns

(true | false)

37.16.41 `$f_Show_On_Value_Item_Row`

Checks the value (`pValue`) of an item (`pThis`). If it matches, this function shows the table row that holds (`pThat`). If it does not match, then the table row is hidden.

Parameters

`pThis` (DOM node | string ID)
`pThat` (DOM node | string ID | DOM node Array)
`pValue` (Number | String | Array)

Returns

(true | false)

37.16.42 `$f_DisableOnValue`

Checks the value (`pValue`) of an item (`pThis`). If it matches, this function disables the item or array of items (`pThat`). If it does not match, then the item is enabled.

Parameters

`pThis` (DOM node | string ID)
`pValue` (String)
`pThat` (DOM node | string ID | DOM node Array)

Returns

(true | false)

37.16.43 `$x_ClassByClass`

Sets a class attribute of an array of nodes that are selected by class.

Parameters

`pNd` (DOM node | string ID)
`pClass` (String)
`pTag` (String)
`pClass2` (String)

Returns

(DOM node | DOM node Array)

37.16.44 `$f_ValuesToArray`

Collects the values of form items contained within DOM node (`pThis`) of class attribute (`pClass`) and nodeName (`pTag`) and returns an array.

Parameters

pThis (DOM node | string ID)
pClass (String)
pTag (String)

Returns

Not applicable.

37.16.45 \$x_FormItems

Returns all form input items contained in a DOM node (pThis) of a certain type (pType).

Parameters

pNd (DOM node | string ID)
pType (String)

Returns

DOM node Array

37.16.46 \$f_CheckAll

Check or uncheck (pCheck) all check boxes contained within a DOM node (pThis). If an array of checkboxes DOM nodes (pArray) is provided, use that array for affected check boxes.

Parameters

pThis (DOM node | string ID)
pCheck (true | false)
pArray (DOM node array)

Returns

Not applicable.

37.16.47 \$f_CheckFirstColumn

This function sets all checkboxes located in the first column of a table based on the checked state of the calling check box (pNd), useful for tabular forms.

Parameters

pNd (DOM node | String)

Returns

DOM node Array

37.16.48 \$x_ToggleWithImage

Given an image element (pThis) and a DOM node (pNd), this function toggles the display of the DOM node (pNd). The src attribute of the image element (pThis) is

rewritten. The image src has any plus substrings replaced with minus substrings or minus substrings are replaced with plus substrings.

Parameters

pThis (DOM Node | string ID)
pNd (DOM Nnde | string id | DOM node Array)

Returns

(DOM Node)

37.16.49 \$x_SwitchImageSrc

Checks an image (pId) src attribute for a substring (pSearch). If a substring is found, this function replaces the image entire src attribute with (pReplace).

Parameters

pNd (DOM node | string ID)
pSearch (String)
pReplace (String)

Returns

(DOM node | false)

37.16.50 \$x_CheckImageSrc

Checks an image (pNd) source attribute for a substring (pSearch). The function returns true if a substring (pSearch) is found. It returns false if a substring (pSearch) is not found.

Parameters

pNd (DOM node | string ID)
pSearch (String)

Returns

(true | fales)

37.16.51 \$u_SubString

Returns a true or false if a string (pText) contains a substring (pMatch).

Parameters

pText (String)
pMatch (String)

Returns

(true | false)

37.16.52 `html_RemoveAllChildren`

Use DOM methods to remove all DOM children of DOM node (`pNd`).

Parameters

`pNd` (DOM node | string ID)

Returns

Not applicable.

37.16.53 `html_SetSelectValue`

Sets the value (`pValue`) of a select item (`pId`). If the value is not found, this functions selects the first option (usually the `NULL` selection).

Parameters

`pId` (DOM node | String)
`pValue` (String)

Returns

Not applicable.

37.16.54 `addLoadEvent`

Adds an onload function (`func`) without overwriting any previously specified onload functions.

Parameters

`pFunction` (Javascript Function)

Returns

Not applicable.

37.16.55 `$f_Swap`

Swaps the form values of two form elements (`pThis,pThat`).

Parameters

`pThis` (DOM Node | String)
`pThat` (DOM Node | String)

Returns

Not applicable.

