ORACLE®

Oracle Database Appliance

Robert van Espelo
EMEA Lead for Oracle Database Appliance
Hardware Business Development

Oracle Database Appliance

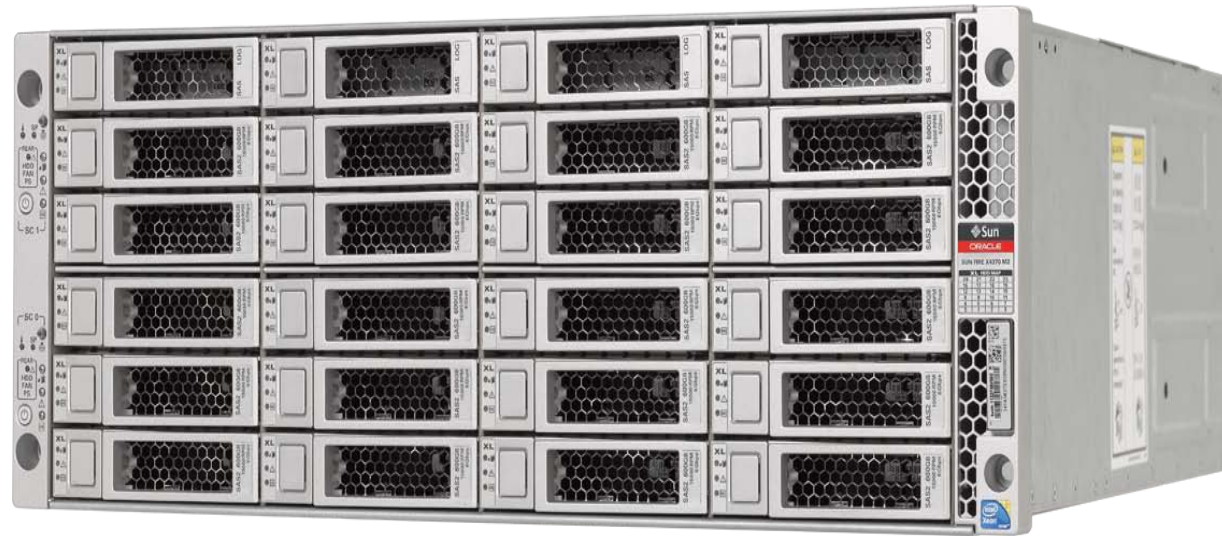Simple. Reliable. Affordable.

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DATABASE APPLIANCE

Available Now

Agenda

- **ODA Benefits**
- ODA Hardware
- ODA Software
- Deployment
- Installation & Maintenance

Oracle Database Appliance

Ideal for SMBs and Departmental Systems

- **Simple** to implement
- Designed and priced to **scale**
- **Performance** improves as you scale
- Highest levels of **serviceability**
- Highest **availability** for this class of machine

Rapidly Deploy a Database Cluster
Simplified skill set required for high availability

- Plug in the power

- Plug in the network

- Wizard-driven install

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'Pay-as-you-Grow' Database Licensing

Reduces up front costs until you need capacity

- Purchase **single** hardware configuration
- Start with minimum of 2 processor core licenses
- Scale to maximum of 24 processor core licenses
- No hardware upgrades required
- License database software just for the cores you enable
- System ships with 12 cores enabled per server—no need to do anything if running at full capacity
- To configure for subcapacity
    - Log onto MyOracleSupport
    - Declare configuration for servers
    - Download encrypted key to reconfigure servers
    - Run CLI to reconfigure servers in BIOS and system will reboot
- Once configured for sub-capacity, core count can only increase in subsequent reconfigurations
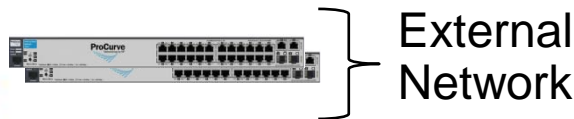- Customer responsible to ensure proper number of licenses owned

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Low Entry Cost To High Availability

