Oracle E-Business Suite on Oracle RAC and Oracle VM: Architecture and Implementation

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AGENDA

- Introduction
- Dell Oracle Grid Infrastructure Project
- Oracle EBS R12 on the Grid: Architecture Design
- Oracle EBS R12 Implementation on RAC and OVM
- Oracle EBS R12 Fast Deployment on OVM
- Summary
- QA

ABOUT AUTHORS

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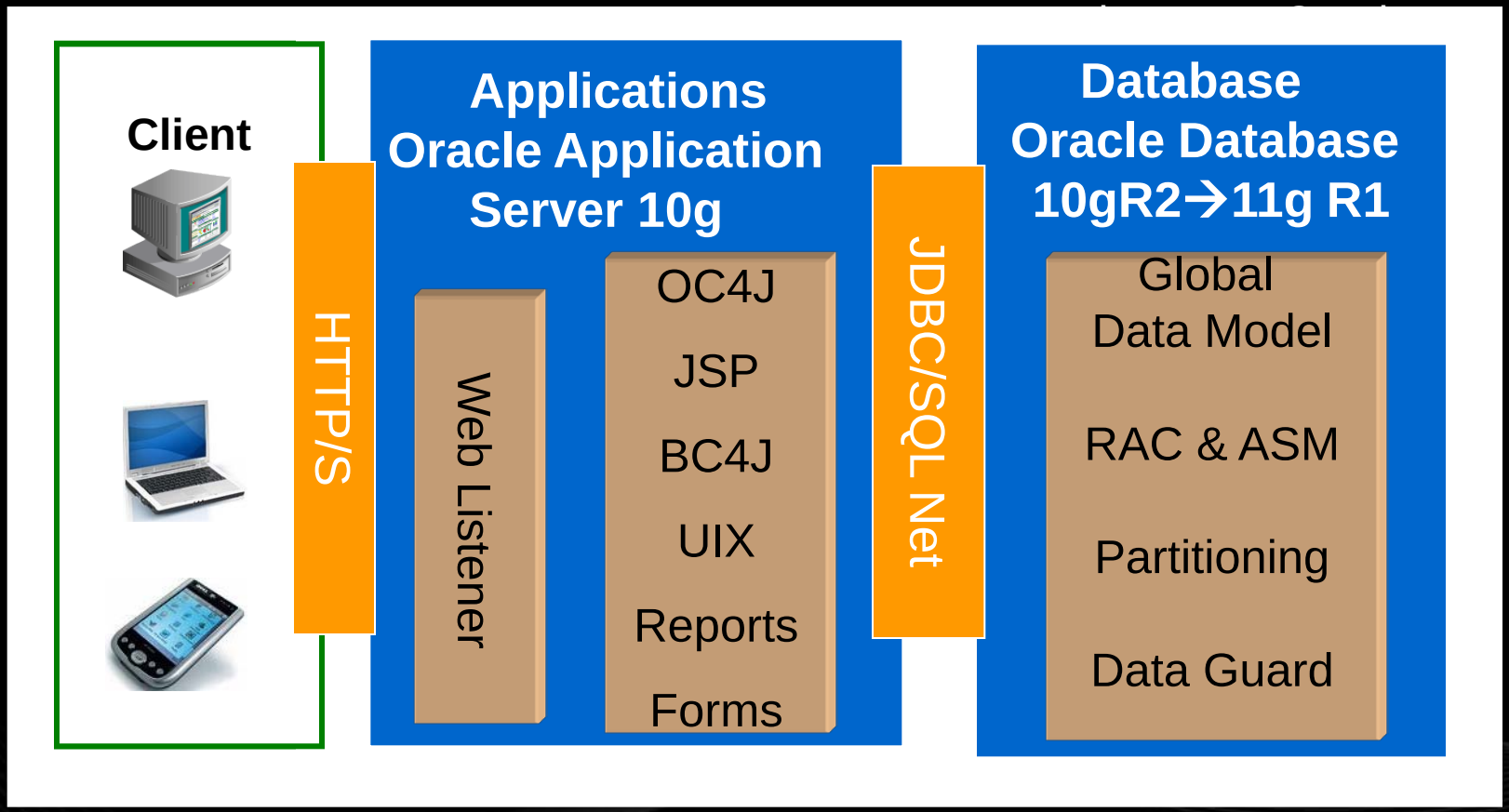
  - 14 years Oracle DBA and Solutions Engineering
  - Specialized in Oracle RAC, Oracle EBS and OVM
  - Oracle Technology Article author and frequent presenter at OOW 06/07/08/09 and Collaborate 08/09
  - IOUG Oracle RAC SIG President

- John Tao

  Lead Oracle Applications DBA, Dell GDBMS
  - Lead for Dell Oracle Apps DBA team
  - Specialized in Oracle RDBMS, RAC, Data Guard, EBS 11i and R12

INTRODUCTION TO ORACLE EBS R12

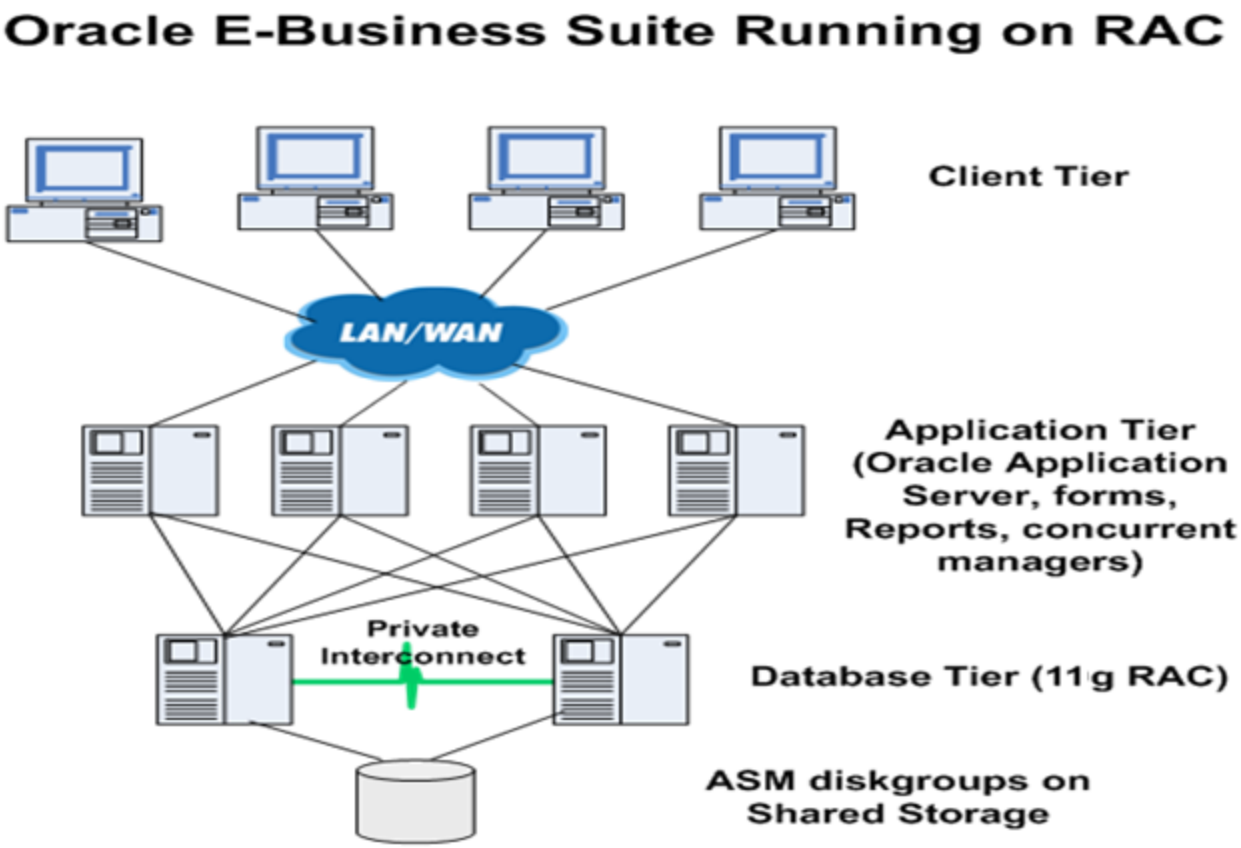
Oracle E-Business Suite R12 Architecture



ORACLE E-BUSINESS SUITE ON RAC: ARCHITECTURE

- RAC: Real Application cluster
  - Multiple instances running on many nodes interconnected by high speed private network share a single database
  - All Instances can execute transactions simultaneously on the single database using cache fusion for node synchronization
- Automatic Storage management (ASM)
  - A integrated file system and volume manager
  - Spread data evenly on disks; automatically rebalance
  - Easy management of file system
  - Provide shared storage for RAC nodes
- Oracle EBS Applications on RAC and ASM
  - Multiple RAC instances for the EBS database on the Database Tier
  - Applications tier nodes connect to multiple database instances
  - RAC provides HA, high scalability and load balancing
  - Oracle EBS Rapid install doesn't support RAC/ASM;
  - Additional Hardware and License cost for RAC
  - Multiple manual steps needed including rconfig utility and autoconfig for RAC/ASM conversion

ORACLE E-BUSINESS SUITE ON RAC: ARCHITECTURE

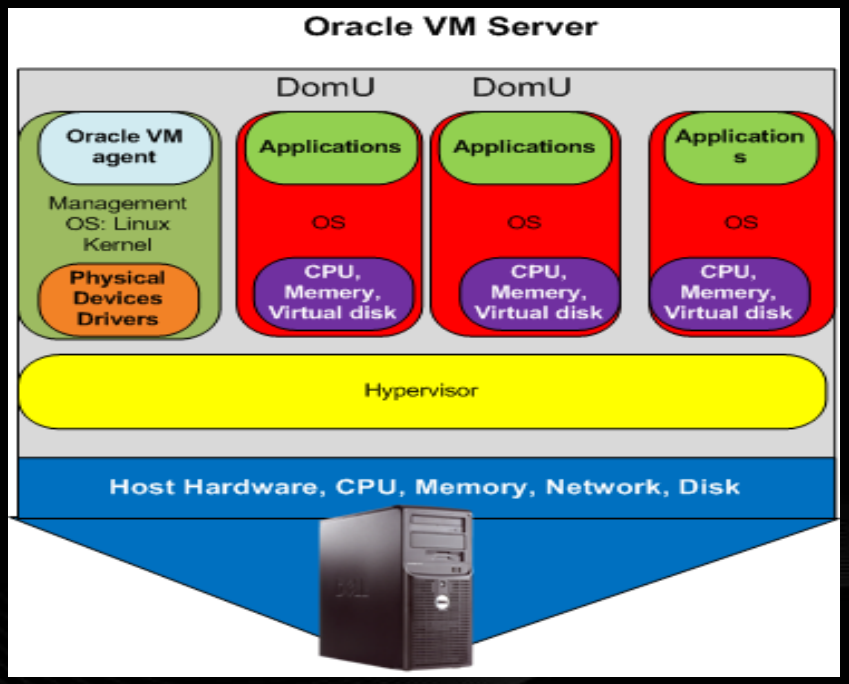


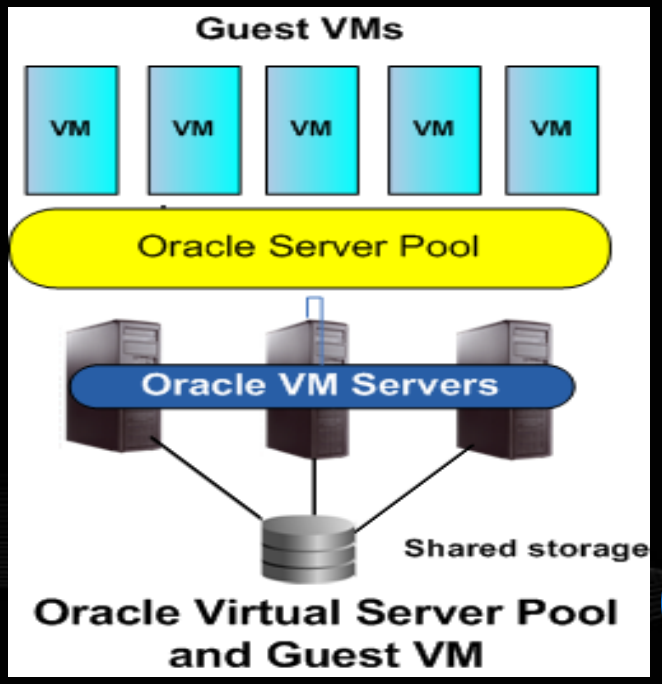
ORACLE VM: ORACLE SERVER VIRTUALIZATION TECHNOLOGY

