

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.

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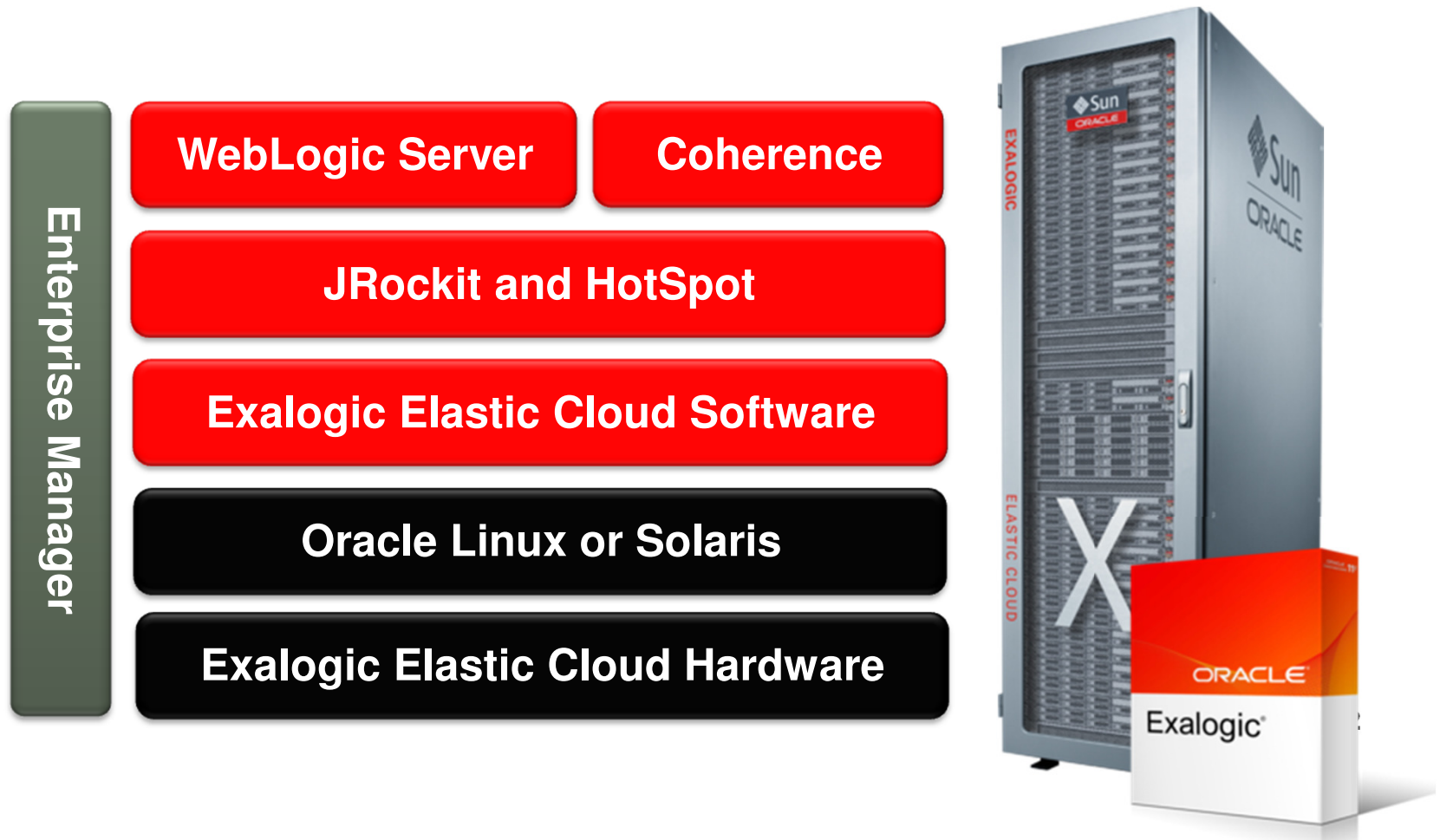
Oracle Exalogic Elastic Cloud Technical Overview

<presenter>

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Oracle's Elastic Cloud Foundation

Application Grid, OS, Enterprise Manager and hardware



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Exalogic Hardware

Exalogic Elastic Cloud Compute Nodes

SunFire X4170 M2

High Performance Compute Nodes

2.93 GHz Xeon Cores	360
1333 MHz RAM	2.8 TB
FlashFire SSD	960 GB

- **CPU, RAM and IO balanced**
 - Optimal Java performance
- **Fully redundant power, disk**
- **Hot swappable**
- **Industry standard**
- **Oracle Enterprise Linux and Oracle Solaris factory installed**



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Exalogic Elastic Cloud Network

NM2 GW and NM2 36P InfiniBand Switch/Ethernet Gateways

Exalogic IO Fabric

QDR InfiniBand	40 Gb/s
Latency (MPI Ping)	1.2 μ s

- **Lossless switched fabric**
- **Channel-based architecture**
 - Quality of Service and security
 - Fault tolerance and failover
 - Extreme Scalability

Datacenter Network Integration

Service Network (Fiber)	10 GbE
Management Network	GbE



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Exalogic Elastic Cloud Storage

Sun Storage 7320

Integrated NAS Appliance

SAS disk storage	40 TB
SSD Read Cache	4 TB
SSD Write Cache	72 GB
NFSv3 Throughput (IPoIB)	3.06 GB/s

- **Fully Integrated storage cluster**
 - Installed software binaries
 - Configuration and application media
 - Logs
 - Batch processing jobs
 - User media and documents
 - JMS/Coherence/Database storage



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Scale on Demand

Start small and grow

- Field upgradable to larger configurations
- Delivered and installed by Oracle



	Quarter Rack	Half Rack	Full Rack	2 - 8 Racks
2.93 GHz Xeon Cores	96	192	360	720 - 2880
1333 MHz RAM	768 GB	1.5 TB	2.8 TB	5.6 – 22.4 TB
FlashFire SSD	256 GB	512 GB	960 GB	1.9 – 7.7 TB
SAS Disk Storage	40TB	40TB	40TB	80 – 320 TB

All figures are model EL X2-2

8 Compute Nodes

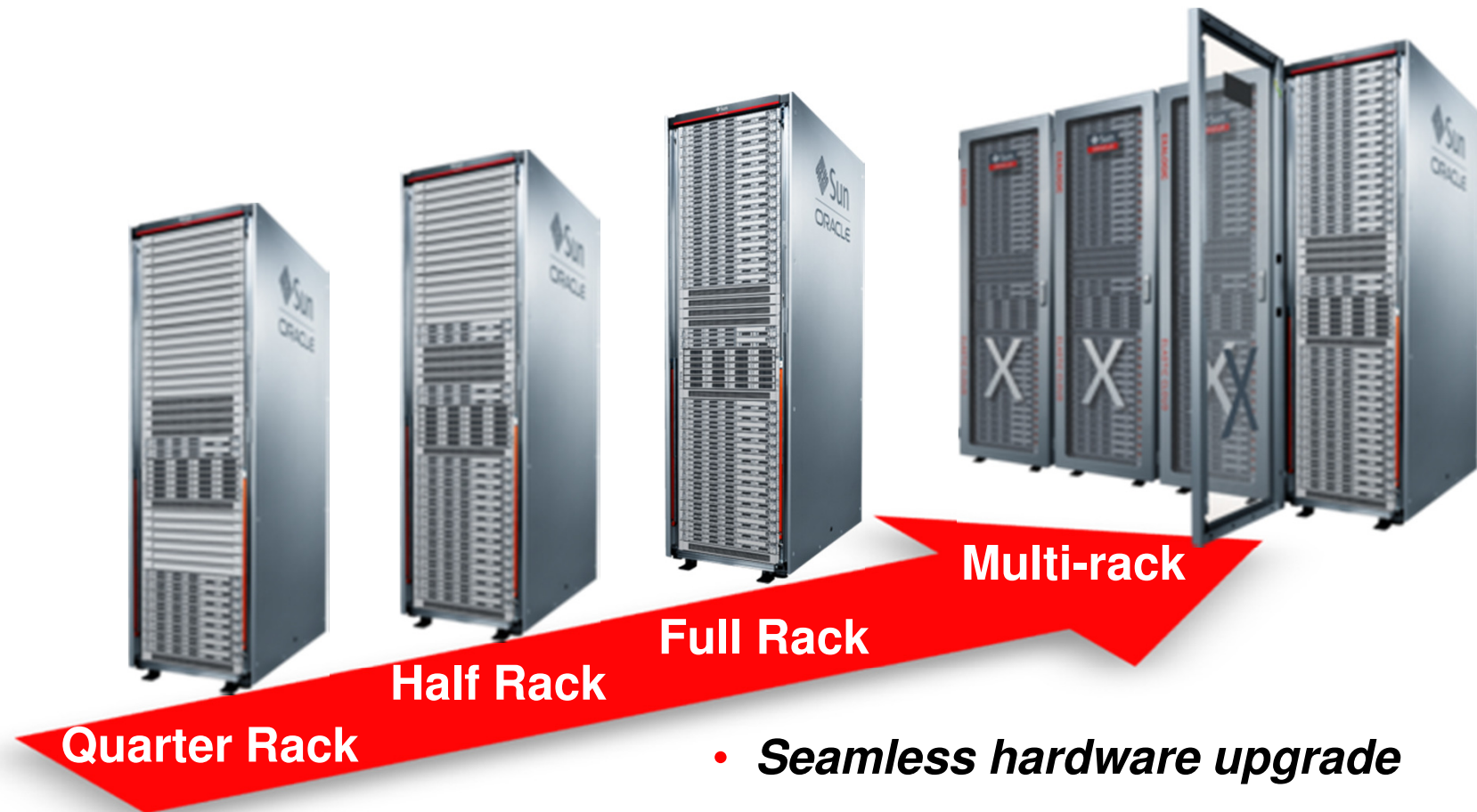
16 Compute Nodes

30 Compute Nodes

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Scale from One Application to Cloud

