

**ORACLE®**



**ORACLE®**

**S311426: Lessons from the RAC Pack: How to install Grid in 30 Minutes**

Saar Maoz, Philip Newlan, Krishnadev Telikicherla  
RACPack – Oracle RAC Development



## Safe Harbor Statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.



## Agenda

- The Goal
- Install Methods & Challenges
- Rapid install tools



## The Goal

- Install Oracle Grid Infrastructure & Oracle RAC
  - Validate: Hardware, OS Config
- Grid Infrastructure
  - Clusterware
  - ASM
  - Patching: Patchset, Bundle Patch, One Off
  - SCAN/VIP listeners
- RAC Home
  - Patching: Patchset, Bundle Patch, One Off
- Database(s)



## Installation Methods

- Oracle Universal Installer (OUI, runinstaller)
  - GUI based
  - Silent with response file
  - Allows for software only (no configuration)
- Cloning (clone.pl)
  - Uses OUI in silent under covers
- OPatch
  - Used to apply patches



## The Challenges

- Ensuring all nodes meet minimum requirements
  - OS packages, kernel parameters, etc.
  - Users, groups, devices, directories, etc.
- Copy software to remote nodes
  - Securely
  - Without re-asking for password
- Need to run some commands as root



## Helpful Tools

- Check RAC Technology Matrix on OTN: [Unix](#), [Linux](#), [Windows](#) and Certify on [Metalink](#)
- [Cluster Verification Utility](#)
- Use **oracle-validated** rpm to set/install kernel rpms/parameters (Note: [728346.1](#))



# 11.2 Install Improvements

## Automatic SSH configuration

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 5 of 16

Cluster Node Information

ORACLE DATABASE 11g

Provide the list of nodes to be managed by Oracle Grid Infrastructure with their Hostname and Virtual IP Name.  
If Oracle Grid Naming Service (GNS) has been selected, Virtual IP addresses will be auto-assigned to nodes in the cluster.

Hostname	Virtual IP Name
stbpo55.oracle.com	stbpo55-vip.oracle.com

SSH Connectivity... Use Cluster Configuration File... Add... Edit... Remove

Operating system username : oracle Operating System Password :

User home is shared by the selected nodes.  
 Reuse private and public keys existing in the user home

Test Setup

Help < Back Next > Finish Cancel

# 11.2 Install Improvements

## OUI Integrated with CVU

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 14 of 17

Perform Prerequisite Checks

Some of the minimum requirements for installation are not completed. Review and fix the issues listed in the following table, and recheck the system.

Check Again Fix & Check Again Show Failed All Nodes Ignore All

Checks	Status	Fixable
SwapSize	Failed	
KernelParameters		
KernelParameter:rmem_max	Failed	Yes
KernelParameter:wmem_max	Failed	Yes
KernelParameter:aio-max-nr	Failed	Yes
NetworkTimeProtocol(NTP)	Failed	

