Consolidate Oracle E-Business Suite Databases in Oracle Database 11g Release 2 Grid: Case Study

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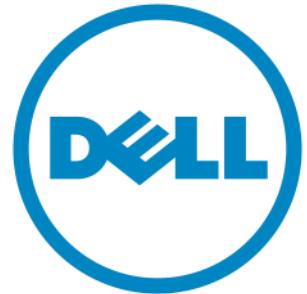
Agenda

- Introduction to Enterprise Grid
- Dell 16 Node Grid Infrastructure Design
- Grid Implementation based on Oracle 11g RAC
- Deploying Oracle EBS Databases on the Grid
- QA

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Introduction to Oracle Grid

Challenges to the Traditional Corporate Computing Architecture

- Consists of island-like systems
- Little or no resource sharing: low resources utilization
- Hard to dynamically adapt changing workload
- A lot of systems, too many Varity, difficult to manage
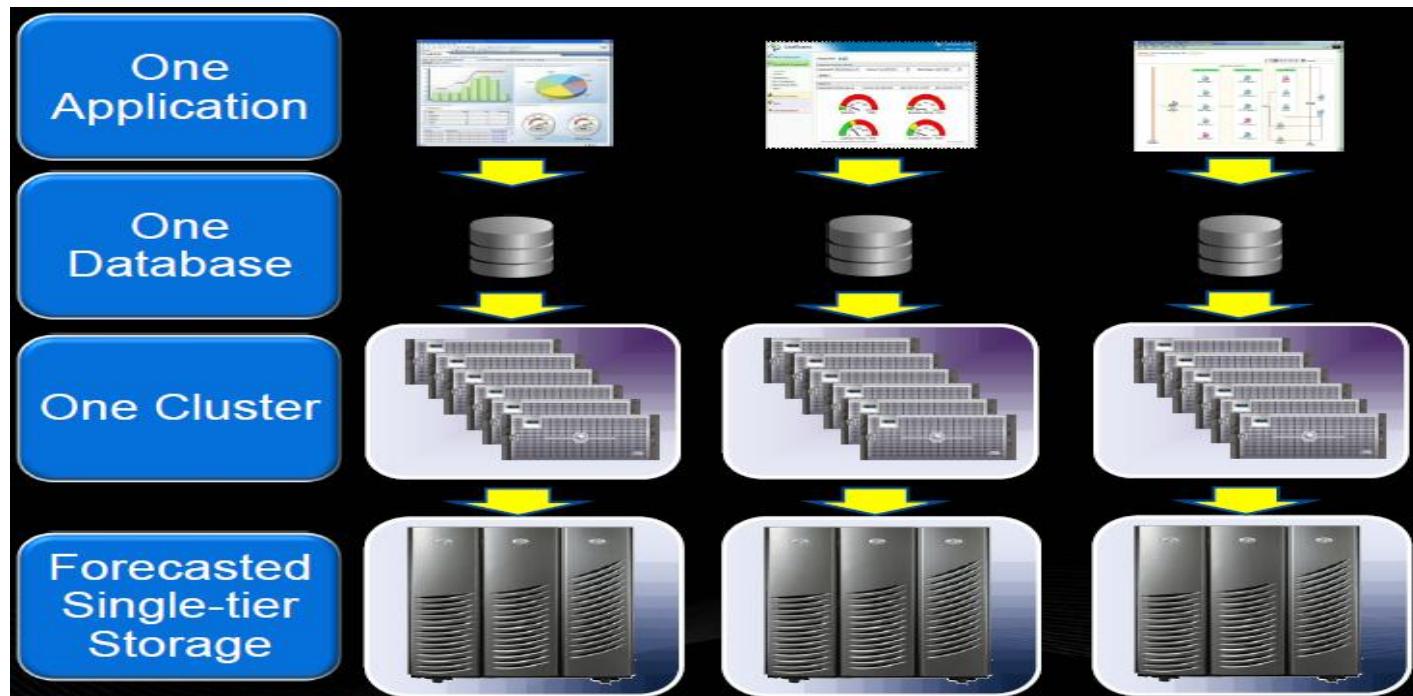
Introduction to Enterprise Grid

Dell's Approach: Enterprise Grid Architecture

- Consolidate databases, applications onto a common Grid platform based on Dell servers and storage resource.
- Provide Platform as a Service to for the databases
- Provide Database Infrastructure as a Services based on Grid based cluster Infrastructure for multiple applications.
- Integrate all the resources to allow provisioning on demand: dynamically provisioning to meet the workload needs
- Scalability and High availability and flexibility

Dell 16 Node Oracle EBS DB Grid Design

Oracle EBS Database Grid Design
- Based on 16 Node Oracle 11g R2 Grid Infrastructure
- Consolidate multiple Oracle EBS Databases
- Support multiple versions of Oracle E-Business Suites
- Support multiple versions of Oracle Databases
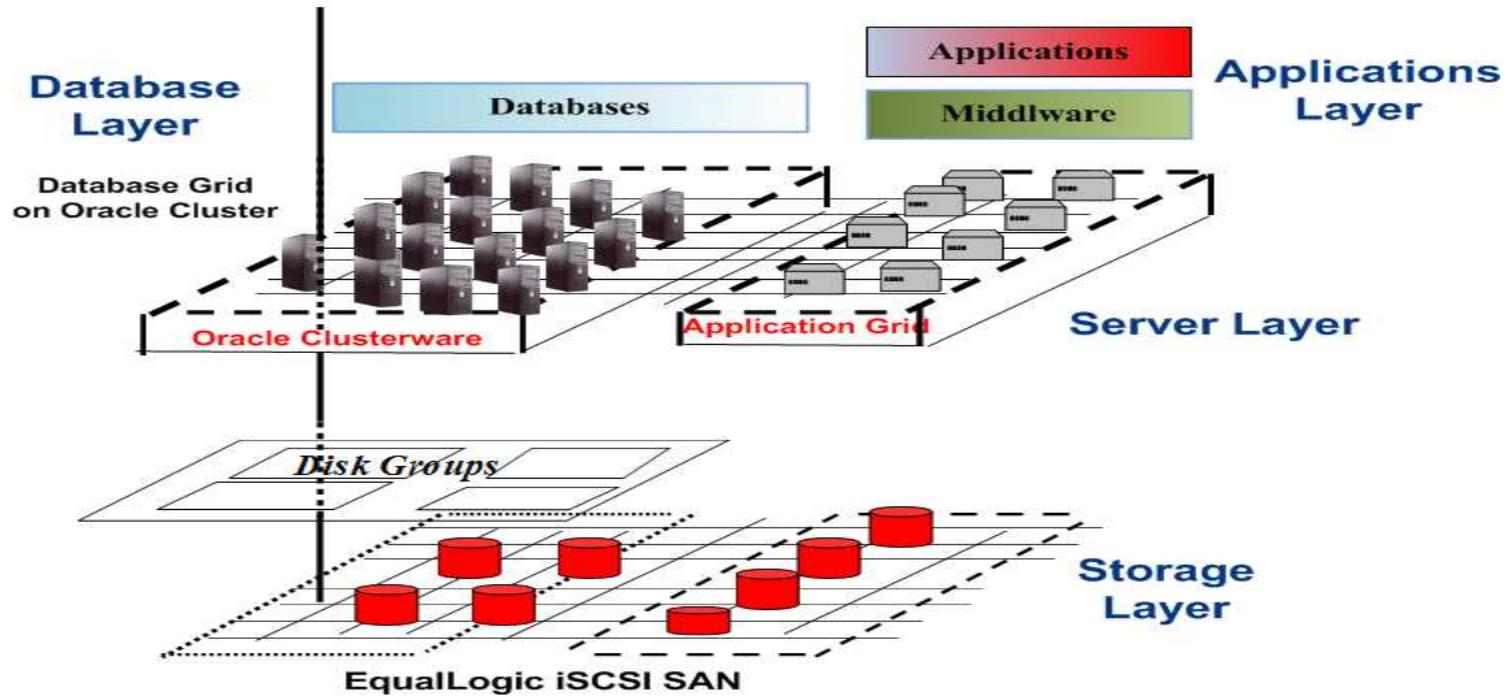
Dell 16 Node DB Grid Architecture Design

Scalable Grid Hard Infrastructure Design:

- Servers:16 Nodes Dell M610 blades: 8 CPUS, 100 GB Memory. Blade servers work well for Grid infrastructure
- Storages: Dell EqualLogic iSCSI SAN: PS6000XV

Database 1

Database 2

Database 3

Database 4

volume 1

Volume 2Volume Volume 2

Volume 3
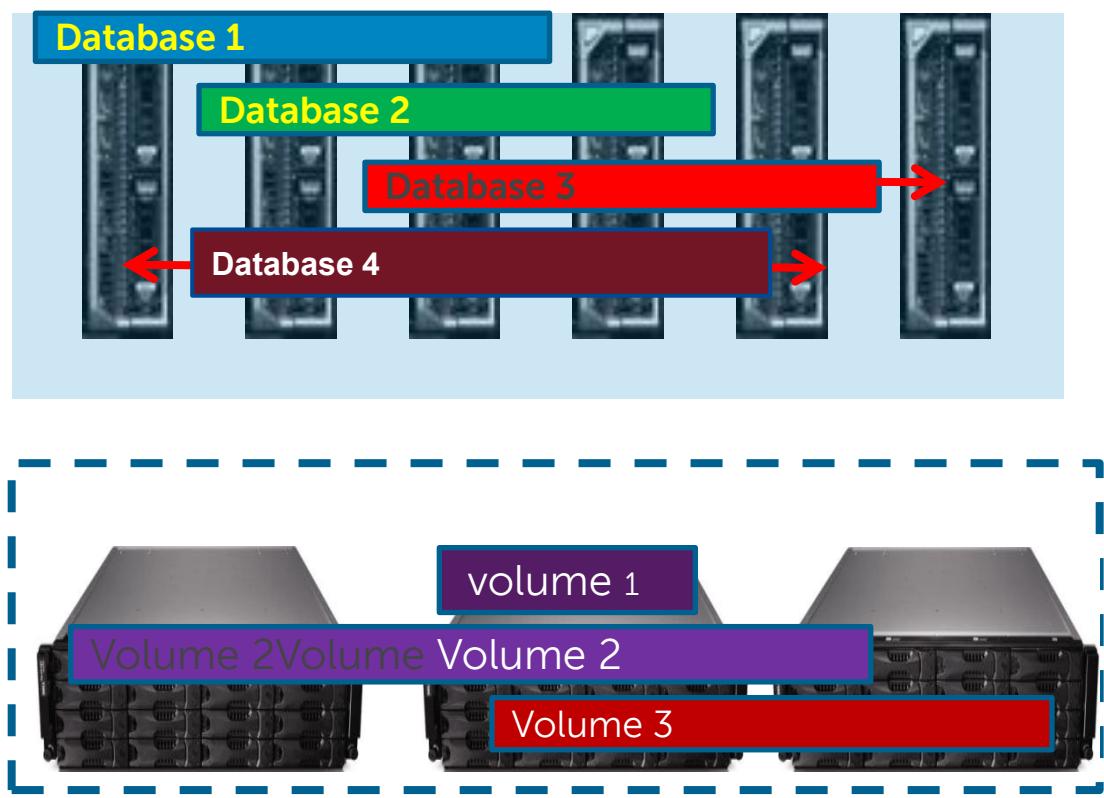
Dell 16 Node Oracle EBS DB Grid Design

Scalable Grid Hard Infrastructure Design
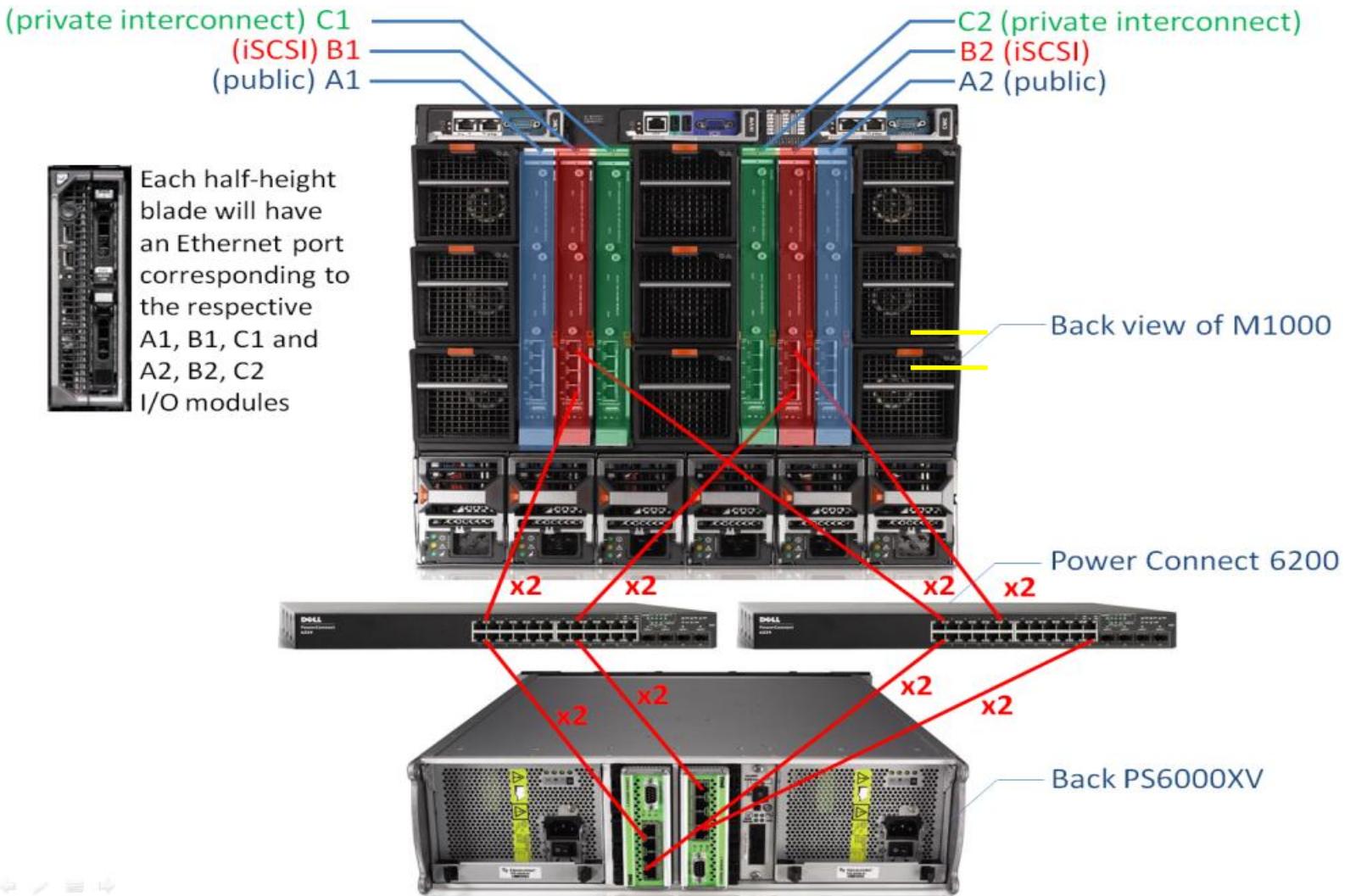
# Dell 16 Node Oracle EBS DB Grid Design

