

So you want Multiple Languages in your Oracle E-Business Suite

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Before We Start A Quick Audience Survey

- How many of you have are on 11.0, 11i, 12?
- How many of you plan to upgrade to R12 in the next 18 months?

What I am going to cover

- Oracle's out of the box Multi Language Support (MLS)
- MLS "Lite" a tweaked implementation of Oracle's MLS
- A custom solution for external facing documents only
- Tips, Tricks and Gotcha's when it comes to MLS and NLS
- I am going to concentrate on R12 in this presentation

Definitions

- National Language Support (NLS)
 - National Language Support (NLS) refers to the ability to run an Applications instance in any single supported language, including specific regional or territorial number and date formats.
 - Typically, in order to support a given language, only the customer-facing components of the Applications software (user interface, lookup tables, online documentation, and so on) are translated.
 - Translations are delivered via NLS patches (more on that later).
- Multiple Language Support (MLS)
 - Multiple Language Support (MLS) refers to the ability to run multiple languages in the same Applications instance.
 - MLS provides multiple language architecture, while NLS provides the individual language translations.

Source ML Note: 393861.1

Oracle's MLS

- Great starting place '**Globalization Guide for Oracle Applications Release 12'**

ML Note: 393861.1

- Translated forms, reports, seed data and help in the following 32 languages:

Arabic, Greek, Hungarian, Lithuanian, Brazilian Portuguese, Slovak, Simplified Chinese, Czech, Latin American Spanish, Italian, Norwegian, Romanian, Slovenian, Traditional Chinese, German, French, Hebrew, Dutch, Russian, Thai, Danish, Canadian French, Japanese, Polish, Swedish, Turkish, Spanish, Croatian, Korean, Portuguese, Finnish, Vietnamese

Oracle Translations

- Not all products are translated in all languages.
For R12 See ML Note: 412218.1

Oracle Applications Release 12.1 Product Level Software Translation Matrix [ID 412218.1]

Modified 12-OCT-2009 Type BULLETIN Status PUBLISHED

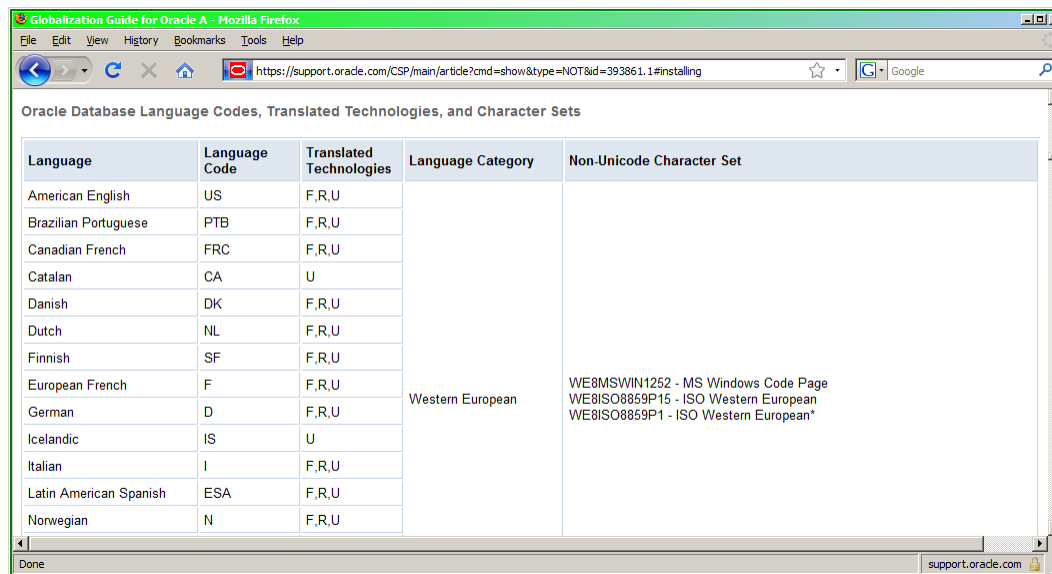
Oracle Applications Release 12 Product Level Software Translation Matrix

