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Oracle WebLogic Server & Exalogic

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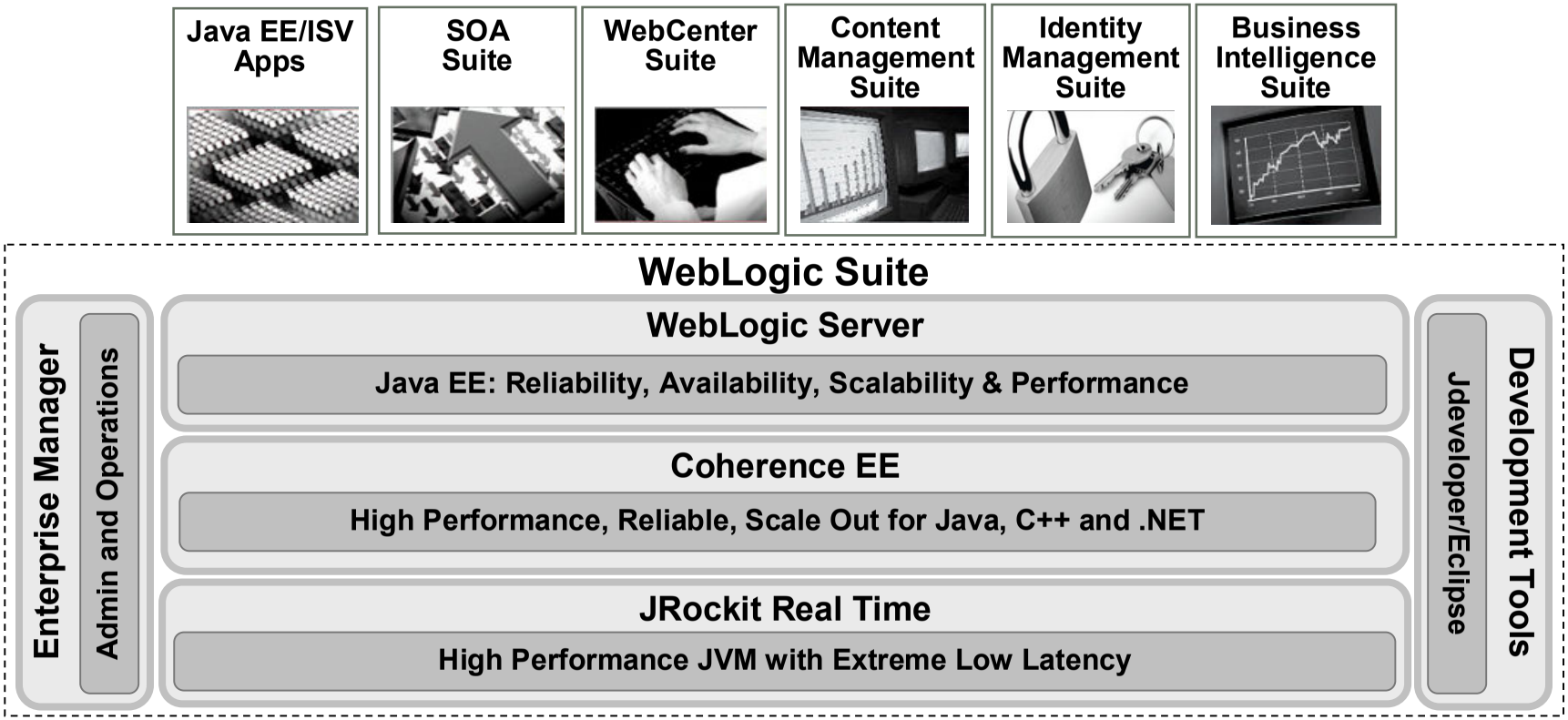
Oracle Fusion Middleware Runtime