Start small and grow





Application Certification and Performance Optimization



Application Support and Certification

Optimized for enterprise Java, ready for everything

Runs 1000's of existing applications

Extreme Performance

ORACLE®
FUSION MIDDLEWARE

**No Certification
Required**

ORACLE®
LINUX

ORACLE®
SOLARIS

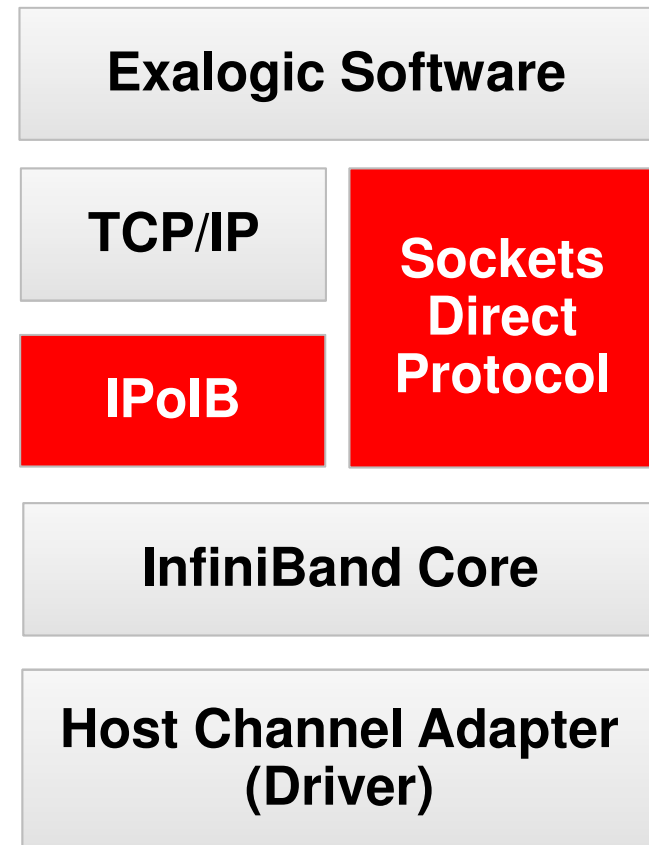
Oracle Exalogic Elastic Cloud

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InfiniBand Performance Advantage

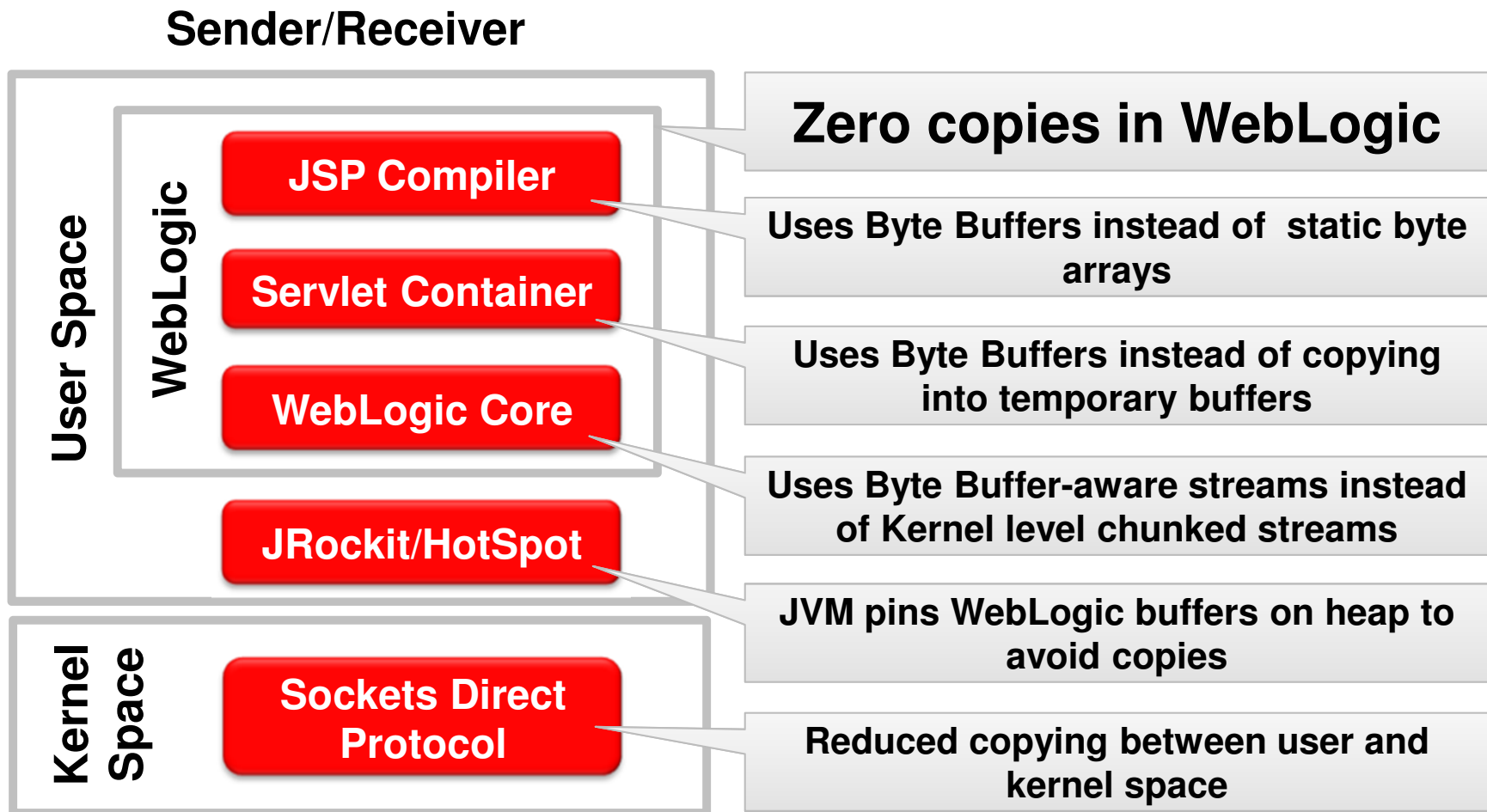
Up to 12x Performance

- **Network IO is critical**
 - #1 limiting factor for application performance and scale
- **Eliminate buffer copies**
 - From four to zero
- **Use larger packet size to reduce network overhead**
 - 64K instead of 4K packets
- **Optimized for InfiniBand**
 - 3x throughput over 10 GbE
 - 50% less latency via native SDP



