Oracle E-Business Suite: Migration to Oracle VM Template Based Deployment

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  • OCP for 11g DBA and 11i and R12 for Apps DBA
Latest Update

Dell Inc, the company of the creators of this method was given the OAUG Innovator of the Year Award 2011.
Agenda

• Virtualizing Oracle E-Business Suite with Oracle VM
• Oracle VM: Architecture and Components
• Oracle EBS Virtualization POC Project
• Migrating Oracle EBS Instance to Virtualized Environment
• Establishing VM Template based Oracle EBS Deployment
• Achieving Oracle EBS High Availability with Oracle VM
• QA
Introduction of Oracle EBS on Oracle VM

• Benefits of the Virtualized Oracle EBS with Oracle VM
  – Server partitions and consolidation
  – High availability and scalability
  – Fast deployment and standardization
  – Backup and recovery solution
  – Fast and simplified cloning processes

• Certification of Oracle E-Business Suite on Oracle VM:
  Oracle VM is supported for Oracle EBS in the following versions

  Release 11i
  – Oracle Applications 11.5.10.CU2 or later with 1i.ATG_PF.H.RUP5
  – Oracle Database 10.2.0.3 or later

  Release 12
  – Applications R12 with Oracle E-Business Suite 12.0.2 Release Update Pack RUP2 (patch 5473858) or later
  – Oracle Database 10.2.0.3 or later
Introduction of Oracle EBS on Oracle VM

• Oracle VM Templates for Oracle E-Business Suite
  – Oracle VM Template contains fully-built, pre-configured software stack and ready to use
  – A great way to deploy a fully configured software stack
  – Downloadable templates for Oracle EBS 12.1.1 and 12.1.3
    ▪ VM template for Database tier VM
    ▪ VM template for Applications tier VM

• How to leverage Oracle VM for Oracle EBS Environment
  – Need to establish Oracle EBS environment on VMs
    ▪ Fresh Install EBS on VMs
    ▪ Use the Oracle EBS templates
    ▪ Migrate Oracle EBS from physical to virtual
Introduction of Oracle EBS on Oracle VM

• **Process of Migrating Oracle EBS to Virtual environment**
  – Streamline process, no installation needed
  – Preserve all the business data, setups, customization
  – New EBS deployment method based on VM templates
    ▪ Create new EBS template based on the migrated VMs
    ▪ Create new EBS instances using on the VM template

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**Physical Machine**
- Physical DB server DEV Instance
- Physical APPS server DEV Instance

**Virtual Machine**
- DB VM for DEV Instance
- APPS VM for DEV instance

**VM Template**
- Database Template
- APPS Template

**Virtual Machine**
- DB VM for Test Instance
- APPS VM for Test Instance

**Processes**
- Migrate
- Create VM template
- Create VM
Oracle VM: Architecture and Components

- **Oracle VM Server**: Xen Hypervisor, management domain dom0 Linux kernel with support of devices, IO, networking, etc.
- **VM**: guest OS with applications running on domU
- **Server partition**: multiple guest VMs run independently on a VM server
- **Virtual CPUs and Virtual Memory** are signed for each guest VM. All network and storage IOs of guest VMs go through Dom0
Oracle VM: Architecture and Components

- VM Server Pool: an autonomous region of VM servers.
- VM servers in the pool: share the storage to HA for VMs.
- Management: VM Manager and Enterprise Manager.
Oracle VM: Architecture and Components

• **VM server pool and VM Repository**
  – HA enabled in server pool and VM level
  – VM will failover to an available VM server in the VM server pool if the VM server running the VM fails
  – All the VM servers in the VM server pool share storage
  – Shared storage is configured based on OCFS2 or NFS-based for VM Repository.
  – VM Repository: /OVS/running_pool: all VM images
    /OVS/seed_pool: all the VM templates
    /OVS/shared_disks: for virtual shared storage by multiple VMs (for Oracle RAC)

• **Guest VM creation**
  – Paravirtualization and Hard Virtualization
  – Create guest VM from a VM template using VM manager
  – Create guest VM from an install tree using virt-install
Oracle VM: Architecture and Components