WebLogic Suite



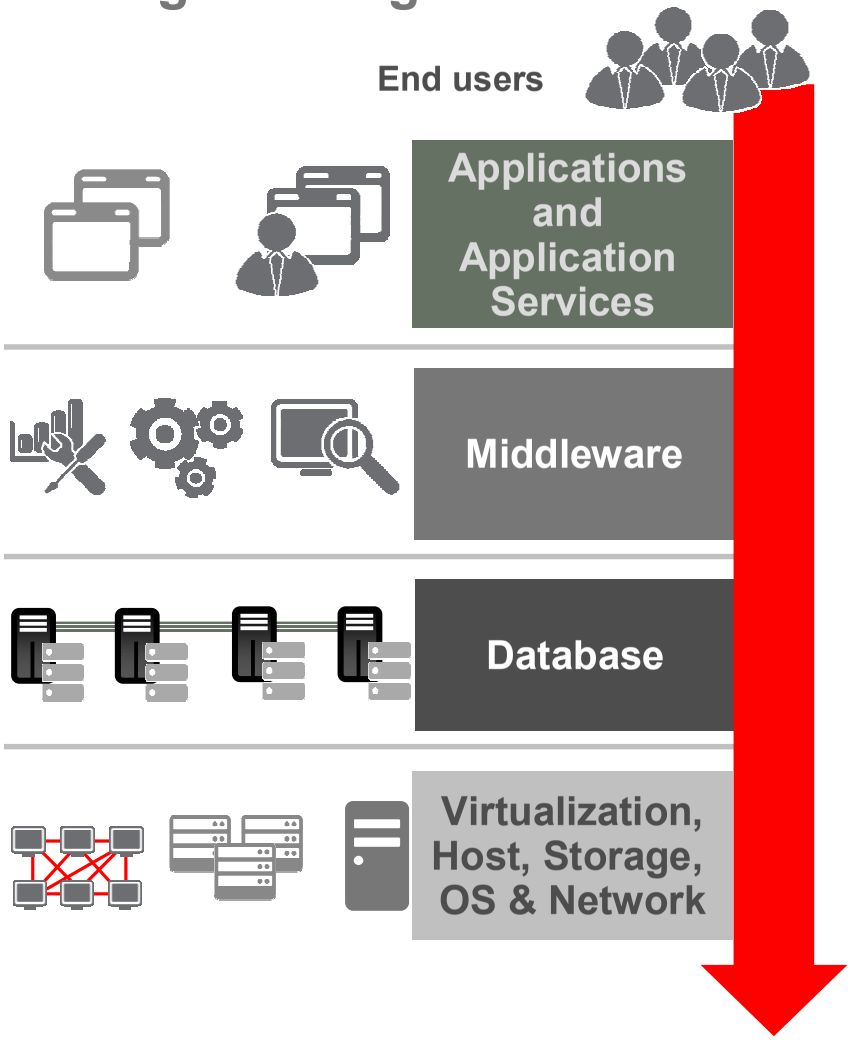
Proven to Outperform

Best Foundation for the Oracle Portfolio

Lowest Operational Cost

Oracle Enterprise Manager

Strategic management solution for the enterprise software stack

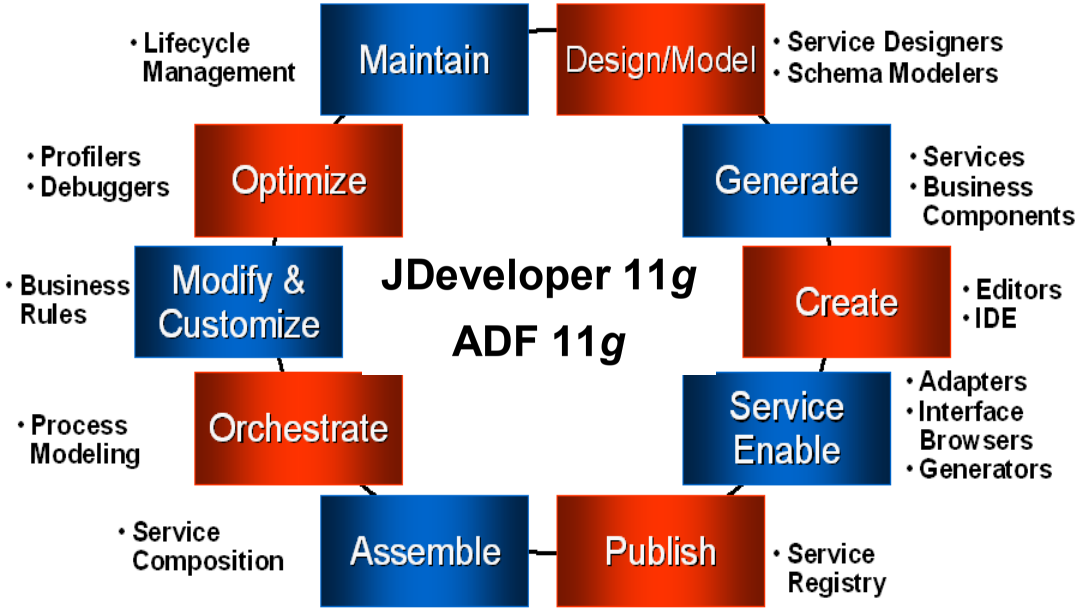


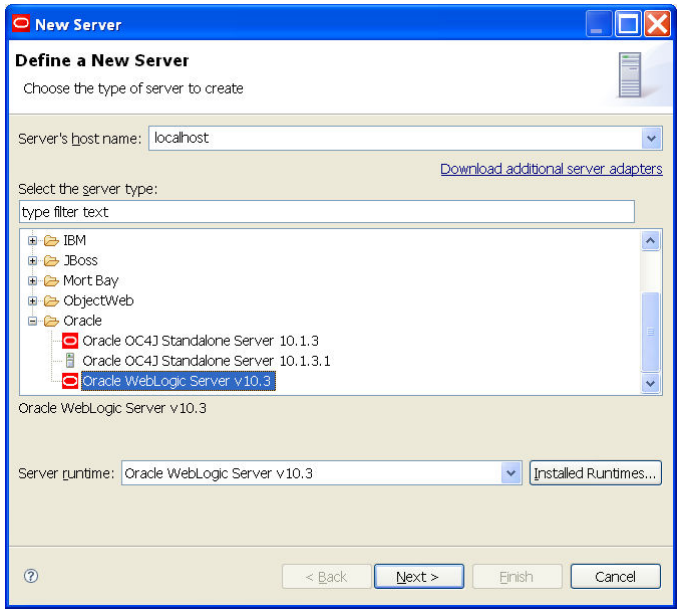
- Leader in the complete enterprise application stack
- Built-in manageability in every tier
- Integrated manageability across the entire stack

Development Tooling

Oracle JDeveloper and Eclipse

- Oracle JDeveloper - integrated design time for Fusion Middleware
- Eclipse – standards based design time contributed to directly by Oracle





Key Product-Level Differentiators

Java EE Server - WebLogic

- Leading w/ 38% Market share
- Java EE 5 & WS standards support
- SPECjAppserver leader
- Highest performing JMS implementation

Deployment and Development

- Enterprise Manager
- JDeveloper and Eclipse

Monitoring and Diagnostics

- Enterprise Manager
- Application Diagnostics for Java
- JRockit Mission Control