Low cost, no complexity, high availability

HP DL380 G7

External Network

Redundant SAS or FC HBA's

MSA2000 Storage Array w/Controllers

- 24 processor cores
- Manual configuration & installation
- Multiple-vendor support contracts
- **Minimum 24** processor core licenses
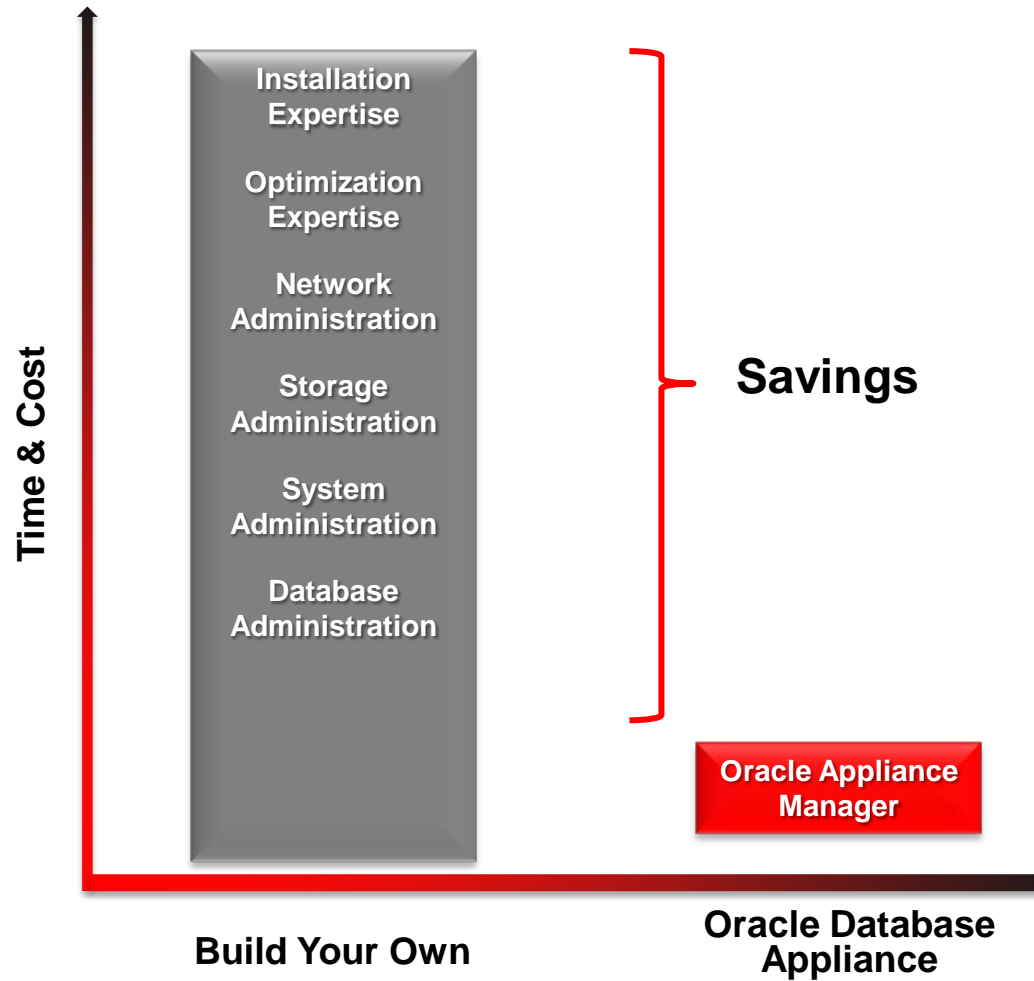- Hardware: ~50.000$ List

Oracle Database Appliance

- 24 processor cores
- One-button configuration & installation
- Single-vendor support contract
- **Minimum 2** processor core licenses
- ODA hardware: 50.000$ List

Easy to Deploy, Manage, and Maintain
Reduced Installation and Administration Effort

Time & Cost

- Installation Expertise
- Optimization Expertise
- Network Administration
- Storage Administration
- System Administration
- Database Administration

Savings

Oracle Appliance Manager

Build Your Own

Oracle Database Appliance

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Easy to Manage
Appliance Manager Software

- Self-managing database features pre-configured
  - Automatic Storage Management,
  - Automatic Memory Management, …
- Automatic detection & correction of many failure conditions
- Fast problem diagnosis
  - Automated Service Request filing (phone home)
  - Relevant logs gathered and packaged for Oracle support
- One-button patching for entire stack
- Single point of contact for all support issues

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Oracle Database Appliance

Just Keeps Running.