Generated on Mon Oct 12 13:27:40 2009

Product/Language	AR	CS	DK	EL	ESA	F	FRC	HR	HU	I	IW	JA	KO	LT	N	NL	PL	PT	PTB	RO	RU	S	SF	SK	SL	TH	TR	VN	ZHS	ZHT
ad Applications DBA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ahl Complex Maintenance, Repair & Overhaul	AR	CS	DK	EL	ESA	F	FRC	-	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	-	RU	S	SF	-	-	TH	TR	-	ZHS	ZHT
ahm Hosting Manager	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ak Common Modules	AR	CS	DK	EL	ESA	F	FRC	HR	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	RO	RU	S	SF	SK	SL	TH	TR	-	ZHS	ZHT
alr Alert	AR	CS	DK	EL	ESA	F	FRC	HR	HU	I	IW	JA	KO	LT	N	NL	PL	PT	PTB	RO	RU	S	SF	SK	SL	TH	TR	VN	ZHS	ZHT
ame Approval Management Engine	AR	CS	DK	EL	ESA	F	FRC	HR	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	RO	RU	S	SF	SK	SL	TH	TR	-	ZHS	ZHT
ams Marketing	AR	CS	DK	EL	ESA	F	FRC	-	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	RO	RU	S	SF	-	-	TH	TR	-	ZHS	ZHT
amv Marketing Encyclopedia System	AR	CS	DK	EL	ESA	F	FRC	-	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	RO	RU	S	SF	-	-	TH	TR	-	ZHS	ZHT
amw Internal Controls Manager	AR	CS	DK	EL	ESA	F	FRC	HR	HU	I	IW	JA	KO	LT	N	NL	PL	PT	PTB	RO	RU	S	SF	SK	-	TH	TR	VN	ZHS	ZHT
ap Payables	AR	CS	DK	EL	ESA	F	FRC	HR	HU	I	IW	JA	KO	LT	N	NL	PL	PT	PTB	RO	RU	S	SF	SK	SL	TH	TR	VN	ZHS	ZHT
ar Receivables	AR	CS	DK	EL	ESA	F	FRC	HR	HU	I	IW	JA	KO	LT	N	NL	PL	PT	PTB	RO	RU	S	SF	SK	SL	TH	TR	VN	ZHS	ZHT
as Sales Foundation	AR	CS	DK	EL	ESA	F	FRC	-	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	RO	RU	S	SF	-	-	TH	TR	-	ZHS	ZHT
asf Sales Online	AR	CS	DK	EL	ESA	F	FRC	-	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	RO	RU	S	SF	-	-	TH	TR	-	ZHS	ZHT
asg CRM Gateway for Mobile Devices	AR	CS	DK	EL	ESA	F	FRC	-	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	-	RU	S	SF	-	-	TH	TR	-	ZHS	ZHT
asl Sales Offline	AR	CS	DK	EL	ESA	F	FRC	-	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	-	RU	S	SF	-	-	TH	TR	-	ZHS	ZHT
asn Sales	AR	CS	DK	EL	ESA	F	FRC	-	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	RO	RU	S	SF	-	-	TH	TR	-	ZHS	ZHT
aso Order Capture	AR	CS	DK	EL	ESA	F	FRC	-	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	-	RU	S	SF	-	-	TH	TR	-	ZHS	ZHT
asp Sales for Handhelds	AR	CS	DK	EL	ESA	F	FRC	-	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	-	RU	S	SF	-	-	TH	TR	-	ZHS	ZHT
ast TeleSales	AR	CS	DK	EL	ESA	F	FRC	HR	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	RO	RU	S	SF	SK	-	TH	TR	-	ZHS	ZHT
az Application Implementation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ben Advanced Benefits	AR	CS	DK	EL	ESA	F	FRC	-	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	RO	RU	S	SF	SK	-	TH	TR	-	ZHS	ZHT
bic Customer Intelligence	AR	CS	DK	EL	ESA	F	FRC	-	HU	I	IW	JA	KO	-	N	NL	PL	PT	PTB	RO	RU	S	SF	-	-	TH	TR	VN	ZHS	ZHT

Oracle DB Character Set

- The database character set identifies how each character or symbol is encoded in binary.
- The recommended character set is AL32UTF8, which will support the full complement of languages.
- If you choose a non-unicode character set refer to the table in section 2 of ML Note: 393861.1

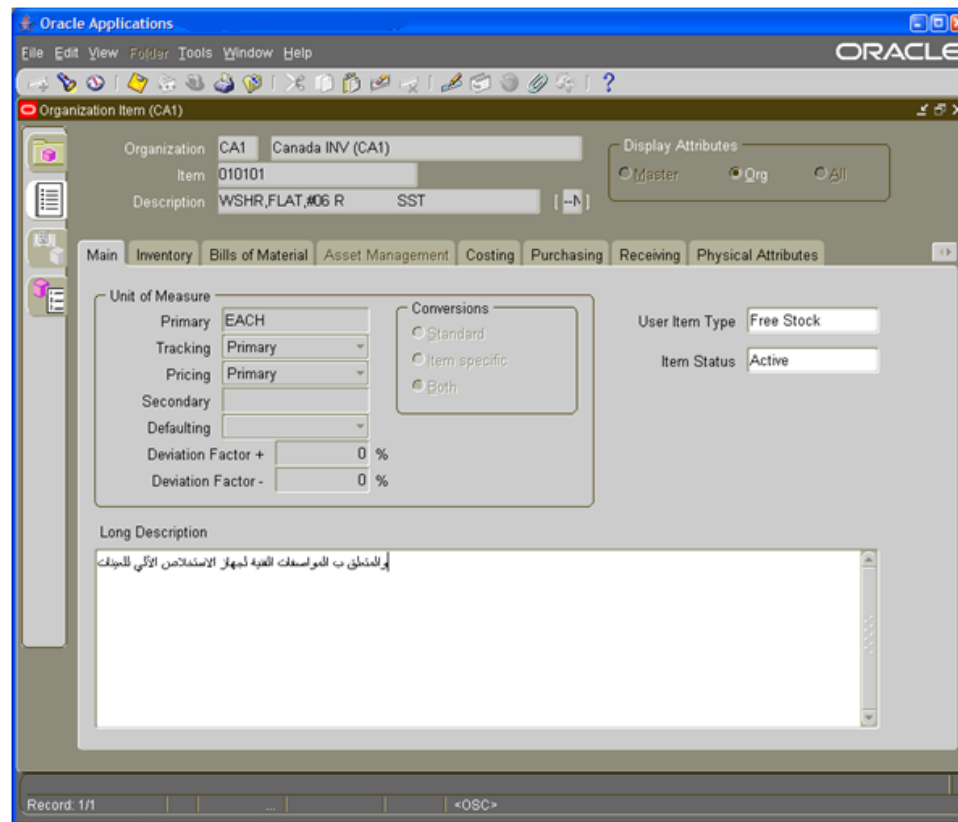


The screenshot shows a Mozilla Firefox browser window with the URL <https://support.oracle.com/CSP/main/article?cmd=show&type=NOT&id=393861.1#installing>. The page title is "Oracle Database Language Codes, Translated Technologies, and Character Sets". The table below lists various languages and their corresponding character sets.