Integrated Solution

- Best for Oracle portfolio
- RAC DB integration
- IdM Integration

JVM - JRockit

- SPECjbb leader
- Real time JVM

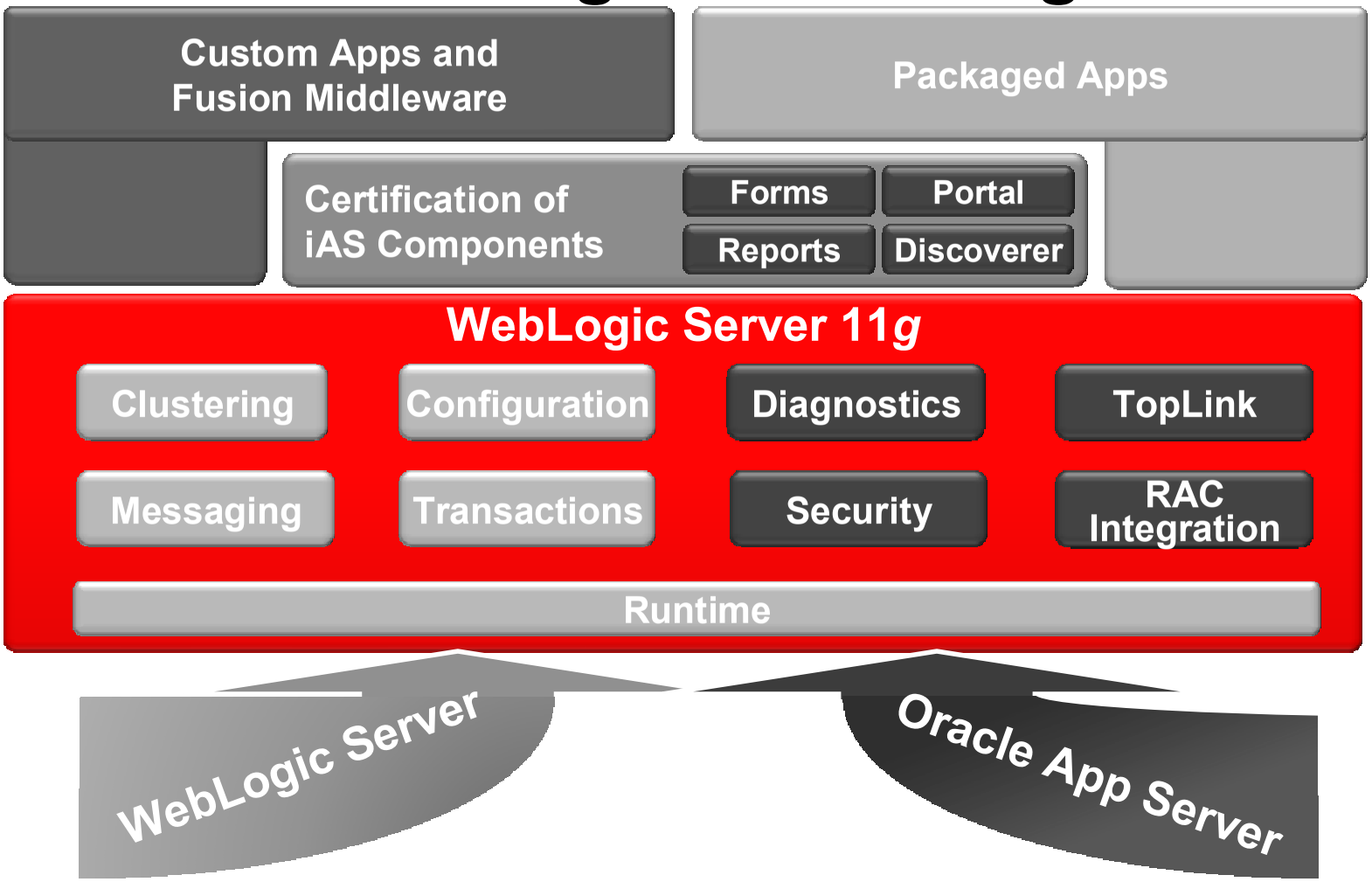
Data Grid - Coherence

"Hard" Benefits

WebLogic Suite

- **Lowest Operational Cost**
  - Lowest operational costs due to most reliable operation and best automation
- **Proven to Outperform**
  - #1 in application server, JVM, and distributed transaction processing performance
- **Best Foundation for Oracle Portfolio**