• **How to build and deploy Oracle EBS VM Templates**
  – Challenges: instance specific configurations
    ▪ Remove them while creating a template from a VM
    ▪ Add them while deploying a template to create VM

• **Oracle E-Business Virtualization Toolkit**:
  – What is virtualization toolkits? Why do we need it?
  – The components: patch 9207542
    ebiz_1211_reconfig.sh, ebiz_1211_cleanup.sh
  – Related Metalink documents: [977681.1], [975734.1]
  – Preinstalled in downloadable EBS Oracle VM templates
Oracle EBS Virtualization POC Project

• Joint POC Project between Dell Solution Engineering and IT
  – Develop a solution to migrate EBS from physical to VM
  – Establish the VM template based EBS Instance deployment for on-going Oracle EBS implementation project

• POC servers and shared storage infrastructure
  – Physical Environment: Oracle E-Business Suite 12.1.1 x86-64 bit
    ▪ APPs tier: Dell PE 2950 running Oracle Enterprise Linux 5U3
    ▪ Database Tier: Dell PE 6950, Oracle Enterprise Linux 5U
  – Virtual Infrastructure:
    ▪ Oracle VM servers: 2 x Dell PowerEdge R810
    ▪ Shared SAN storage: Dell EqualLogic PS6510 Storage, allocated 2TB for VM repository
    ▪ VM Manager: 1 Dell PE2950 running VM Manager
Oracle VM: Architecture and Components
Oracle EBS Virtualization POC Project
Oracle EBS Virtualization POC Project

• **Virtualization Process Design**
  – Migrate Oracle EBS from physical servers to virtual machines
  – Create Oracle EBS VM templates from the virtual machines
  – Create Oracle EBS VMs from the VM templates

• **Leverage Oracle E-Business Suite Templates from Oracle**
  – Downloadable from Oracle E-Delivery
  – Oracle EBS VMs created from the template:
    ▪ Include Linux configuration for Oracle EBS (APPS and DB)
    ▪ Include Oracle E-Business Visualization Toolkit
    ▪ but it is an vision Instance only

• **Migration Process Design:**
  – Starting with downloaded Oracle EBS Templates
  – Build Oracle EBS VMs
  – Replaced APPS and DB with the cloned copy from Physical
  – Reconfigure a New Oracle EBS instance on VMs
  – Create new templates from the new Oracle EBS instance
Oracle EBS Virtualization POC Project
Migration Process Implementation

Create DB VM

Create APPS VM

Downloaded VIS DB template

Downloaded VIS APPS template

DB VM ebs12_11_db (ebsvmdb)

APPS VM ebs12_1 apps (ebsvmapps)

Copy gfsdev db

Remove Instance

Copy gfsdev apps

Reconfigure

VM Server Pool

gfsdev Instance
DB server
Physical

Vision Instance

ebsdb

Reconfigure

gfsdev Instance
APPS server
Physical
Migration Process Implementation

Create Vision Instance VM from Template

Downloaded two EBS Vision instance VM templates:
- OVM_EL5U3_X86_64_EBI12.1.1_APPs_VIS_VM
- OVM_EL5U3-x86_64-EB12.1.1_DB_VIS_VM
Migration Process Implementation

- Create EBS VMs using the downloaded Oracle EBS template
  - Imported two VM templates to the VM server pool
    OVM_EL5U3_X86_64_EBIZ12.1.1_APPS_VIS_VM
    OVM_EL5U3-x86_64-EBIZ12.1.1_DB_VIS_VM

- Create VMs using two templates
Create Vision Instance VM from Template

- **Startup DB VM (ebsvmdb):** Automatic reconfiguring DB VM:
  
ebiz_1211_reconfig.sh → rapid clone adclone.pl
Create Vision Instance VM from Template

Version 12.0.0

cdcfgclone Version 120.31.12010000.1

Enter the APPS password:

Running:
/u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0/appsutil/clone/bin/.../jre/bin/java -Xmx600M -cp 1.1/VIS/db/tech_st/11.1.0/appsutil/clone/jlib/java:/u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0/appsutil/clone/jlib/xmlparserv2.jar:/u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0/appsutil/clone/jlib/oracle.apps.ad.context.CloneContext-e /u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0/appsutil/clone/context/db/CTXORIG.xml -validate -pairsfile /tmp/adpairsfile_3935_lst -stage /u01/E-BIZ/db/tech_st/11.1.0/appsutil/clone 2> /tmp/cdcfgclone_3935.err; echo $? > /tmp/cdcfgclone

Log file located at /u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0/appsutil/clone/bin/CloneContext/47.log

Provide the values required for creation of the new Database Context file.

