Hit the Ground Running

Oracle 10gR2 RAC on Linux

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Agenda

• Concepts and Definitions
• Hardware and Software Requirements
• Overview of the Installation Process
• Some Useful Links
• Best Practices
• Recommended Reading Topics
Oracle 10gR2 RAC Concepts and Definitions

• RAC – Real Application Clusters
  ➢ One Database, Many Instances
  ➢ Shared Storage Architecture

• Database
  ➢ What persists when everything shuts down

• Instance
  ➢ The Processes and Memory on a node accessing the database

• Clusterware
  ➢ Oracle’s cluster management services

• Listener
  ➢ Client network access to instances

• Flash Recovery Area
  ➢ The place storing all files needed for database recovery
Oracle 10gR2 RAC Concepts and Definitions (2)

- **Automatic Storage Management**
  - AKA Oracle’s Logical Volume Manager
  - Stripes across raw devices
  - Requires a dedicated ASM Instance per node

- **ASMLib (optional with ASM)**
  - Support Libraries for ASM devices

- **Oracle SID**
  - Identifier that uniquely defines an instance

- **Oracle Services**
  - Defines groups of instances
  - Used for workload management

- **Cache Fusion**
  - Oracle RAC’s mechanism for cache coherency
Planning: Storage Requirements

• Shared Storage
  ➢ SCSI-3 Reservations or NFS Certified Appliance
  ➢ Device Naming Persistence
  ➢ Configure Raw devices if needed

• Binaries, Inventory, and Trace Files
  ➢ local or shared (Cluster File System)

• Oracle Cluster Devices
  ➢ Cluster Registry and Voting disks [raw or NFS]

• Database Files
  ➢ Data files, control files, spfile, online redo log files
    ➢ Standard Edition: Must use ASM (Automatic Storage Management)
    ➢ Enterprise Edition: NFS, Raw, CFS, or ASM

• Backup Files, Flash Recovery Files, Archive Log Files, etc
  ➢ NFS, CFS, ASM, or local (not recommended)
Node Requirements

• All Node configurations must have the same…
  ➢ Same Architecture and OS
  ➢ Same Network Interface Names
  ➢ Same Disk Device Names
  ➢ Same uid and gids for Oracle user
  ➢ Directory Structure

• Except the following is permitted…
  ➢ Different Number and Speed of CPUs
  ➢ Different Memory Sizes
Network Requirements

• Public and Private Networks
  ➢ Private Interconnect
    ➢ GigE is popular choice
    ➢ No cross-over cables
    ➢ UDP (Cache Fusion) and TCP (CRS)
    ➢ Can be bonded
    ➢ Same subnet throughout cluster
  ➢ Public Network
    ➢ Same subnet throughout cluster

• Virtual IP (VIP) Addresses
  ➢ Listeners listen on and redirect to VIPs
  ➢ Each node has its own VIP

• Three Addresses for each Node
  ➢ Node : host address
  ➢ Node-priv: host interconnect address
  ➢ Node-vip: host virtual IP address
Software Requirements

• Certification Matrix

• The Linux Choices
  - SuSe or RHEL
  - “Unbreakable” Enterprise Linux

• Oracle Clusterware

• Oracle Standard or Enterprise Edition with RAC option
  - SE: Free but limited RAC License and must use ASM
  - EE: No limit to number of CPUs, but need to purchase RAC licenses
Useful Links

- Oracle Support ([http://metalink.oracle.com](http://metalink.oracle.com))
  - Certification Matrix

- Oracle Technology Network ([http://otn.oracle.com](http://otn.oracle.com))
  - Software Downloads
  - Guides
    - Quick Start Installation
    - Installing Oracle RAC
    - Installing Oracle Database
  - Reference material
    - Read the release notes
Some More Links (http://www.cptech.com)

- Certification Matrix
  - http://metalink.oracle.com/ (Click on Certification tab)
- Oracle Database Software
- Oracle Enterprise Linux
- Oracle 10gR2 Documentation
- Oracle 10gR2 RAC Installation Guide
  - http://download-east.oracle.com/docs/cd/B19306_01/install.102/b14203/toc.htm
- Oracle 10gR2 on Linux Installation Guide
  - http://download-east.oracle.com/docs/cd/B19306_01/install.102/b15660/toc.htm
- Oracle 10gR2 on Linux Release Notes
  - http://download-east.oracle.com/docs/cd/B19306_01/relnotes.102/b15659/toc.htm
- Oracle Cluster Verification FAQ
- Oracle RAC Deployment Guide
  - http://download-east.oracle.com/docs/cd/B19306_01/rac.102/b14197/toc.htm
- Installing Oracle on Linux Walk-Through (non-RAC) - background
- Oracle 10gR2 RAC installation on Firewire Walkthrough - background
  - http://www.oracle.com/technology/pub/articles/hunter_rac10gr2.html
- Oracle ASM Intro
- Oracle ASMLib
Installation Overview