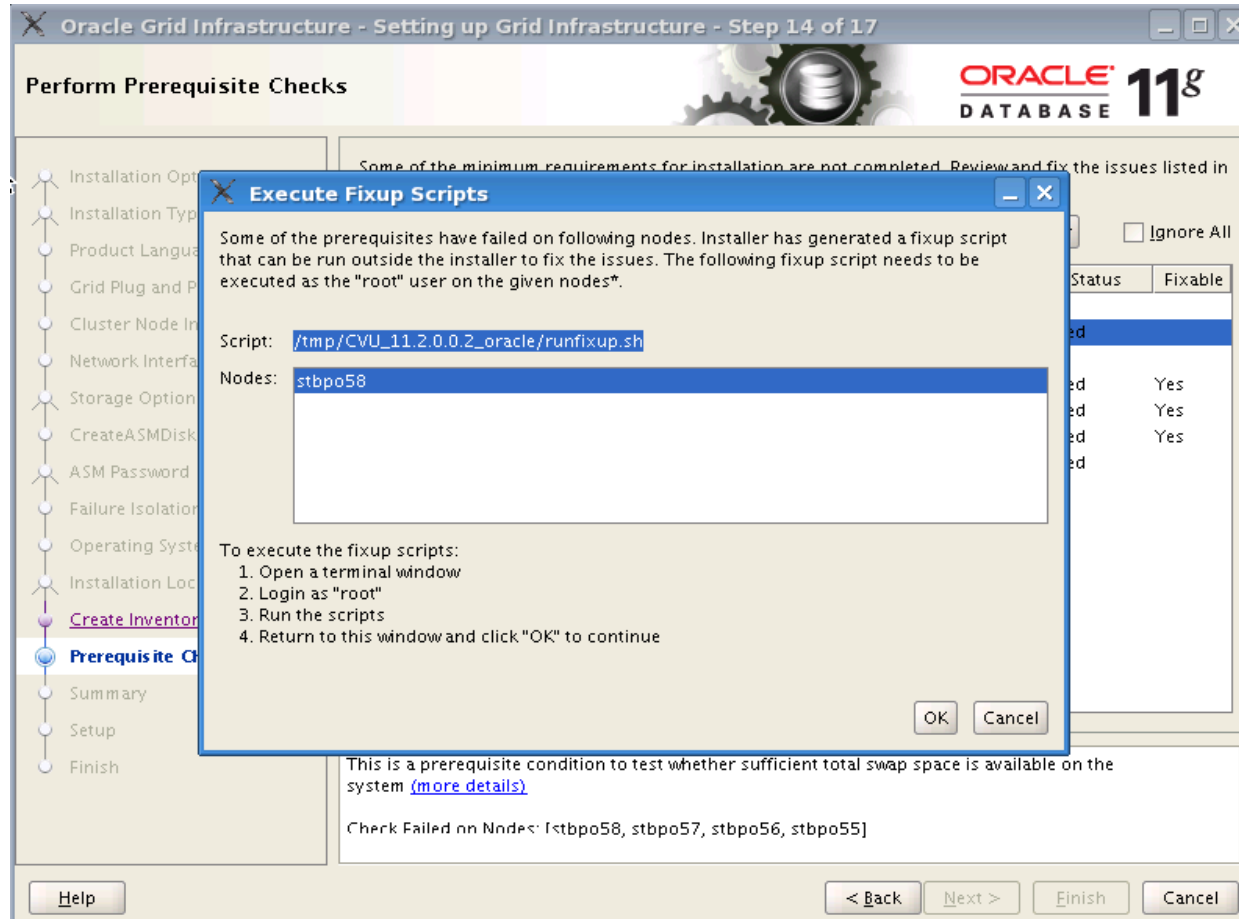
This is a prerequisite condition to test whether sufficient total swap space is available on the system [\(more details\)](#)

Check Failed on Nodes: [stbpo58, stbpo57, stbpo56, stbpo55]