- Benefit of Oracle Virtualization
  - Server consolidation: increasing hardware utilization and reducing physical servers needed
  - Isolation: Virtual machines can't effect each other
  - High performance server virtualization
  - Fast deployment through pre-configured Oracle VM template
  - Centralized management solutions
  - Combined benefits of Grid Computing and server virtualization
- Certificated Oracle products on OVM
  - Oracle Databases, RAC, Oracle apps server/Middleware
  - Oracle E-Business Suite:
    - 11.5.10 CU2 or later with 11i.ATG_PF.H.RUP5
    - 12.0.2 RUP2 or later for Linux x86.
    - 12.0.3 or up, OEL/RHEL 4.7/ OVM 2.1.2 or up Linux x86-64.
    - 12.0.4 or later, OEL/RHEL 5.2, OVM 2.1.2 for Linux x86-64
    - Latest Certification: Metalink Note: 465915.1

ORACLE VM: ORACLE SERVER VIRTUALIZATION TECHNOLOGY

- Oracle VM Technology
  - Virtual Server: Xen Hypervisor, management domain dom0 Linux kernel with support of devices, IO, networking, etc.
  - Virtual Server Pool: an autonomous region of VM servers
  - VM: guest OS with applications running on domU



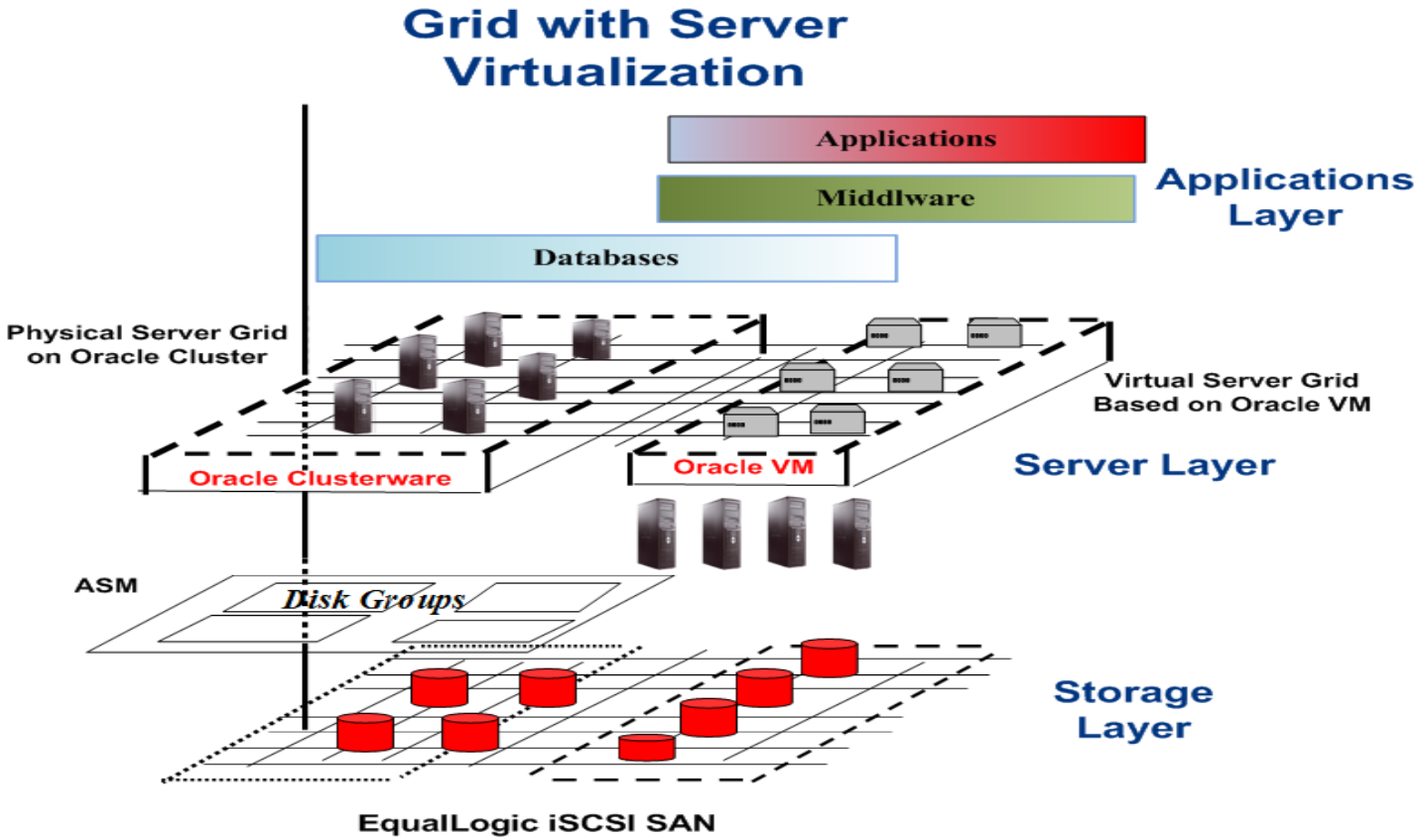


DELL ORACLE GRID REFERENCE POC PROJECT: COMBING RAC AND VM

- Grid Reference POC Project
  - POC Project Goal:
    - Expand the Grid to include physical Grid and Virtual Grid
    - Implement the Grid on Commodity hardware and SAN storage
    - Consolidate multiple multi-tier applications in a single Grid
    - Implementation details refer to OOW: S308185, 5-6pm,10/14
- Grid Architecture
  - Physical Grid: 8 + nodes Oracle 11g RAC to provide multiple database services
  - Virtual Grid: a set of virtual machines on Oracle VM server pool based on Oracle VM servers running on Dell Blades
  - Grid control as the unified management
- Grid Hardware Platform:
  - Commodity Hardware: Dell Blade Servers:
  - Shared SAN storage: Dell EqualLogic iSCSI storage