  - Best integration and support for Oracle database, Fusion Middleware, and Fusion Applications

Convergence to the Ultimate Application Server – WebLogic Server 11g



WebLogic Server

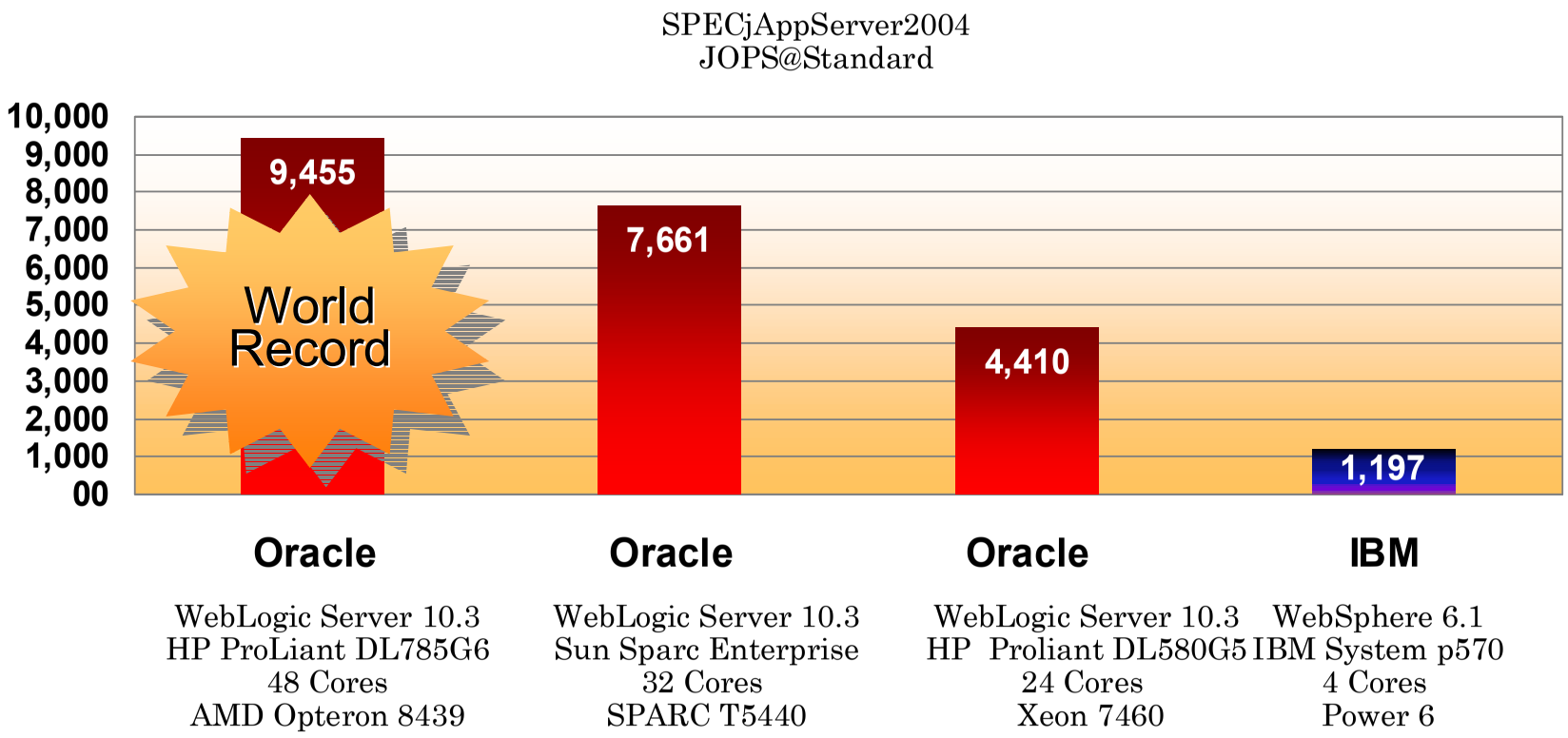
Java EE 5.0 and Java SE 6.0

Java Standard	Support
Java SE	6.0
Java EE	5.0
JSP 2.1	√
JSF 1.2	√
Servlet 2.5	√
EJB 3.0	√
JAX-WS 2.1	√
JMS 1.1	√
JNDI 1.2	√
JCA 1.5	√
JTA 1.1	√
JMX 1.2	√
Java EE Deployment 1.2	√
Java EE Management 1.1	√
JDBC 3.0	√