Grid System Architecture Design

Database Grid Architecture Design

EqualLogic PS6000XV Storage Arrays
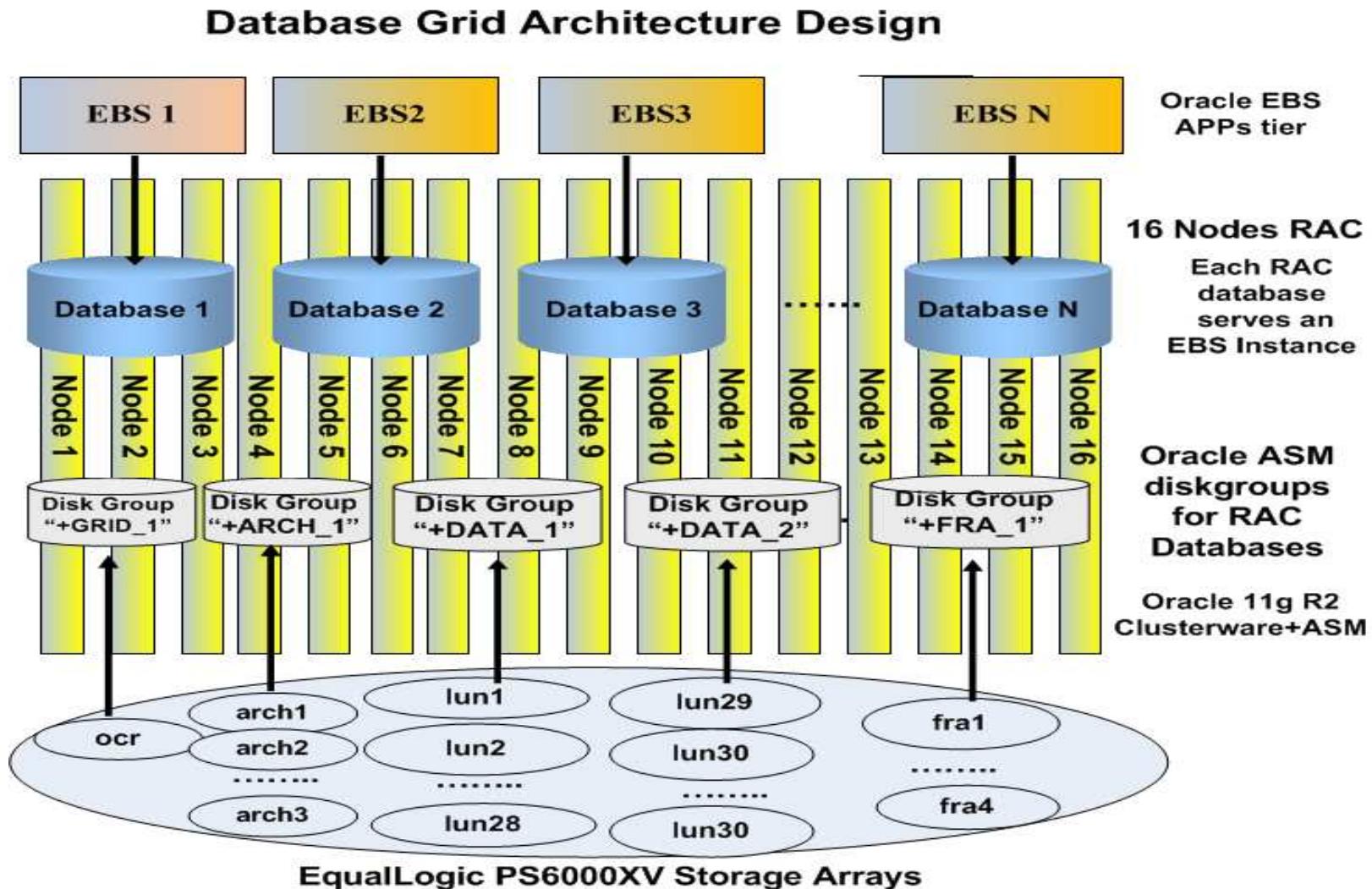
Grid Implementation on Oracle 11gR2 RAC

- 11gR2 Grid Infrastructure configuration
  - OS : OEL 5U5 Kernel: 2.6.18-194.17.4.0.1.el5 x86_64
  - Networks configuration
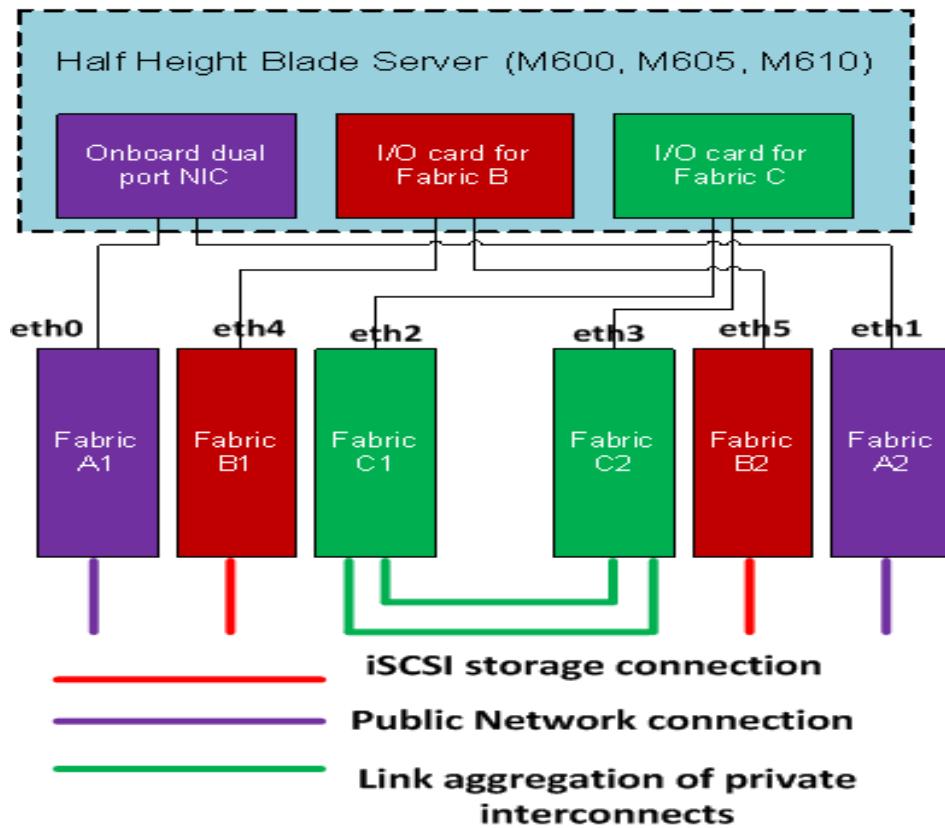
eth0 for public,
eth2 and eth3 forms bond0
    for private interconnect
eth4 and eth5 connected to
    EqualLogic Storage
    through two redundant
    switches
32 IPs for ISCSI connections
16 Public IPs:
16 Private IPs
16 VIPs
 3 SCAN-IPs

Half Height Blade Server (M600, M605, M610)

Onboard dual port NIC
I/O card for Fabric B
I/O card for Fabric C

eth0 eth4 eth2 eth3 eth5 eth1

Fabric A1 Fabric B1 Fabric C1 Fabric C2 Fabric B2 Fabric A2

iSCSI storage connection
Public Network connection
Link aggregation of private interconnects

Grid Implementation on Oracle 11gR2 RAC

- **EqualLogic iSCSI SAN volumes, Raid 1+0 configuration**
  - Data Volumes: 17 Lun: 700GB , DATA_1 diskgroup: 12 TB
  - Data Volumes: 9 Lun: 700GB, DATA_2 diskgroup: 6.4TB
  - Reserved for 21 reserved. Total: 47 * 700GB=32TB
  - Data Volume: OCR : 3GB, GRID_1 diskgroup: 3GB
  - Data Volumes: ARCH0-7 : 250GB, ARCH_1 diskgroup: 2TB
  - Data Volumes: FRA0-7 : 250GB, FRA_1 diskgroup: 2TB

- **Establishing host access to EqualLogic volumes**
  - Use iscsiadm utility to create iSCSI interfaces
    - rpm -qa|grep -i iscsi-initiator
    - service iscsi start; chkconfig iscsi on
    - iscsiadm -m iface -I iface_eth4 --op=new,
    - iscsiadm -m iface -I iface_eth4 --op=update –n iface.hwaddress -v <hwaddress>

Grid Implementation on Oracle 11gR2 RAC

- Discover the iSCSI volume
  - Edit /etc/iscsi/iscsid.conf to specify the login for the volumes
  - iscsiadm -m discovery -t st -p <storage IP> -- interface=eth4-iface --interface=eth5-iface
- Login to iSCSI storage:
  - iscsiadm -m node -p group_ip_address --interface iface_name --login,
- Creation storage multipath devices using Device Mapper Mutlipath: edit /etc/multipath.conf:

```
oracle:+ASM2:/u02/oradata/asm>more /etc/multipath.conf
blacklist {
        devnode "^sd[a]$"
}

defaults {
        user_friendly_names no
}

devices {
        device {
                vendor "EQLOGIC"
                product "100E-00"
                path_grouping_policy multibus
                getuid_callout "/sbin/scsi_id -g -u -s /b.
                features "1 queue_if_no_path"
                path_checker readsector0
                failback immediate
                path_selector "round-robin 0"
                no_path_retry 5
                rr_min_io 10
                rr_weight priorities

        }
}
```