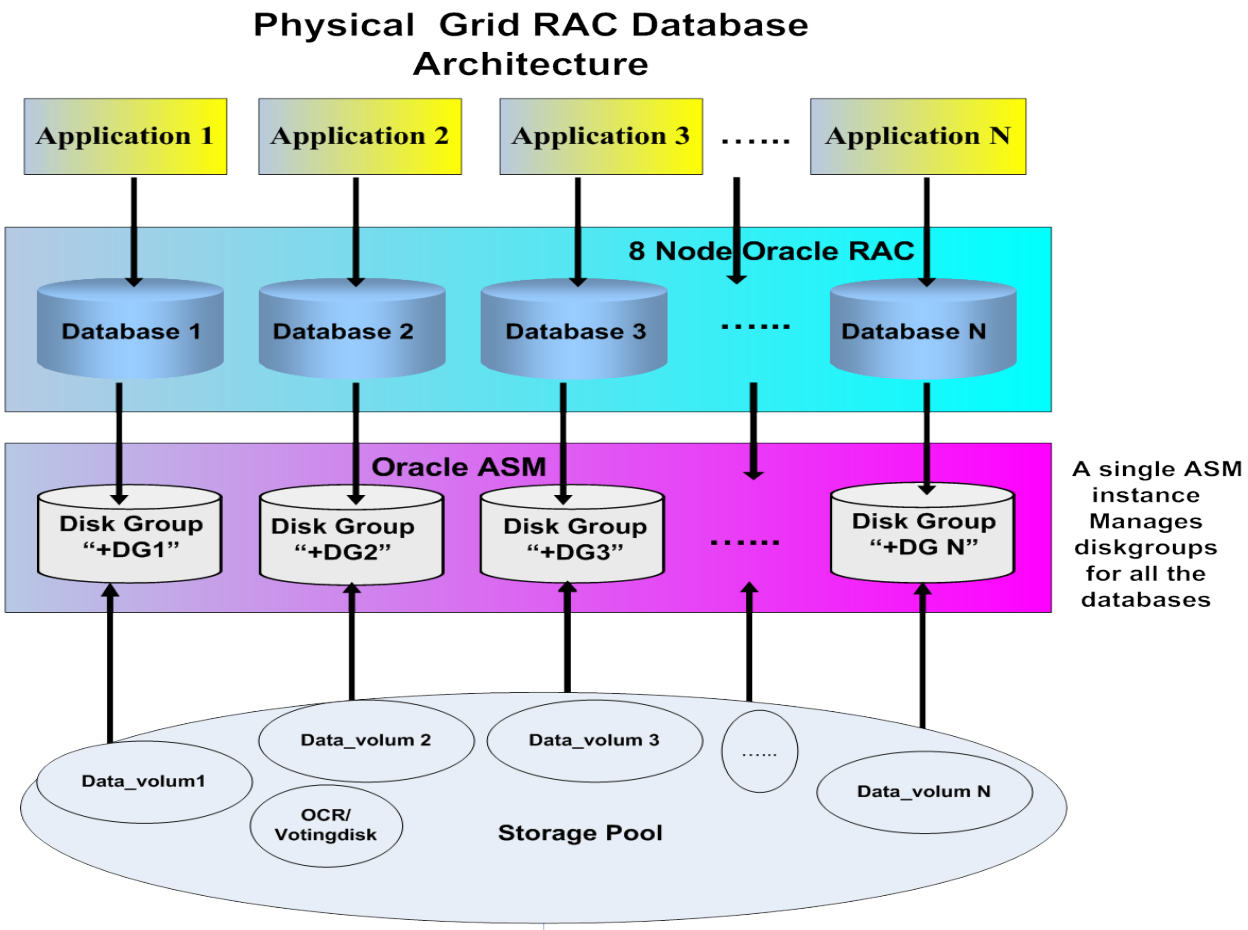
DELL ORACLE GRID REFERENCE POC PROJECT: COMBING RAC AND VM

- Grid Infrastructure



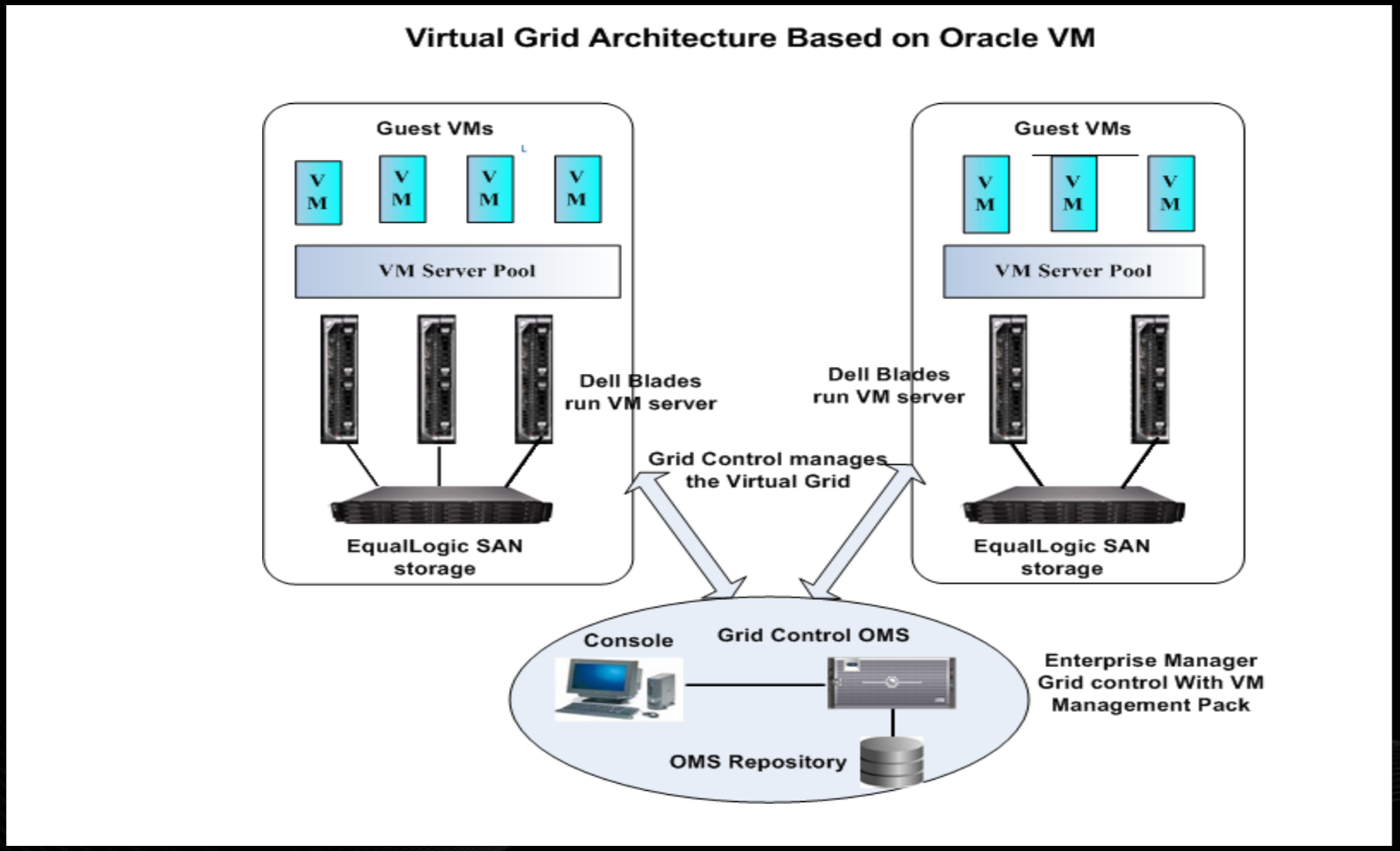
DELL ORACLE GRID REFERENCE POC PROJECT: COMBING RAC AND VM

- Physical Grid Architecture



DELL ORACLE GRID REFERENCE POC PROJECT: COMBING RAC AND VM

- Virtual Grid Architecture



DELL ORACLE GRID REFERENCE POC PROJECT: COMBING RAC AND VM

- Consolidate enterprise applications on the Grid
  - Applications and middleware on the virtual Grid
    - Create a guest VM using Oracle OEL 5.2 template
    - Deploy application on the guest VM
    - Build the VM template of the VM
    - Create new guest VMs based on the VM template
  - Deploy database service on the physical Grid
    - Provision adequate size of storage volume from SAN
    - Make the volume accessible to all the physical Grid Nodes
    - Create the ASM diskgroup
    - Create database service on the ASM diskgroup
    - Create application database schema on the database
    - Establish the application database connections
  - Deploy DEV/Test Application suite on the virtual Grid
    - Multi-tier nodes are on the VMs
    - Fast deployment based on templates

DELL ORACLE GRID REFERENCE POC PROJECT: COMBING RAC AND VM

- Methods to deploy applications on the virtual Grid
  - Deploy applications based on pre-built apps templates
    - Register the pre-build application template
    - Create guest VMs based on the template
    - Customize the guest VM and establish application env
    - Build the VM templates of the application
  - Deploy applications without pre-build apps templates
    - Create the guest VM using an OS VM template
    - Deploy the applications/middleware/DB on VMs
    - Create VM templates for the application
  - Deploy applications by importing virtual machine images
    - Copy the virtual machine image files to /OVS/running_pool
    - Import the image files to the VM server pool

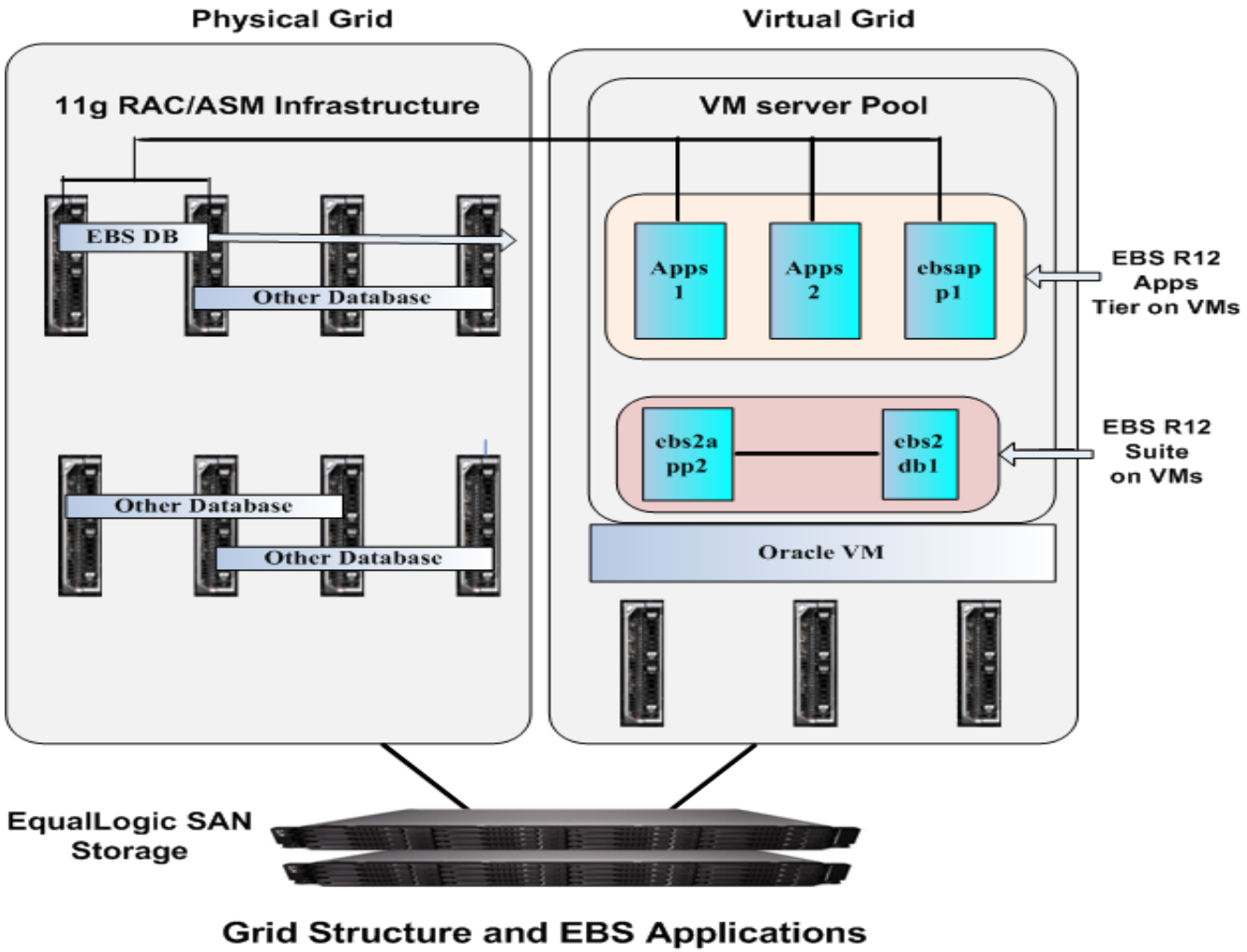
ORACLE EBS R12 ON THE GRID: ARCHITECTURE DESIGN

- Deploy Oracle EBS R12 Suite on RAC/VM
  - Create applications tier nodes on the pre-built virtual Grid
    - Three applications tier nodes on three VM on the virtual Grid
    - OS: Oracle Enterprise Linux 5.2 64 bit
    - Virtual CPU: 2, Virtual Memory: 2GB, Virtual disk: 13 GB for OS disk and Instance_top, 60GB for shared appl_top for first node
    - Oracle E-Business suite R12 *12.0.0.4 with patches*
    - *Shared appl_top and flexible t*o add more VMs for Apps nodes
  - Database tier on the physical Grid
    - Use pre-built 8 node 11g RAC infrasturecture
    - Allocate two node RAC EBS database, expansion to more nodes
    - ASM instances provides the storage virtualization
    - EBS applications nodes on virtual Grid connect the database services on physical grid
    - 150 GB data volume allocated on EqualLogic SAN storage

ORACLE EBS R12 ON THE GRID: ARCHITECTURE DESIGN

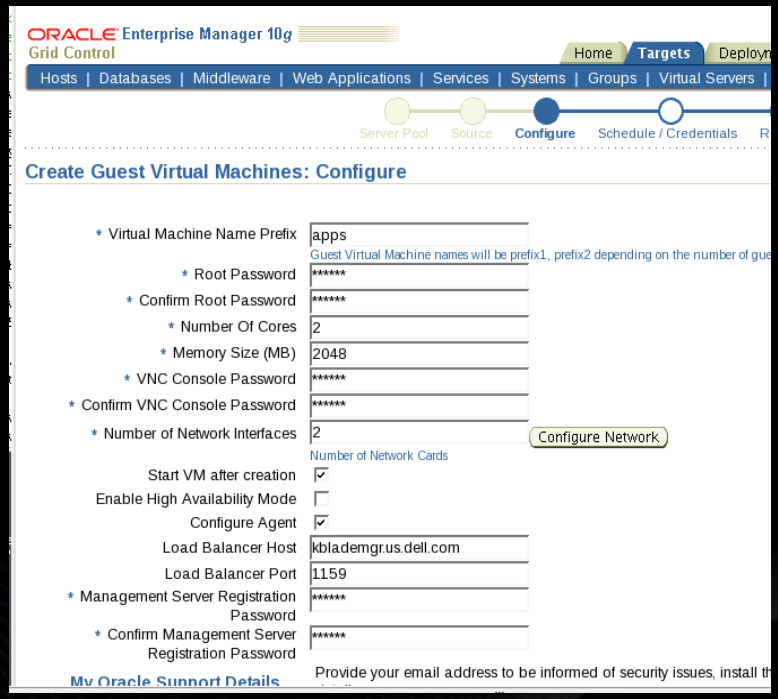
- How to scale out the EBS suite
  - Add more Apps nodes by creating VMs using the Apps template
  - Expand the database tier to additional RAC nodes
- Oracle EBS R12 Dev/Test Instance on the Virtual Grid
  - Both Apps tier and Database tier nodes on Virtual Machines
    - Reduce the physical servers for DEV/Test EBS instances
    - OS: Oracle Enterprise Linux 5.2 64 bit
      Virtual CPU: 2, Virtual Memory: 2GB,
      Virtual disk: DB: 13 GB for OS disk, 60 GB for database files
      Apps: 13 GB for OS disk, 40 GB for Application files
    - Oracle E-Business suite R12 12.0.0.4 with patches
    - Create Applications node template and Database node template
    - Deploy additional EBS suite based on the Apps/ DB templates

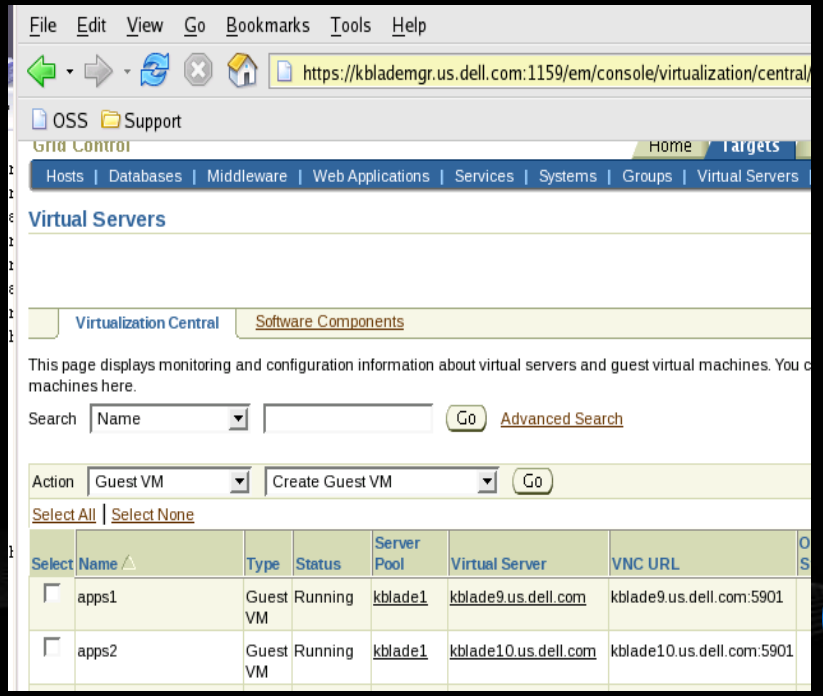
ORACLE EBS R12 ON THE GRID: ARCHITECTURE DESIGN