- Standards Compliant
  - Certified JEE 5.0 Compatible
- High Performance
- Advanced Security
- Enterprise Messaging
- Web Services
- Integrated Operations & Administration
- Integrated, Productive Development Tools
- Open Source Certified

Latest Performance Benchmarks

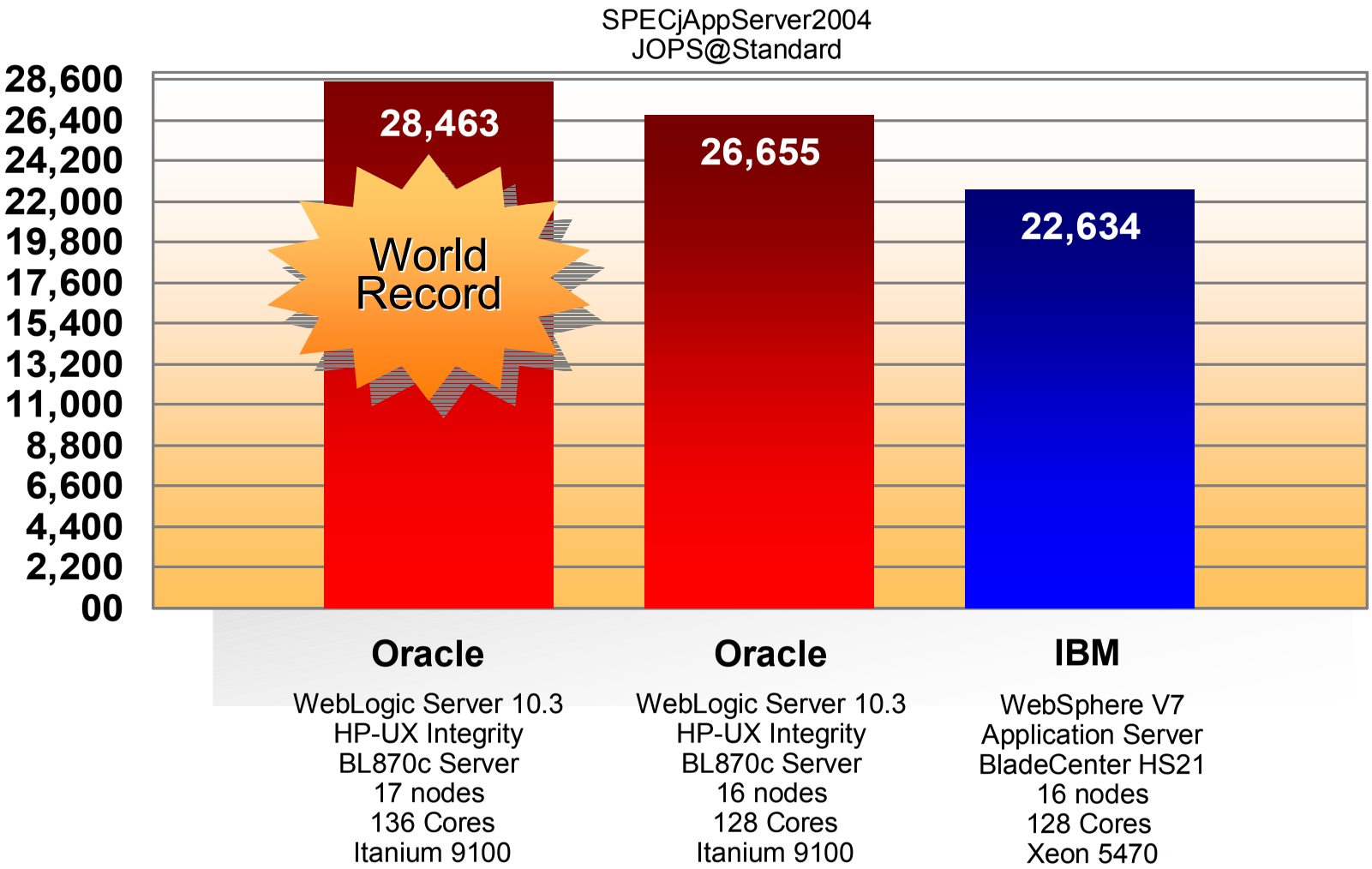