37.16.56 `$f_SetValueSequence`

Sets array of form item (`pArray`) to sequential number in multiples of (`pMultiple`).

Parameters

pArray (Array)
pMultiple (Number)

Returns

Not applicable.

37.16.57 \$dom_AddTag

Inserts the html element (pTag) as a child node of a DOM node (pThis) with the innerHTML set to (pText).

Parameters

pThis (DOM node | string ID)
pTag (String)
pText (String)

Returns

DOM node

37.16.58 \$tr_AddTD

Appends a table cell to a table row (pThis). And sets the content to (pText).

Parameters

pThis (DOM node | string ID)
pText (String)

Returns

(DOM node)

37.16.59 \$tr_AddTH

Appends a table cell to a table row (pThis). And sets the content to (pText).

Parameters

pThis (DOM node | string ID)
pTest (String)

Returns

DOM node

37.16.60 \$dom_AddInput

Inserts the html form input element (pType) as a child node of a DOM node (pThis) with an id (pId) and name (pName) value set to pValue.

Parameters

pThis (DOM node | string ID)
pType (String)
pId (String)
pName (String)
pValue (String)

Returns

(DOM node)

37.16.61 \$dom_MakeParent

Takes a DOM node (`p_Node`) and makes it a child of DOM node (`p_Parent`) and then returns the DOM node (`pNode`).

Parameters

p_This (DOM node | string ID)
p_Parent (DOM node | string ID)

Returns

(DOM node)

37.16.62 \$x_RowHighlight

Give an table row DOM element (`pThis`), this function sets the background of all table cells to a color (`pColor`). A global variable `gCurrentRow` is set to `pThis`.

Parameters

pThis (DOM node | String)
pColor(String)

Returns

Not applicable.

37.16.63 \$x_RowHighlightOff

Give an table row Dom node (`pThis`), this function sets the background of all table cells to `NULL`.

Parameters

pThis (DOM Element | String)

Returns

Not applicable.

37.16.64 \$v_Upper

Sets the value of a form item (`pNd`) to uppercase.

Parameters

pNd (DOM Node | String)

Returns

Not applicable.

37.16.65 \$d_Find

Hides child nodes of a Dom node (pThis) where the child node's inner HTML matches any instance of pString. To narrow the child nodes searched by specifying a tag name (pTag) or a class name (pClass). Note that the child node is set to a block level element when set to visible.

Parameters

pThis (DOM node | String)

pString (String)

pTags (String)

pClass (String)

Returns

Not applicable.

37.16.66 \$f_First_field

Places the user focus on a form item (pNd). If pNd is not found then this function places focus on the first found user editable field.

Parameters

pNd

Returns

true (if successful)

Using REST Administration Interface API

The REST Administration API enables Oracle Application Express instance administrator to perform administrative functions in an Application Express instance over REST and HTTP protocols. This is particularly useful for machine-to-machine communication when `SQL*Net` connections are not possible, for instance in cloud environments. The REST Administration Interface enables administrators to automatically fetch usage metrics for an Oracle Application Express instance with a REST client.

Tip:

The REST Administration Interface requires Oracle REST Data Services (ORDS) release 3.0.5 or later.

- [Authentication](#) (page 38-1)
- [Individual REST Services](#) (page 38-3)

See Also:

"Using the REST Administration Interface to View Usage Statistics" in *Oracle Application Express Administration Guide*

38.1 Authentication

REST clients must authenticate before accessing the administrative REST services. First, an Oracle Application Express instance administrator must log into the Oracle Application Express application and register a REST client.

When a client has been registered in Instance Administration, the dialog shows `Client ID` and `Client Secret`, with which the client can then perform authentication following the `OAuth2 Client Credentials` flow. A client first connects with a `Client ID` and a `Client Secret` as the credentials. Upon successful authentication, the server sends back the `OAuth Access Token`. Using this access token, the client can then access the administrative REST services.