Language	Language Code	Translated Technologies	Language Category	Non-Unicode Character Set
American English	US	F,R,U	Western European	WE8MSWIN1252 - MS Windows Code Page WE8ISO8859P15 - ISO Western European WE8ISO8859P1 - ISO Western European*
Brazilian Portuguese	PTB	F,R,U		
Canadian French	FRC	F,R,U		
Catalan	CA	U		
Danish	DK	F,R,U		
Dutch	NL	F,R,U		
Finnish	SF	F,R,U		
European French	F	F,R,U		
German	D	F,R,U		
Icelandic	IS	U		
Italian	I	F,R,U		
Latin American Spanish	ESA	F,R,U		
Norwegian	N	F,R,U		

Oracle DB Character Set

- Once you are on a AL32UTF8 database you can enter data using any character set you like.



The screenshot shows the Oracle Applications interface for the Organization Item (CA1) form. The form is titled "Organization Item (CA1)" and displays the following information:

- Organization: CA1 Canada INV (CA1)
- Item: 010101
- Description: WSHR,FLAT,#06 R SST
- Display Attributes: Master, Org, All
- Unit of Measure: Primary: EACH, Tracking: Primary, Pricing: Primary, Secondary: , Defaulting: , Deviation Factor +: 0%, Deviation Factor -: 0%
- Conversions: Standard, Item specific, Both
- User Item Type: Free Stock
- Item Status: Active
- Long Description:

المنطق ب المواصفات القياسية لجهاز الاستملاء الآلي للمعدات

The form also includes a navigation bar with tabs for Main, Inventory, Bills of Material, Asset Management, Costing, Purchasing, Receiving, and Physical Attributes. The status bar at the bottom indicates "Record: 1/1" and "<OSC>".

Enabling Oracle's MLS

Instructions from:

Oracle Applications, Maintenance Procedures, Release 12
Adding and Maintaining NLS Languages

1. License Manager, active the language
2. adadmin, Maintain Multi-Lingual Tables
(copies base language seed data)
3. Apply NLS patch 44400000 for the language
(adds seed data translations)
4. Translation Synchronization Patch Utility and apply patch
5. Install NLS Help

Wow that is easy

Yes but now the fun begins

- You must always apply the NLS Translation Patches for the patches you apply going forward, (this includes future upgrades).
 - This results in additional DBA work and increased down time windows
 - Your \$APPL_TOP now includes many more code objects:
\$AR_TOP/forms/<language>/
\$AR_TOP/reports/<language>/
- Deactivating a language is not supported.
 - Even if you are not using them, once activated, you must maintain all languages that are active in an NLS system.
- You have to now support your user base in non-English forms and reports.
 - Desktop procedures
 - Support calls
 - Customizations

What do you really need?

My recent client was:

- Mid-sized (~\$400 million in revenue)
- Dozens of subsidiaries around the world
- Moving to a single global Oracle E-Business Suite instance

- English was the predominate corporate language

- Only external facing documents needed to be translated
 - Purchase Orders
 - Sales Order Acknowledgements
 - Shipping Documents
 - AR Invoices

Executive Management decided that full blown Oracle MLS was far more than they needed or could handle. Are there other options?

Yes, there are other options

We found that there are two possible options to full MLS E-Business Suite

- MLS "Lite"
- Only translate external facing Documents

MLS “Lite”

This solution is not fully supported by Oracle

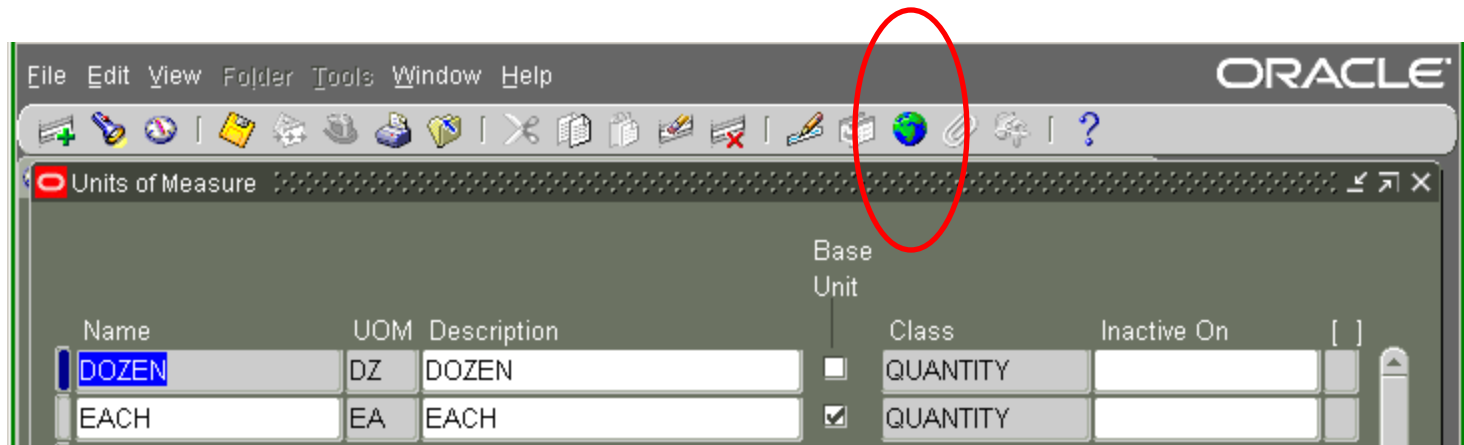
- Basically MLS “Lite” allows you to use the %_TL tables to store translation data that your users must enter.
- You don’t get Oracle’s seed NLS translations.
- You don’t have NLS translated forms or reports