ORACLE EBS R12 ON THE GRID IMPLEMENTATION: PREPARING ENVIRONMENT

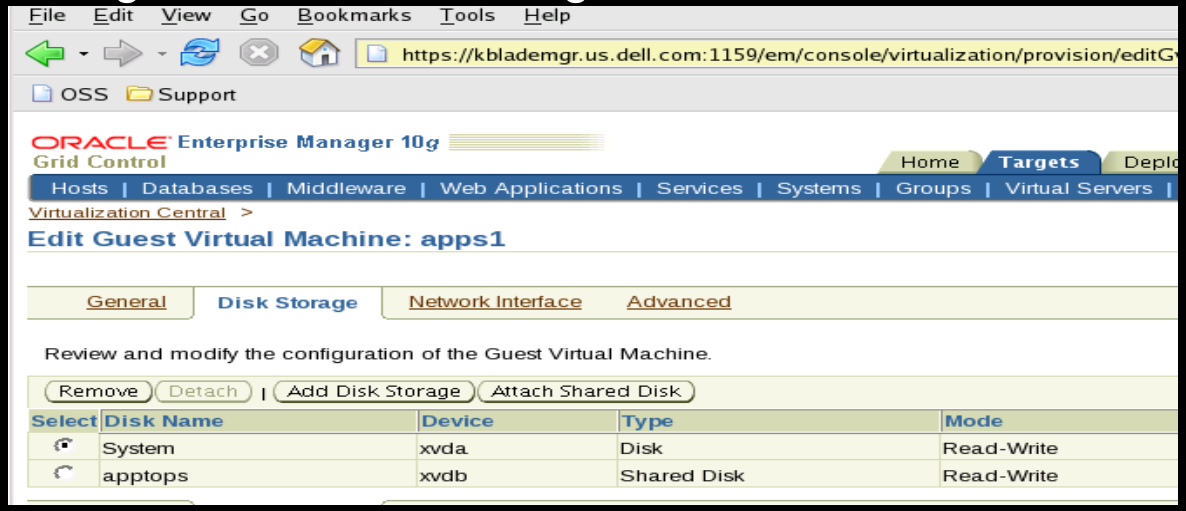
- Prepare the VMs on virtual Grid for EBS RAC/ VM Implementation:
  - Create Two VMs for Applications tier.
    - Create two guest VMs using Oracle OEL5.2 64 bit VM template
    - Use Enterprise Manager VM Management pack





ORACLE EBS R12 ON THE GRID IMPLEMENTATION: PREPARING ENVIRONMENT

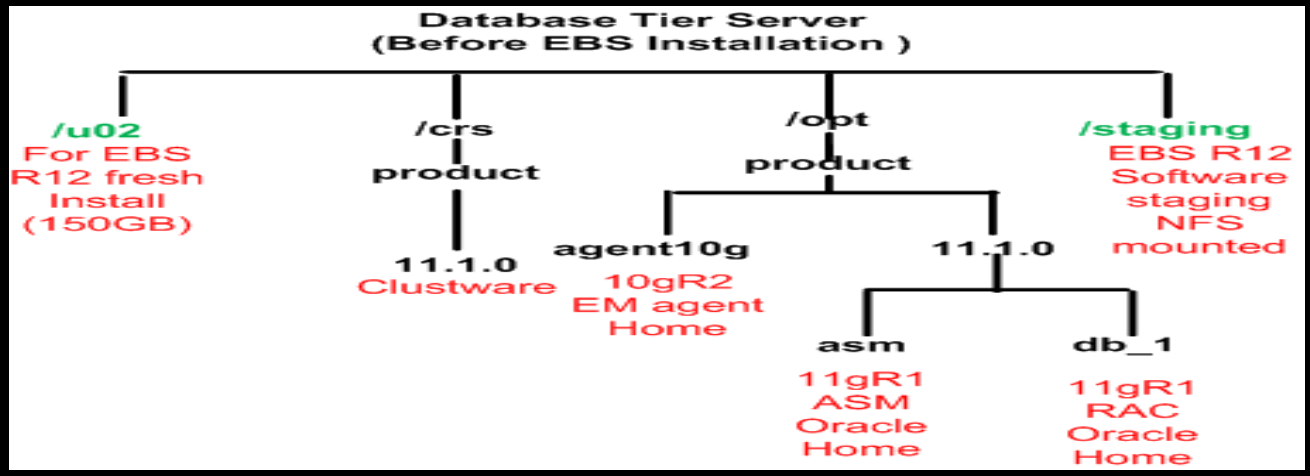
- Prepare the VMs on Virtual Grid for EBS
  - Assign the resources to guest VMs OS:



  - Configure file system on apps tier node 1 ebsapp1:
    virtual disks: system→/dev/xvda1 for guest VM
    appltops → /dev/xvdb1: as the shared appl_top
  - NFS mounted shared appl_top on other apps node ebsapp2:
  - OS kernel parameters, required packages, software, OS users

ORACLE EBS R12 ON THE GRID IMPLEMENTATION: PREPARING ENVIRONMENT

- Prepare 11g RAC nodes on Physical Grid for EBS RAC/ VM Implementation:
  - 11g RAC infrastructure :
    - File systems of DB node of 11g RAC

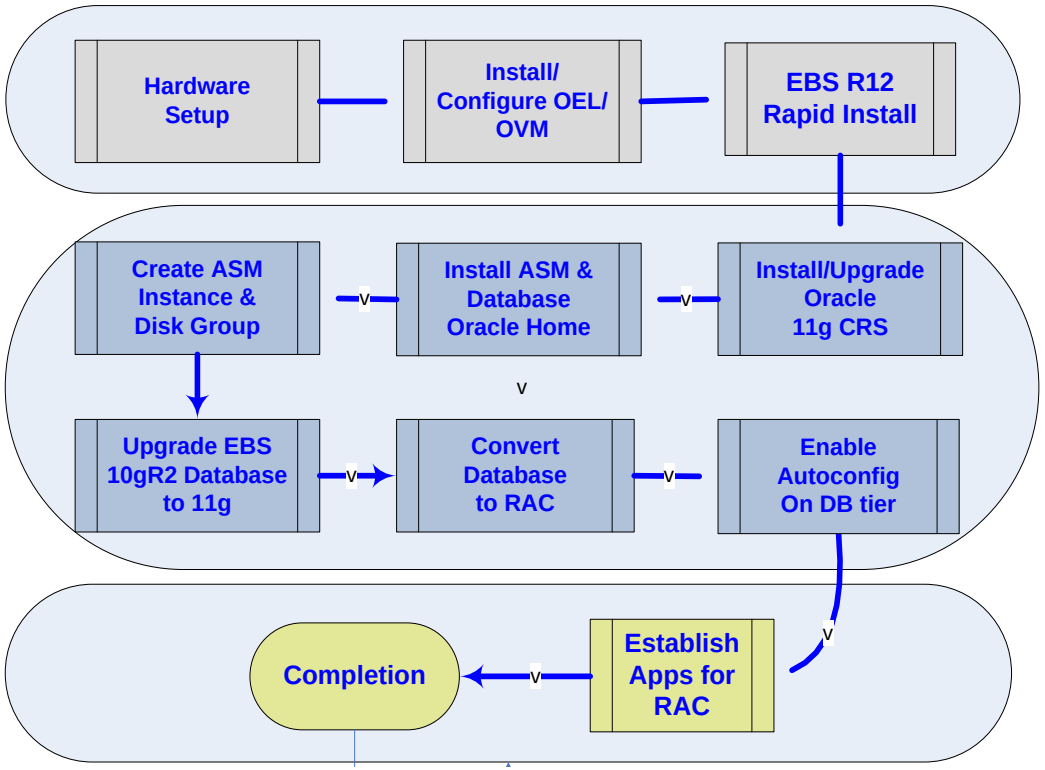


    - Prepare additional storage:

      /u02: 150GB for fresh install, /staging EBS software NFS mounted
  - Storage for EBS database: allocated 150GB storage to create partition: /dev/mapper/data3p1 and create ASM diskgroup data3 on it

ORACLE EBS R12 ON THE GRID IMPLEMENTATION: R12 RAPID INSTALL

Implementation of Oracle EBS R12



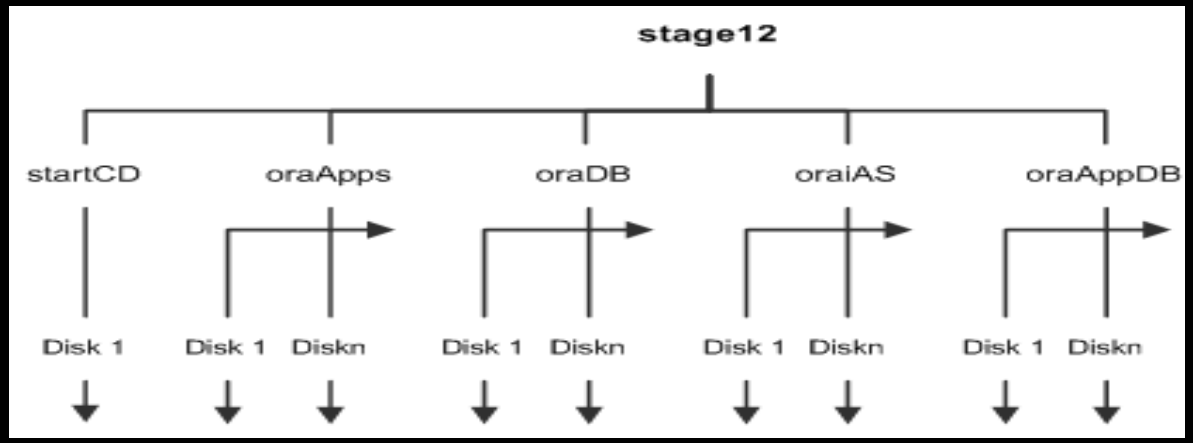
EBS R12 Fresh Install

11g Database Upgrade and RAC/ASM Conversion

Establish Applications For RAC DB

ORACLE EBS R12 ON THE GRID IMPLEMENTATION: R12 RAPID INSTALL

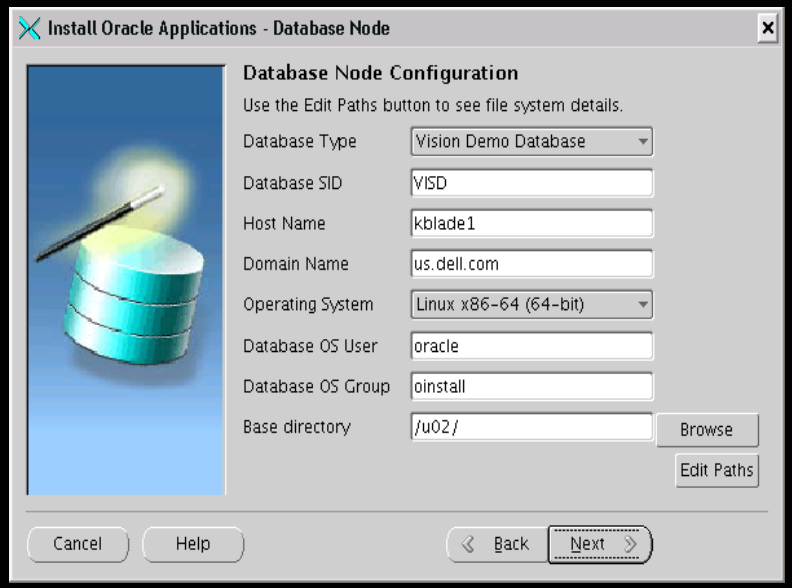
- Staging Area Layout:

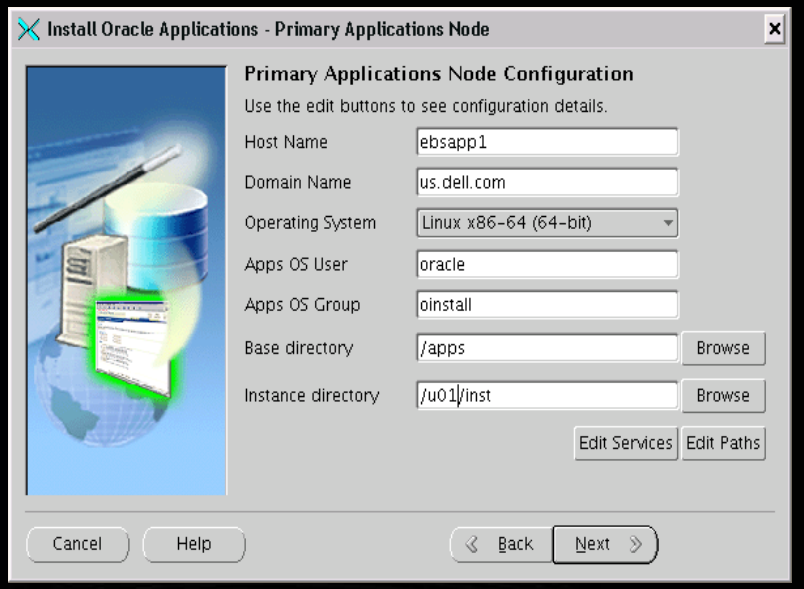



```
[oracle@kblade1 R12]$ ls -ltr /staging/staging/R12/
drwxr-xr-x  7 e a      4096 Jul 24 16:58 startCD
drwxr-xr-x 11 e a      4096 Jul 24 19:02 oraApps
drwxr-xr-x  7 e a      4096 Jul 24 19:13 oraDB
drwxr-xr-x  5 e a      4096 Jul 24 19:06 oraAS
drwxr-xr-x 50 e a      4096 Jul 24 18:48 oraAppDB
drwxr-xr-x  1 e a      4816 Jul 24 19:06 Patches
drwxr-xr-x  6 e a      4096 Jul 24 20:50 examples
```