HTTP Request Syntax Parameter

Table 38-1 HTTP Request Syntax

Parameter	Description
HTTP Method	POST

Table 38-1 (Cont.) HTTP Request Syntax

Parameter	Description
URL	<code>http://application-express-host:port/ords/apex_instance_admin_user/oauth/token</code>
Request Body	<code>grant_type=client_credentials</code>
HTTP Request Headers	"Content-Type": "application/x-www-form-urlencoded" "Authorization": <i>Client-ID:Client Secret</i> in Base64-encoded form

Returns

Returns a JSON object with the following structure upon successful authentication:

```
{
  "access_token": OAuth access token for subsequent requests,
  "token_type": "bearer",
  "expires_in": lifetime of the OAuth token, in seconds; typically "3600"
}
```

If authentication is unsuccessful, the server responds with HTTP-401:Unauthorized.

Examples

In the following example `ClientID` stands for the Client ID and `ClientSecret` for the Client Secret.

Example 1

The example displays the following output when you execute command line utility `curl`:

```
$ curl -i
  --user ClientID:ClientSecret
  --data "grant_type=client_credentials"
  http://application-express-host:port/ords/apex_instance_admin_user/oauth/
token

HTTP/1.1 200 OK
Content-Type: application/json
Transfer-Encoding: chunked

"access_token":"LfXJilIBdzj5JPRn4xb5QQ..","token_type":"bearer","expires_in":3600
```

Use a JSON parser to extract the value of the `access_token` attribute and use it in subsequent requests.

Example 2

The example displays the following output when you use the `APEX_WEB_SERVICE` package in another Application Express instance:

```
begin
  apex_web_service.oauth_authenticate(
    p_token_url => 'http://application-express-host:port/ords/
apex_instance_admin_user/oauth/token',
    p_client_id => 'ClientID',
```

```

        p_client_secret => 'ClientSecret'
    );
    dbms_output.put_line( 'The token is: ' ||
apex_web_service.oauth_get_last_token );
end;
/

```

The token is: LfXJilIBdzj5JPRn4xb5QQ..

With the acquired OAuth Access Token, the administrative REST Services can be called.

38.2 Individual REST Services

Individual REST Services have the following services:

- [Fetch Instance-Level Statistics](#) (page 38-3)
- [Fetch Workspace-Level Statistics](#) (page 38-5)
- [Application-Level Statistics](#) (page 38-7)
- [Instance Overview](#) (page 38-9)
- [REST Service Version Information](#) (page 38-11)

38.2.1 Fetch Instance-Level Statistics

This service returns usage statistics for the whole Oracle Application Express instance.

HTTP Request Syntax Parameter

Table 38-2 HTTP Request Syntax

Parameter	Description
HTTP Method	GET
URL	<code>http://application-express-host:port/ords/apex_instance_admin_user/stats/latest/instance</code>
HTTP Request Headers	<code>"authorization": "Bearer: OAuth access token acquired with Authentication"</code>

Returns

```

{
  "items": [
    {
      "log_day": "2016-09-15T00:00:00Z",
      "workspace_id": 1809074264671554,
      "workspace_name": "SOMEWORKSPACE",
      "workspace_link": {
        "$ref": "http://application-express-host:port/ords/apex_instance_admin_user/stats/latest/workspace/someworkspace"
      },
      "application_id": 4750,
    }
  ]
}

```

```
"application_name": "Oracle APEX Packaged Applications",
"application_link": {
```

Parameters

Filtering is possible for each of the JSON attributes by appending a query to the request URL as follows:

```
http://application-express-host.../latest/instance?q=query
```

Examples

Get All Instance Statistics

The example displays the following output when you execute command line utility `curl`:

```
$ curl -H"Authorization: Bearer LfXJilIBdzj5JPRn4xb5QQ..
-i http://localhost:8081/ords/restauth/emp/list/
http://application-express-host:port/ords/apex_instance_admin_user/stats/
latest/instance
```

The example displays the following output when you use the `APEX_WEB_SERVICE` package in another Application Express instance:



Note:

The example assumes that the `OAUTH_AUTHENTICATE` procedure is successful.

```
select apex_web_service.make_rest_request(
  p_url => 'http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/instance'
  p_http_method => 'GET' )
from dual;
```