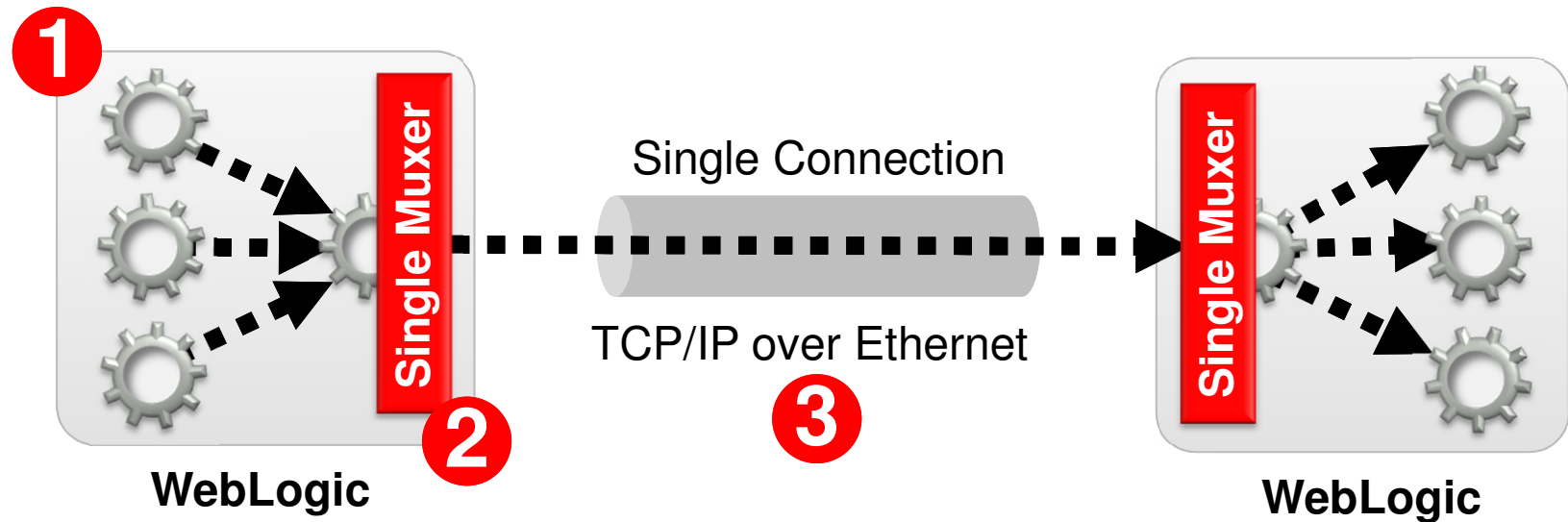
Reduced IO Buffer Copying

Dramatic reduction in buffer copying



Standard Inter-process Communication

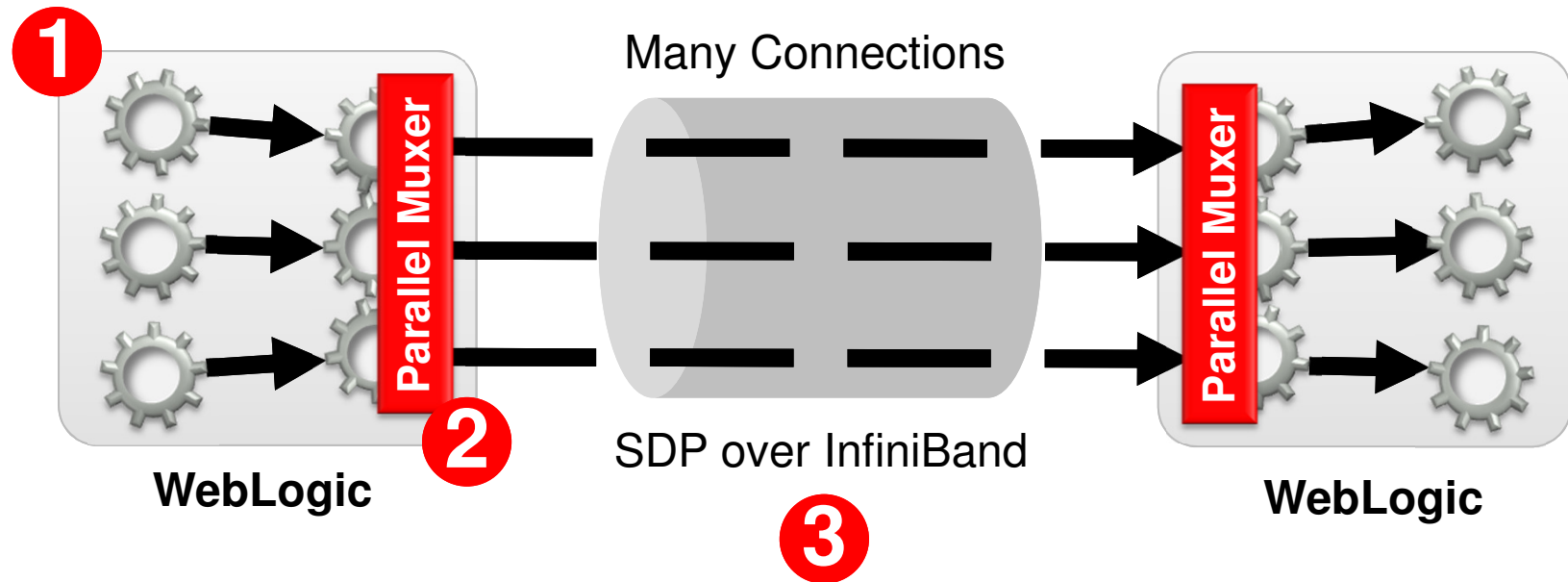
Multi-core, memory and IO bottlenecks



1. Work manager self-tuning for varied architectures
2. Single muxer lock contention for narrowband
3. Small (4K) message sizes incur substantial overhead

Exalogic Inter-process Communication

60% higher workload, 1/2 latency

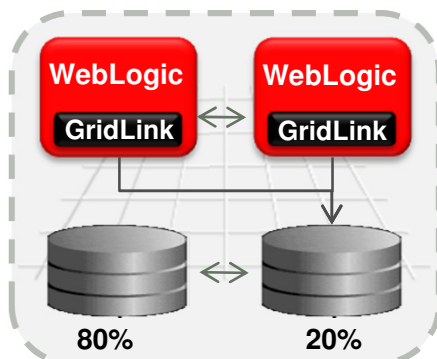


1. Multi-core scheduling algorithm optimized for Exalogic
2. Parallel muxer reduces lock contention
3. Large (64K) message sizes reduce processing overhead

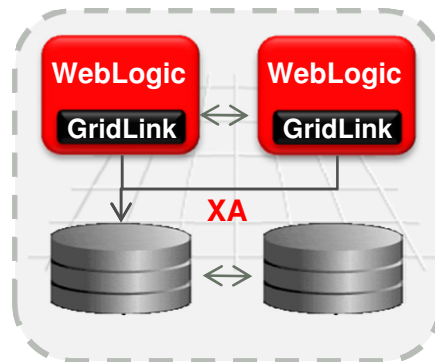
Exalogic GridLink for Exadata

Unique Oracle RAC integration and OLTP fault tolerance

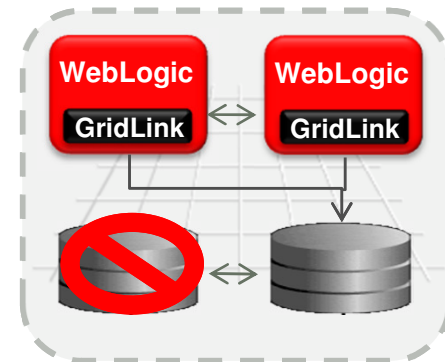
- Integrated Exalogic and Exadata clusters
- Dynamic load balancing of requests to RAC nodes
- RAC node transaction affinity for data locality
- Maximum JDBC performance with SQLNet over native InfiniBand protocol (SDP)
- Instant load balancing and failover with RAC changes



**RAC Node Load Aware
Connection Requests**



**RAC Node Affinity
For Transactions**



**Continuous Connections
Even with RAC Changes**



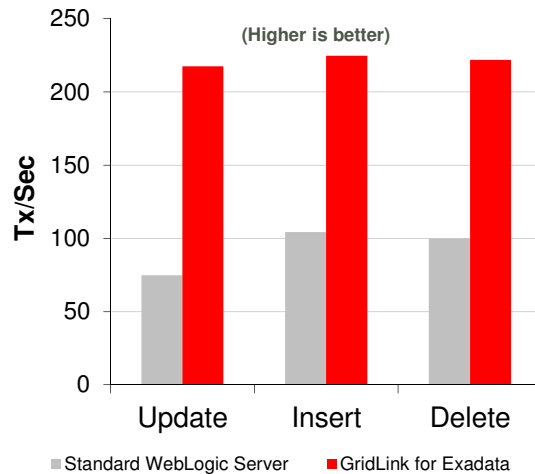
Baseline System Under Test

System used as reference for performance comparison

- Hardware:
 - Dell R710
 - 2 socket x 6 cores Xeon X5670 @ 2.93GHz
 - 76283904k (76 GB)
 - Broadcom NetXtreme II BCM5709 (GbE)
- Software
 - Oracle Linux 2.6.18 5 (no Exalogic optimizations enabled)
 - WebLogic Server 10.3.4 (no Exalogic optimizations enabled)
 - JRockit R28.0.1 6 (no Exalogic optimizations enabled)
 - Oracle Database 11.2.0.2 7
 - JDBC Driver 11.1.0.7 (no Exalogic optimizations enabled)

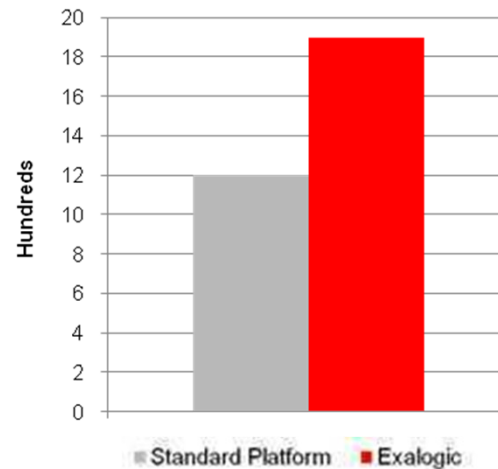
Extreme Java

The power of the Oracle Exalogic Elastic Cloud Software



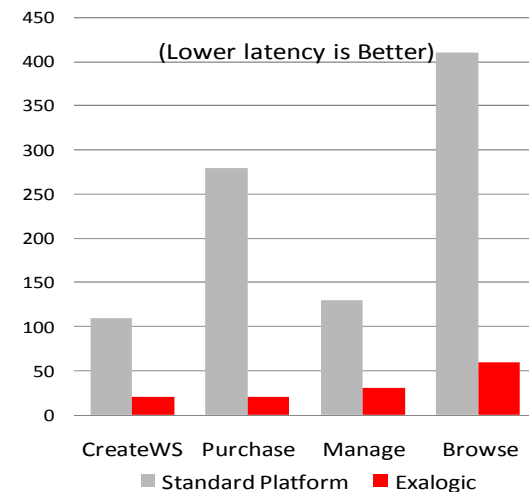
**2-3X improvement
in Database OLTP**

- Run-time connection load balancing
- JDBC over SDP



**60% more
Java Operations/sec.**

- Enhanced buffer handling for InfiniBand
- Optimized multi-core scheduler



**Up to 10X faster
response time**

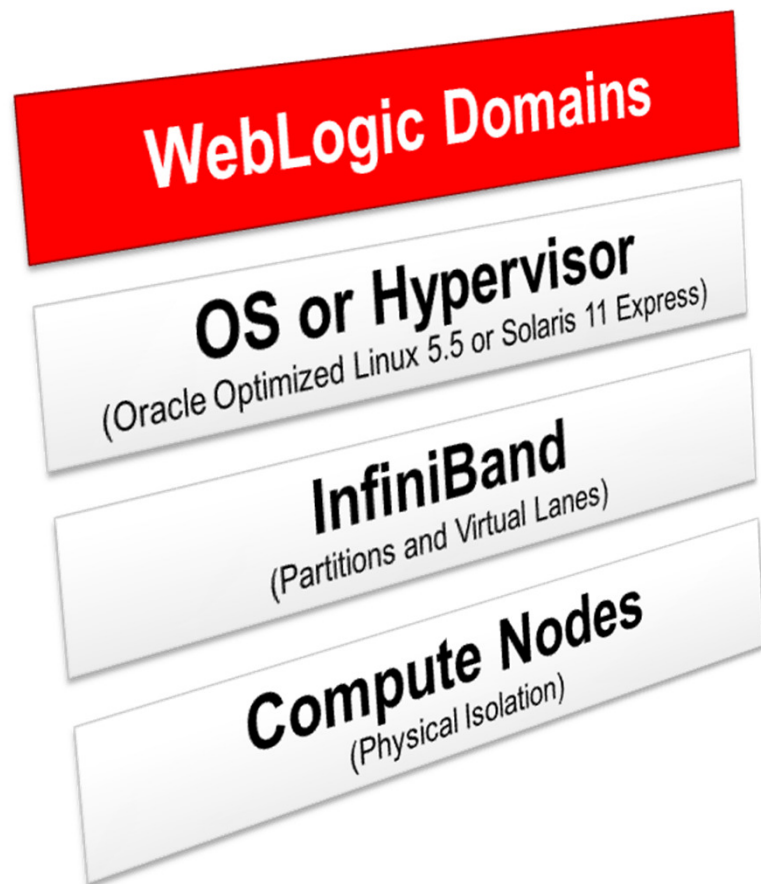
- Cluster IPC multiplexing over SDP
- Scatter-gather IO