World's Most Popular Database	Highly Available	Easy to Deploy And Manage	Single Vendor Support
✓ Comprehensive features for OLTP & BI/DW applications.	✓ Fully redundant and fault tolerant appliance	✓ Risk-free installation and automated management	✓ Full Oracle Support Services for entire system.

■ Great performance
■ Proven reliability
■ Best security
■ Pay-as-you-grow scalability
■ Wide range of applications
	■ Fully redundant hardware
	■ Database server failover
	■ Triple-mirrored databases
	■ Built-in Failure Detection
	■ Automated Disk Backup
		■ One-button installation
		■ One-button stack patching
		■ Self-managing storage
		■ Auto-correct failures
		■ Automated Service Requests
			■ Best practice configuration
			■ Single point of contact
			  ■ Hardware
			  ■ Database software
			  ■ Operating system

Tagline · **Key Message** · **Sub Message** · **Differentiators**
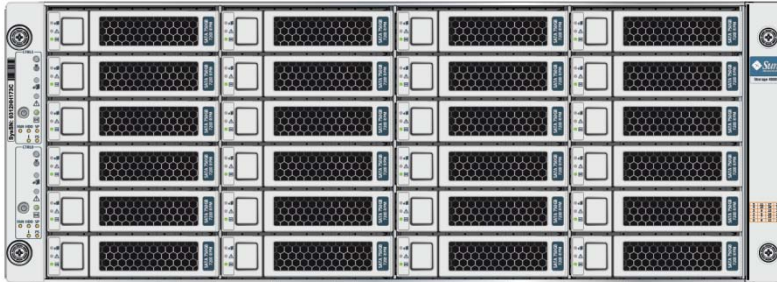
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Agenda

- ODA Benefits
- **ODA Hardware**
- ODA Software
- Deployment
- Installation & Maintenance