The following is a JSON-Document response:

```
{
  "items": [
    {
      "log_day": "2016-09-15T00:00:00Z",
      "workspace_id": 267781782378434879,
      "workspace_name": "SOMEWORKSPACE",
      "workspace_link": {
        "$ref": "http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/workspace/someworkspace"
```

Get Instance Statistics Since August 1st, 2016

The example displays the following output when you execute command line utility `curl`:

```
$ curl -H"Authorization: Bearer LfXJilIBdzj5JPRn4xb5QQ..
-i http://localhost:8081/ords/restauth/emp/list/
http://application-express-host:port/ords/apex_instance_admin_user/stats/
latest/instance?q=%7B%22log_day%22:%7B%22$gt%22:%7B%22$date
%22:%222016-08-01T00:00:00Z%22%7D%7D%7D
```

The example displays the following output when you use the `APEX_WEB_SERVICE` package in another Application Express instance:

 **Note:**

The example assumes that the `OAUTH_AUTHENTICATE` procedure is successful.

```
select apex_web_service.make_rest_request(
       p_url =>          'http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/instance?q=' ||
                                utl_url.escape('{"log_day": {"$gt": {"$date":
"2016-08-01T00:00:00Z"}}}') ,
       p_http_method => 'GET',
       p_scheme =>      'OAUTH_CLIENT_CRED' )
from dual;
```

The following is a JSON-Document response:

```
{
  "items": [
    {
      "log_day": "2016-09-15T00:00:00Z",
      "workspace_id": 267781782378434879,
      "workspace_name": "SOMEWORKSPACE",
      "workspace_link": {
        "$ref": "http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/workspace/someworkspace"
```

38.2.2 Fetch Workspace-Level Statistics

This service returns usage statistics for a specific Application Express workspace.

HTTP Request Syntax Parameter

Table 38-3 HTTP Request Syntax

Parameter	Description
HTTP Method	GET
URL	<code>http://application-express-host:port/ords/apex_instance_admin_user/stats/latest/workspace/workspace-name</code>
HTTP Request Headers	<code>"authorization": "Bearer: OAuth access token aquired with Authentication"</code>

Returns

```
{
  "items": [
    {
      "log_day": "2016-09-15T00:00:00Z",
      "workspace_id": 1809919633676005,
      "application_id": 106,
      "application_name": "Sample Calendar",
      "application_link": {
        "$ref": "http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/application/106"
```

```

    },
    "page_events": 94,
:

```

Parameters

Filtering is possible for each of the JSON attributes by appending a query to the request URL as follows:

```
http://application-express-host.../latest/instance?q=query
```

Examples

Get All Statistics For Workspace "MYWORKSPACE"

The example displays the following output when you execute command line utility `curl`:

```

$ curl -H"Authorization: Bearer LfXJilIBdzj5JPRn4xb5QQ..
-i http://localhost:8081/ords/restauth/emp/list/
http://application-express-host:port/ords/apex_instance_admin_user/stats/
latest/workspace/myworkspace

```

The example displays the following output when you use the `APEX_WEB_SERVICE` package in another Application Express instance:



Note:

The example assumes that the `OAUTH_AUTHENTICATE` procedure is successful.

```

select apex_web_service.make_rest_request(
    p_url =>          'http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/workspace/myworkspace'
    p_http_method => 'GET',
    p_scheme =>      'OAUTH_CLIENT_CRED' )
from dual;

```

The following is a JSON-Document response:

```

{
  "items": [
    {
      "log_day": "2016-09-15T00:00:00Z",
      "workspace_id": 1809919633676005,
      "application_id": 106,
      "application_name": "Sample Calendar",
      "application_link": {
        "$ref": "http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/application/106"
      },
      "page_events": 94,
    }
  ]
:

```

Get Workspace Statistics For "MYWORKSPACE" Since August 1st, 2016

The example displays the following output when you execute command line utility `curl`:

```

$ curl -H"Authorization: Bearer LfXJilIBdzj5JPRn4xb5QQ..
-i http://localhost:8081/ords/restauth/emp/list/