ORACLE EBS R12 ON THE GRID IMPLEMENTATION: R12 RAPID INSTALL

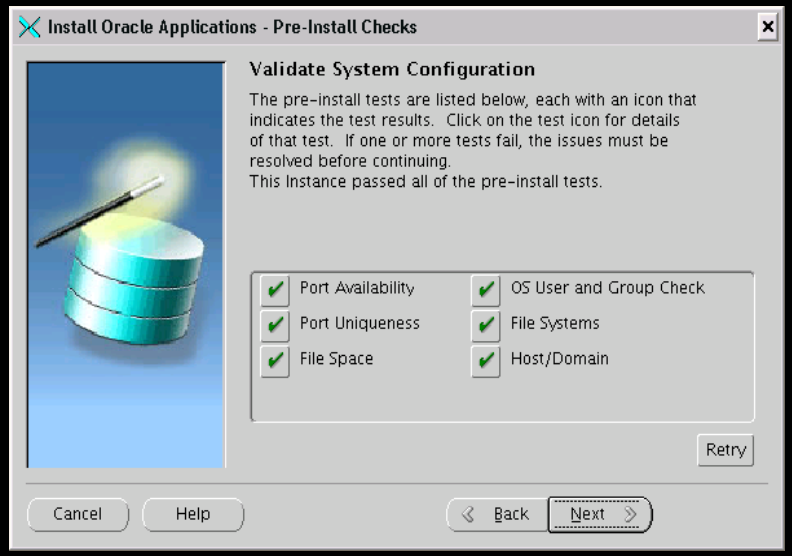
- Define all the configuration details for both DB and Apps Server

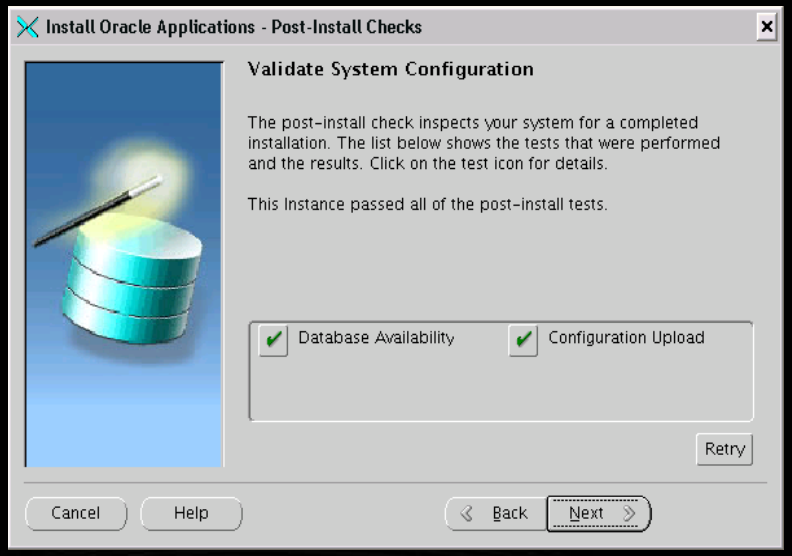




ORACLE EBS R12 ON THE GRID IMPLEMENTATION: R12 RAPID INSTALL

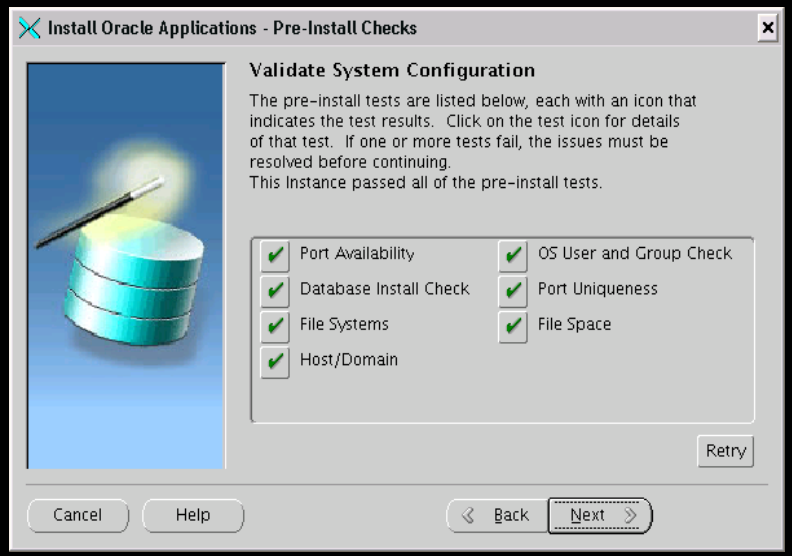
- Make Sure the Pre-Install Check and Post-Install Tests all Passed

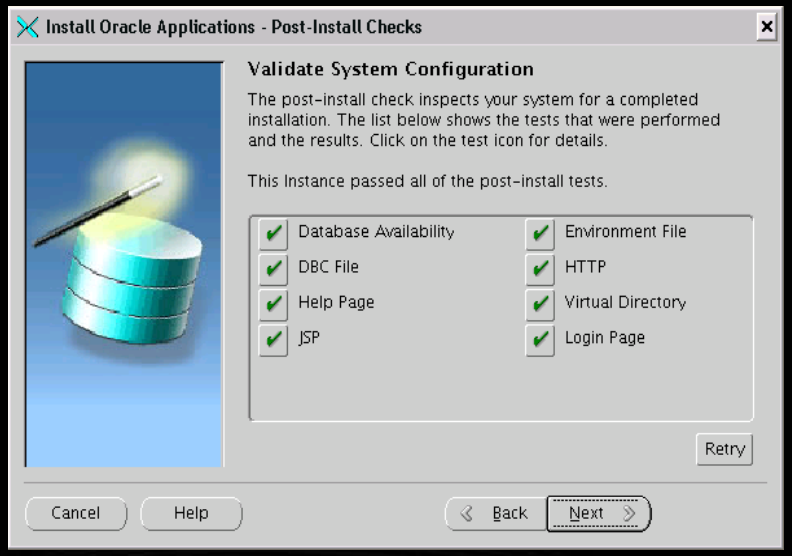




ORACLE EBS R12 ON THE GRID IMPLEMENTATION: R12 RAPID INSTALL

- Make Sure the Pre-Install Check and Post-Install Tests all Passed

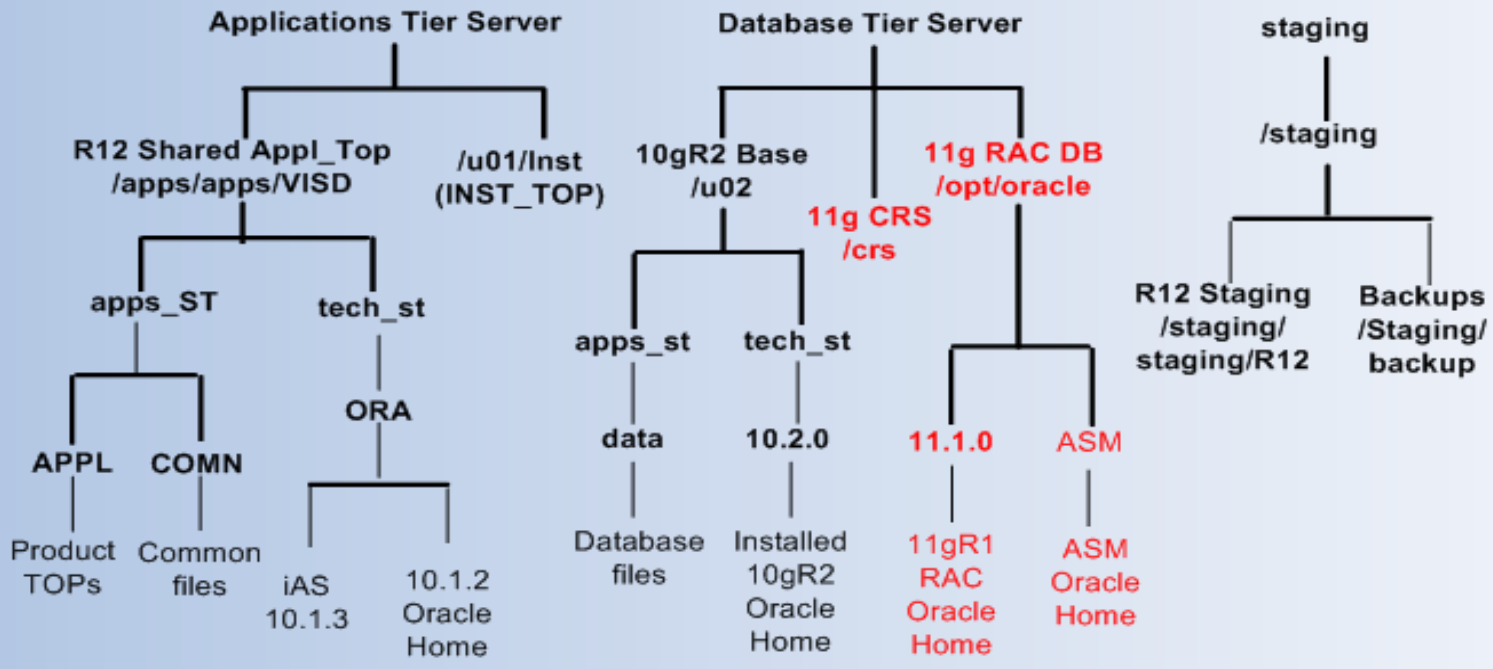




EBS R12 Fresh Install

Rapid Install EBS R12

- Database Node and Applications Node File Systems Layout:



- Fresh Install Results:
  A Complete working EBS R12 system:
  Database tier: single node; Oracle 10gR2 software and Database
  Applications tier: single node Applications file systems.

ORACLE EBS R12 ON THE GRID IMPLEMENTATION: SHARED APPL_TOP

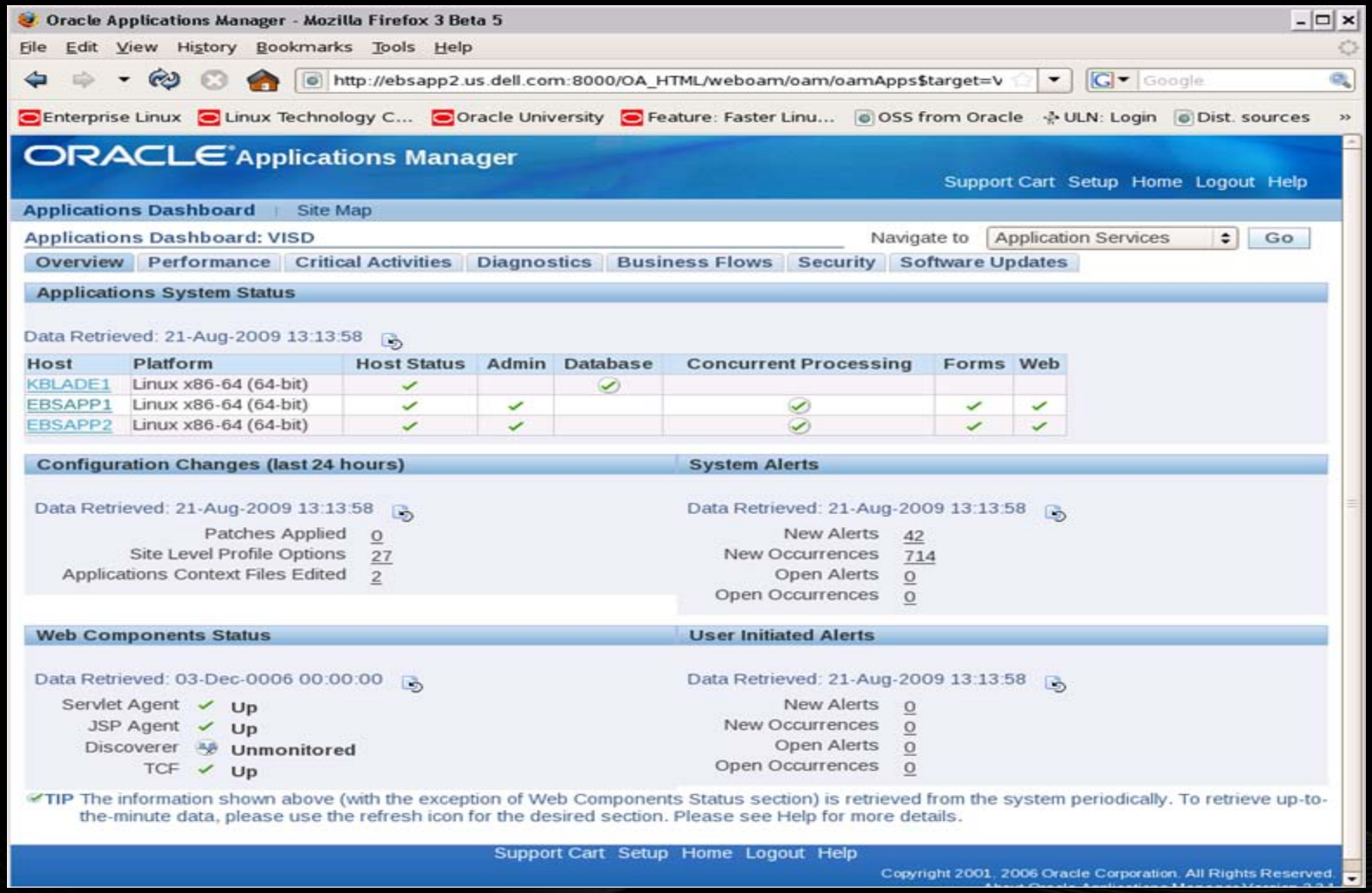
- Preparing the existing node:
  - Run adprecclone.pl and copy the context file to the new node