Exalogic Multi-tenancy

Essential Application Multi-tenancy

Maximum security and fine-grained resource allocation



- **Multi-level application isolation**
 - Balance performance, availability, security and density per Application or Line of Business as required
- **Security and resource allocation aligned, separable**
 - Seamless integration with existing processes and organization

InfiniBand Partitions and Virtual Lanes

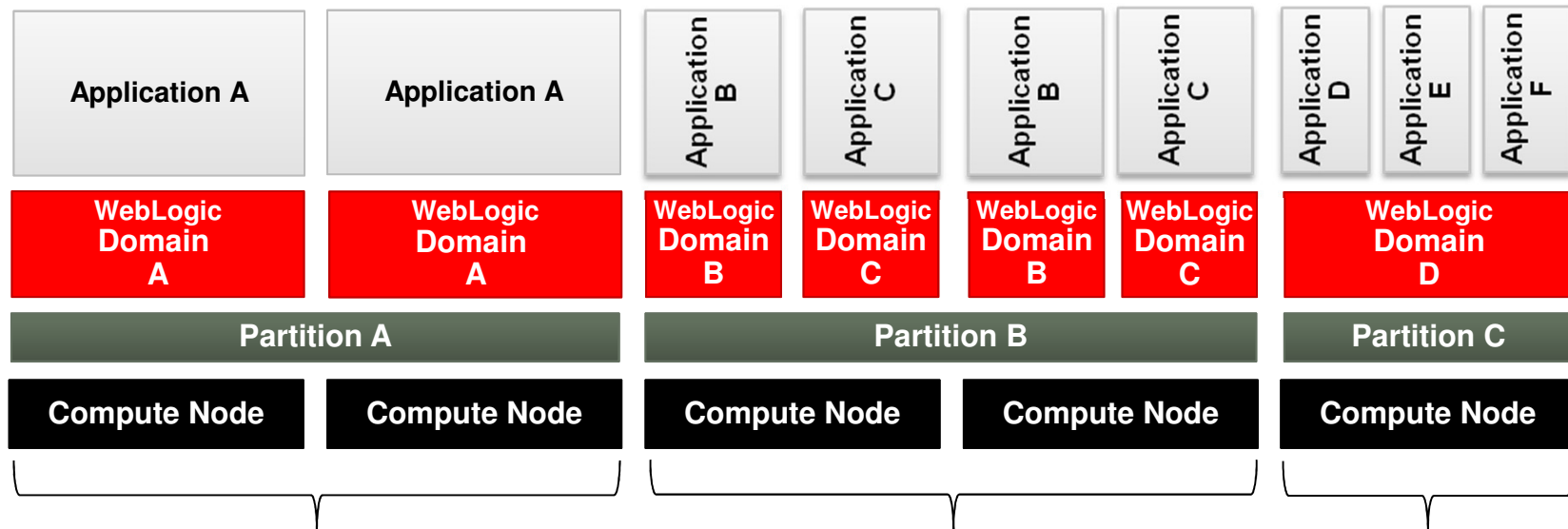
Dynamic scalability, security, Level of Service

- **Security between devices is enforced by switches**
 - Security provisioned based on IO device groupings called “partitions”
- **Level of Service-based traffic separation**
 - Each IO device supports up to 15 Virtual Lanes
 - Virtual Lanes support per-application Quality of Service



WebLogic Server Multi-tenancy in Exalogic

Maximum density, manageability, flexibility



- Single application
- High Availability
- Dedicated CPU/Memory for maximum performance
- Maximum security

- Multiple HA applications or one composite HA application
- Common Level of Service (shared CPU, Memory, failure unit, security)

- Multiple applications
- Single availability
- Maximum density



Management

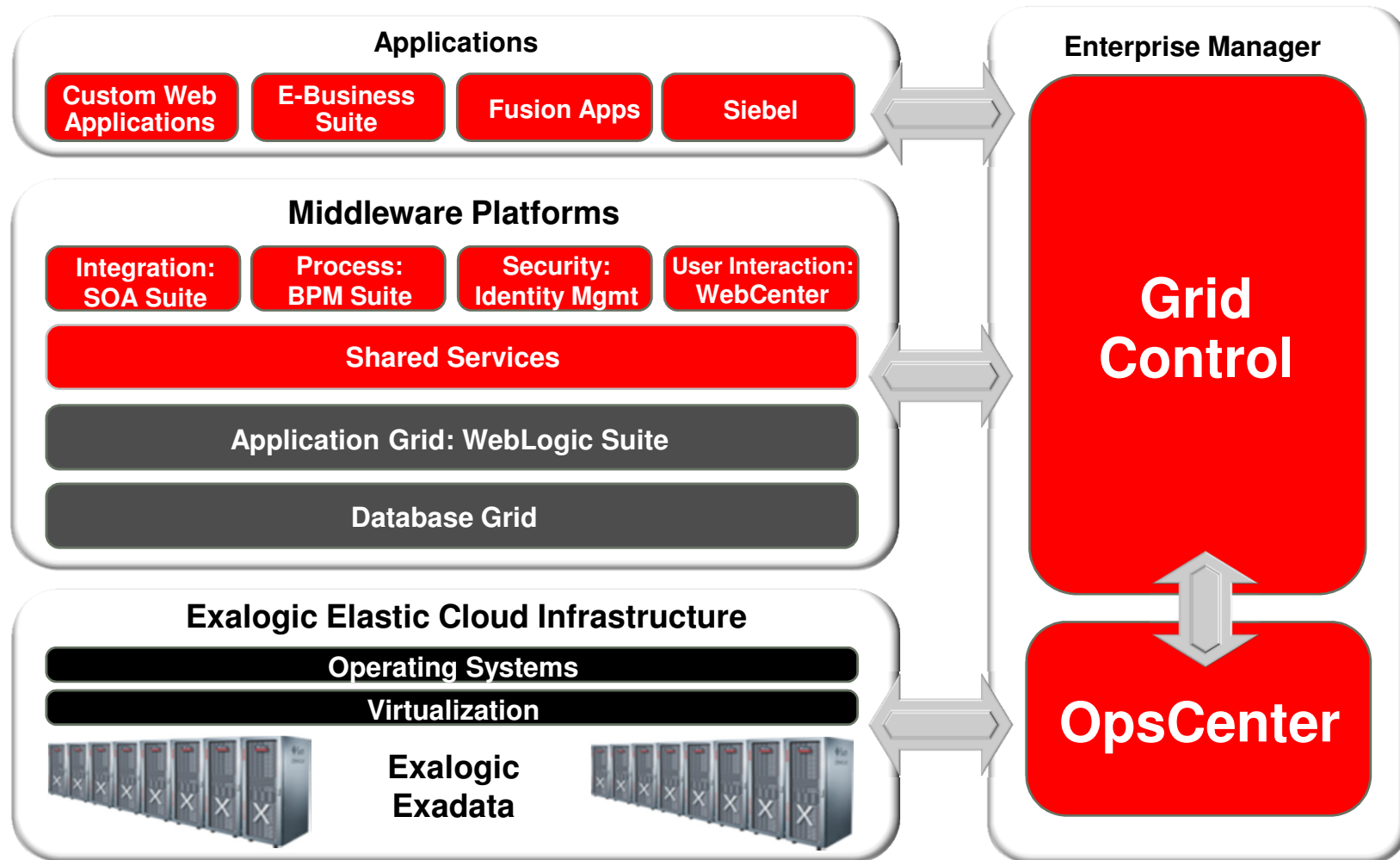
Standardized and Easy to Manage



- **All Exalogic Machines are built the same**
 - Delivered Tested and Ready-to-Run
- **All Exalogic Machines are configured the same**
 - No unique configuration issues
- **All Exalogic Machines are patched and upgraded consistently**
 - Firmware, OS, Java VM, Middleware patches
- **All Exalogic Machines “Phone Home”**
 - Remote Telemetry alerts Oracle of problems
- **All Exalogic Machines are monitored and managed from Applications to Disk**

Exalogic Elastic Cloud Management Infrastructure

From Infrastructure Application to Power Supply



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Complete and Integrated Management