Continued Leadership – Single Node



See: http://www.spec.org/jAppServer2004/results/

Latest Performance Benchmarks

Continued Leadership - Multi Node



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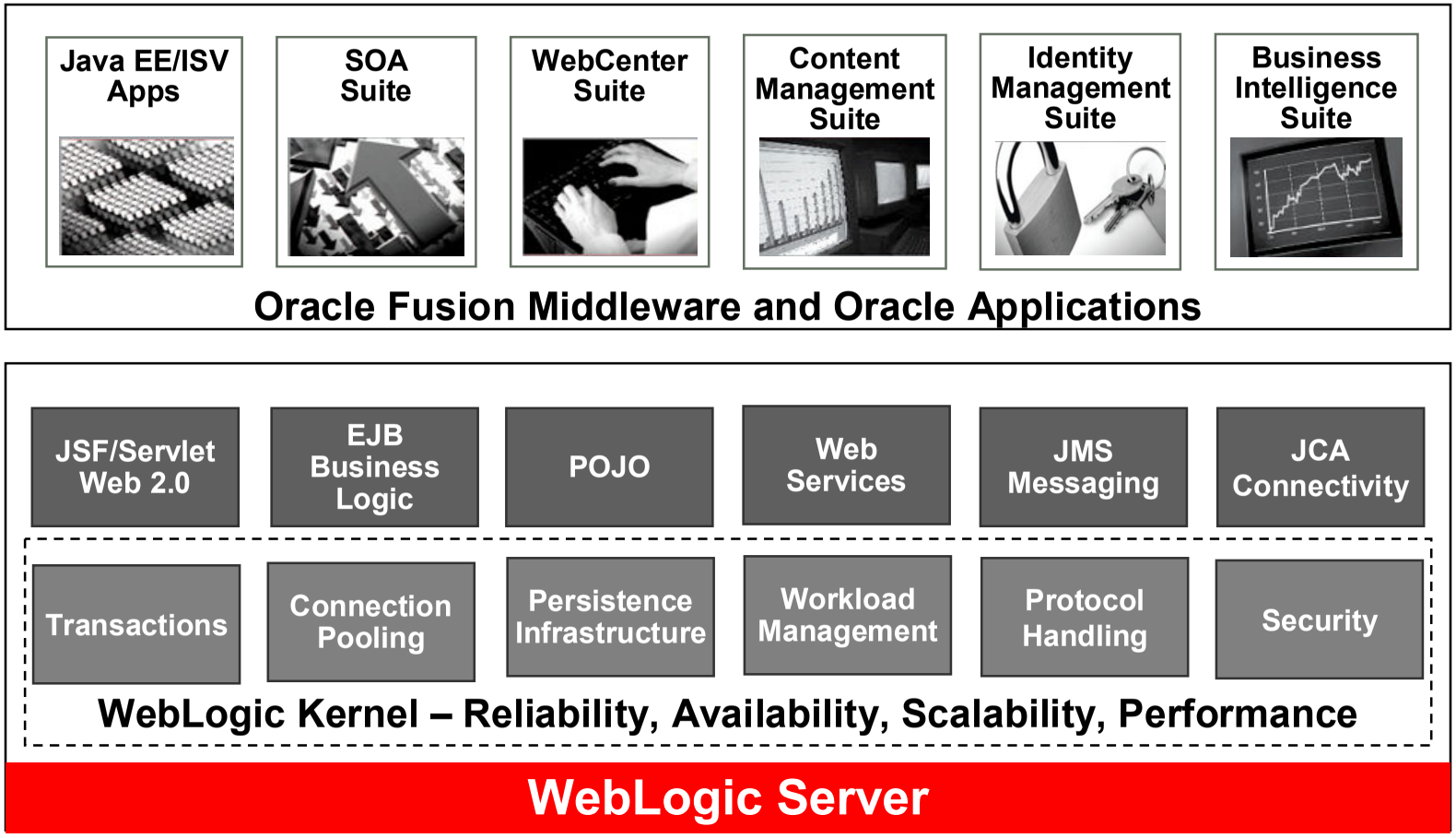
See: http://www.spec.org/jAppServer2004/results/