    [applmgr@ebsapp1 scripts]$ cdh $INST_TOP/admin/scripts
    [applmgr@ebsapp1 scripts]$ perl ./adpreclone.pl appsTier

- Configure the new node to be added:
  - Run adclonectx.pl to create a new context file for the new node to be added to the multi-node system.
  - Run the AutoConfig utility to generate the new Instance Home for this node and update the required tables in the database

    [applmgr@ebsapp2 bin]$ cd /apps/apps/apps_st/comn/clone/bin
    [applmgr@ebsapp2 bin]$ perl adclonectx.pl addnode contextfile=/u01/VISD_ebsapp1.xml

    [applmgr@ebsapp2 bin]$ cd /apps/apps/apps_st/appl/ad/12.0.0/bin
    [applmgr@ebsapp2 bin]$ perl /apps/apps/apps_st/appl/ad/12.0.0/bin/adconfig.pl contextfile=/u01/inst/apps/VISD_ebsapp2/appl/admin/VISD_ebsapp2.xml


Oracle Applications Manager - Mozilla Firefox 3 Beta 5
File Edit View History Bookmarks Tools Help
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Enterprise Linux
Linux Technology C...
Oracle University
Feature: Faster Linu...
OSS from Oracle
ULN: Login
Dist. sources
ORACLE Applications Manager
Support Cart Setup Home Logout Help
Applications Dashboard
Site Map
Applications Dashboard: VISD
Navigate to
Application Services
Go
Overview
Performance
Critical Activities
Diagnostics
Business Flows
Security
Software Updates
Applications System Status
Data Retrieved: 21-Aug-2009 13:13:58
Host
Platform
Host Status
Admin
Database
Concurrent Processing
Forms
Web
KBLADE1
Linux x86-64 (64-bit)
EBSAPP1
Linux x86-64 (64-bit)
EBSAPP2
Linux x86-64 (64-bit)
Configuration Changes (last 24 hours)
Data Retrieved: 21-Aug-2009 13:13:58
Patches Applied 0
Site Level Profile Options 27
Applications Context Files Edited 2
System Alerts
Data Retrieved: 21-Aug-2009 13:13:58
New Alerts 42
New Occurrences 714
Open Alerts 0
Open Occurrences 0
Web Components Status
Data Retrieved: 03-Dec-0006 00:00:00
Servlet Agent Up
JSP Agent Up
Discoverer Unmonitored
TCF Up
User Initiated Alerts
Data Retrieved: 21-Aug-2009 13:13:58
New Alerts 0
New Occurrences 0
Open Alerts 0
Open Occurrences 0
TIP The information shown above (with the exception of Web Components Status section) is retrieved from the system periodically. To retrieve up-to-the-minute data, please use the refresh icon for the desired section. Please see Help for more details.
Support Cart Setup Home Logout Help
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ORACLE EBS R12 ON THE GRID IMPLEMENTATION: EBS 11G DATABASE UPGRADE

- Pre-Upgrade steps
  - Shutdown the application server processes and database listener
  - Install ExampleCD in the 11g Oracle Home
  - Apply Interoperability DB patches for R12: 6598432, 6815733, 6991626, 7253531
  - Collecting Pre-Upgrade Information

    Copy $ORACLE_HOME/rdbms/admin/utlu111i.sql to /tmp

    Run the script and review the report to make sure the database is ready for upgrade
  - Run $ORACLE_HOME/nls/data/old/cr9idata.pl script to create the $ORACLE_HOME/nls/data/9idata directory

    $ perl $ORACLE_HOME/nls/data/old/cr9idata.pl
  - Check for the integrity of the source database prior to starting the upgrade by downloading and running dbupgdiag.sql script, then validating and resolve the invalid objects in sys and system
  - Check for TIMESTAMP WITH TIMEZONE Datatype

```
SQL> select * from v$timezone_file;

FILENAME            VERSION
------------        ----------
timezlrg.dat        4
```

ORACLE EBS R12 ON THE GRID IMPLEMENTATION: EBS 11G DATABASE UPGRADE

- Upgrade the database
  - Startup database as upgrade mode
  - Run $ORACLE_HOME/rdbms/admin/catupgrd.sql
  - Restart the database in normal mode and run post-upgrade scripts catuppst.sql
  - recompile all invalid objects with utlrp.sql
  - Run utlu111s.sql script for upgrade verification

ORACLE EBS R12 ON THE GRID IMPLEMENTATION: EBS 11G DATABASE UPGRADE

- Output of script utlu111s.sql:

```
SQL> spool utlu111s.log
SQL> @?/rdbms/admin/utlu111s.sql
Oracle Database 11.1 Post-Upgrade Status Tool           09-03-2009 18:41:12
Component                                       Status    Version     HH:MM:SS
Oracle Server
    ORA-01408: such column list already indexed VALID     11.1.0.7.0  00:26:14
JServer JAVA Virtual Machine                    VALID     11.1.0.7.0  00:13:08
Oracle Real Application Clusters                INVALID   11.1.0.7.0  00:00:01
OLAP Analytic Workspace                         VALID     11.1.0.7.0  00:00:16
OLAP Catalog                                    VALID     11.1.0.7.0  00:01:07
Oracle OLAP API                                 VALID     11.1.0.7.0  00:00:31
Oracle XDK                                      VALID     11.1.0.7.0  00:00:30
Oracle Text                                     VALID     11.1.0.7.0  00:01:18
Oracle XML Database                             VALID     11.1.0.7.0  01:20:42
Oracle Database Java Packages                   VALID     11.1.0.7.0  00:00:26
Oracle Multimedia                               VALID     11.1.0.7.0  00:03:32
Spatial                                         VALID     11.1.0.7.0  00:04:57
Gathering Statistics                                                  00:11:06
Total Upgrade Time: 02:23:59

PL/SQL procedure successfully completed.

SQL> spool off
```

ORACLE EBS R12 ON THE GRID IMPLEMENTATION: EBS 11G DATABASE UPGRADE

- Perform Post upgrade steps:
  - Start the new listener in the 11g Oracle Home
  - Copy the script adgrants.sql from Apps tier $APPL_TOP/admin and run it as sysdba in the DB node
  - Grant create procedure privilege on CTXSTS

    Copy the scripts adctxprv.sql from Apps tier $AD_TOP/patch/11g/sql and run it as APPS with the following command:

    $ sqlplus apps/<APPS password> @adctxprv.sql <SYSTEM password> CTXSYS
  - Validate Workflow ruleset

    On the Apps admin server node, run the script wfaqupfix.sql as APPLSYS with the following commend:

    $ sqlplus <APPLSYS user>/<APPLSYS password> @wfaqupfix.sql <APPLSYS user> <APPS user>
  - Gather statistics for sys schema

    Copy $APPL_TOP/admin/adstats.sql from the administration server node to the database server and run the script as sysdba in restricted mode
  - Re-create all custom database links

ORACLE EBS R12 ON THE GRID IMPLEMENTATION: EBS 11G DATABASE UPGRADE

- Implement and Run AutoConfig
  - Apply patch 6636108 on the apps tier
  - Run the admkappsutil.pl utility to create the file appsutil.zip in the <INST_TOP>/admin/out directory.

    perl <AD_TOP>/bin/admkappsutil.pl
  - Copy the appsutil.zip file from apps tier and unzip to the 11g $ORACLE_HOME
  - Build the new context file for dbtier using

    $ORACLE_HOME/appsutil/bin/adbldxml.pl tier=db
  - Run autoconfig on db tier and apps tier
- Re-create grants and synonyms for APPS with adadmin
- Restart the application services and run adpreclone on both DB and Apps tier

ORACLE EBS R12 ON THE GRID IMPLEMENTTAION: EBS 11G DATABASE RAC CONVERSION

- Prepare ConvertToRAC.xml
  - File Location: $ORACLE_HOME/assistants/rconfig/sampleXMLs
  - Edit parameters: Convert verify="NO" || “ONLY”
    SourceDBHome: /opt/oracle/product/11.1.0/db_1
    TargetDBHome: /opt/oracle/product/11.1.0/db_1
    SourceDBInfo SID: VISD
    RAC nodes: kblade1, kblade2;
    Instance Prefix: VISD;
    SharedStorage type: ASM
    TargetDatabaseArea: +DATA3
- Create new spfile in ASM
  - Create spfile =’+DATA3/spfilevisd.ora’ from pfile;
  - Link the init<SID>.ora to the spfile
  - Startup database instance with the spfile
  - Use netca to create local and remote listeners
- Run rconfig : $ORACLE_HOME/bin/rconfig ConvertToRAC.XML
  - Migrate the database to ASM storage
  - create DB instances
  - Configure Listener and NetServices
  - configure/register CRS
  - Start the instances on all nodes included in the conversion (kblade1 and kblade2)

ORACLE EBS R12 ON THE GRID IMPLEMENTTAION: EBS 11G DATABASE RAC CONVERSION

oracle@kblade1:/opt/oracle/product/11.1.0/db_1/assistants/rconfig/sampleXMLs

```
<?xml version="1.0" encoding="UTF-8"?>
<n:RConfig xmlns:n="http://www.oracle.com/rconfig"
           xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
           xsi:schemaLocation="http://www.oracle.com/rconfig">
    <n:ConvertToRAC>
<!-- Verify does a precheck to ensure all pre-requisites are met, before the conversion is attempted. Allowable
values are: YES|NO|ONLY -->
       <n:Convert verify="ONLY">
<!--Specify current OracleHome of non-rac database for SourceDBHome -->
             <n:SourceDBHome>/opt/oracle/product/11.1.0/db_1</n:SourceDBHome>
<!--Specify OracleHome where the rac database should be configured. It can be same as SourceDBHome -->
             <n:TargetDBHome>/opt/oracle/product/11.1.0/db_1</n:TargetDBHome>
<!--Specify SID of non-rac database and credential. User with sysdba role is required to perform conversion -->
             <n:SourceDBInfo SID="VISD">
               <n:Credentials>
                 <n:User>sys</n:User>
                 <n:Password>oracle</n:Password>
                 <n:Role>sysdba</n:Role>
               </n:Credentials>
             </n:SourceDBInfo>
<!--ASMInfo element is required only if the current non-rac database uses ASM Storage -->
             <n:ASMInfo SID="+ASM1">
               <n:Credentials>
                 <n:User>sys</n:User>
                 <n:Password>oracle</n:Password>
                 <n:Role>sysdba</n:Role>
               </n:Credentials>
             </n:ASMInfo>
<!--Specify the list of nodes that should have rac instances running. LocalNode should be the first node in this
 nodelist. -->
             <n:NodeList>
               <n:Node name="kblade1"/>
               <n:Node name="kblade2"/>
             </n:NodeList>
<!--Specify prefix for rac instances. It can be same as the instance name for non-rac database or different. The
 instance number will be attached to this prefix. -->
             <n:InstancePrefix>sales</n:InstancePrefix>
<!--Specify port for the listener to be configured for rac database.If port="", alistener existing on localhost
will be used for rac database.The listener will be extended to all nodes in the nodelist -->
             <n:Listener port="1521"/>
<!--Specify the type of storage to be used by rac database. Allowable values are CFS|ASM. The non-rac database s
hould have same storage type. -->
             <n:SharedStorage type="ASM">
<!--Specify Database Area Location to be configured for rac database.If this field is left empty, current storag
e will be used for rac database. For CFS, this field will have directory path. -->
               <n:TargetDatabaseArea>+DATA3</n:TargetDatabaseArea>
@
                                                                              1,38          Top
```