Help < Back Next > Finish Cancel

# 11.2 Install Improvements

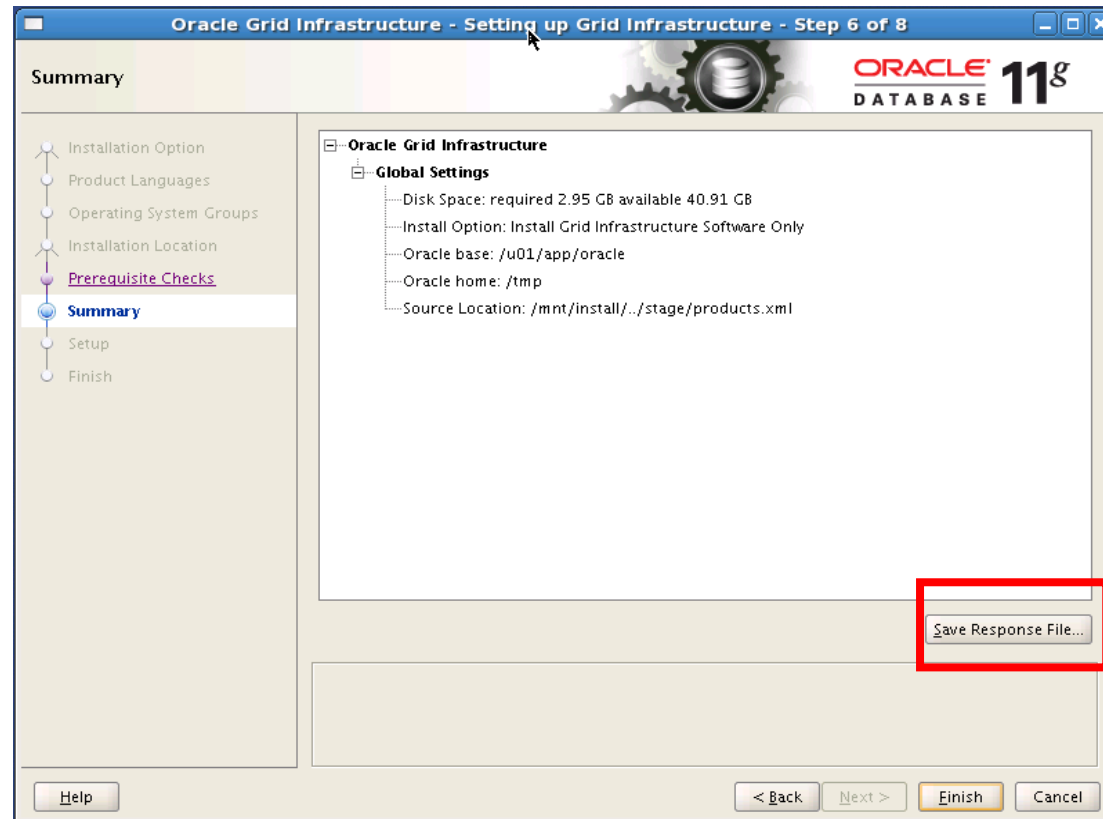
## CVU Fixups



## 11.2 Install Improvements

### Save Response File

- Also auto saved to Oracle Home/inventory/response



- In 10g or 11.1 use the `-record` flag to runInstaller



## Real-world Examples

- Oracle RAC in Oracle VM templates
  - Automatically deploys Grid Infrastructure and Oracle RAC within VM templates
  - Uses cloning technology
- Install/Config of Database Machine
  - Automatically install/configures RAC on DB Machine
  - Uses silent install
- General case RAC



## Oracle RAC OVM Template

- Builds a production ready two node Oracle Database 11g Release 2 RAC configuration in 30 minutes
- Template is distributed as archive files containing two disk images
  - Oracle Enterprise Linux 5U2 system disk image
  - Oracle RAC Software disk image
    - All homes updated to latest Bundle Patch
    - Clone Install script for Grid Infrastructure and RAC
- Entire install is automated
  - User only providing minimal input parameters.



# RAC-Clone Demo

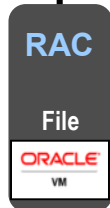
# Oracle VM Templates

Rapid Application Deployment

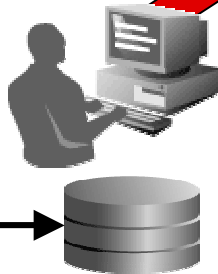
ORACLE E-Delivery

Download from Oracle

- Pre-built, pre-configured VM
- Complete Clusterware, ASM, RAC installation
- Database 11g, Enterprise Manager dbControl