Grid Implementation on Oracle 11gR2 RAC

```
oracle@ausmegnovdev02:/u02/oradata/asm
ls: /dev/math: No such file or directory
oracle:+ASM2:/u02/oradata/asm>ls /dev/mpath
36090a088a0f601baaad474964f01b0cd    36090a088a0f691cfaad494a04f01c074
36090a088a0f601f9aad4f4a24f019095    36090a088a0f691eaaad494a14f01b050
36090a088a0f611b9aad4b4954f015061    36090a088a0f6a1c7aad4f49b4f015030
36090a088a0f611bbaad434974f013097    36090a088a0f6a1ceaad4a49f4f01c05b
36090a088a0f611c7aad4749b4f0160a3    36090a088a0f6a1e6aad474a14f01206e
36090a088a0f611ceaad4149f4f01d0b5    36090a088a0f6b1b8aad474954f01101d
36090a088a0f611eeaad434a24f0190ed    36090a088a0f6b1b9aad434964f01c0e8
36090a088a0f621c8aad4749c4f0190b2    36090a088a0f6b1baaad4f4964f01e005
36090a088a0f621cfaad434a04f01d078    36090a088a0f6b1c8aad4149d4f015068
36090a088a0f621d0aad424a14f01605e    36090a088a0f6b1f8aad4b4a24f01e0a1
36090a088a0f621f4aad454a24f0150fb    36090a088a0f6b1fbaad414a34f0140ea
36090a088a0f631b9aad4d4954f0160a6    36090a088a0f6c1c6aad4149b4f017003
36090a088a0f631baaad494964f015071    36090a088a0f6c1c7aad4349c4f01406a
36090a088a0f631ceaad4449f4f01c05c    36090a088a0f6c1cdaad4b49e4f01f022
36090a088a0f641c7aad4b49b4f01a08d    36090a088a0f6c1ceaad4d49f4f018002
36090a088a0f641f4aad474a24f01d011    36090a088a0f6c1cfaad4c4a04f01c013
36090a088a0f651c8aad4b49c4f0150ad    36090a088a0f6c1eaaad4b4a14f013074
36090a088a0f661b9aad4f4954f0140f3    36090a088a0f6c1edaad4f4a14f01e002
36090a088a0f661baaad4b4964f0190a4    36090a088a0f6d1f8aad4d4a24f01b0c6
36090a088a0f661c6aad4d49a4f0130ba    36090a088a0f6e1b8aad494954f017018
36090a088a0f661cfaad464a04f01d0eb    36090a088a0f6e1b9aad454964f019026
36090a088a0f67100abd454a34f01b026    36090a088a0f6e1baaad414974f01d058
36090a088a0f671c7aad4d49b4f01f0d4    36090a088a0f6e1c6aad4549b4f015093
36090a088a0f671cdaad4549e4f01f0ef    36090a088a0f6e1c8aad4349d4f01b0f1
36090a088a0f671ceaad4749f4f01a03a    36090a088a0f6e1cdaad4e49e4f013055
36090a088a0f671f4aad494a24f01b07b    36090a088a0f6e1edaad414a24f0140fb
36090a088a0f681baaad4d4964f014085    36090a088a0f6e1f4bcd584f65301e098
36090a088a0f681c8aad4d49c4f016084    36090a088a0f6e1fbaad434a34f01103c
36090a088a0f681e6aad454a14f0130f5    36090a088a0f6f1c7aad4549c4f01a0c7
36090a088a0f691b9aad414964f011043    36090a088a0f6f1ceaad404a04f012035
36090a088a0f691c6aad4f49a4f01f04b    36090a088a0f6f1cfaad4f4a04f013072
36090a088a0f691cdaad4849e4f0110b3    36090a088a0f6f1eaaad4d4a14f0140dd
oracle:+ASM2:/u02/oradata/asm>ls
archive_lun01  data_lun02  data_lun11  data_lun20  data_lun29  data_lun39  fra_lun01
archive_lun02  data_lun03  data_lun12  data_lun21  data_lun31  data_lun40  fra_lun02
archive_lun03  data_lun04  data_lun13  data_lun22  data_lun32  data_lun41  fra_lun03
archive_lun04  data_lun05  data_lun14  data_lun23  data_lun33  data_lun42  fra_lun04
archive_lun05  data_lun06  data_lun15  data_lun24  data_lun34  data_lun43  fra_lun05
archive_lun06  data_lun07  data_lun16  data_lun25  data_lun35  data_lun44  fra_lun06
archive_lun07  data_lun08  data_lun17  data_lun26  data_lun36  data_lun45  fra_lun07
archive_lun08  data_lun09  data_lun18  data_lun27  data_lun37  data_lun46  fra_lun08
data_lun01     data_lun10  data_lun19  data_lun28  data_lun38  data_lun47  ocr_css1
```

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Grid Implementation on Oracle 11gR2 RAC

- 11g R2 Grid Infrastructure Configuration
  - GI Oracle HOME(Clusterware and ASM)

```
SQL> /

ARCH_1      /u02/oradata/asm/archive_lun04 250.004883
ARCH_1      /u02/oradata/asm/archive_lun01 250.004883
ARCH_1      /u02/oradata/asm/archive_lun03 250.004883
ARCH_1      /u02/oradata/asm/archive_lun02 250.004883
DATA_1      /u02/oradata/asm/data_lun13    700.004883
DATA_1      /u02/oradata/asm/data_lun17    700.004883
DATA_1      /u02/oradata/asm/data_lun20    700.004883
DATA_1      /u02/oradata/asm/data_lun05    700.004883
DATA_1      /u02/oradata/asm/data_lun01    700.004883
DATA_1      /u02/oradata/asm/data_lun21    700.004883
DATA_1      /u02/oradata/asm/data_lun06    700.004883
DATA_1      /u02/oradata/asm/data_lun16    700.004883
DATA_1      /u02/oradata/asm/data_lun07    700.004883

DATA_1      /u02/oradata/asm/data_lun18    700.004883
DATA_1      /u02/oradata/asm/data_lun15    700.004883
DATA_1      /u02/oradata/asm/data_lun12    700.004883
DATA_1      /u02/oradata/asm/data_lun08    700.004883
DATA_1      /u02/oradata/asm/data_lun03    700.004883
DATA_1      /u02/oradata/asm/data_lun09    700.004883
DATA_1      /u02/oradata/asm/data_lun02    700.004883
DATA_1      /u02/oradata/asm/data_lun04    700.004883
DATA_2      /u02/oradata/asm/data_lun33    700.004883
DATA_2      /u02/oradata/asm/data_lun24    700.004883
DATA_2      /u02/oradata/asm/data_lun27    700.004883
DATA_2      /u02/oradata/asm/data_lun32    700.004883
DATA_2      /u02/oradata/asm/data_lun29    700.004883

DATA_2      /u02/oradata/asm/data_lun34    700.004883
DATA_2      /u02/oradata/asm/data_lun26    700.004883
DATA_2      /u02/oradata/asm/data_lun28    700.004883
DATA_2      /u02/oradata/asm/data_lun31    700.004883
FRA_1       /u02/oradata/asm/fra_lun04     250.004883
FRA_1       /u02/oradata/asm/fra_lun01     250.004883
FRA_1       /u02/oradata/asm/fra_lun03     250.004883
FRA_1       /u02/oradata/asm/fra_lun02     250.004883
GRID_1      /u02/oradata/asm/ocr_css1      3.00292969
```

Shared NAS mounted on all 16 nodes
/u01/app/grid/product/11.2.0.2/grid_1
Must run multicast patch before running
root.sh during GI install
Listener running in GI home

The ASM diskgroups and ASM disks
create on the EqualLoigc volumes.