ORACLE EBS R12 ON THE GRID IMPLEMENTTAION: EBS 11G DATABASE RAC CONVERSION

- Enabling Autoconfig on Database Tier:
  - As the APPS user, de-register the current configuration by running the following command on the primary node:

    SQL> exec fnd_conc_clone.setup_clean;
  - Shutdown the application services and listener
  - From the 11gORACLE_HOME/appsutil/bin directory, create an instance-specific XML context file by executing the command with node 1 information

    adbldxml.pl tier=db appsuser=apps appspass=<APPSpwd>
  - Rename $ORACLE_HOME/dbs/init<instance_name>.ora to allow autoconfig to generate a new init file with RAC-specific parameters
  - execute AutoConfig script from the $ORACLE_HOME/appsutil/bin directory

    $ perl adconfig.pl
  - Rename the init file back to init<instance_name>.ora which points to the spfile in ASM with all the RAC-specific parameters

ORACLE EBS R12 ON THE GRID IMPLEMENTTAION: EBS 11G DATABASE RAC CONVERSION

- Enabling Autoconfig on Database Tier (cont')
  - Copy $ORACLE_HOME/appsutil from node 1 to node 2
  - execute AutoConfig script from the $ORACLE_HOME/appsutil/bin directory with the new context file for node 2

    adbldxml.pl tier=db appsuser=apps appspass=<APPSpwd>
  - From the 11gORACLE_HOME/appsutil/bin directory, create an instance-specific XML context file by executing the command with node 2 information
  - Run the autoconfig again on node 1 to update the database and configuration with node 2 information

- Register the TNS_ADMIN with CRS
  - As AutoConfig creates the listener and tnsnames files in a context directory and not in the $ORACLE_HOME/network/admin directory, the new TNS_ADMIN path must be updated in CRS with the commands for both nodes 1 and 2 after running autoconfig:

    srvctl setenv nodeapps -n <node > -t "TNS_ADMIN= <Full Path of ORACLE HOME>/network/admin/<context directory>"

    srvctl setenv instance -d <database> -i <instance> -t "TNS_ADMIN= <Full Path of ORACLE HOME>/network/admin/<context directory>"

- Run autoconfig on both nodes, then on node 1 again to update the database and configuration with the node 2 information

- Restart the database instances and listeners on both nodes

ORACLE EBS R12 ON THE GRID IMPLEMENTTAION: EBS 11G DATABASE RAC CONVERSION

- Establish the Application Environment for Oracle RAC
  - Run adconfig on all apps nodes
    - Set jdbc_url in the context_file to the instance of RAC Node1
    - Prepare tnsnames.ora to connect to RAC Node 1
    - Execute autocnfig:

      $AD_TOP/bin/adconfig.sh context_file=<context_name>.xml
    - Check tnsnames.ora in $INST_TOP/ora/10.1.2 and 10.1.3

      VISD_BALANCE=(DESCRIPTION=
      (ADDRESS_LIST=
      (LOAD_BALANCE=YES)
      (FAILOVER=YES)
      (ADDRESS=(PROTOCOL=tcp)(HOST=kblade1-vip.us.dell.com)(PORT=1521))
      (ADDRESS=(PROTOCOL=tcp)(HOST=kblade2-vip.us.dell.com)(PORT=1521))
      (CONNECT_DATA=(SERVICE_NAME=VISD)))
    - Verify VISD.dbc file in $FND_SECURE

      APPS_JDBC_URL=jdbc\:oracle\:thin\:@(DESCRIPTION\=(ADDRESS_LIST\=
      (LOAD_BALANCE\=YES)(FAILOVER\=YES) (ADDRESS\=(PROTOCOL\=tcp)
      (HOST\=kblade1-vip.us.dell.com)(PORT\=1521))(ADDRESS\=(PROTOCOL\=tcp)
      (HOST\=kblade2-vip.us.dell.com) (PORT\=1521)))(CONNECT_DATA\=(SERVICE_NAME\=VISD)))

ORACLE EBS R12 ON THE GRID IMPLEMENTTAION: EBS 11G DATABASE RAC CONVERSION

- Establish the Application Environment for Oracle RAC
  - Configure Load Balancing
    - edit context_file and set:

<TWO_TASK oa_var="s_tools_twotask" osd="unix">VISD_BALANCE</TWO_TASK> /*for Froms apps

<TWO_TASK oa_var="s_weboh_twotask" osd="unix">VISD_BALANCE</TWO_TASK> /* for self service apps

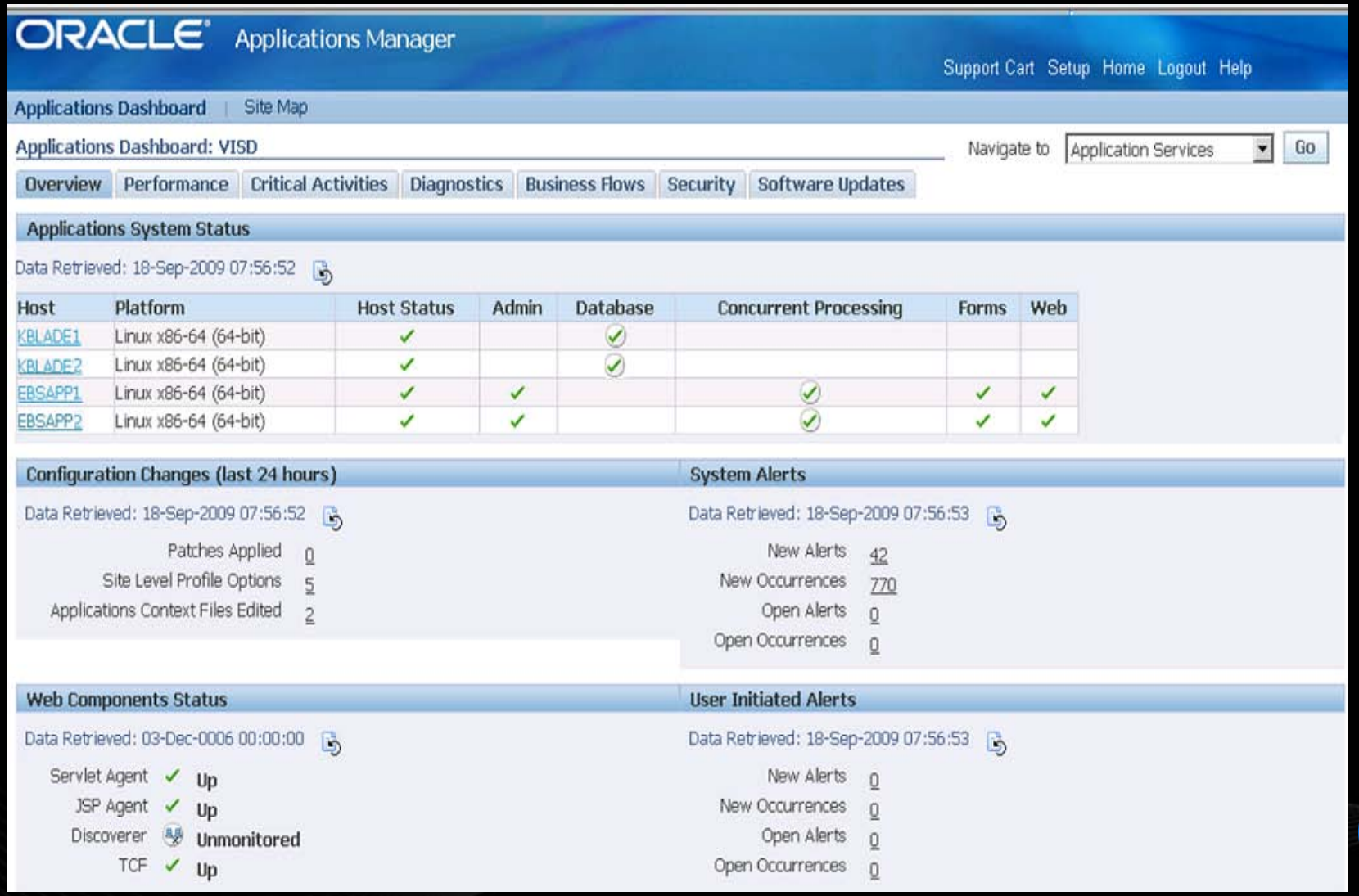
<jdbc_connect_alias oa_var="s_apps_jdbc_connect_alias">VISD_BALANCE</jdbc_connect_alias> /* for self service apps

    - Run autoconfig $AD_TOP/adconfig.sh
    - Profile option “Applications Database ID” to set the dbc file at $FND_SECURE

visd.dbc file: apps_jdbc_url session:

APPS_JDBC_URL=jdbc\:oracle\:thin\:@(DESCRIPTION\=(ADDRESS_LIST\=
(LOAD_BALANCE\=YES)(FAILOVER\=YES)(ADDRESS\=(PROTOCOL\=tcp)
(HOST\=kblade1vip.us.dell.com)(PORT\=1521))(ADDRESS\=(PROTOCOL\=tcp)
(HOST\=kblade2-vip.us.dell.com)(PORT\=1521)))(CONNECT_DATA\=
(SERVICE_NAME\=VISD)))

ORACLE EBS R12 ON THE GRID IMPLEMENTTAION: EBS 11G DATABASE RAC CONVERSION



ORACLE EBS R12 ON THE GRID IMPLEMENTTAION: SCALE OUT EBS SUITE

- Scale Out Database Tier : Expand the RAC Nodes
  - Enabling autoconfig on the new node to be added
    - Copy and clone the Oracle Home from existing node
    - execute AutoConfig script from the $ORACLE_HOME/appsutil/bin directory with the context file for the new node

      adbldxml.pl tier=db appsuser=apps appspass=<APPSpwd>
    - From the 11gORACLE_HOME/appsutil/bin directory, create an instance-specific XML context file by executing the command with the new node information
    - Run the autoconfig again on node 1 to update the database and configuration with node 2 information
  - Register the TNS_ADMIN with CRS
    - As AutoConfig creates the listener and tnsnames files in a context directory and not in the $ORACLE_HOME/network/admin directory, the new TNS_ADMIN path must be updated in CRS with the commands for the new node after running autoconfig:

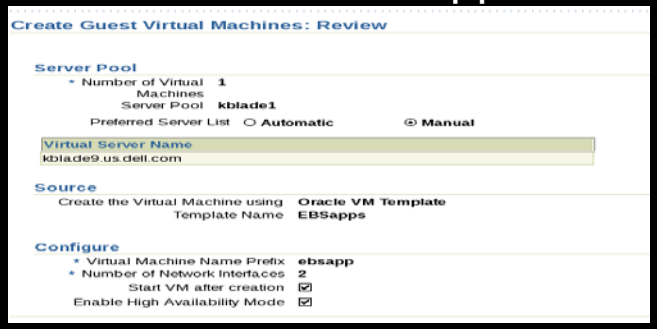
      srvctl setenv nodeapps -n <node > -t "TNS_ADMIN= <Full Path of ORACLE HOME> /network/admin/<context directory>"

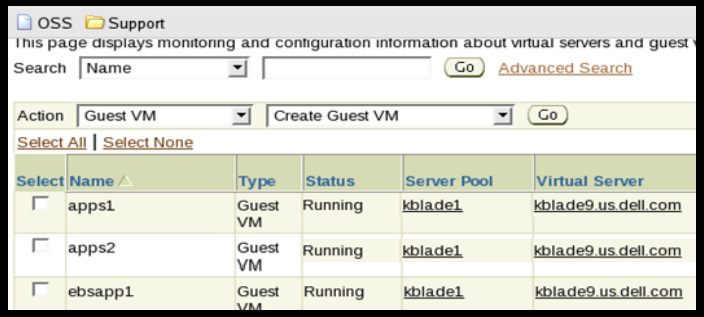
      srvctl setenv instance -d <database> -i <instance> -t "TNS_ADMIN= <Full Path of ORACLE HOME>/network/admin/<context directory>"
  - Run autoconfig on all DB nodes, then on all the nodes again except for the last node to update the database and configuration with the new node information