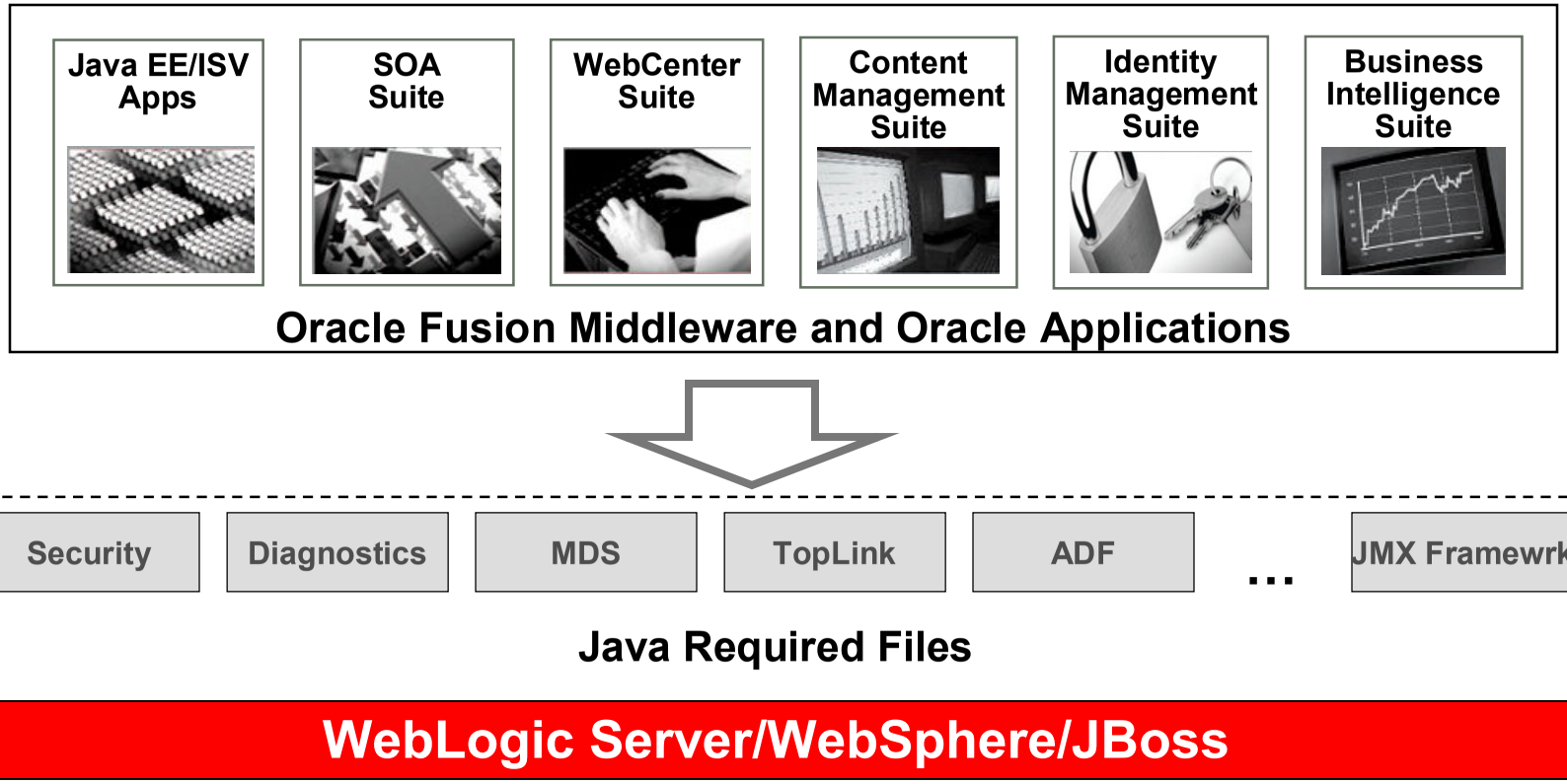
WebLogic Server Infrastructure

Java EE 5, Persistence, Messaging and Web Services



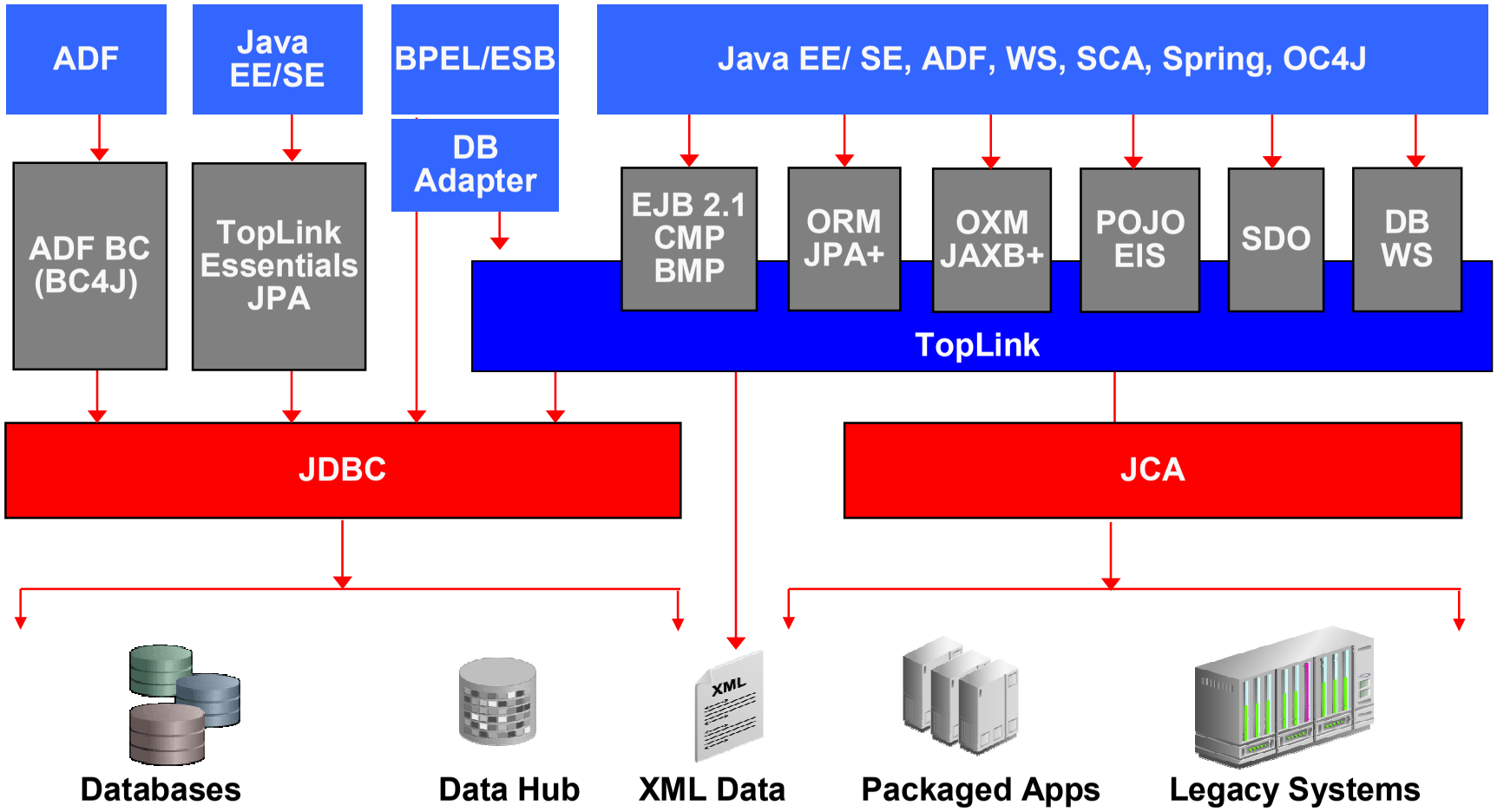