Grid Implementation on Oracle 11gR2 RAC

- Multiple Oracle HOMEs
  - On shared NAS mounted on all 16 nodes, but registered on requested instance nodes
- Pre-11gR2 version databases with 11gR2 GI
  - Required to ping CRS on all 16 nodes

    $GRID_HOME/bin/crsctl pin css -n ausmegnovdev01 ausmegnovdev02 ausmegnovdev03 ausmegnovdev04 ausmegnovdev035 ausmegnovdev06 ausmegnovdev07 ausmegnovdev08 ausmegnovdev09 ausmegnovdev10 ausmegnovdev11 ausmegnovdev12 ausmegnovdev13 ausmegnovdev14 ausmegnovdev15 ausmegnovdev16

  - To list pinned node(s):

    [oracle@ausmegnovdev01.us.dell.com /home/oracle]
    $ $GRID_HOME/bin/olsnodes -t -n
    ausmegnovdev01 1   Pinned
    ausmegnovdev02 2   Pinned
    .
    .
    .
    ausmegnovdev16 16   Pinned

- Multiple Database services: database instances allocation

Grid Implementation on Oracle 11gR2 RAC

DB Server	Env	DB Name	Instance	Listener Port	Oracle Home	OH Version	PSU Version	ASM DG
ausmegnovdev01	DevSupt	geba1dd	geba1dd1	1530	/u01/app/oracle/product/11.1.0/db_1	11.1.0.7.6	Jan 2011	DATA_1
	Nov Dev	gebd2dd	gebd2dd1	1548	/u01/app/oracle/product/11.1.0/db_2	11.1.0.7.7	Apr 2011	DATA_2
	patch	gebd1ht	gebd1ht					
	GRC DEV Rep							
ausmegnovdev02	Sept DEV	gebd1dd	gebd1dd1	1538	/u01/app/oracle/product/11.1.0/db_2	11.1.0.7.7	Apr 2011	DATA_1
	GRC DEV							
ausmegnovdev03	ProdQA	gebd2rt	gebd2rt1	1559	/u01/app/oracle/product/11.1.0/db_1	11.1.0.7.6	Jan 2011	DATA_1
	GRC UAT							
ausmegnovdev04	Training	geba1rt	geba1rt1	1538	/u01/app/oracle/product/11.1.0/db_1	11.1.0.7.6	Jan 2011	DATA_1
	ESP SND	gebe1st	gebe1st	1528	/u01/app/oracle/product/11.1.0/db_2	11.1.0.7.7	Apr 2011	DATA_2
	GRC UAT Rep							
ausmegnovdev05	Sept SIT	gebd2tt	gebd2tt1	1548	/u01/app/oracle/product/11.1.0/db_2	11.1.0.7.7	Apr 2011	DATA_1
	Archive UAT	arcrut	arcrut	1555	/u01/app/oracle/product/11.1.0/db_1	11.1.0.7.6	Jan 2011	DATA_1
ausmegnovdev06	Sept SIT	gebd2tt	gebd2tt2	1548	/u01/app/oracle/product/11.1.0/db_2	11.1.0.7.7	Apr 2011	DATA_1
	Archive Rep	arcred	arcred	1548	/u01/app/oracle/product/11.1.0/db_1	11.1.0.7.6	Jan 2011	DATA_1
	Archive DEV	arcrdd	arcrdd	1540	/u01/app/oracle/product/11.1.0/db_1	11.1.0.7.6	Jan 2011	DATA_1
ausmegnovdev07	VMWare POC	gebd3rt	gebd3rt1	1522	/u01/app/oracle/product/11.1.0/db_1	11.1.0.7.6	Jan 2011	DATA_1
	ESP CRP2	gebe2ct	gebe2ct	1568	/u01/app/oracle/product/11.1.0/db_2	11.1.0.7.7	Apr 2011	DATA_1
	Archive UAT	arcrot	arcrot	1555	/u01/app/oracle/product/11.1.0/db_1	11.1.0.7.6	Jan 2011	DATA_1
ausmegnovdev08	ESP DEV	gebe2dd	gebe2dd1	1538	/u01/app/oracle/product/11.1.0/db_1	11.1.0.7.6	Jan 2011	DATA_1

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Deploying Oracle EBS Databases on Grid

- **Deployment Methods**
  - **Fresh Install**
    - EBS Release 12.1.1 with 11gR1 DB
    - Can be used for new projects/systems
    - For Novora EBS 11i with 11gR1 DB to be upgraded to R12 with 11gR2 DB

  - **Clone**
    - Cloning is the method we use most as we are migrating the EBS databases from individual physical database servers to the Grid to consolidate the environments
    - Cloning keeps Oracle Home versions and patch levels, configuration, and all business data and setups
    - AD Clone registers the Oracle Home and configure the instance environments, such as listener, tns, etc.

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Deploying Oracle EBS Databases on Grid

Fresh Install

- Database tier server file system layout before EBS R12 installation

Database Tier Server File System Layout Before EBS Fresh Install

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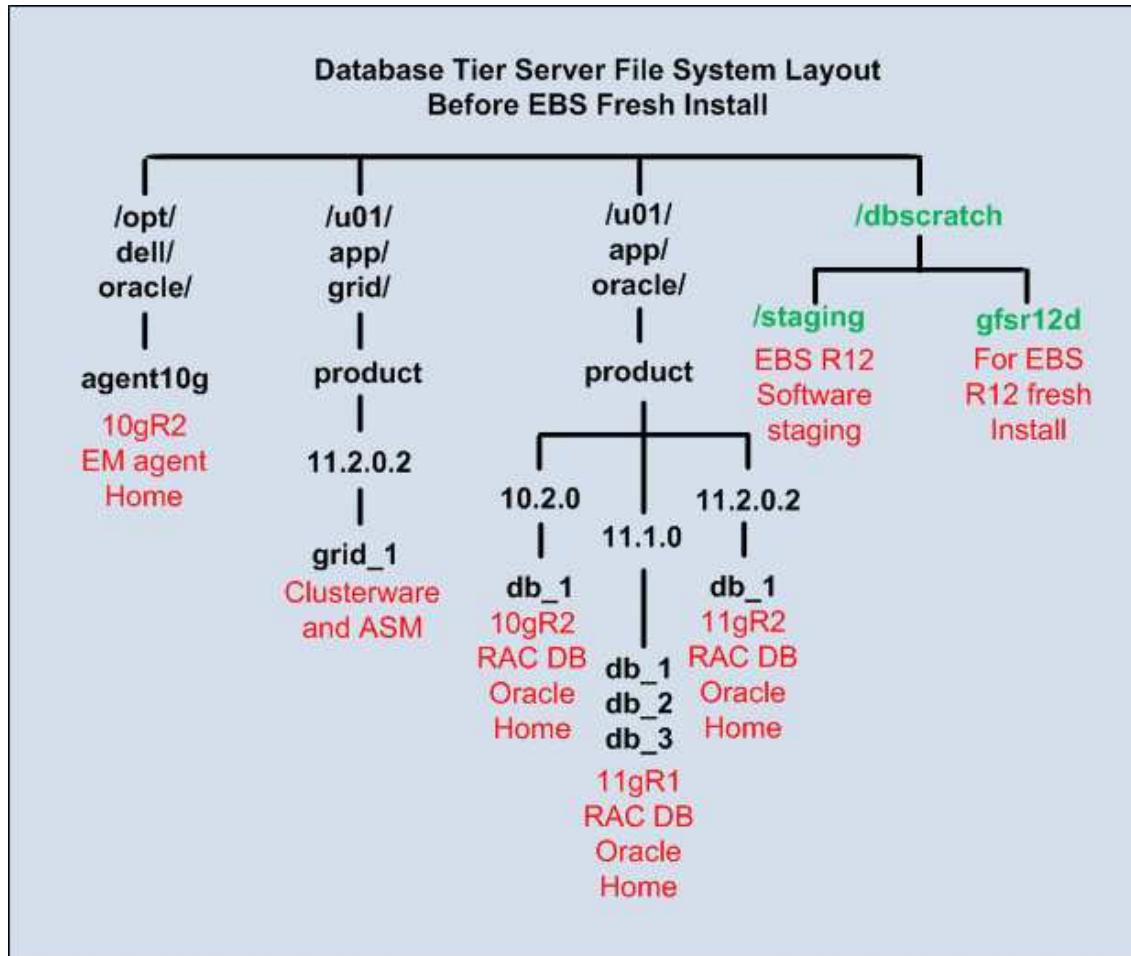
Deploying Oracle EBS Databases on Grid