```

```
http://application-express-host:port/ords/apex_instance_admin_user/stats/
latest/workspace/myworkspace?q=%7B%22log_day%22:%7B%22$gt%22:%7B%22$date
%22:%222016-08-01T00:00:00Z%22%7D%7D%7D
```

The example displays the following output when you use the `APEX_WEB_SERVICE` package in another Application Express instance:

 **Note:**

The example assumes that the `OAUTH_AUTHENTICATE` procedure is successful.

```
select apex_web_service.make_rest_request(
    p_url => 'http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/workspace/myworkspace?q=| |
    utl_url.escape(' "log_day": "$gt":"$date":
"2016-08-01T00:00:00Z" '),
    p_http_method => 'GET' )
from dual;
```

The following is a JSON-Document response:

```
{
  "items": [
    {
      "log_day": "2016-09-15T00:00:00Z",
      "workspace_id": 1809919633676005,
      "application_id": 106,
      "application_name": "Sample Calendar",
      "application_link": {
        "$ref": "http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/application/106"
      },
      "page_events": 94,
    }
  ]
}
```

38.2.3 Application-Level Statistics

This service returns usage statistics for a specific application.

HTTP Request Syntax Parameter

Table 38-4 HTTP Request Syntax

Parameter	Description
HTTP Method	GET
URL	<code>http://application-express-host:port/ords/apex_instance_admin_user/stats/latest/application/application-id</code>
HTTP Request Headers	<code>"authorization": "Bearer: OAuth access token aquired with Authentication</code>

Returns

```
{
  "items": [
    {
      "log_day": "2016-09-15T00:00:00Z",
      "workspace_id": 1809919633676005,
      "application_id": 106,
      "application_name": "Sample Calendar",
      "application_link": {
        "$ref": "http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/application/106"
      },
      "page_events": 94,
    }
  ]
}
```

Parameters

Filtering is possible for each of the JSON attributes by appending a query to the request URL as follows:

```
http://application-express-host.../stats/latest/application/application-id?q=query
```

Examples

Get All Statistics For Application "106"

The example displays the following output when you execute command line utility `curl`:

```
$ curl -H"Authorization: Bearer LfXJilIBdzj5JPRn4xb5QQ..
-i http://localhost:8081/ords/restauth/emp/list/
http://application-express-host:port/ords/apex_instance_admin_user/stats/
latest/application/106
```

The example displays the following output when you use the `APEX_WEB_SERVICE` package in another Application Express instance:



Note:

The example assumes that the `OAUTH_AUTHENTICATE` procedure is successful.

```
select apex_web_service.make_rest_request(
  p_url => 'http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/application/106'
  p_http_method => 'GET',
  p_scheme => 'OAUTH_CLIENT_CRED' )
from dual;
```

The following is a JSON-Document response:

```
{
  "items": [
    {
      "log_day": "2016-09-15T00:00:00Z",
      "workspace_id": 1809919633676005,
      "application_id": 106,
      "application_name": "Sample Calendar",
    }
  ]
}
```



```

        "application_link": {
            "$ref": "http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/application/106"
        },
        "page_events": 94,
    :

```

Get Statistics For Application "106" Since August 1st, 2016

The example displays the following output when you execute command line utility `curl`:

```

$ curl -H"Authorization: Bearer LfXJilIBdzj5JPRn4xb5QQ..
-i http://localhost:8081/ords/restauth/emp/list/
http://application-express-host:port/ords/apex_instance_admin_user/stats/
latest/application/106?q=%7B%22log_day%22:%7B%22$gt%22:%7B%22$date
%22:%222016-08-01T00:00:00Z%22%7D%7D%7D

```

The example displays the following output when you use the `APEX_WEB_SERVICE` package in another Application Express instance:

Note:

The example assumes that the `OAUTH_AUTHENTICATE` procedure is successful.

```

select apex_web_service.make_rest_request(
    p_url => 'http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/application/106?q=' ||
            utl_url.escape(' "log_day": "$gt": "$date":
"2016-08-01T00:00:00Z" '),
    p_http_method => 'GET' )
from dual;

```

The following is a JSON-Document response:

```

{
  "items": [
    {
      "log_day": "2016-09-15T00:00:00Z",
      "workspace_id": 1809919633676005,
      "application_id": 106,
      "application_name": "Sample Calendar",
      "application_link": {
        "$ref": "http://application-express-host:port/ords/
apex_instance_admin_user/stats/latest/application/106"
      },
      "page_events": 94,
    :

```

38.2.4 Instance Overview

This service returns aggregated overview data for an Application Express instance.