Maintain

Remote Management

- Telemetry

Phone Home

- Proactive Support

My Oracle Support Integration

Manage

End-to-End Diagnostics

- Service Levels
- Root Cause

Configuration Mgmt

- Change Tracking

Patch Automation

- Firmware, OS

Deploy

Provisioning of Firmware,
OS, Middleware, and
Applications

Clone and Scale-out

Test

Functional Testing

Load Testing

Test Management

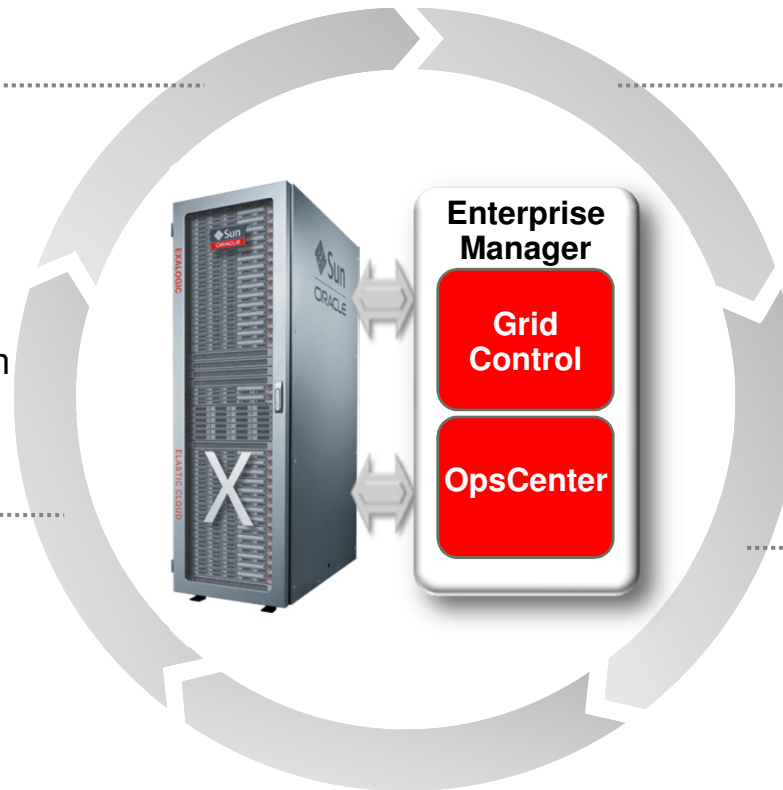
Monitor

Application-to-Disk

Exalogic Monitoring Integration

- System, Compute Nodes, Switch, Storage

Energy Utilization and Impact



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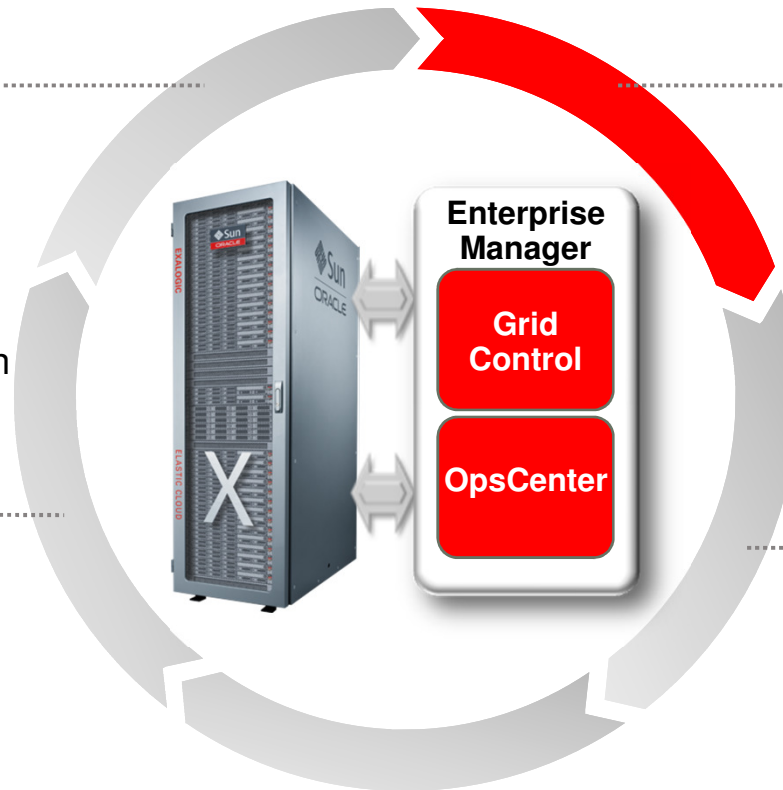
Clone and Scale-out

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Exalogic Elastic Cloud Provisioning

Reduce time and eliminate errors in building environments

- Clone directly from test to production
- Clone operation includes
 - WebLogic Server binaries and domain configuration
 - SOA artifacts, including SOA Composites and Web Services
 - Java Platform Security configuration
- Extend domain or cluster in same flow
- Modify predefined procedures with custom steps & scripts

WLS/FMW Domain

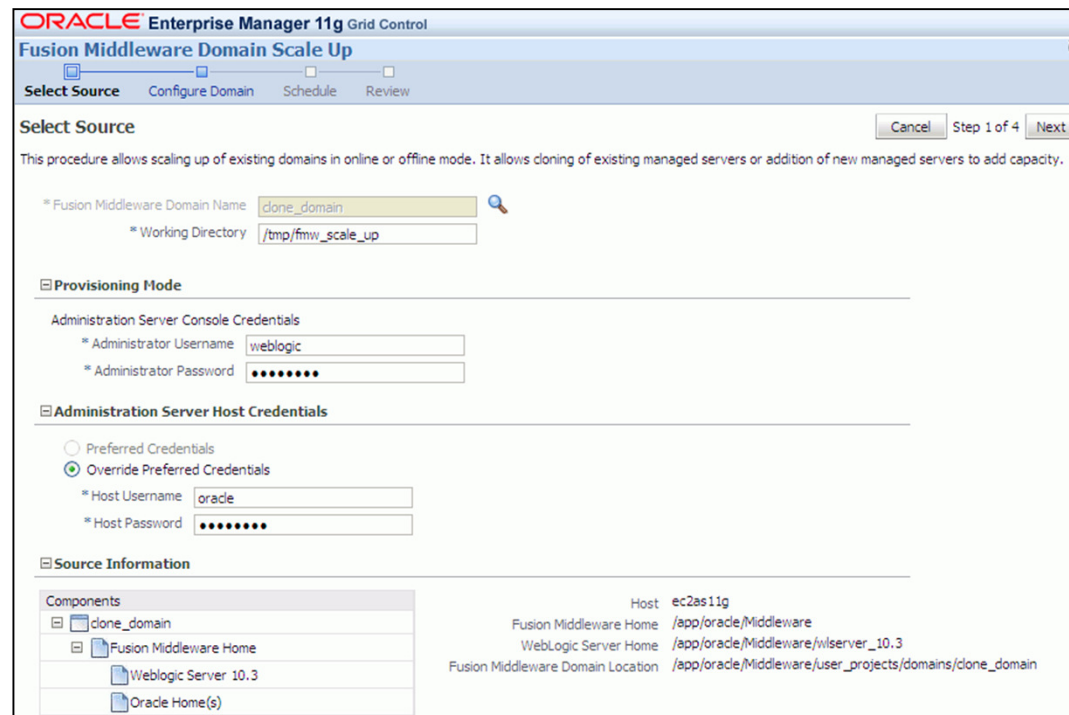


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Scale Up Exalogic Elastic Cloud

Quickly improve application performance by scaling up your Fusion Middleware domains

- Add capacity to existing, generic domain or cluster to accommodate increase in load
- Scale up operation includes provisioning home, adding/cloning managed servers, creating machine and node manager



ORACLE Enterprise Manager 11g Grid Control

Fusion Middleware Domain Scale Up

Select Source Configure Domain Schedule Review

Cancel Step 1 of 4 Next

This procedure allows scaling up of existing domains in online or offline mode. It allows cloning of existing managed servers or addition of new managed servers to add capacity.

* Fusion Middleware Domain Name:

* Working Directory:

Provisioning Mode

Administration Server Console Credentials

* Administrator Username:

* Administrator Password:

Administration Server Host Credentials

☐ Preferred Credentials

☒ Override Preferred Credentials

* Host Username:

* Host Password:

Source Information

Components	Host
<input checked="" type="checkbox"/> clone_domain	ec2as11g
<input checked="" type="checkbox"/> Fusion Middleware Home	/app/oracle/Middleware
<input checked="" type="checkbox"/> Weblogic Server 10.3	/app/oracle/Middleware/wlserver_10.3
<input checked="" type="checkbox"/> Oracle Home(s)	/app/oracle/Middleware/user_projects/domains/clone_domain

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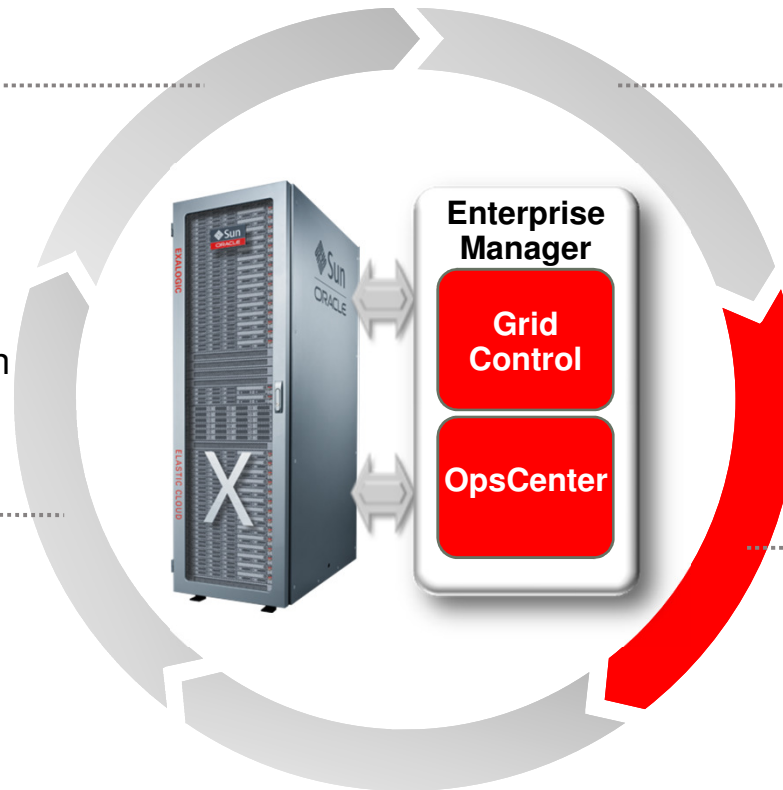
Clone and Scale-out