Target System Hostname (virtual or normal) [ebsvmd]:
Target Instance is RAC (y/n) [n]: n
Target System Database SID: ebsdb
Target System Base Directory: /u01/E-BIZ/12.1.1/VIS
Target System utl_file_dir Directory List: /usr/tmp
Number of DATA_TOP’s on the Target System [1]:
Target System DATA_TOP Directory 1 [/u01/E-BIZ/12.1.1/VIS/db/apps_st/data] :
Target System RDBMS ORACLE_HOME Directory [/u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0] :
Do you want to preserve the Display [null] (y/n) ?:
Create Vision Instance VM from Template

- **Startup APPS VM (ebsvmapp):**
Migration Process Implementation

Automatic reconfiguring APPS VM by calling rapid clone adclone.pl utility
Create Vision Instance VM from Template

Automatic reconfiguring APPS VM by calling rapid clone adclone.pl utility

Target System Base Directory: /u01/E-BIZ/12.1.1/VIS
Target System Tools ORACLE_HOME Directory [/u01/E-BIZ/12.1.1/VIS/apps/tech_st/10.1.2]:
Target System Web ORACLE_HOME Directory [/u01/E-BIZ/12.1.1/VIS/apps/tech_st/10.1.3]:
Target System APPL_TOP Directory [/u01/E-BIZ/12.1.1/VIS/apps/apps_st/appl]:
Target System COMMON_TOP Directory [/u01/E-BIZ/12.1.1/VIS/apps/apps_st/common]:
Target System Instance Home Directory [/u01/E-BIZ/12.1.1/VIS/inst]:
Target System Root Service [enabled]:
Target System Web Entry Point Services [enabled]:
Target System Web Application Services [enabled]:
Target System Batch Processing Services [enabled]:
Target System Other Services [disabled]:
Do you want to preserve the Display [atgtxk-10:0.0] (y/n) ? : n
Target System Display [cbsvmpapp:0.0]:
Do you want the the target system to have the same port values as the source system (y/n)?
Target System Port Pool [0-99]: 0

Checking the port pool 0
done: Port Pool 0 is free
Report file located at /u01/E-BIZ/12.1.1/VIS/inst/apps/ebsdb_ebsvmpapp/admin/out/portpool.1st
Complete port information available at /u01/E-BIZ/12.1.1/VIS/inst/apps/ebsdb_ebsvmpapp/admin/portpool.1st
Create Vision Instance VM from Template

Automatic reconfiguring APPS VM by calling rapid clone adclone.pl utility
Migration Process Implementation

Running Rapid Clone with command:

```
perl /u01/E-BIZ/12.1.1/UIS/apps/apps_st/comm/clone/bin/adclone.pl java=-u01/E-BIZ/12.1.1/UIS/apps/appss_st/comm/clone/bin/.../jre/bin/java -Xmx600M -DCONTEXT_VALIDATED=true
```

Beginning application tier Apply - Sat Oct 16 21:25:22 2010

```
/u01/E-BIZ/12.1.1/UIS/apps/apps_st/comm/clone/bin/.../jre/bin/java -Xmx600M -DCONTEXT_VALIDATED=true
```

**Startup Oracle E-Business 12.1.1 Vision Instance on ebsvmapp:**

![Oracle E-Business 12.1.1 Vision Instance](image-url)
Migration Process Implementation

Clone APPS and DB tier from physical DEV Instance
Migration Process Implementation