MLS "Lite" - Setup

- Follow the same instructions for a normal MLS setup
 1. License Manager, active the language
 2. adadmin, Maintain Multi-Lingual Tables (copies base language seed data)
- Stop there, don't do any of the patching.

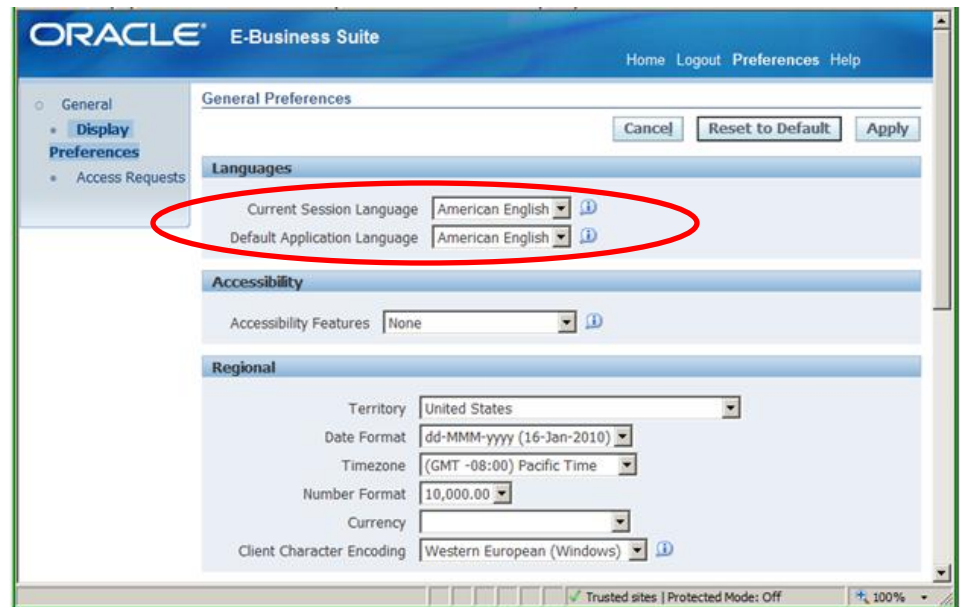
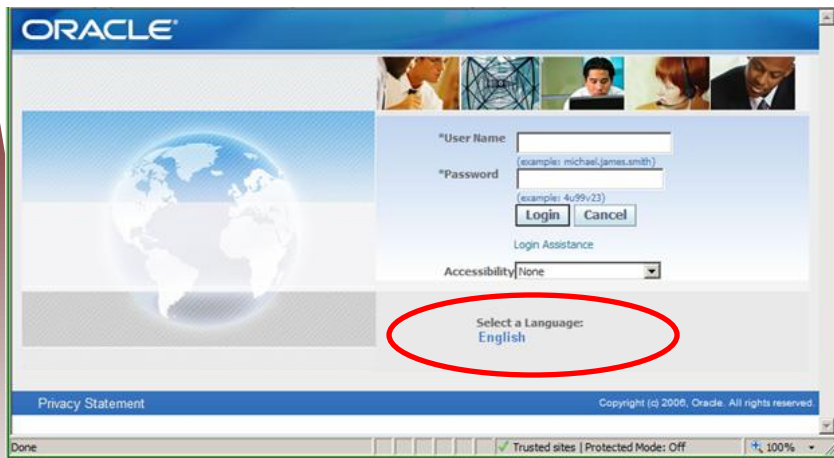
MLS "Lite" - Details

- The Language is now enabled and can be selected.
- The %_TL tables have copied over base language (US) data.
- When you are in a language enabled form you can select the language and change the language specific data in the %_TL table. (Globe Icon in the tool bar)



User Language Selection

- Users can set their language in the General Preferences form. This will affect the forms/reports that are called from the filesystem.
- However, the code tree does not have the corresponding language so navigating to forms or running reports will error.



User Language Selection “fix”

- We need to disable the ability for the user to select a language when the login
- We need to disable the ability for the user to select a language from the Global Preferences form
- Both can be accomplished with a Forms Personalization
- This seems to resolve this issue completely

Removing Language Selection From Login Page

- Per ML Note: 735964.1, the system profile 'Local Login Mask' has been obsoleted in R12 so follow these steps.
 1. Logon with Functional Administrator responsibility
 2. Click on 'Personalization' Tab
 3. Enter `/oracle/apps/fnd/sso/login/webui` in document path and click on 'Go' button
 4. Click on 'Pencil' icon under 'Personalize Page' for `/oracle/apps/fnd/sso/login/webui/LangImagesRN`
 5. make sure that 'Include' for Site is checked and click on 'apply'
 6. Look for 'Table Layout' and click on 'Pencil' icon in 'Personalize' column.
 7. Change 'rendered' property value to 'false' at Site level from LOV and click on Apply.
 8. This will disable the language selection links in the login page.