Test

Functional Testing

Load Testing

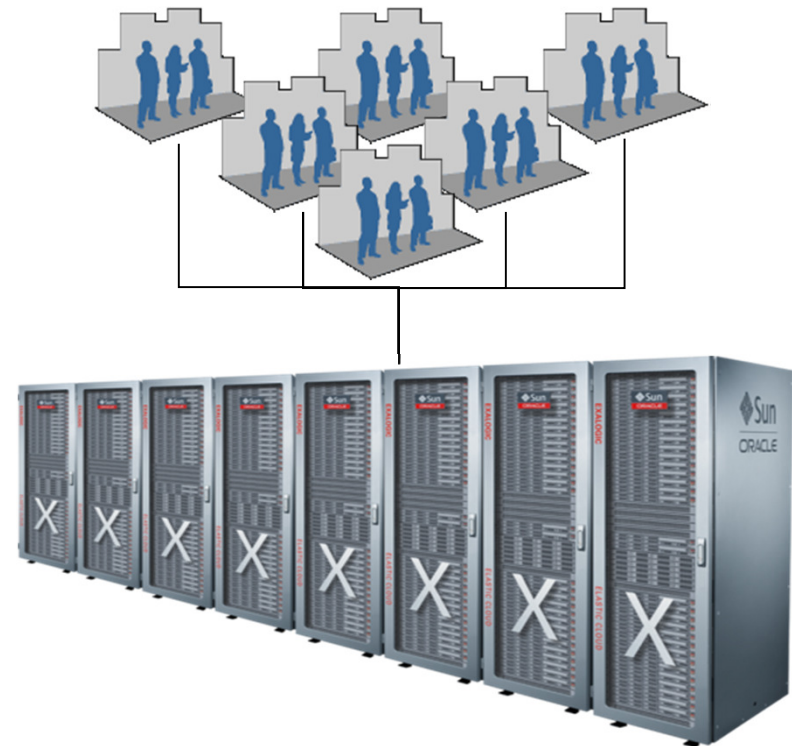
Test Management



Test Exalogic Elastic Cloud

Functional and Load Testing Automation

- Realistic load and performance testing for Web, SOA and packaged applications deployed on Exalogic
- Scale to thousands of concurrent users to simulate peak production loads
- Automatic script generation covers both functional testing and load
- Smart integration for application performance diagnosis



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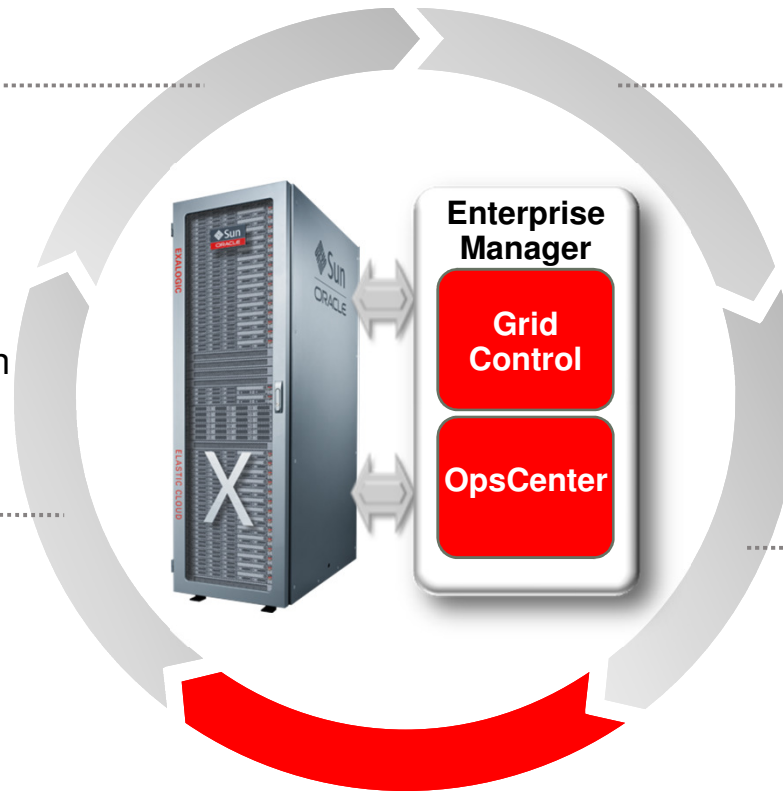
Monitor

Application-to-Disk

Exalogic Monitoring Integration

- System, Compute Nodes, Switch, Storage

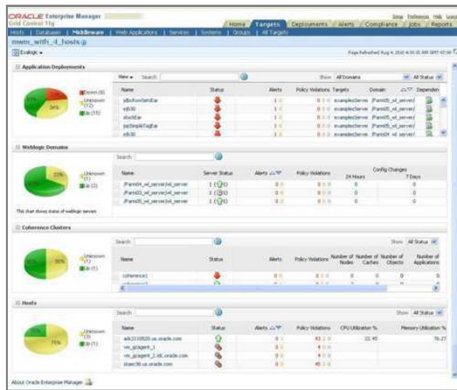
Energy Utilization and Impact



Integrated End to End Monitoring

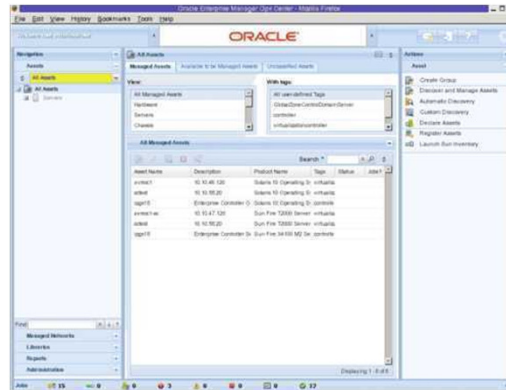
From Application, Datacenter to Support

Grid Control



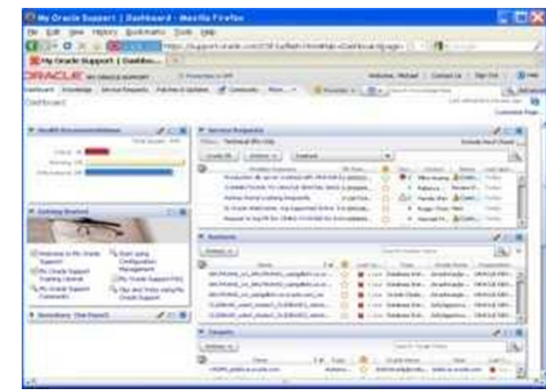
Application Operations

OpsCenter



Data Center Operations

My Oracle Support



Oracle Support



Exalogic

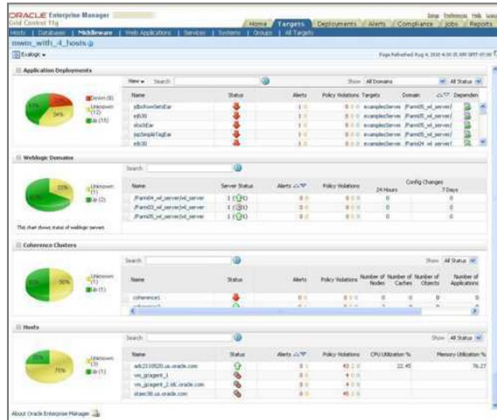


Exadata

Enterprise Manager

From Application Operations to Data Center Operations

Enterprise Manager Grid Control



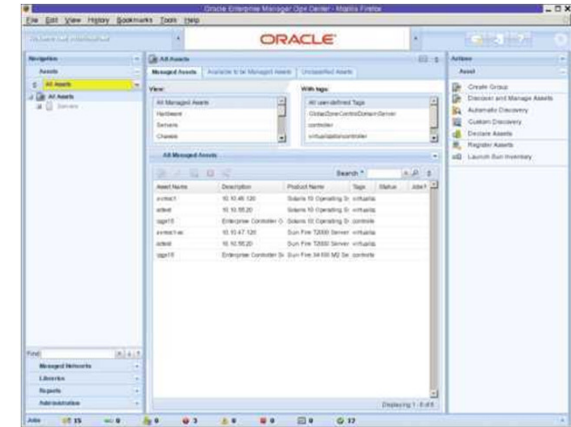
Application Operations

GC Agent

Drill Between Specific Views



Enterprise Manager OpsCenter



Data Center Operations

ILOM



Exallogic

ORACLE

Monitor Exalogic: Enterprise Manager

Analyze and correlate data across the entire software stack

- **Exalogic Application Grid management**

- Deployed applications
- WebLogic Domains & Managed Servers
- Coherence clusters
- Physical compute node status

- **Operational Views**

- Operational status
- KPI, Response & Load chart
- Alerts & policy violations
- Configuration changes (24h)
- Component and JVM metrics