• Clone APPS and DB from physical servers to VMs
  – Run preClone on physical servers
    Run adpreclone on gfsdevapps (APPS server)
    Run adpreclone on gfsdevdb (DB server)
  – Copy the following from gfsdevapps to ebsvmapps
    /u01/oracle/gfsd/ → /u01/E-BIZ/12.1.1/VIS
  – Copy the following from gfsdevdb to ebsvmdb
    /u01/oracle/gfsd/db → /u01/E-BIZ/12.1.1/VIS/db
  – Setup for automatic reconfiguration on the VMs
    /usr/sbin/oraclevm-template –cleanup
    remove vision instance specific configuration
    /usr/sbin/oraclevm-template –enable
    set flag to run automatic reconfiguration next time VM startup

• Reboot DB VM ebs_1211_db (hostname: ebsvmdb)
  – Automatic reconfiguring DB VM:
    ebiz_1211_reconfig.sh → rapid clone adclone.pl apptier
Migration Process Implementation

Console: ebs_1211_db

Enter static IP address: 155.6.9.31
Enter netmask: [255.255.0.0]
Enter gateway: 155.16.0.1
Enter DNS server: 155.16.0.1

Shutting down interface eth0:
Shutting down loopback interface:

Configuring network settings.
  IP configuration: Static IP address

Bringing up loopback interface:
Bringing up interface eth0:

Enter hostname (e.g, host.domain.com): ebsvmdb.us.dell.com

Network configuration changed successfully.
  IP configuration: Static IP address
  IP address: 155.6.9.31
  Netmask: 255.255.0.0
  Gateway:
  DNS server: 155.16.0.1
  Hostname: ebsvmdb.us.dell.com

Enter the APPS password: _
Migration Process Implementation

```
Console : ebs_1211_db

Enter the APSS password:

Running:
/u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0/appsutil/clone/bin/jre/bin/java -Xmx600M -cp "/u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0/appsutil/clone/jlib/java:/u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0/appsutil/clone/jlib/xmlparserv2.jar:/u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0/appsutil/clone/jlib/" oracle.apps.ad.context.CloneContext -e /u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0/appsutil/context/db/CTXDBIG.xml -validate -pairfile /tmp/adpairfile_3927.1st -stage /u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0/appsutil/clone 2> /tmp/adcfyclone_3927.err; echo $? > /tmp/adcfyclone_3927.log

Log file located at /u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0/appsutil/clone/bin/CloneContext_22.log

Provide the values required for creation of the new Database Context file.

Target System Hostname (virtual or normal) [ebsvmdb] : ebsvmdb

Target Instance is RAC (y/n) [n] : y

Target System Database SID : ebsdb

Target System Base Directory : /u01/E-BIZ/12.1.1/VIS

Target System util_file_dir Directory List : /usr/tmp

Number of DATA_01's on the Target System [1] : 1

Target System DATA_01 Directory 1 [/u01/oracle/gfsd/db/apps_st/data] : /u01/E-BIZ/12.1.1/VIS/db/apps_data

RC-000002: Warning: Directory /u01/E-BIZ/12.1.1/VIS/db/apps_data not found.

Target System DATA_01 Directory 1 [/u01/oracle/gfsd/db/apps_st/data] : /u01/E-BIZ/12.1.1/VIS/db/apps_data

Target System ORACLE_HOME Directory [/u01/E-BIZ/12.1.1/VIS/db/tech_st/11.1.0] :
Do you want to preserve the Display [null] (y/n) ? : y
```
Migration Process Implementation

```
Beginning application tier Apply - Wed Nov 10 08:48:04 2010

APPS Password: Log file located at /u01/E-BIZ/12.1.1/VIS/inst/apps/ebsdb_ebsvmaapps/admin/log/ApplyAppstier_11100048.log
```