- Database tier server file system layout after EBS R12 fresh install

Database Tier Server File System Layout after EBS R12 Fresh Install

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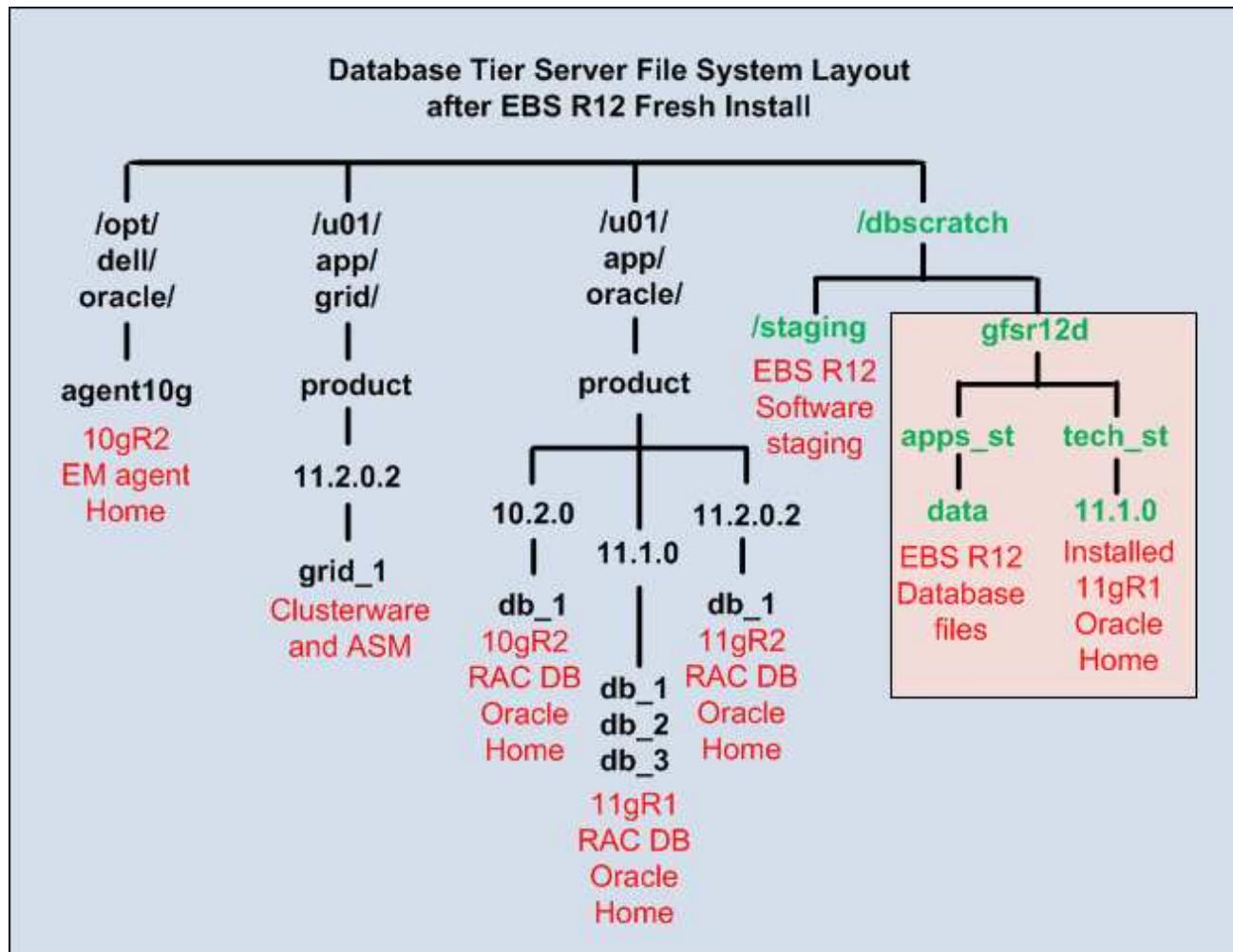
Deploying Oracle EBS Databases on Grid

- **Upgrade 11gR1 EBS Database to 11gR2**
  - **Pre-upgrade steps**
    - **On application tier, apply the interoperability patches 9868229, 10163753 and 11071569, and the latest autoconfig**
    - **Check for TIMESTAMP WITH TIMEZONE Datatype in the current database**

      SQL> select * from v$timezone_file;
      FILENAME   VERSION
      ------------   ----------
      timezlrg.dat   4

    - **Install Oracle Database 11g Products from the 11g Examples CD to the 11gR2 Oracle home**

      After the installation, make sure the following:

      - The ORACLE_BASE environment variable must be set accordingly.

      - The ORACLE_HOME environment variable points to the *new* 11.2.0 Oracle home.

      - The PATH environment variable includes $ORACLE_HOME/bin and the directory where the new perl executable is located (usually $ORACLE_HOME/perl/bin).

      - The LD_LIBRARY_PATH environment variable includes $ORACLE_HOME/lib.

      - The PERL5LIB environment variable points to the directories where the new perl libraries are located (usually $ORACLE_HOME/perl/lib/[*perl version*] and $ORACLE_HOME/perl/lib/site_perl/[*perl version*])

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Deploying Oracle EBS Databases on Grid

- **Upgrade 11gR1 EBS Database to 11gR2 (cont')**
  - **Pre-upgrade steps (cont')**
    - **Analyze the database with pre-upgrade information tool:**

      SQL> @$11g_ORACLE_HOME/rdbms/admin/utlu112i.sql

    - **Create nls/data/9idata directory**

      run the $ORACLE_HOME/nls/data/old/cr9idata.pl script to create the $ORACLE_HOME/nls/data/9idata directory

      After creating the directory, make sure that the ORA_NLS10 environment variable is set to the full path of the 9idata directory whenever you enable the 11g Oracle home.

    - **Apply 11.2.0.2 RDBMS interoperability patches 4247037 , 9776940, 10149223 , 10229719**

    - **If the SYS.ENABLED$INDEXES table exists, drop it:**

      SQL> drop table sys.enabled$indexes;

Deploying Oracle EBS Databases on Grid

- **Upgrade 11gR1 EBS Database to 11gR2 (cont')**

  - **Database upgrade**

    - **Shut down Applications server processes and database listener**

      Make sure that you do not have the LOCAL_LISTENER initialization parameter set to ensure that the database does not inadvertently point to a non-existent listener during upgrade.

    - **Create a pfile from spfile and copy the pfile to the new 11gR2 Oracle Home**

    - **Set parameter compatible to 11gR2 and adjust the values of the initialization parameters to at least the minimum values indicated by the Pre-Upgrade Information Tool.**

    - **Shutdown the database**

    - **Set the following to the new 11gR2 Oracle home:**
      /etc/oratab, ORACLE_HOME, PATH

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Deploying Oracle EBS Databases on Grid

- **Upgrade 11gR1 EBS Database to 11gR2 (cont')**
  - **Database Upgrade (cont')**
    - **Startup database as upgrade mode**
    - **Run $ORACLE_HOME/rdbms/admin/catupgrd.sql**
    - **Restart the database in mornal mode and run Post-Upgrade Status script Toolutlu111s.sql for upgrade verification**
    - **Run the post-upgrade scripts catuppst.sql**
    - **Recompile all invalid objects with utlrp.sql and execute ORACLE_HOME/rdbms/admin/utluiobj.sql to display only those objects which are newly invalid because of the upgrade process**

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Deploying Oracle EBS Databases on Grid

- **Upgrade 11gR1 EBS Database to 11gR2 (cont')**
  - **Post Upgrade Steps**
    - **Modify init parameters – use document 396009.1 [Database Initialization Parameter Settings for Oracle Applications Release 12](#) as a guideline**
    - **Start the new database listener in 11gR2 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/115/sql and run it as APPS with the following command:

      $ sqlplus apps/<APPS password> @adctxprv.sql <SYSTEM password> CTXSYS

Deploying Oracle EBS Databases on Grid

- **Upgrade 11gR1 EBS Database to 11gR2 (cont')**

  - **Post Upgrade Steps (Cont')**

    - **Set CTXSYS parameter**

      Use SQL*Plus to connect to the database as SYSDBA and run the following command:

      SQL> exec ctxsys.ctx_adm.set_parameter('file_access_role', 'public');

    - **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>

Deploying Oracle EBS Databases on Grid

- **Upgrade 11gR1 EBS Database to 11gR2 (cont')**
  - **Post Upgrade Steps (cont')**
    - **Implement and Run AutoConfig**

      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

      Ensure the variable s_jretop points to $ORACLE_HOME/jdk/jre and is not altered to any other value