Monitor Exalogic: OpsCenter

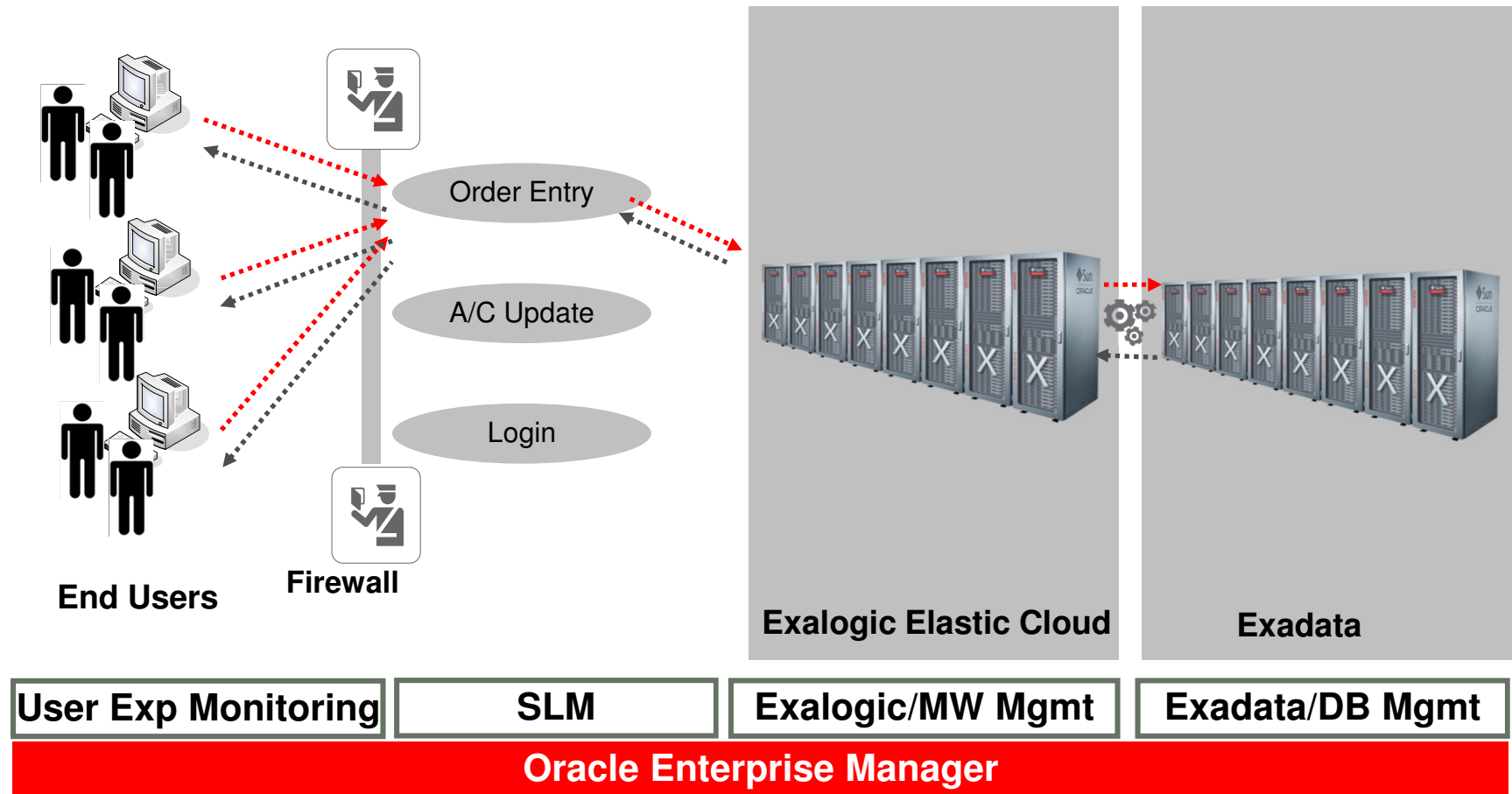
Analyze and correlate data across the entire environment

- **Hardware monitoring**
 - Hardware fault monitoring
 - Operating System performance monitoring
 - Patch automation
 - Configuration and compliance reporting



End-to-End Exalogic Elastic Cloud Monitoring

Manage performance and change across all tiers



- Transaction tracing and performance monitoring across all tiers

Complete and Integrated Management

Maintain

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Phone Home

- Proactive Support

My Oracle Support Integration

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Exalogic Monitoring Integration

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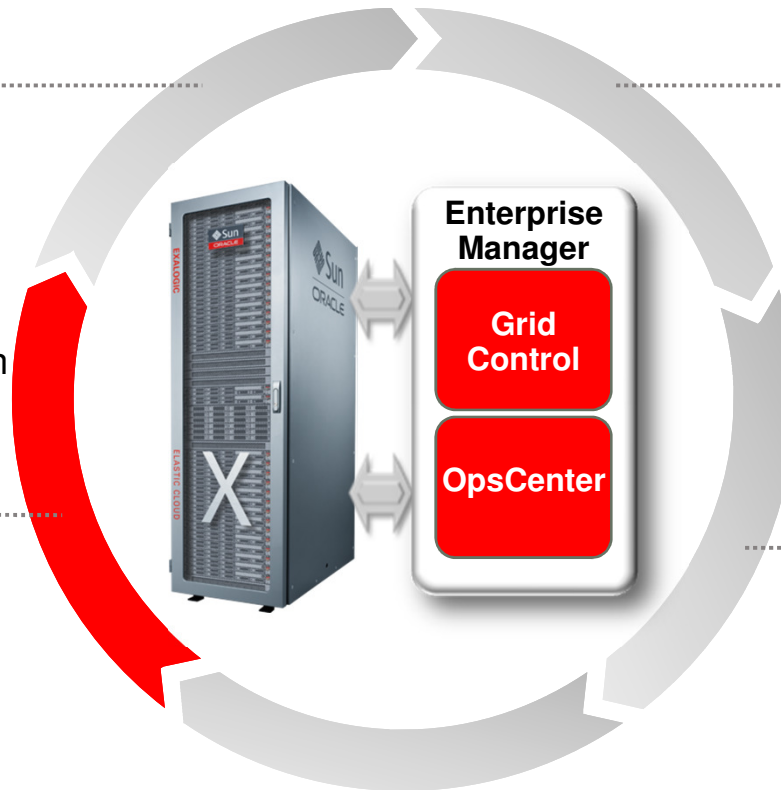
Clone and Scale-out

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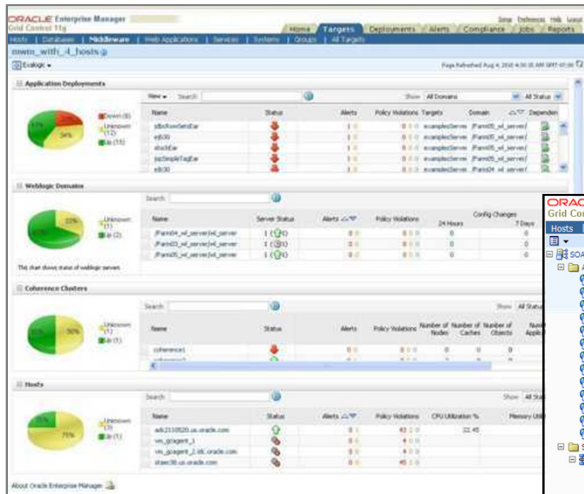
Test Management



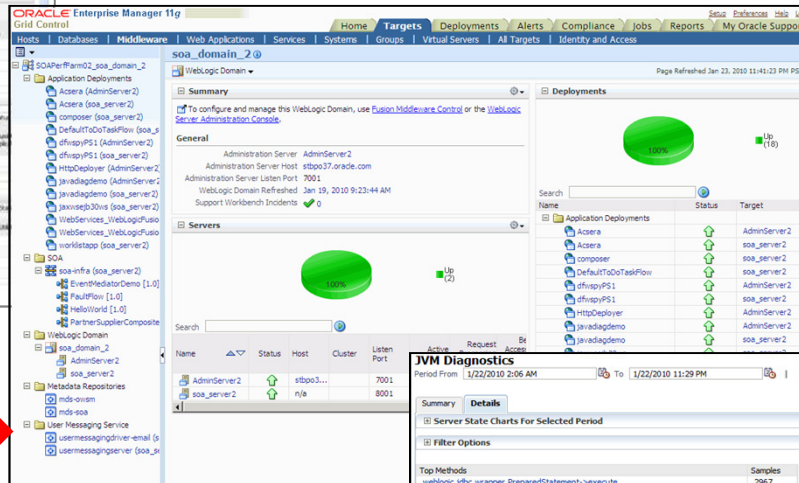
Exalogic Elastic Cloud End to End Diagnostics

Pinpoint the root cause of bottlenecks

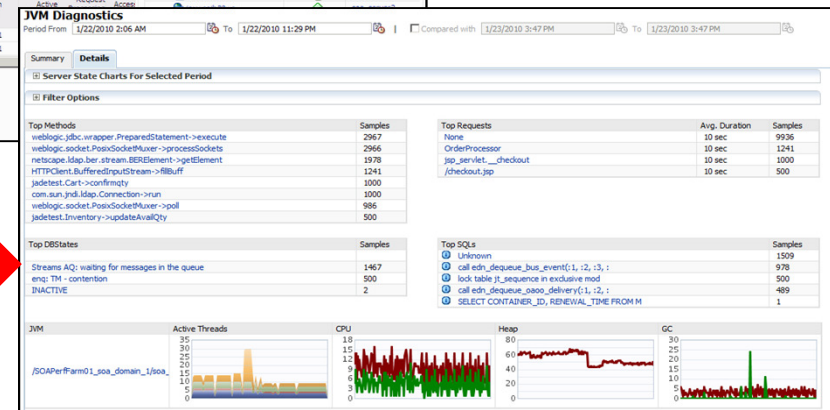
Exalogic Dashboard



WebLogic Home Page



JVM Diagnostics

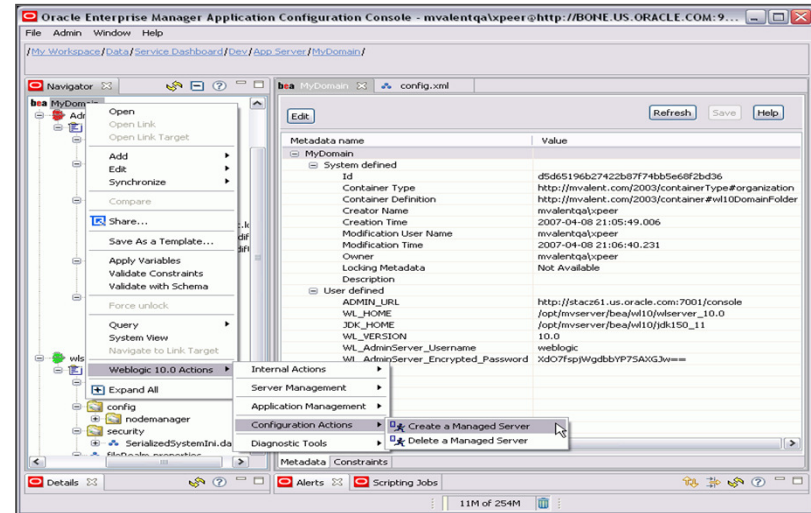


Manage Exalogic Elastic Cloud

Configuration Management

- **Automated Configuration Management**

- Enforcement of Exalogic Elastic Cloud configurations using Policies
 - OS parameters, cell configuration
- Detection of configuration drifts and changes
 - From defined golden standards
 - Between storage servers and between Exalogic machines
 - Compare configurations across both applications and middleware
- Detect targets that do not have required patches