Console: ebs_12_1_1_apps

```
Enter static IP address: 155.16.9.32
Enter netmask: 255.255.0.0
Enter gateway: 155.16.0.1
Enter DNS server: 155.16.0.1

Shutting down interface eth0:
Shutting down loopback interface:
Configuring network settings.
  IP configuration: Static IP address
  Bringing up loopback interface:
  Bringing up interface eth0:

Enter hostname (e.g., host.domain.com): ebsvmaapps.us.dell.com

Network configuration changed successfully.
  IP configuration: Static IP address
  IP address: 155.16.9.32
  Netmask: 255.255.0.0
  Gateway: 155.16.0.1
  DNS server: 155.16.0.1
  Hostname: ebsvmaapps.us.dell.com

Copyright (c) 2002 Oracle Corporation
Redwood Shores, California, USA
Oracle Applications Rapid Clone
Version 12.0.8
adcfgclone Version 12.8.31.12010000.1

Enter the APPS password:
Migration Process Implementation

- Startup new EBS instance: ebsvm on VMs (host: ebsvmapps)
Migration Process Implementation

- Review the cloned instance
  - The new instance ebdvm is the clone of the gfsdev instance on physical gfsdevdb on physical server ebsvmdb on virtual machine
Migration Process Implementation

- **Rapid Cone adclone.pl reconfigured EBS Instance**

```
[oracle@ebsvm db 11.1.0]$ ls
admin    cmis    install   lib    lib32  opmn
apex     css     install_platform  lib32  oracore
appsutil etx     instantclient    log    oradata
appsutil.zip dbs     instantclient32  md    oraInst.loc
tools    demo     inventory     mesg   ord
bin      diag     j2ee       msg    oul
ccr     diagnostics  javavm  mysql
config   emc      jvm      network  owb
cfgtoollogs  gfsd_gfsdevdb.env  jdk   nls
clone    gfsd_gfsdevdb.env  jlib   own
config   has      jwiki    ocrd
ers      hs       jwdb    odbc
```

```
[oracle@ebsvm db 11.1.0]$ pwd
/u01/E-BIZ/12.1.1/VI/St/db/tech_st/11.1.0/network/admin
[oracle@ebsvm db 11.0]$ ls -l
```

- **New EBS Instance ebsvm** = gfsd copy + Rapid Clone + two VMs from Oracle EBS templates
- **Virtualization kit scripts**: `/usr/sbin/oraclevm-template`, `/u01/ebiz_1211_reconfig.sh`
Create New EBS Templates

- **gfsdev Instance**
  - DB server
  - Physical

- **Downloaded VIS DB template**
  - DB VM ebs12_11_db (ebsvmdb)
  - VM Server Pool

- **Downloaded VIS APPS template**
  - APPS VM ebs12_1_1apps (ebsvmapp)

- **Newly Created DB Template**
  - Newly Created APPS Template

- **Cleanup**

- **Create Template**

- **gfsdev Instance**
  - APPS server
  - Physical
Create New Oracle EBS Templates

• Cleanup the Instance specific config and set reconfigure flag
  – Shutdown the APPS and Database
  – remove instance specific configuration for ebsvm (both VMS)
    /usr/sbin/oraclevm-template – cleanup
  – set flag to run automatic reconfiguration VM during the VM startup (for both VMs)
    /usr/sbin/oraclevm-template – enable

• Create VM templates based on the new EBS VMs
  – Shutdown both APPS VM and Database VM
  – Save VM as Template
Create New Oracle EBS Templates

Create APPS Template

New Template List

<table>
<thead>
<tr>
<th>Virtual Machine Template Name</th>
<th>Size (MB)</th>
<th>Status</th>
<th>Creation Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL5U3_EBZ1211_DEV_APPS_PVM</td>
<td>75,280</td>
<td>Active</td>
<td>Nov 12, 2010</td>
</tr>
<tr>
<td>OVM_EL5U5_X86_64_PVM_10GB</td>
<td>12,700</td>
<td>Active</td>
<td>May 17, 2010</td>
</tr>
<tr>
<td>EL5U3_EBZ1211_DEV_DB_PVM</td>
<td>155,280</td>
<td>Active</td>
<td>Nov 12, 2010</td>
</tr>
<tr>
<td>OVM_EL5U3_X86_64_EBI212.1.1_DB_VIS_PVM</td>
<td>251,048</td>
<td>Active</td>
<td>Oct 11, 2010</td>
</tr>
<tr>
<td>OVM_EL5U3_X86_64_EBI212.1.1_APPS_VIS_PVM</td>
<td>51,365</td>
<td>Active</td>
<td>Oct 11, 2010</td>
</tr>
</tbody>
</table>
Create New EBS VM From the Template
Create New EBS VMs From Templates

### Create gfstestdb VM

| Virtual Machines  |  |  |
|-------------------|-------------------|
| Virtual Machine Name: | gfstestdb |
| Enable High Availability: | true |
| Virtual Machine Templates  |  |  |
| Template Name: | EL5U3_EBZ1211_DEV_DB_PVM |
| Size (MB): | 155280 |
| Status: | Active |
| Server Pool  |  |  |
| Server Pool Name: | owi_pool |
| Status: | Active |
| Preferred Server: | Auto |

### Create gfstestapps VM

| Virtual Machines  |  |  |
|-------------------|-------------------|
| Virtual Machine Name: | gfstestapps |
| Enable High Availability: | true |
| Virtual Machine Templates  |  |  |
| Template Name: | EL5U3_EBZ1211_DEV_APPS_PVM |
| Size (MB): | 75280 |
| Status: | Active |
| Server Pool  |  |  |
| Server Pool Name: | owi_pool |
| Status: | Active |
| Preferred Server: | Auto |

VM creation status:
Create New EBS VMs From the templates

- Startup up DBVM (gfstestdb)