Oracle Database Appliance
Chassis

FRONT VIEW
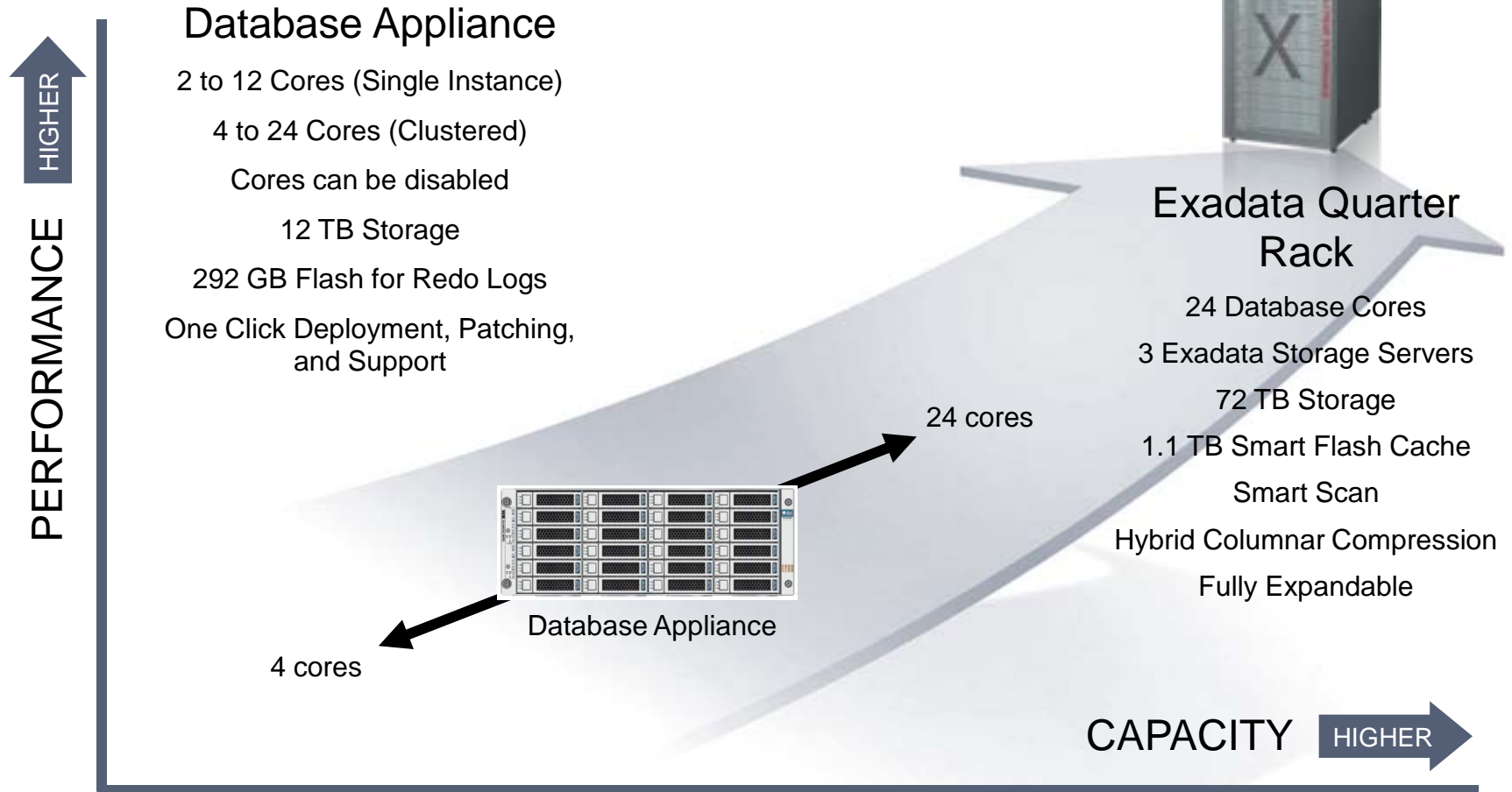

REAR VIEW

Sun Fire X4370 M2

- 4U Redundant Storage Server
- 2 Server Nodes (SN)
- 20x 600GB 15K RPM SAS (12 TB RAW, 4 TB Usable)
- 4x 73GB STEC GEN3 SSD for redo logs
- 2 Hot-swap redundant power supplies
- Redundant 5V and 12V disk backplane power
- Independent power locate buttons and status
- Independent power buffer chips and individually wired between PSUs and SNs.
- Chassis control and status is independently accessible on each SN
- No centralized chassis control manager
- Hot Swap SN modules,
- Hot Swap Fans
- Hot Swap Disks
- Hot Swap Power Supplies
- All CRUs are front and rear accessible

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Oracle Database Appliance
Expandability

- Technically iSCSI or NFS expansion via 1 or 10-GbE network connectivity is possible, but restrictions apply
- FC-AL expansion not supported
- Infiniband not supported
- SAS expansion not supported

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Database Appliance

2 to 12 Cores (Single Instance)

4 to 24 Cores (Clustered)

Cores can be disabled

12 TB Storage

292 GB Flash for Redo Logs

One Click Deployment, Patching, and Support

Exadata Quarter Rack

24 Database Cores

3 Exadata Storage Servers

72 TB Storage

1.1 TB Smart Flash Cache

Smart Scan

Hybrid Columnar Compression

Fully Expandable

24 cores

Database Appliance

4 cores

PERFORMANCE

HIGHER

CAPACITY   HIGHER

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Oracle Database Appliance
Hardware Benefits Review

- Internal chassis wiring
  - Less potential of accidentally pulled cables
- Redundant and Hot-serviceable components
  - Server Nodes
  - Fan Assembly
  - Power
    - Two redundant PSU
    - Individual power cable from PSU to Server Node
    - Independent buffer chip to each Server Node
  - Triple-mirrored HDD and SSD
  - Two internal networking to fuse cache across the clustered Server Nodes
- Two dual-SAS controllers per Server Node
- Improved Performance
  - SSDs used for redo logs
  - Networking throughput
- CPU on demand
  - Allows for growth by enabling more CPU cores to meet customer demands

Agenda

- ODA Benefits
- ODA Hardware
- **ODA Software**
- Deployment
- Installation & Maintenance

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Oracle Database Appliance
Full Oracle Stack

- Oracle Linux 5.5

- Oracle Database EE (11.2.0.2)

- Optional RAC, or RAC One Node

- Oracle Grid Infrastructure 11g Release 2 (11.2.0.2)
  - Oracle Clusterware
  - Oracle Automatic Storage Management
  - GI Patch Set Update (PSU) 3