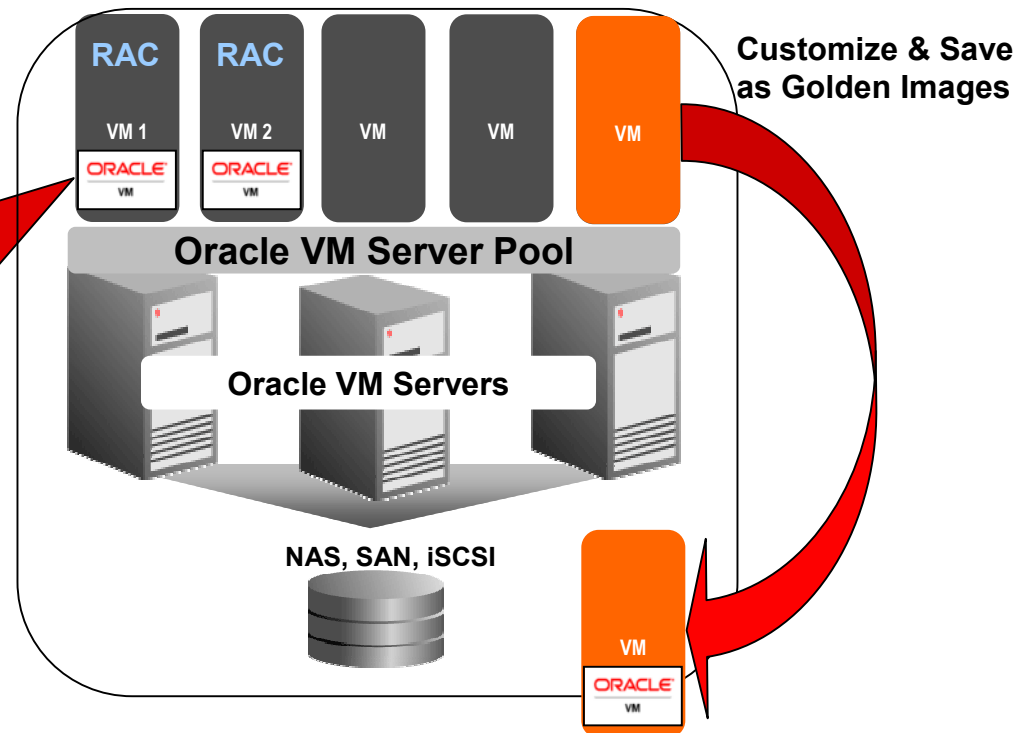


Import to Oracle VM Manager



Start-Up in Oracle VM Pool

Save hours or days in installation and configuration time



ORACLE





## Configure Steps

- First Boot Config

**Operating System Configuration**

- RAC Cluster Build

**Build and configure the Grid Infrastructure Home**

**Build and configure the RAC Home**

**Create the RAC Database**



# Configure Steps

## First Boot Config

- OVM Template OS
  - Special Case
    - A significant proportion of the OS is pre-prepared
  - Boot Time - Cluster Node Specific Data
    - Node Network Details
    - Node Names / IP Addresses
    - SCAN Name / IP Addresses

# Configure the OS – First Boot

```
root@strrac07:/u01/clone
File Edit View Terminal Tabs Help

NODE DETAILS
=====
                NODE 1                NODE 2
-----
Enter Public Nodename      : [strrac07      ] [strrac08      ]
   Public IP address      : [144.25.246.48 ] [144.25.246.49 ]
Enter the VIP Nodename    : [strrac07-vip ] [strrac08-vip  ]
   VIP IP address        : [144.25.246.107] [144.25.246.108]
Enter Private IP address  : [10.10.10.7   ] [10.10.10.8    ]

NETWORK DETAILS
=====
Enter Public Network Adapter Name : [eth0      ]
   Public Subnet mask             : [255.255.252.0 ]
   Default Gateway IP            : [144.25.244.3  ]
Enter Private Network Adapter Name : [eth1      ]
   Private Subnet mask           : [255.255.255.0 ]
Enter DNS Server IP Address       : [144.25.246.110] Domain : [us.oracle.com ]

CLUSTER DETAILS
=====
What do you want to call this cluster : >strrac0708 <
Enter the SCAN name and IP for cluster: [strrac10-vip ]

Help >> Enter the cluster name
```