```
Console: gfstestdb

Enter static IP address: 155.16.9.34
Enter netmask: [255.255.0.0]
Enter gateway: 155.16.0.1
Enter DNS server: 155.16.0.1
Shutting down interface eth0: [OK]
Shutting down loopback interface: [OK]
Configuring network settings.
  IP configuration: Static IP address
Carrying up loopback interface: [OK]
Carrying up interface eth0: [OK]
Carrying up interface eth0_bak: [OK]
Enter hostname (e.g, host.domain.com): gfstestdb.us.dell.com
Network configuration changed successfully.
  IP configuration: Static IP address
    IP address: 155.16.9.34
    Netmask: 255.255.0.0
    Gateway: 155.16.0.1
    DNS server: 155.16.0.1
    Hostname: gfstestdb.us.dell.com
    ip_tables: (C) 2000-2006 Netfilter Core Team

Enter the APPS password:
```

```
[oracle@gfstestdb ~]$ ps -ef | grep pmon
oracle 8748 1 0 20:06 ? 00:00:00 ora_pmon_gfstest
oracle 9576 9553 0 20:21 tty1 00:00:00 grep pmon
[oracle@gfstestdb ~]$ _
```
Create New EBS VMs From the Templates

- Startup up APPs VM (gfstest1apps)
Create New EBS VMs From the templates

- Startup up Apps VM (gfstestapps)

Run autoconfig:
- `oracle@gfstest1apps scripts]$ ./adaautocfg.sh`
Create New EBS VMs From the templates

- New Oracle E-Business Suite Instance Deployed from the Template

![Oracle E-Business Suite Instance](image-url)
Oracle EBS High Availability on VM

- Enable HA on VM server pool and VMs:
Oracle EBS High Availability with Oracle VM VM

- **Live Migration:** Migrate VMs to another VM server in the same VM server pool. No Downtime for Applications.
Oracle EBS High Availability with Oracle VM

- Failed Over:

Both DB and APPS VMs run on OWIVS2 VM server

OWLVS2 VM server down

Both VMs Down

Failed over to OWIVS1 in 1-2 minutes
Summary and Acknowledgement

• Use Oracle VM template to create VMs for Vision instance
• Clone EBS Apps and DB from development Instance
• Reconfigure VMs to form the clone of the development instance
• Create the new VM template based on the development instance.
• Create the new development and test EBS instances on VM environment using the new VM templates
• Live Migration and Fail Over of Oracle EBS on Oracle VM
• Special Thanks to the support of Oracle EBS on Oracle VM Team: Ivo Dujmovic and Noby Joseph in Oracle Corporation

References:
1. Five-part series from Ivo Dujmovic: E-Business Suite 12.1.1 Templates for Oracle VM Now Available
Thank You and QA
Visit Kai Yu’s Oracle Blog at http://kyuoracleblog.wordpress.com/