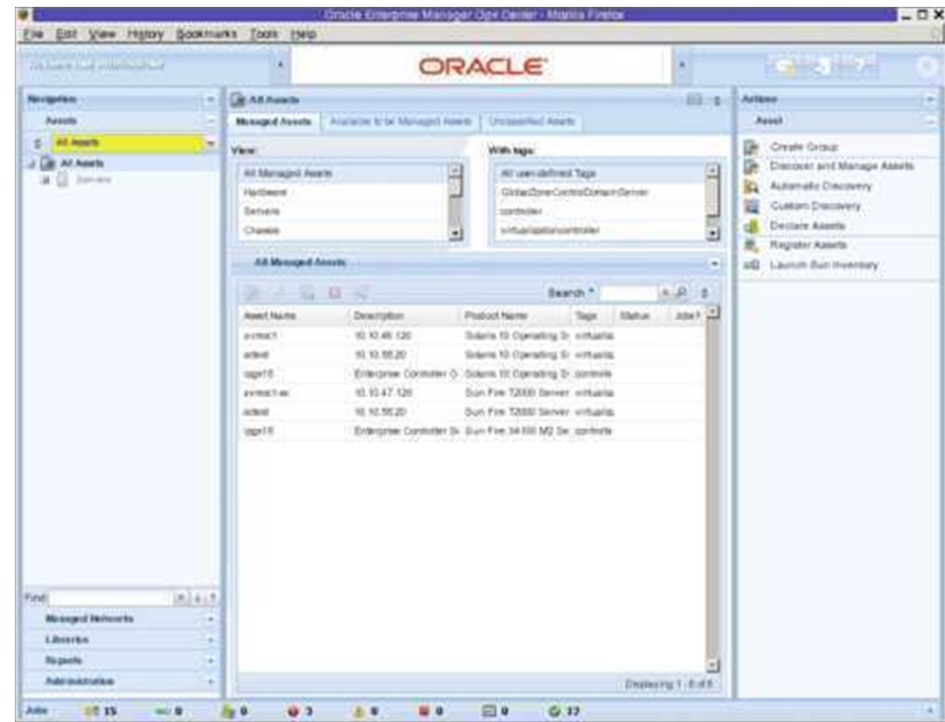
ORACLE®
Exalogic



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Manage Exalogic Elastic Cloud Hardware Management

- **Hardware lifecycle and patch management**
 - Life Cycle Management of physical devices
 - Firmware provisioning
 - Operating System bare metal re-imaging
 - Patch automation



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My Oracle Support Integration

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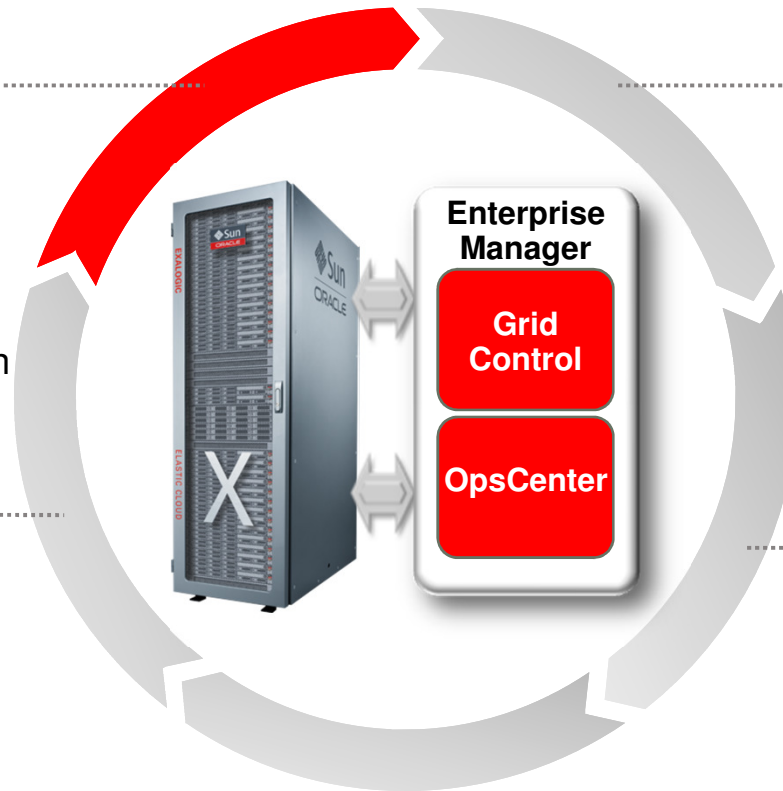
Clone and Scale-out

Test

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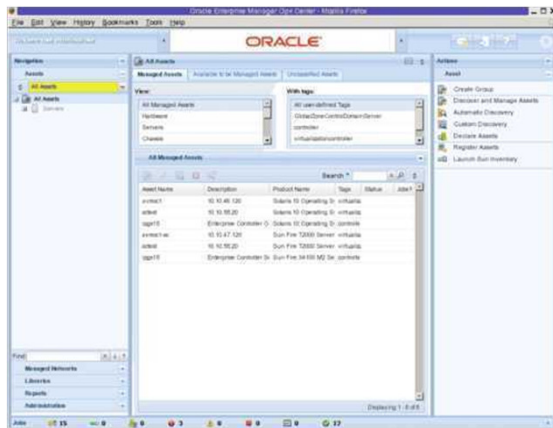
Test Management



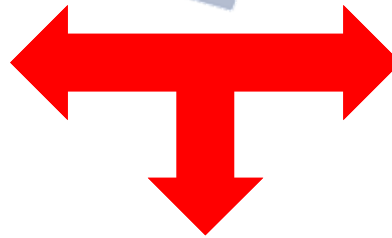
Integrated Lights Out Management

Serviceability built-In

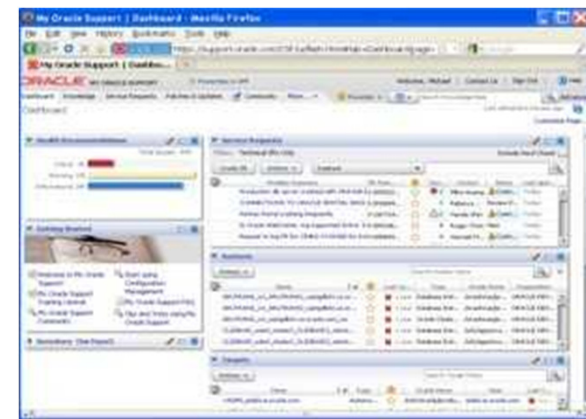
OpsCenter



Proactive
Serviceability
“Phone Home”



My Oracle Support



- **OpsCenter**

- ILOM integrated
- Direct integration with My Oracle Support



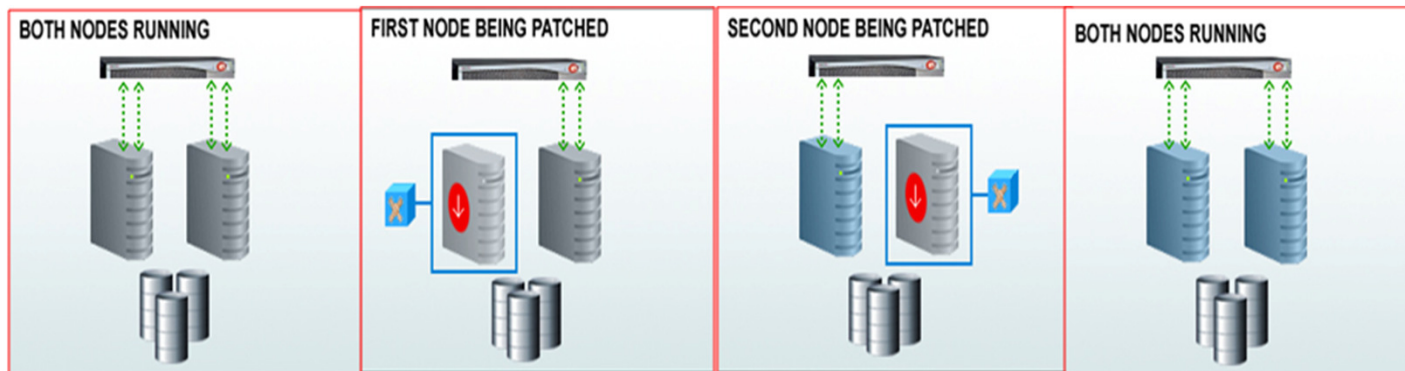
Exalogic

- **Exalogic ILOM**

- Compute nodes
- Gateways
- Storage
- Switches

Maintain Exalogic Elastic Cloud

- Middleware Patch Management using Deployment Procedures
 - Download patches as recommended by Support
 - ‘Patch Plan’ to collect multiple patches and validate them for potential conflicts
 - Patch conflict resolution: Proactively find available merge patches, otherwise log SRs
 - ‘Analyze’ mode to check for cluster health to avoid unforeseen failures
- Lights-out Linux Patch Management



For More Information



Contact

- Your Oracle Sales Professional

Resources

- www.oracle.com/exalogic

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