# Cloning Homes

Prepare the Homes for Cloning

- Why
  - Slipstreams all patches – No patching immediately after install
  - Silent Install - Avoids user errors
  - Allows repeatable Installs
- How
  - First Prepare your Home
    - Install
    - Patch
    - Shutdown
    - Cleanup – or use a Software only install
    - Compress
  - Copy to new cluster

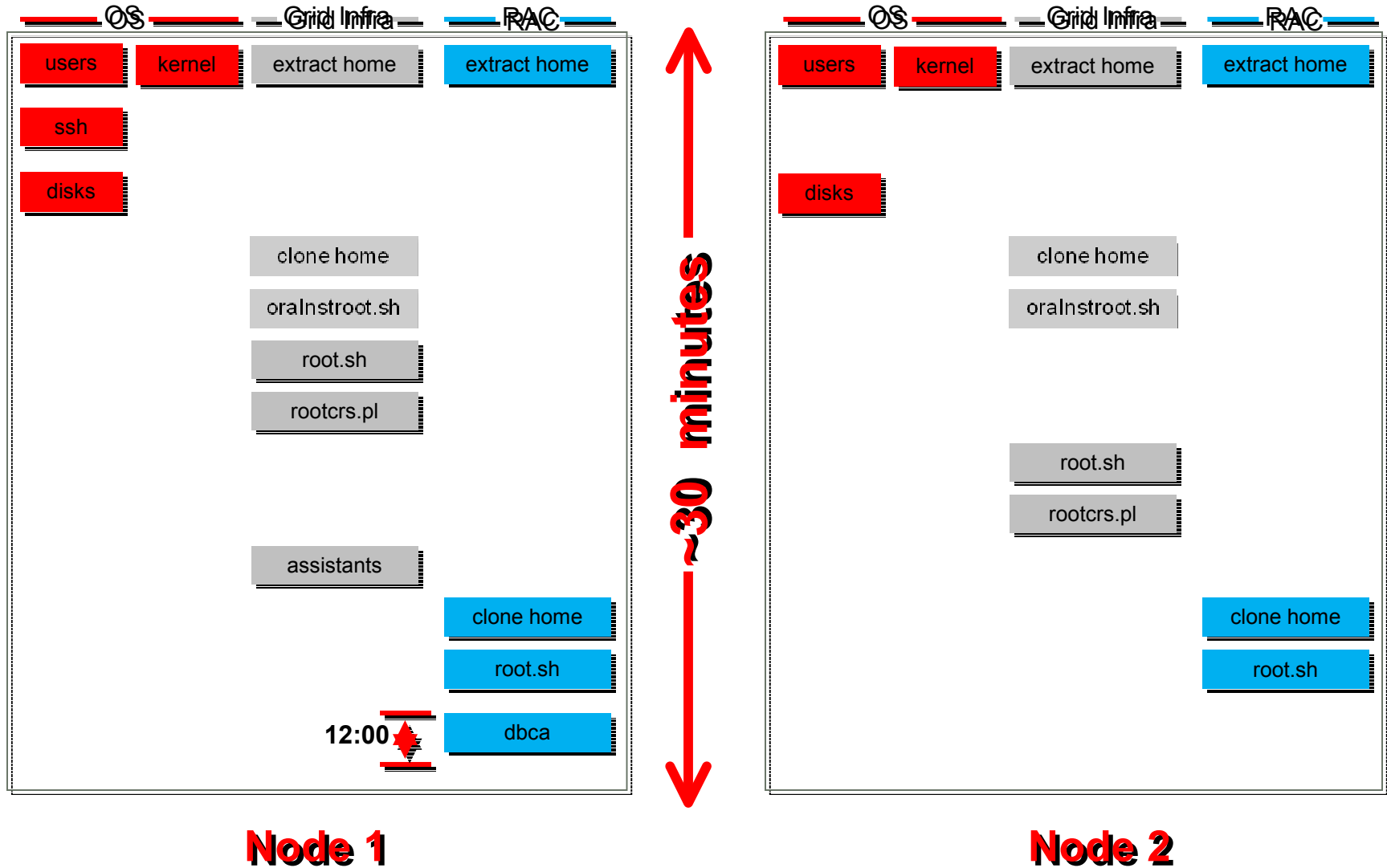


## Configure Steps

Build and Configure the Grid Infrastructure Home

- Extract the cloned home
- Configure
  - clone.pl
    - The magic
  - root.sh
    - Silent
  - rootcrs.pl
    - Silent
  - Post install assistants
    - Silent