Removing Language Selection From Global Preferences Page

- Remove the language selection options in the Preferences page with the following personalization.
 1. Logon with Functional Administrator responsibility
 2. Click on 'Personalization' Tab
 3. Enter `/oracle/apps/fnd/preferences/webui` in document path and click on 'Go' button
 4. Click on 'Pencil' icon under 'Personalize Page' for `/oracle/apps/fnd/preferences/webui/PreferencesPG`
 5. make sure that 'Include' for Site is checked and click on 'apply'
 6. Look for 'Message Choice: Current Session Language' and click on 'Pencil' icon in 'Personalize' column.
 7. Change 'rendered' property value to 'false' at Site level from LOV and click on Apply.
 8. Look for 'Message Choice: Default Application Language' and click on 'Pencil' icon in 'Personalize' column.
 9. Change 'rendered' property value to 'false' at Site level from LOV and click on Apply.
 10. This will disable the language selection links in the Preference page.

MLS "Lite" - Summary

- So this enabled the %_TL tables and language selection for user data entry without requiring all the code tree objects (forms, reports, etc.)
- However as I mentioned before:
This solution is not fully supported by Oracle
- It seems fine during patching
- Oracle AOL team members agree that this should work

My Clients Requirements

- English is the official “Corporate” language
- R12.0.6 used in US and Canada
- Rolling out R12 to 9 EU Subsidiaries
- Need to support multiple languages when dealing with customers and suppliers
- Communication with external parties is through documents (report output)

AP Check

Commercial Invoice

Dunning Letters

Print Quote

Remittance Advice

Sales Order Book and Ship Notifications

Service Request Debrief

AR Invoice

Customer Contracts

Packing Slip

Purchase Order

Sales Order Acknowledgement

Service Installation Report

Statements (Customers and Suppliers)

- And these reports were customized already using XML Publisher

Decisions

- Full blown Oracle MLS was too much for such a minimal requirement.
- MLS “Lite” while it worked was not 100% supported by Oracle.
- Since the external facing documents were already custom why not consider a broader custom solution.

A Custom Solution

- Looking at the reports output only a few data elements needed to be translated

Company Logo

To Customer Contact

Address Customer Address

Quote Date 23-MAR-2009
Quotation Number
Quotation Name 12345

WE ARE PLEASED TO SUBMIT THE FOLLOWING QUOTATION SUBJECT TO CONDITIONS SHOWN:

Item	Qty	Product	Unit Price	Discount	Total Price
1	1	4590 7030 WPS-3MIDTFL, LibMole 3000 NanoCapMicro Thermostated Pylrod-Loop	22 269.00	-1 113.00	21 147.00
2	3	WPS-7Rate AutoSampler 943502			
3	1	SERVICE LABOR/CLUSE PER HR 960/108	285.00	0.00	755.00
4	1	Power Card US 8x5187	3.01	0.00	0.01
		SERVICE HANDLING FREIGHT,DMSTC	0.01	0.00	0.01
Quotation Total					21 942.02

Notes:

Quote Expires 17 SEP 2009

Estimated Delivery Within 50 Days ARO

Freight Prepaid and Added

FOB Point

Respectfully Submitted

Rep P/Code
Man P/Code
Mat P/Code

Translations Requirements

- Some data elements are already in the local language
 - Addresses
- Some data elements can be handled but just entering additional setup values in the local language. Users would then have to select the translated value for a given transaction.
 - Payment Terms
 - Unit of Measures
- Some elements are already striped by Operating Unit or Inventory Organization allowing translated data entry in the first place.
 - Item Descriptions

Remaining Translations

- The remaining data elements could be looked up using several custom PL/SQL functions.

```
function GET_LOOKUP_MEANING_ORG ( p_lookup_type          in varchar2,  
                                p_org_id                in number,  
                                p_document_type         in varchar2,  
                                p_party_site_id         in number,  
                                p_cust_site_use_id     in number,  
                                p_lookup_code          in varchar2,  
                                p_return_type          in varchar2  
                                ) RETURN varchar2;
```

```
Function GET_ITEM_DESCRIPTION ( p_inventory_item_id  in number,  
                               p_cust_site_use_id   in number,  
                               p_party_site_id      in number,  
                               p_org_id             in number  
                               ) RETURN varchar2
```