• Pre-Installation Prep
• Clusterware Installation
• DB Software Installation
• Database Creation
Pre-Installation Steps

• Configure Network
  ➢ Private network bonding
  ➢ DNS Entries
  ➢ /etc/hosts

• Prep the OS
  ➢ Required RPMs and System Configuration File Changes
  ➢ Create user, groups, and environment variables
  ➢ SSH user equivalence across all nodes in the cluster
    ➢ Check ‘ssh {nodeN} date’ and ‘ssh {nodeN.domain} date’ as oracle user
  ➢ Configure hangcheck timer

• Configure Disks (see earlier storage slide)
  ➢ Create ASM Disks via ASMLib if using ASMLib

• Get Software
  ➢ Download and Unpack Clusterware and Database Software
  ➢ Important: Two Oracle Homes!
Cluster Installation

• Create a directory for the Cluster software ($ORA_CRS_HOME)
• Install Clusterware binaries into $ORA_CRS_HOME
  ➢ {cluster-sw}/rootpre/rootpre.sh as root
  ➢ {cluster-sw}/runInstaller –record –destinationFile /tmp/clus-sw-install.rsp
    ➢ Creates startup files (/etc/init.d/init, crs etc)
    ➢ Run root scripts when prompted on specified nodes in order
      - Execution on first node will initialize the voting and CRS devices
      - Execution on last node will configure startup the node applications via ‘vipca’

• Installer copies files via scp
  ➢ Verify as this step will fail silently
DB Software Installation

• Create a directory for the database software ($ORACLE_HOME)
• Install Database binaries into $ORACLE_HOME
  ➢ `{database-sw}/runInstaller -record -destinationFile /tmp/db-sw-install.rsp`
  ➢ Run root scripts when prompted on specified nodes in order
• Installer with replicate binaries to remote nodes for ‘local’ $ORACLE_HOMEs
• Configure Oracle Network Using Network Configuration Assistant
  ➢ Run $ORACLE_HOME/bin/netca
Database Creation

• Configure ASM
  ➢ Run $ORACLE_HOME/bin/dbca
  ➢ select Configure ASM
    ➢ Provide path to directory with raw devices when prompted

• Create One or More Databases using Database Configuration Assistant
  ➢ Run $ORACLE_HOME/bin/dbca and select Create Database
    ➢ Set DBCA_RAW_CONFIG if using Raw Devices
    ➢ Indicate that this is a cluster installation

• Configure Client
  ➢ Make sure client is connecting to VIP and specifies a Service rather than a SID
Oracle’s Cluster Verification Utility (cluvfy)

- Oracle utility that tries to do just what it says
- Attempts to identify problems early and throughout the installation process
  - Verifies node connectivity
  - Verifies
- Find it at {cluster-sw}/cluvfy/cluvfy.sh
Best Practices

• Synchronize time (ntp)
• Cluster Verification Utility
  ➢ Use it each step of the way
• During Cluster installation: Check for failure of ‘vipca’ during ‘root.sh’
  ➢ Will fail if using non-routeable addresses
  ➢ Run ‘vipca’ by hand as root before continuing
• NFS
  ➢ Use recommended mount settings for data
  ➢ Use “normal” mount settings for Oracle binaries
• ASM
  ➢ Use ASM to stripe across RAID 1 devices
• CFS
  ➢ Don’t use Oracle CFS for data files
Best Practices (2)

- **Host Name Resolution Peculiarities**
  - `/etc/hosts`
    - Don’t have the nodes name on localhost line entry
    - List FQDN before ‘shortname’
  - Verify ‘hostname’ returns FQDN
  - Have all addresses in DNS

- **When using dbca…**
  - Don’t create sample schemas
  - Don’t configure for shared server (MTS)

- **Monitor Flash Recovery space warnings in alert file**
  - 2G by default and can quickly fill with archive logs and halt system
Recommended Topics

- Backup and Recovery
  - Recovery Manager (rman)
  - Cluster Device Backup (ocrconfig)

- Automatic Storage Management (ASM)
  - ASMLib (not required for ASM)

- Interacting with RAC
  - ‘srvctl’ – database control
  - ‘emctl’ – enterprise manager control
  - ‘crsctl’ – cluster management

- Get to know your log files
  - $ORACLE_BASE/admin/{DB}/bdump/
  - $ORA_CRS_HOME/log/

- Oracle Enterprise Manager (aka dbconsole)
Questions

• Contact:
  - Chris Page (cpage@cptech.com)
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