- Oracle Enterprise Manager Database Control

- Oracle Automatic Service Requests

- Oracle Appliance Manager

Oracle Clusterware

- Allows clustering of independent servers so that they cooperate as a single system
  - Presented as one server to applications and end users
- Capable of protecting any kind of application in a failover cluster
  - Increased HA
- Fully integrated with Oracle RAC

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Oracle Automatic Storage Management

- Volume manager and file system for Oracle database
  - Single-Instance Oracle Database
  - Oracle RAC configurations
- Uses disk groups to store datafiles
  - ASM presents a file system for Oracle database files
- Provides flexible server-based mirroring options
  - Enables two-way and three-way mirroring for increased HA
  - Can replace failed or pre-failed drives without affecting operation of file system
- Improves I/O performance
  - Consolidates data storage into small number of disk groups
  - Provides dynamic rebalancing ensuring every file is evenly spread across all the disks in a disk group

Oracle Enterprise Manager
Database Control

- Provides interface to perform database administrative tasks
  - Creating schema objects (tablespaces, tables, indexes)
  - Managing user security
  - Backing up and recovery of the databases
  - Importing and exporting of data
- Provides performance and status information about databases

Automatic Service Request (ASR)

- Optional offering for enhanced support experience
- Automatically opens service requests with Oracle for specific hardware faults
  - Service requests filed electronically and securely
  - Fast and accurate resolution of the hardware faults
  - Improved availability, less downtime
- Can be integrated with existing monitoring tools
  - ASR manager can send SR notifications via SNMP traps to existing monitoring tools

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Oracle Database Appliance
Additional Software Support

- Support of other Oracle Database Enterprise Options and Features are support
    - Oracle Active Data Guard
    - Partitioning
    - Real Application Testing
    - Total Recall
    - Advanced Security
    - Label Security
    - Database Vault
    - OLAP
    - Data Mining

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Oracle Database Appliance
Additional Software Support

- Continued List of Supported Options and Features
  - Spatial
  - In-Memory Database Cache
  - Retail Data Model
  - Communications Data Model
  - Database Enterprise Management
    - *Diagnostic Pack*
    - *Tuning Pack*
    - *Change Management Pack*
    - *Configuration Management Pack for Oracle Database*
    - *Provisioning and Patch Automation Pack for Database*
    - *Data Masking Pack*

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Agenda

- ODA Benefits
- ODA Hardware
- ODA Software
- **Deployment**
- Installation &
  Maintenance

Oracle Database Deployment Options
Three Tiers of Availability

- Oracle Database Enterprise Edition 11.2.0.2
- Database Deployment Options
  - Oracle Restart
  - RAC One Node
  - Real Application Clusters

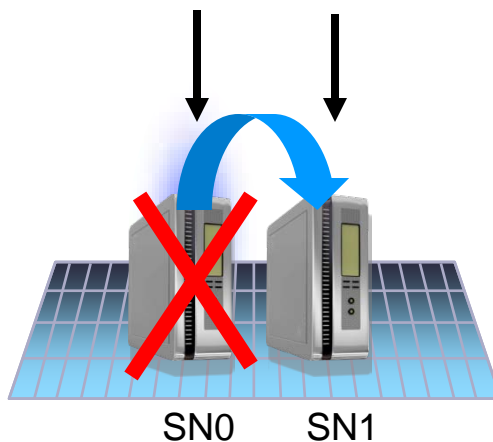| Single Instance	Active – Passive	Active – Active
• Good Availability	• Better Availability	• Best Availability
• Oracle Database 11*g* Enterprise Edition	• Oracle Database 11*g* Enterprise Edition	• Oracle Database 11*g* Enterprise Edition
	• Oracle Real Application Clusters One Node	• Oracle Real Application Clusters
	• Can have mutual failover	• Mutual failover and loadbalancing