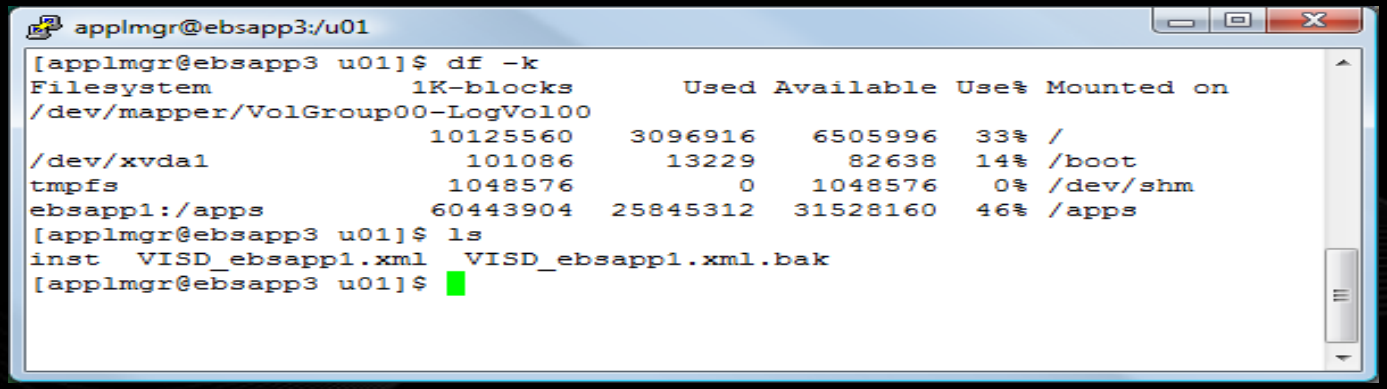
ORACLE EBS R12 ON THE GRID IMPLEMENTTAION: SCALE OUT EBS SUITE

- Scale Out Apps Tier: Adding An Apps Node
  - Create VM from template
    - Create the VM template ebsapp from the VM of Apps node 1

      Grid control→ Visual Central→save Guest VM as template
    - Create VM ebsapp1 for the third apps node from the template







ORACLE EBS R12 ON THE GRID IMPLEMENTTAION: SCALE OUT EBS SUITE

- Scale Out Apps Tier: Adding An Apps Node
  - Run Apps clone process for inst_top and join the shared_top
    - Preparing the existing node:
      - Run adprecclone.pl and copy the context file to the new node

        [applmgr@ebsapp1 scripts]$ cdh $INST_TOP/admin/scripts

        [applmgr@ebsapp1 scripts]$ perl ./adpreclone.pl appsTier

    - Configure the new node to be added:
      - Run adclonectx.pl using the existing node context file to create a new context file for the new node to be added to the multi-node system.
      - Run the AutoConfig utility to generate the new Instance Home for this node and update the required tables in the database

        [applmgr@ebsapp3 bin]$ cd /apps/apps/apps_st/comn/clone/bin

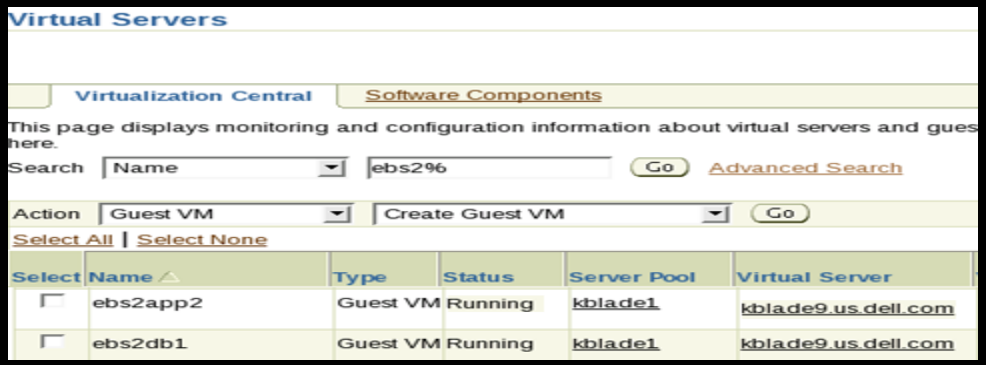
        [applmgr@ebsapp3 bin]$ perl adclonectx.pl addnode contextfile=/u01/VISD_ebsapp1.xml

        [applmgr@ebsapp3 bin]$ cd /apps/apps/apps_st/appl/ad/12.0.0/bin

        [applmgr@ebsapp3 bin]$ perl /apps/apps/apps_st/appl/ad/12.0.0/bin/adconfig.pl contextfile=/u01/inst/apps/VISD_ebsapp3/appl/admin/VISD_ebsapp3.xml

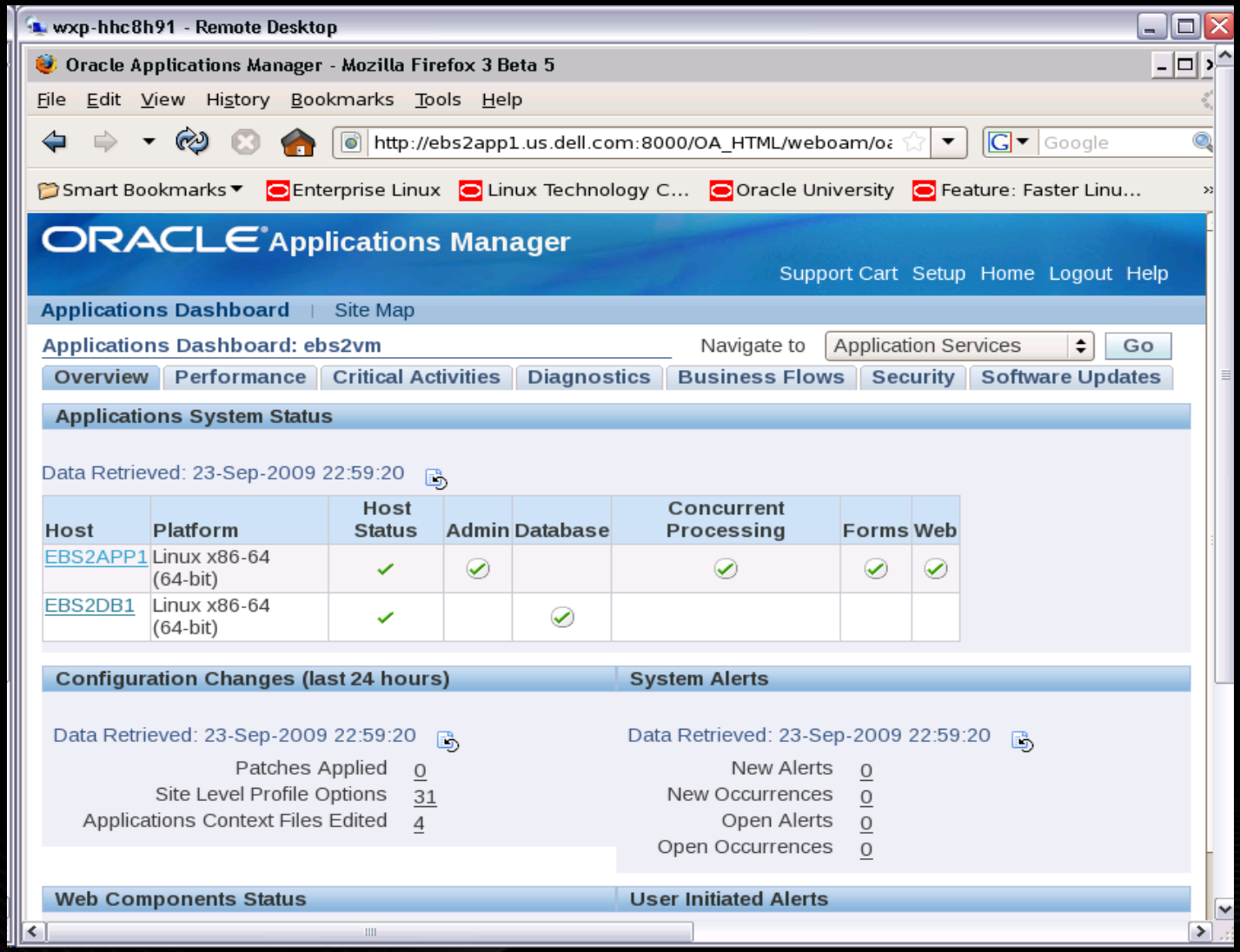
ORACLE EBS R12 DEV/TEST INSTANCE ON THE VIRTUAL GRID: IMPLEMENTATION

- Prepare VMs for Apps tier and DB tier
  - Create VMs for Apps node and DB nodes from OS template



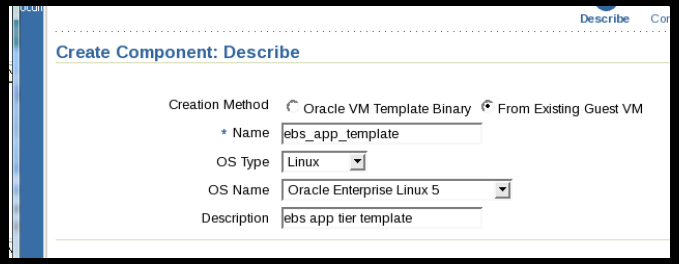
  - Prepare the environment for EBS install
    - Storage, network, rpms, Os kernel configuration.
- Fresh Install EBS
  - Fresh install EBS on VM ebs2db and ebs2app2 (hostname: ebs2app1)

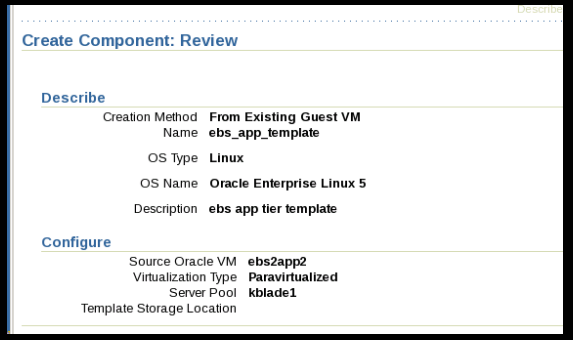
ORACLE EBS R12 DEV/TEST INSTANCE ON THE VIRTUAL GRID: IMPLEMENTATION



ORACLE EBS R12 DEV/TEST INSTANCE ON THE VIRTUAL GRID: IMPLEMENTATION

- Create Templates for Apps node and DB node
  - Create the templates :





- Create new EBS instance from the templates
  - Create VM from template
    - Create two VMs ebs3db1 and ebs3app1 from the templates
    - Modify the network configuration and hostnames of two ebs3db1, ebs3app1

ORACLE EBS R12 DEV/TEST INSTANCE ON THE VIRTUAL GRID: IMPLEMENTATION

- Configure the New Instance with Cloning Process
  - DB Tier
    - Run adcfgclone.pl dbTechStack with the information on the new node and instance
    - Rename database name with nid utility
    - Bring up database and listener
    - Run autoconfig
  - Apps Tier
    - Run adcfgclone.pl appsTier
    - Create the context file with the information on the new node and instance
    - Run autoconfig
    - Bring up application services

SUMMARY

- Dell Grid POC Project: Pre-built Grid with physical and virtual grids
- The Grid combines the RAC and OVM to consolidate multiple enterprise applications
- Deployment of the Oracle EBS on both physical Gird and virtual Grid
- Fast deployment of Oracle EBS on the virtual Grid for DEV/Test
- Next Steps:
  - Exploring EBS on 11g RAC database with OVM
  - Complete EBS VM templates creation and the creation of new instance from the EBS VM templates
- Acknowledge the support of Oracle engineers: Akanksha Sheoran, Rajat Nigam, Daniel Dibbets, Kurt Hackel, Channabasappa Nekar, Premjith Rayaroth, and Dell Engineer: Roger Lopez
- Related Oracle OpenWorld Presentations
  - ID#: S308185, Provisioning Oracle RAC in a Virtualized Environment, Using Oracle Enterprise Manager, 10/11/09 13:00-14:00, Kai Yu & Rajat Nigam
  - ID#: S308185, Building an Oracle Grid with Oracle VM on Blade Servers and iSCSI Storage, 10/14/09 17:00 - 18:00, Kai Yu and David Mar