      Run autoconfig on db tier and apps tier

Deploying Oracle EBS Databases on Grid

- **Upgrade 11gR1 EBS Database to 11gR2 (cont')**
  - **Post Upgrade Steps (cont')**
    - **Gather statistics for SYS schema**

      Copy $APPL_TOP/admin/adstats.sql from the administration server node to the database server. Make sure the default temporary tablespace has at least 1.5 GB free and run adstats.sql in restricted mode:

      $ sqlplus "/ as sysdba"

      SQL> alter system enable restricted session;

      SQL> @adstats.sql

      $ sqlplus "/ as sysdba"

      SQL> alter system disable restricted session;

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Deploying Oracle EBS Databases on Grid

- **Upgrade 11gR1 EBS Database to 11gR2 (cont')**
  - **Post Upgrade Steps (cont')**
    - **Re-create all custom database links**
    - **Re-create grants and synonyms for APPS with adadmin**
    - **Restart Applications server processes and run adpreclone on both DB and Apps ties**
    - **Synchronize Workflow views**

      Log on to Oracle E-Business Suite with the "System Administrator" responsibility. Submit a single request with the following parameters:

      Request Name = Workflow Directory Services User/Role Validation

      p_BatchSize = 10000

      p_Check_Dangling = Yes

      Add missing user/role assignments = Yes

      Update WHO columns in WF tables = No

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Deploying Oracle EBS Databases on Grid

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Deploying Oracle EBS Databases on Grid

- **Clone processes**
  - **Backup of Source Environment**
    - Run adpreclone script in both database and apps tier
    - Backup of Oracle Home on database server
    - Backup of database (in ASM) using rman
    - Backup of APPLTOPs on apps tier
  - **Copy of the backup set to target systems**
    - Including Oracle Home, database, and APPLTOPs
  - **Cloning Oracle Home on the Grid**
    - Restore the Oracle Home binary to the designed location
    - Run adcfgclone.pl script and respond to the prompt with correct information - such as RAC or non-RAC, port number, ASM diskgroup names for database file location, etc.
    - Oracle Home is registered to the Oracle Inventory and Listener is configured under $ORACLE_HOME/{context_name} and started

Deploying Oracle EBS Databases on Grid

- ## Clone processes (cont')
  - ### Restore database to ASM
    - #### Add and make changes to the following init parameters:
      - Db_name = {source_db_name}
      - control_files = +DATA_1,+ARCH_1
        *** Do not use the default value for control_files generated by the adclone:

        control_files = +DATA_1/cntrl01.dbf,+ARCH_1/cntrl02.dbf,+DATA_1/cntrl03.dbf
      - db_unique_name = {target_db_name}
      - db_file_name_convert = ('+DATA_1/{source_db_name}', '+DATA_1/geba1rt')
      - log_file_name_convert = ('+DATA_1/{source_db_name}', '+DATA_1/{target_db_name}', '+ARCH_1/{source_db_name}', '+DATA_1/{target_db_name}')
    - #### Startup nomount and restore the controlfile
      - Controlfiles are restored with OMF names
      - Replace the init parameter control_files with the restored controfile namesin init file

Deploying Oracle EBS Databases on Grid

- **Clone processes (cont')**
  - Restore and recover the database using rman and open with resetlogs
  - Rename the database name from source to target with nid
  - Change the init parameter db_name = {target_db_name} in init file
  - Mount the DB and open with resetlogs
  - Post clone steps
  - For the RAC DB clone, add the redo logs, undo tablespaces for the secondary instances
  - Add all init parameters in the pfile required for RAC database and create the spfile in ASM for all instances to use

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Deploying Oracle EBS Databases on Grid

- **Clone processes (cont')**
  - **On the secondary nodes**
    - Run adcfgclone.pl script and respond with the secondary node information
    - Startup the instances
    - Post clone steps
  - **Create database services using srvctl for the RAC load-balance and fail-over capability**

  - **Apps tier – not in the scope of this presentation**

Deploying Oracle EBS Databases on Grid

Deploying Oracle EBS Databases on Grid

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Grid Implementation on Oracle 11gR2 RAC

- **Running RAC Database for Oracle EBS instances**

  - Novora SIT database running on node 5 and 6:

[oracle@ausmegnovdev06.us.dell.com /u01/app/oracle/product/11.1.0/db_2]

$ srvctl status database -d gebd2tt

Instance gebd2tt1 is running on node ausmegnovdev05

Instance gebd2tt2 is running on node ausmegnovdev06

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Deploying Oracle EBS Databases on Grid

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Deploying Oracle EBS Databases on Grid
what's special?

- **$ORACLE_HOME/appsutil**
  - For configuration and cloning
  - Can be generated from the apps tier for the very first time - new OH or fresh install
- **Parameter utl_file_dir in DB = $APPLTMP and $APPLPTMP**
  - Chellange – can't use the same path name for different apps servers/env
- **DB trace files accessible by apps tier**
  - Centtralized location - /u01/app/oracle/admin

  SQL> show parameter diag

  NAME   TYPE   VALUE

  ---------------------------------- ---------- -----------------------------

  diagnostic_dest   string   /u01/app/oracle/admin

  oracle:gebd2tt1:/u01/app/oracle/admin/diag/rdbms>ls -ltr

  total 0

  drwxr-xr-x 3 oracle oinstall 80 Jun 30 09:53 gebe1st
  drwxr-xr-x 3 oracle oinstall 80 Jun 30 09:57 geba1rt
  drwxr-xr-x 3 oracle oinstall 80 Jun 30 16:06 geba1dd
  drwxr-xr-x 3 oracle oinstall 80 Jun 30 16:30 gebd1dd
  drwxr-xr-x 3 oracle oinstall 80 Jun 30 16:47 gebd2tt
  drwxr-xr-x 3 oracle oinstall 80 Jun 30 16:50 arcrut
  drwxr-xr-x 3 oracle oinstall 80 Jun 30 17:56 arcrdd
  drwxr-xr-x 3 oracle oinstall 80 Jun 30 17:58 arcred
  drwxr-xr-x 3 oracle oinstall 80 Jun 30 23:55 gebe2dd
  drwxr-xr-x 3 oracle oinstall 80 Jul 18 12:04 arcrot
  drwxr-xr-x 3 oracle oinstall 80 Jul 18 18:13 gebe2ct

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Deploying Oracle EBS Databases on Grid
what's special?

- **Parameter utl_file_dir in DB = $APPLTMP and $APPLPTMP**
  Chellange – can't use the same path name for different apps servers/env

Filesystem	1K-blocks	Used	Available	Use%	Mounted on
aussmtnas02:/endor_app01/common/endor	206515200	172039200	34476000	84%	/db/gebs/appl/app1/common/endor
aussmtnas03:/endor_app02/common/endor	206515200	640	206514560	1%	/db/gebs/appl/app2/common/endor
aussmtnas02:/malak_app01/common/malak	206515200	159619808	46895392	78%	/db/gebs/appl/app1/common/malak
aussmtnas04:/malak_app02/common/malak	206515200	3199648	203315552	2%	/db/gebs/appl/app2/common/malak
aussmtnas04:/han_app01/common/han	206515200	147649856	58865344	72%	/db/gebs/appl/app1/common/han
aussmtnas02:/han_app02/common/han	206515200	146424352	60090848	71%	/db/gebs/appl/app2/common/han
aussmtnas04:/windu_app01/common/windu	206515200	172366144	34149056	84%	/db/gebs/appl/app1/common/windu
aussmtnas03:/jedi_app01/common/jedi	206515184	61326088	145189096	30%	/db/gebs/appl/app1/common/jedi
aussmtnas04:/jedi_app02/common/jedi	206515184	176175856	30339328	86%	/db/gebs/appl/app2/common/jedi
aussmtnas04:/jango_app1/common/jango	165212144	160903080	4309064	98%	/db/gebs/appl/app1/common/jango
aussmtnas02:/jango_app2/common/jango	165212144	108037240	57174904	66%	/db/gebs/appl/app2/common/jango
aussmtnas02:/db_gebs_appl_app1/common/u4vmexar	258143984	161451232	96692752	63%	/db/gebs/appl/app1/common/u4vmexar
aussmtnas02:/windu_app02/common/windu	206515200	151340672	55174528	74%	/db/gebs/appl/app2/common/windu
aussmtnas02:/jaba_app1/common/jaba	206515200	198039328	8475872	96%	/db/gebs/appl/app1/common/jaba
aussmtnas03:/jaba_app2/common/jaba	206515200	80832896	125682304	40%	/db/gebs/appl/app2/common/jaba
aussmtnas03:/hoth_app01/common/hoth	206515200	117542944	88972256	57%	/db/gebs/appl/app1/common/hoth
aussmtnas04:/hoth_app02/common/hoth	206515200	105420736	101094464	52%	/db/gebs/appl/app2/common/hoth
aussmtnas02:/leia_app01/common/leia	206515200	160888192	45627008	78%	/db/gebs/appl/app1/common/leia
aussmtnas03:/leia_app02/common/leia	206515200	70587648	135927552	35%	/db/gebs/appl/app2/common/leia
aussmtnas02:/sifo_app1/common/sifo	165212160	148323520	16888640	90%	/db/gebs/appl/app1/common/sifo
aussmtnas04:/sifo_app2/common/sifo	165212160	608	165211552	1%	/db/gebs/appl/app2/common/sifo
aussmtnas04:/dooku_app1/common/dooku	165212160	136659936	28552224	83%	/db/gebs/appl/app1/common/dooku
aussmtnas02:/dooku_app2/common/dooku	165212160	2648352	162563808	2%	/db/gebs/appl/app2/common/dooku
aussmtnas02:/sit_common_top/common	103257600	85840704	17416896	84%	/db/gebs/appl/app_common/common
aussmtnas03:/sit_misc_top/misc/apps/apps_st/comn	141172000	62455648	78716352	45%	/db/gebs/appl/misc/misc/apps/apps_st/comn