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Oracle Restart

- Single Instance
- Runs on one node
- No failover on failure
- Automatic restart
  - HW/SW failures
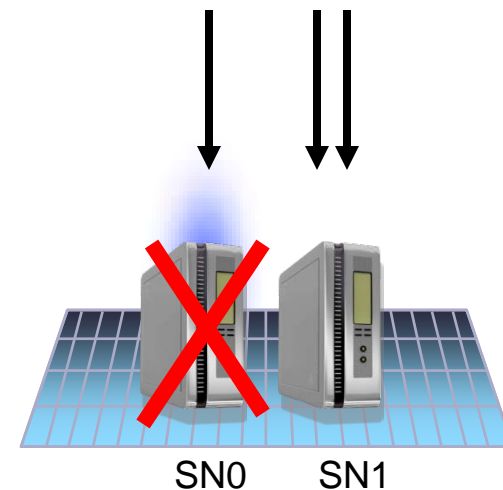 - On reboot
- Managed by Oracle Clusterware

SN0   SN1

RAC One Node

- Single Instance
- Runs on one node
- Passive failover on failure
- Database relocation
- Managed by Oracle Clusterware

SN0   SN1

Oracle RAC

- Cluster database
- Active failover on failure

SN0   SN1

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Oracle Appliance Manager
Deployment Module

- Oracle Database Class Options
  - **Very Small**
    200 Processes, 16 MB log buffer, SGA*: 4096-8192 MB, PGA*: 2048-4096 MB. 1 GB redo log file

  - **Small**
    400 Processes, 16 MB log buffer, SGA: 8192-16384 MB, PGA: 4096-8192 MB, 1 GB redo log file

  - **Medium**
    800 Processes, 32 MB log buffer, SGA:16384-24576 MB, PGA: 8192-12288 MB, 2 GB redo log file

  - **Large**
    1200 Processes, 64 MB log buffer, SGA: 24576-49152 MB, PGA: 12288-24576 MB, 4 GB redo log file

  - **Very Large**
    2400 Processes, 64 MB log buffer, SGA:49152 MB, PGA: 24576 MB, 4 GB redo log file

* SGA= System Global Area, PGA= Program Global Area

Oracle Appliance Manager

Deployment Module

- Deploys OS, Oracle Appliance Manager, Grid Infrastructure & Database
- Configures GI & RDBMS (Oracle Database)
- Ensures correct configuration of disks & networks
- Consistent implementation of known Best Practices
- Configures optimal disk layout for ASM
- Performs initial configuration of disks & ASM DG(s)

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Agenda

- ODA Benefits
- ODA Hardware
- ODA Software
- Deployment
- **Installation & Maintenance**

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Extreme Simplicity for setup & Maintenance
Oracle Appliance Manager

- Provides One Button functionality to easily install, manage, maintain & validate the system.
    - Configurator Module
    - Deployment Module
    - Storage Management Module
    - Patching Module
    - Validation & Diagnostic Tools Module
- Performs discovery of the storage subsystem.
- Monitors disks for hard & soft failures.
- Recovers ASM disk groups on shared disk failure.
- Automates procedures after remove/replace disks

Configurator

- Hides the complexity of setting up the cluster
- GUI-based enquiry collects configuration information
    - Cluster name
    - Domain
    - Networking information
    - Database size
- Validates gathered information
- Configures OS & Networks
- Deploys the Grid Infrastructure & Database

Oracle Database Appliance

World Wide Number Allocation

- Base WWN is programmed in the PDB FRUID
- A total of 4 numbers are allocated as shown in the table
- WWN number resides on sticker on PDB

WWN	Assignment
Base Number	SC-0, Expander-0
Base Number+1	SC-0, Expander-1
Base Number+2	SC-1, Expander-0
Base Number+3	SC-1, Expander-1

Oracle Database Appliance

MAC Address Allocation

- Base MAC address is programmed in SN FRUID
- A total of 5 numbers are allocated as shown in the table
- MAC Address resides on sticker on SN module near fans

MAC Address	Assignment
Base Number	Kawela Gigabit Enet port-0
Base Number+1	Kawela Gigabit Enet port-1
Base Number+2	SP
Base Number+3	SP Sideband Port (via Kawela)
Base Number+4	On-board Cluster NIC port-0 (Ophir)
Base Number+5	On-board Cluster NIC port-1 (Ophir)

Appliance Manager Software

Oracle Appliance Manager
Configurator

Setup the customized System Name

Oracle Appliance Manager

System Info

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DATABASE APPLIANCE

- Welcome
- Config Type
- **System Info**
- Network Info
- Database Info
- Network Validation
- Summary