HTTP Request Syntax Parameter

Table 38-5 HTTP Request Syntax

Parameter	Description
HTTP Method	GET
URL	<code>http://application-express-host:port/ords/apex_instance_admin_user/info/latest/instance/number-of-days</code>
HTTP Request Headers	<code>"authorization": "Bearer: OAuth access token aquired with Authentication"</code>

Returns

```
{
  "items": [
    {
      "workspaces_total": 1074,
      "apps_total": 2827,
      "schemas_total": 1065,
      "reporting_timeframe_since": "2016-07-16T13:30:40Z",
      "reporting_timeframe_to": "2016-10-14T13:30:40Z",
      "active_apps_timeframe": 2827,
      "active_developers_timeframe": 731,
      "workspaces_timeframe": 1074
    }
  ],
  "first": {
    "$ref": "https://apexea.oracle.com/pls/apex/apex_instance_admin_user/info/latest/instance/90"
  }
}
```

Parameters

`number-of-days`: Return the aggregated values from today to the given number of days into the past.

Example

The example displays the following output when you execute command line utility `curl`:

```
$ curl -H"Authorization: Bearer LfXJilIBdzj5JPRn4xb5QQ.."
-i http://localhost:8081/ords/restauth/emp/list/
http://application-express-host:port/ords/apex_instance_admin_user/info/
latest/instance/90
```

The example displays the following output when you use the `APEX_WEB_SERVICE` package in another Application Express instance:

**Note:**

The example assumes that the `OAUTH_AUTHENTICATE` procedure is successful.

```

select apex_web_service.make_rest_request(
    p_url =>          'http://application-express-host:port/ords/
apex_instance_admin_user/info/latest/instance/90',
    p_http_method => 'GET' )
from dual;

```

The following is a JSON-Document response:

```

{
  "items": [
    {
      "workspaces_total": 1074,
      "apps_total": 2827,
      "schemas_total": 1065,
      "reporting_timeframe_since": "2016-07-16T13:30:40Z",
      "reporting_timeframe_to": "2016-10-14T13:30:40Z",
      "active_apps_timeframe": 2827,
      "active_developers_timeframe": 731,
      "workspaces_timeframe": 1074
    }
  ],
  "first": {
    "$ref": "https://apexea.oracle.com/pls/apex/apex_instance_admin_user/info/
latest/instance/90"
  }
}

```

38.2.5 REST Service Version Information

This service returns version information for the REST Administrative Interface.

HTTP Request Syntax Parameter

Table 38-6 HTTP Request Syntax

Parameter	Description
HTTP Method	GET
URL	<code>http://application-express-host:port/ords/apex_instance_admin_user/info/latest/</code>
HTTP Request Headers	<code>"authorization": "Bearer: OAuth access token aquired with Authentication"</code>

Returns

```

{
  "items": [
    {
      "version": "5.1.0"
    }
  ]
}

```

Example

The example displays the following output when you execute command line utility `curl`:

```
$ curl -H"Authorization: Bearer LfXJilIBdzj5JPRn4xb5QQ..  
      -i http://localhost:8081/ords/restauth/emp/list/  
      http://application-express-host:port/ords/apex_instance_admin_user/info/  
rest-service-version
```

The example displays the following output when you use the `APEX_WEB_SERVICE` package in another Application Express instance:

**Note:**

The example assumes that the `OAUTH_AUTHENTICATE` procedure is successful.

```
select apex_web_service.make_rest_request(  
      p_url =>          'http://application-express-host:port/ords/  
apex_instance_admin_user/info/latest/rest-service-version',  
      p_http_method => 'GET' )  
from dual;
```

The following is a JSON-Document response:

```
{  
  "items": [  
    {  
      "version": "5.1.0"  
    }  
  ]  
}
```

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