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Shared or Local Storage for GI and Oracle Home?

GI/ASM and OH Configuration	Pros	Cons
Shared GI/ASM and OH (NAS storage)	Patching only once; less time and effort for maintenance	Depending on NAS system and network; no rolling patch; everything down if issue with NAS, network, GI/ASM or OH binaries
Local GI/ASM and Shared OH	Patching only once for OH, less effort for OH maintenance; rolling patch for GI/ASM	all instances running on the OH down if issue with OH binaries
Local GI/ASM and OH	Rolling patch for both GI/ASM and OH, less or no down time during rolling patching; more reliable and independent from the NAS and network	more time and effort for patching and maintenance

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Shared or Local Storage for GI and Oracle Home?

- **Currently configured both GI/ASM and Oracle Home on shared NAS**
    - NAS issue has caused downtime for all instances on all nodes

- **Solution – Migrating GI/ASM and Oracle Home from NAS to local storage**

- **How?**
    - Split current 16 node cluster into two clusters (nodes 1-8) and (nodes 9-16).
    - Current cluster will become nodes 1-8 after removing nodes 9-16 by node remove process. All instances running on current cluster on nodes 1-8
    - Rebuild nodes 9-16 to a new cluster and install GI and Oracle Home on local storage
    - Migrate all instances from nodes 1-8 to the new cluster

Migrating Shared GI and Oracle Home to Local Storage

- Move all instances running on nodes 9-16 to nodes 1-8
- Remove nodes 9-16 from the current cluster by removing cluster node process
- Obtain new IP addresses for SCAN Listener on cluster 2
- Request small size LUN for voting disk (3GB)
- Unzone some of unused LUNs and make them available to the cluster on nodes 9-16
- Remove the nodes 9-16 from the current cluster by node remove process
- Add local storage nodes 9-16 and rebuild the servers
- Install and configure the Grid Infrastructure on the local storage
- Clone the DBs from the existing cluster (nodes 1-8) to the new cluster (nodes 9-16)
- Remove DB's from nodes 1-8
- Release the LUNs from nodes 1-8 and allocate them to nodes 9-16
- Rebuild nodes 1-8 and add them to the new cluster (nodes 9-16) by adding cluster node process
- Run the prep-install validations (pre-requisite check, CLUVFY) for CRS install
- Then we have the cluster with all 16 nodes running GI and Oracle Home on the local storage

Current Status and Future Plans

- **Currently, only Novora system databases are running on the Grid**
  - 11gR1 databases for Oracle Apps 11i
  - Archiving databases for Novora 11i
  - 11gR2 databases for Oralce Apps R12

- **Future Plans – hosting 4 major Oracle Apps 11i and R12 systems**
  - Upgrading databases from 11gR1 to 11gR2 for Novora Oracle Apps R12
  - Migrating DFS EBS 11i 10gR2 databases from individual physical servers to the grid
  - Clone non-prod 11gR1 DBs to the grid for COIN$ systems
  - Clone non-prod 11gR2 DBs to the grid for PIM systems
  - Migrating databases for other utility tools for Oracle Apps systems, e.g. GRC, ITG, etc.
  - Expected to host 50+ databases

Comparison and Savings of Before and After Consolidation

Comparison	Before	After
Number of servers	30+	16
Database instances	30+	50+, Have the capacity for 100+
Storage	50+TB total of all servers and DBs	32TB
Cloning Time	3-5 days/env (10-12 envs/quarter)	2-3days/env (12-15 envs/quarter)
Patching time	2hrs each server – 60+ hours/quarter	10 hours total/quarter
DBA time	4 full time	2 full time
Cost	$$$	$$

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Summary

- Oracle Grid Infrastruture provides great solutions for database system consolidations which include servers, storage, database management, datacenter space, etc.

- Grid Infrastructure provides high availability, scalability, efficient usability, manageability to different versions of database systems

- Cost-savings on hardware, datacenter, and DBA time

- Special considerations and configurations are required for consolidating EBS databases on the Grid

Acknowledgement

- Sreekanth Chintala – architect and strategist, design on MegaGrid/GI systems, drived database migration from individual physical servers to MegaGrid, driving on migrating GI and OH from shared NAS storage to local HD on Novora GI system

- Ravi Kulkani – DBA Eng team lead, technical support on the Novora GI implementation

- OOW Session ID#10109 : Database as a Service - How does Dell do it in a Consolidated Private Cloud?

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References

- Oracle E-Business Suite on Oracle RAC and Oracle VM: Architecture and Implementation, Kai Yu and John Tao, Oracle Open World 2009, Session ID #S310132
- Implementing Oracle E-Business Suite in a scalable and reliable virtual system architecture, Kai Yu and John Tao, A Dell Technical White Paper, OAUG 2011
- Database as a Service - How does Dell do it in a Consolidated Private Cloud? Sreekanth Chintala and Ravi Kulkarni, Oracle Open World 2011, Session ID #10109
- Interoperability Notes EBS R12 with Database 11gR2 [ID 1058763.1], Oracle white paper
- Using Oracle 11g Release 2 Real Application Clusters with Oracle E-Business Suite Release 12 [ID 823587.1], Oracle white paper
- Pre 11.2 Database Issues in 11gR2 Grid Infrastructure Environment [ID 948456.1], Oracle white paper

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Q&A

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Thank You and QA

Contact us at john_tao@delll.com, kai_yu@dell.com or visit Kai's Oracle Blog at http://kyuoracleblog.wordpress.com/

My OOW 2011
■ **Conference Presentation Schedules**

Posted by: **kyuoracleblog** | August 13, 2011

I will present or participlate as a panellist of the following OOW sessions:

1. *Ensure the High Availability and Stability of Oracle RAC: Storage and Network Side Story , Session #09385, 10/2/2011, Sunday, 01:30 PM, Moscone West – 2005*

2. *Launching the IOUG Virtualization SIG: 360 Degrees of Virtualization for Oracle DBA... , session #28900, IOUG Virtualization panel, 10/2, Sunday, 04:00 PM, Moscone West – 2009*

3. *Consolidate Oracle E-Business Suite Databas in Oracle Database 11g Release 2 Grid: Case Study, session#08945, 10/4/2011, Tuesday, 10:15 AM, Intercontinental – Intercontinental Ballroom A*

4. *Configuring and Managing a Private Cloud with Oracle Enterprise Manager , Oracle OpenWorld 2011 session#06980 , 10/4/2011, Tuesday, 05:30 PM, Moscone South – 309, San Franscio*

5. *Upgrading Oracle Enterprise Manager, Using Best Practices , Oracle OpenWorld 2011 session#0733, 10/6/2011, Thursday, 01:30 PM, Intercontinental – Intercontinental Ballroom A*

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