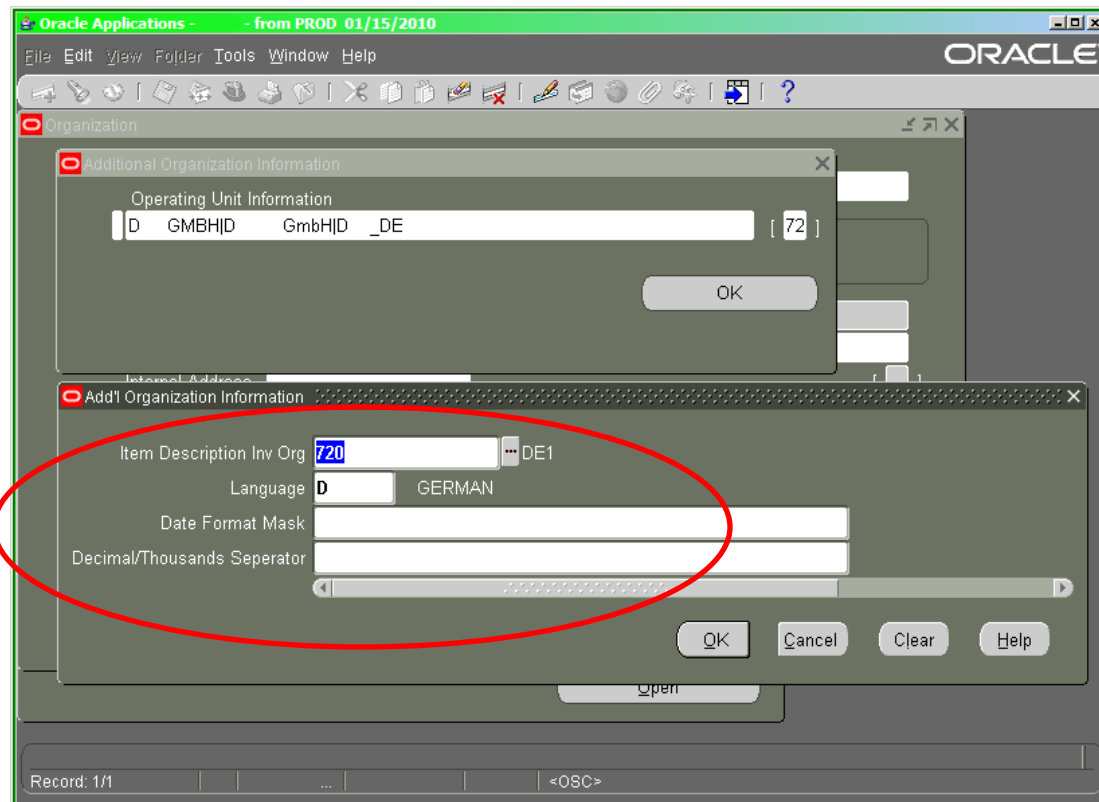
- These PL/SQL functions could be easily incorporated into the existing queries.

Determining Language Required

- We found that language requirements would need to default as follows:
 - 1) Operating Unit Level
 - 2) Customer Level
 - 3) Customer Site Level
- This allows the Swiss Operating Unit to have a general default of German, but some customers can be setup to receive documents in French or Italian

1st Level Defaulting

- Translations can be specified by Operation Unit as a first level default
- DFF's set on Operating Unit form



2nd Level Defaulting

- Translations can be specified by Customer or Supplier Site

ORACLE Trading Community

Customer: 3M Company >
Site: 2967
Organization Name: 3M Company, Account Number: 1000, Registry ID: 1000
Address: 5400 Route B PO Box 1228 COLUMBIA, MO 65205

Account Site Information

Site Name: _____ Alternate Name: _____

Site Details | Business Purposes | Communication | Payment Details | Profile | Profile Amount | Late Charges

Account Site Address

Site Number: 2967
Country: United States
Address Line 1: 5400 Route B
Address Line 2: PO Box 1228
Address Line 3: _____
Address Line 4: _____
City: COLUMBIA
Country: BOONE
State: MO
Postal Code: 65205
Addressee: _____
Status: Active
Identifying Address:

Geography Code Override: _____
Context Value: _____
Item Description Inv Org: _____
Language: _____

Account Site Details

Operating Unit: D United States, Reference: M0401-B
Category: _____, Status: Active
Territory: _____
Translation: _____
EDI Location: _____
Context Value: _____
Item Description Inv Org: _____
Language: _____

ORACLE Payables

Suppliers > Update JRPJR, INC. - 12976: Address Book >
Update Address
* Indicates required field

Supplier Name: JRPJR, DIC., Supplier Number: 12976

Address Details | Contact Details and Purpose

Site Number: 112207
Country: United States
Address Line 1: 3208 ORIOLE DR.
Address Line 2: _____
Address Line 3: _____
Address Line 4: _____
City: SAN JOSE
County: _____
State: CA
Postal Code: 95117
Address Name: SAN JOSE
Addressee: _____
Status: Active
Geography Code Override: _____
Language: _____
Context Value: _____
Item Description Inv Org: _____
Language: _____

Communication Details Update to all sites using this address
Phone Area Code: 408
Phone Number: 248-3200
Fax Area Code: 408
Fax Number: 243-0605
Email Address: _____
Address Purpose: Purchasing, Payment, RFQ Only

Item Description

- Each country wants to translate the item descriptions as they see fit
- Each Operating Unit has an Inventory Organization
- The Item Long Description holds the translated Item Description in each Inventory Organization
- The custom PL/SQL function then pulls the Items Long Description from the requested Inventory Organization
- If a Long Description does not exist in the specified Inventory Organization it will pull a default English description

Custom Translation Data

- Custom table to hold translations:
XXCUS_MLS_TRANSLATIONS
- Columns of data
 - LOOKUP_TYPE – categorization of data
 - LOOKUP_CODE – source US element
 - LANGUAGE – target language
 - ORG_ID – operating unit over ride
 - DOCUMENT_TYPE – document over ride
 - LOOKUP_MEANING – translated short value
 - LOOKUP_DESCRIPTION – translated long value
- We ended up with 1729 translations so far, but the vast majority of these are data labels on the reports