# Cluster Build - Process Flow






# RAC-Clone Demo - Review



## Database Machine – The Basics

- 8 Compute Nodes
- 14 Storage Nodes [Cells]
- One or more Clusters
- One or more Databases
- One or more Diskgroups
- End to End Provisioning
  - Ability to rerun one or more steps
  - Ability to include best practices
  - Log all install and configuration steps
  - Apply all recommended Patches





## Database Machine – Configuration Steps

- OS/Hardware Setup – First Boot
  - IP addresses, dns,ntp,/etc/hosts,users,ssh
  - Validation
- Storage Setup
  - Cell disks
  - Grid disks
- Oracle Software Setup
  - Grid Infrastructure
  - Database(s)



## Database Machine – The Tool

- Results
  - Repeatable
  - Consistent
  - Complete
  - Updateable
  - Uniform
  - Less errors
  - Documented
  - Less human keystrokes
- Hours compared to days...



**Database Machine – Let Us Show You**



## General RAC – The Basics

- Prototyped and tested on Linux
- Less user input compared to Database Machine
- Can not make same assumptions as for DB Machine & VM templates



## General RAC

- Configuration entry...
- Simple data entry...



## General RAC - Steps

- `ValidateEnv` - Validate configuration file
- `UnzipFiles` - Unzip Oracle software
- `WriteNodelists` - Create list of nodes
- `setupSSHroot` - Setup ssh for root if possible
- `UpdateEtcHosts` - Update `/etc/hosts` for node connectivity
- `SetupStorage` - Setup `udev`, and appropriate permissions for storage
- `RunCluvfy` - Run CVU and fixups
- `CreateUsers` - Create required users
- `SetupSSHusers` - Setup ssh for required users
- `GridSwInstall` - Install Grid Infrastructure on all nodes
- `GridRootScripts` - Run root scripts for Grid Infrastructure
- `DbSwInstall` - Install database software on all homes and nodes
- `CreateASMDiskgroups` - Create ASM instance
- `CreateListener` - Create ASM Listener
- `DbcaDB` - Create all databases based on best practices
- `ResecureMachine` - Remove ssh for root



## General RAC

- Uses standard Oracle tools
  - OUI, CVU, clone.pl, OPatch
- Becomes root for administrative tasks:
  - Create users
  - Run root.sh for install and configuration
  - Update /etc/hosts
  - Setup udev



## General RAC – The Tool

- Results
  - Repeatable
  - Consistent
  - Complete
  - Updateable
  - Uniform
  - Less errors
  - Documented
  - Less human keystrokes





## General RAC – Going forward...

- Cloned software images
  - Allows updates to Grid, ASM and RAC
    - Latest patches and bundle patches
    - Recommended parameters
  - Install and Configuration become a non-event...



**Q**  
**QUESTIONS**  
**&**  
**ANSWERS**  
**A**



## More RAC Sessions at OW09!

- **TUE 05:30 PM** South 300: S311442: RAC SIG Customer Panel
- **TUE 01:00 PM** South 300: S311427: Oracle Real Application Clusters on Oracle VM: Best Practices
- **WED 10:15 AM** South 104 S311425: Oracle Real Application Clusters and Oracle Clusterware Release 11.2
- **WED 11:45 AM** South 104 S311440: Understanding Oracle Real Application Clusters Internals
- **DEMO GROUNDS -- WEST --**



ORACLE IS THE **INFORMATION** COMPANY

**ORACLE®**