System Name: posales

Region: America

Timezone: America/Los_Angeles

Database Deployment: RAC

New Root Password: •••••••

New Root Passwo

Select from three Database Deployment Configurations: RAC, RAC One Node, or Single Instance

Help   < Back   Next >   Finish   Cancel

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Oracle Appliance Manager
Configurator

Oracle Appliance Manager
Configurator

Oracle Appliance Manager

Storage Management Module

- Oracle Appliance Manager Daemon (oakd) is started during boot
- Discovers storage subsystem
- Tracks configuration by storing metadata
- Monitors status of disks
- Generates alerts on failures
- Takes corrective action on appropriate events
- Interacts with ASM for complete automation

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Oracle Appliance Manager
Storage Management Module

1. oakd monitors the physical state of disks

2. monitors disk status in ASM

3. based on events interacts with ASM for corrective actions

4. ASM takes actions as directed by oakd

Patching Module

- Patching Module provides tools to patch OS, Oracle Application Manager Modules, Grid Infrastructure(GI), RDBMS

- Provides a single interface and command to patch all the components including OS, firmware, BIOS , GI and RDBMS

- Patching Module will update the repository to reflect the newly installed patches and firmware's

- Bundle Patches for all components that is to be patched.

Oracle Appliance Manager

Patching Module

Phase 1 → Validate

System Validation → State of System before applying Patch

Component Validation → Validate Component Connectivity

Conflict Resolution → Checks for conflicts

Phase 2 → Apply

Apply patch in order using specific tool for each component

Start Component after patch application

Phase 3 → Reporting & Clean up

Report Patch Success and the current Component state

Clean up → Clean up of Temp areas and reboot as necessary

Oracle Appliance Manager
Validation & Diagnostic Tools Module

- A set of tools for validation & diagnostics

- Validation tool provides detailed information about the components – both HW & SW

- Diagget tool collects all the diagnostics information and can be used when experiencing problems.

- Healthcheck can be used to check the health of OS, DB, Clusterware and other Oracle Database Appliance components to ensure they are healthy and functionally optimally.

Wide Range of Oracle & ISV Applications

Horizontal

ORACLE E-BUSINESS SUITE — ORACLE PEOPLESOFT ENTERPRISE — ORACLE SIEBEL — ORACLE JD EDWARDS ENTERPRISEONE — ORACLE FUSION APPLICATIONS

Finance

3i Infotech — SUNGARD ADMINISTAR — FIDELITY INFORMATION SERVICES — Adaptik Insurance Solutions — CGI — Infosys — SABRIX

Healthcare

CERNER — Kodak — KRONOS — SIEMENS — McKESSON Empowering Healthcare — GE

Manufacturing

INTERGRAPH — RedPrairie — Autodesk — ARIBA — cardonet

Telcos

Minerva Networks — ALCATEL — NORTEL — CISCO SYSTEMS — GENESYS — cybertrust secured site — ERICSSON TAKING YOU FORWARD — Aspect

Retail

micros FIDELIO — synthesis retail solutions — ESCALATE RETAIL — Aldata Group

Government

MAXIMUS — Tele Atlas — aal — ACS — ARINC — Bentley — infor be enterprising

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Summary

- ## Simple to deploy
  - Pre-configured with validated components
  - Best practices implemented
  - Reduced risk in deploying HA

- ## Simple to manage
  - Automatically detects problems & takes corrective actions
  - Patch all components with single command
  - End-to-end management – hardware to software

- ## Simple to troubleshoot
  - ASR configuration
  - Validates system configuration
  - Gathers relevant logs for support

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"The Oracle Database Appliance was up and running in 20% of the time it takes us to roll out a typical 2 node RAC. We didn't have to spend time on engineering the drives, o/s packages, or patching. When Oracle says one button install – they're right!"

Rhos B. Dyke
Executive Vice President, Cloud Creek Systems, Inc

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"We ran 9 of our most complex processes on Oracle's Database Appliance, and executed them in a fraction of the time it takes on our existing platforms. The multi-core head room enables us to do much more, with much less equipment, in much less time!
That's truly great bang for the buck!"

Jason Scinocca
Chief Technology Officer, CallSource Inc.