Sample Translation Data

- So what does the translation data look like

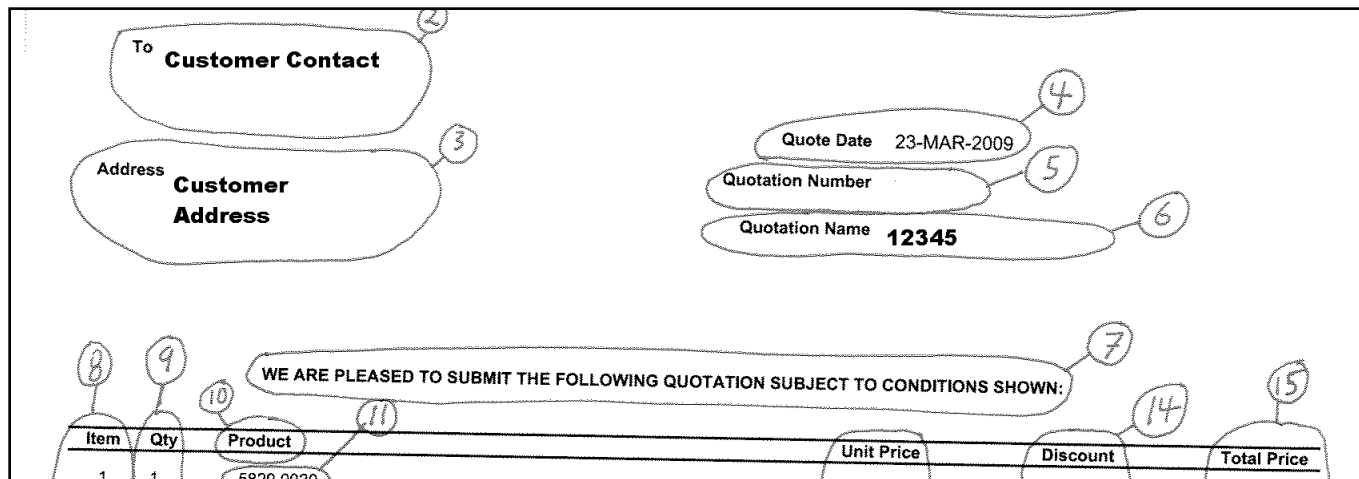
LOOKUP_TYPE	COUNT(*)
LABELS	1373
RA_TERMS	264
TRX_CLASS	30
AP_PAYMENT_TERMS	20
UOM	18
TITLE	14
FREIGHT_TERMS	5
FOB_TERMS	4
MEMO_LINES	1

- This also allows us to have different translations by:
 - Language
 - Operating Unit
 - Document Type

LOOKUP_TYPE	LOOKUP_CODE	LANGUAGE	ORG_ID	DOCUMENT_TYPE	LOOKUP_MEANING	LOOKUP_DESCRIPTION
RA_TERMS	30 NET	D			30 NET	30 Tage netto
RA_TERMS	30 NET	DK			30 NET	30 dage netto
RA_TERMS	30 NET	F	644	SALES_ORDER_ACK	30 NET	30 jours net
RA_TERMS	30 NET	F			30 NET	Paiement à 30 jours Net
RA_TERMS	30 NET	I	644	SALES_ORDER_ACK	30 NET	30 giorni netto
RA_TERMS	30 NET	I			30 NET	30 gg. data fattura
RA_TERMS	30 NET	S			30 NET	30 dgr netto
RA_TERMS	30 NET	US	644	SALES_ORDER_ACK	30 NET	30 days net
RA_TERMS	30 NET	US			30 NET	Net Due in 30 Days

Label Data

- So what is this Label Data?
- These are the actual data labels in the output report.
- We realized that the only differences between each languages templates were primarily the data labels. So why not pull them from the database as well as the data.
- This allows us to have a single report and a single template to support 10+ languages.



Label Data (cont)

- Some sample label data

LOOKUP_TYPE	LOOKUP_CODE	LANGUAGE	ORG_ID	DOCUMENT_TYPE	LOOKUP_MEANING	LOOKUP_DESCRIPTION
LABELS	QUOTE_NUMBER	D			Angebot	
LABELS	QUOTE_NUMBER	DK			Quotation	
LABELS	QUOTE_NUMBER	F			Nombre de devis	
LABELS	QUOTE_NUMBER	I			Oggetto	
LABELS	QUOTE_NUMBER	NL			Quotation	
LABELS	QUOTE_NUMBER	S			Giltig till	
LABELS	QUOTE_NUMBER	US			Quotation	

- This also allows use to leverage the translation of a data element across multiple documents.
- While also allowing some translations to be specific to a OU and Document.

Summary

- By using the custom solution we have been able to support multiple languages in external facing document.
- This is working with a minimal amount of tweaks.
- However there are some Gotcha's we have run into.

Tips, Tricks and Gotcha's

- The following are an assortment of Tips, Tricks and Gotcha's that I have run into while having to deal with MLS and the Oracle E-Business Suite.

Gotcha: Where did my data go?

- You run the following query using the exact same DB user on one PC and you get records but from another PC you get no records.

```
select APPLICATION_NAME
  from FND_APPLICATION_VL;
```

- Views that display translation data do so using the following condition:
`t.LANGUAGE = USERENV('LANG')`
- On the two PC's you have a different NLS_LANG set, verify with the following:

```
select USERENV('LANG') from dual;
```

- NLS_LANG is composed of three components
<language>_<territory>.<characterset>
PC1 was set to AMERICAN_AMERICA.WE8MSWIN1252
PC2 was set to GERMAN_GERMANY.WE8MSWIN1252

- Fix:
PC2 set to AMERICAN_GERMANY.WE8MSWIN1252
regedit
HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\KEY_OraClient10g_home1\NLS_LANG

Gotcha: ORA-01722: invalid number

- Users have the ability to set their own decimal and thousands separator in the General Preferences
 - US Style 1,000.00
 - European Style 1.000,00
- This extends beyond their forms session to concurrent programs they run
- So if you have a program that needs to convert a string to a number you have to keep this in mind
- Also this gets more complicated with interfaces to external system that the users might run

Gotcha: Countries in Addresses

- The address country field in the OraApps comes from a predefined list of values
- The translations for the country names are the English translation
German -> Deutschland
- Deutschland is not a valid list of values so you would need to create a custom translation table entry for this

Gotcha: Dates

- Date mask differences exist
01-DEC-2010 -> 01.01.2010
- Not only is the date mask convention different but the character based terms need conversion
December -> Dezember
So:
01-DEC-2010 -> 01-DEZ-2010
- This is a database function so the only workaround is use NLS parameters on the function calls (to be covered later)

T&T: DB NLS Settings

The following query will dump out your current DB NLS Settings

```
select *  
  from NLS_DATABASE_PARAMETERS  
 order by 1;
```

PARAMETER	VALUE
NLS_CALENDAR	GREGORIAN
NLS_CHARACTERSET	AL32UTF8
NLS_COMP	BINARY
NLS_CSMIG_SCHEMA_VERSION	5
NLS_CURRENCY	\$
NLS_DATE_FORMAT	DD-MON-RR
NLS_DATE_LANGUAGE	AMERICAN
NLS_DUAL_CURRENCY	\$
NLS_ISO_CURRENCY	AMERICA
NLS_LANGUAGE	AMERICAN
NLS_LENGTH_SEMANTICS	BYTE
NLS_NCHAR_CHARACTERSET	AL16UTF16
NLS_NCHAR_CONV_EXCP	FALSE
NLS_NUMERIC_CHARACTERS	.,
NLS_RDBMS_VERSION	10.2.0.3.0
NLS_SORT	BINARY
NLS_TERRITORY	AMERICA
NLS_TIMESTAMP_FORMAT	DD-MON-RR HH.MI.SSXXF AM
NLS_TIMESTAMP_TZ_FORMAT	DD-MON-RR HH.MI.SSXXF AM TZR
NLS_TIME_FORMAT	HH.MI.SSXXF AM
NLS_TIME_TZ_FORMAT	HH.MI.SSXXF AM TZR

T&T: Multi-Byte Characters

- Characters in a AL32UTF8 database are encoded in 1 to 4 bytes.
- VARCHAR2(100)
 - Typically means 100 bytes of data, not 100 characters
 - This can result in database errors related to data being too large for a given column
 - This can also be specified with VARCHAR2(100 BYTE) or VARCHAR2(100 CHAR)
 - This can be changed globally for an instance using the initialization parameter NLS_LENGTH_SEMANTICS
- SUBSTR(MY_STRING,4,10)
 - Typically means start at byte 4 return next 10 bytes (based on NLS_LENGTH_SEMANTICS)
 - This will result in a hopelessly scrambled return value in a multi-byte DB if not careful
 - Developers should use specific functions to ensure no ambiguity
SUBSTRC this will return based on characters
 - This applies to other string functions LENGTH, INSTR
- LIKE condition
 - There is a LIKEC version that correctly handles different string lengths based on encoding

T&T: TO_NUMBER

- Users in the OraApps have the ability to specify their own NLS_NUMERIC_CHARACTERS using the Preferences.
- If you convert a string to number it will use the users NLS_NUMERIC_CHARACTERS setting, even if this is run under a concurrent request.
- You can override this by specifying an NLS string when calling the function.

```
TO_NUMBER ('13.000,00', '99G999D99', 'nls_numeric_characters = ",. "')
```

Where:

'99G999D99' – The format mask for the number

'nls_numeric_characters = ",. "' – The thousands and decimal separator to be used

T&T: Other NLS Parameters in Functions

- TO_DATE
 - NLS_DATE_LANGUAGE
 - NLS_CALENDAR
- TO_NUMBER
 - NLS_NUMERIC_CHARACTERS
 - NLS_CURRENCY
 - NLS_DUAL_CURRENCY
 - NLS_ISO_CURRENCY
- TO_CHAR
 - NLS_DATE_LANGUAGE
 - NLS_NUMERIC_CHARACTERS
 - NLS_CURRENCY
 - NLS_ISO_CURRENCY
 - NLS_DUAL_CURRENCY
 - NLS_CALENDAR
- TO_NCHAR
 - NLS_DATE_LANGUAGE
 - NLS_NUMERIC_CHARACTERS
 - NLS_CURRENCY
 - NLS_ISO_CURRENCY
 - NLS_DUAL_CURRENCY
 - NLS_CALENDAR
- NLS_UPPER
 - NLS_SORT
- NLS_LOWER
 - NLS_SORT
- NLS_INITCAP
 - NLS_SORT
- NLSSORT
 - NLS_SORT

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