Hot Pluggability Engineered In

Java Required Files with Fusion Middleware 11



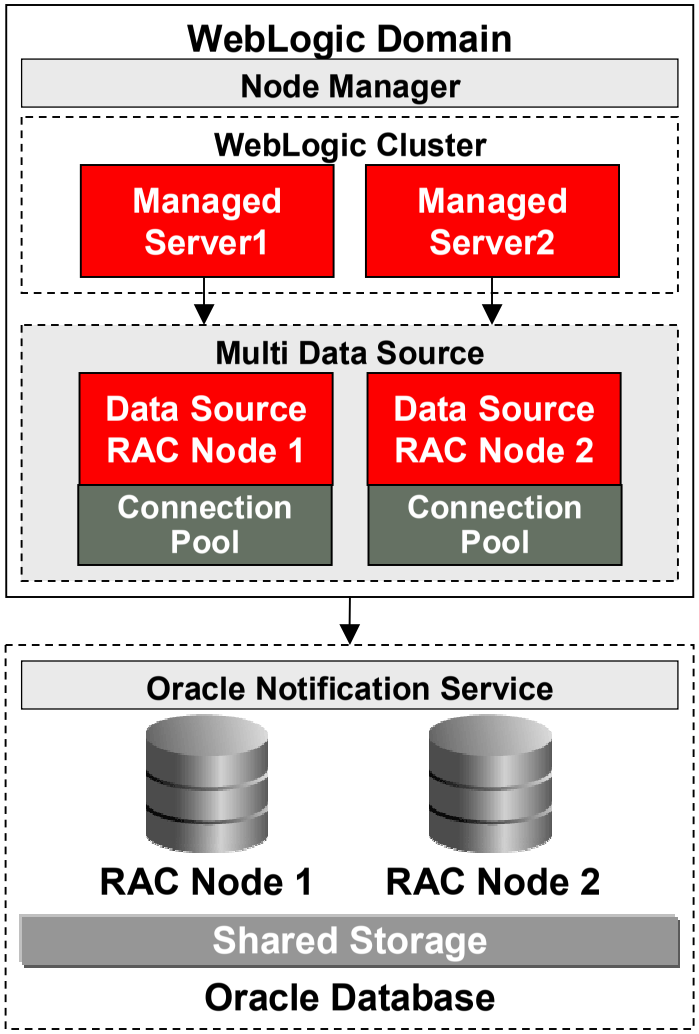
Oracle TopLink in Fusion Middleware

Strategic Persistence Infrastructure



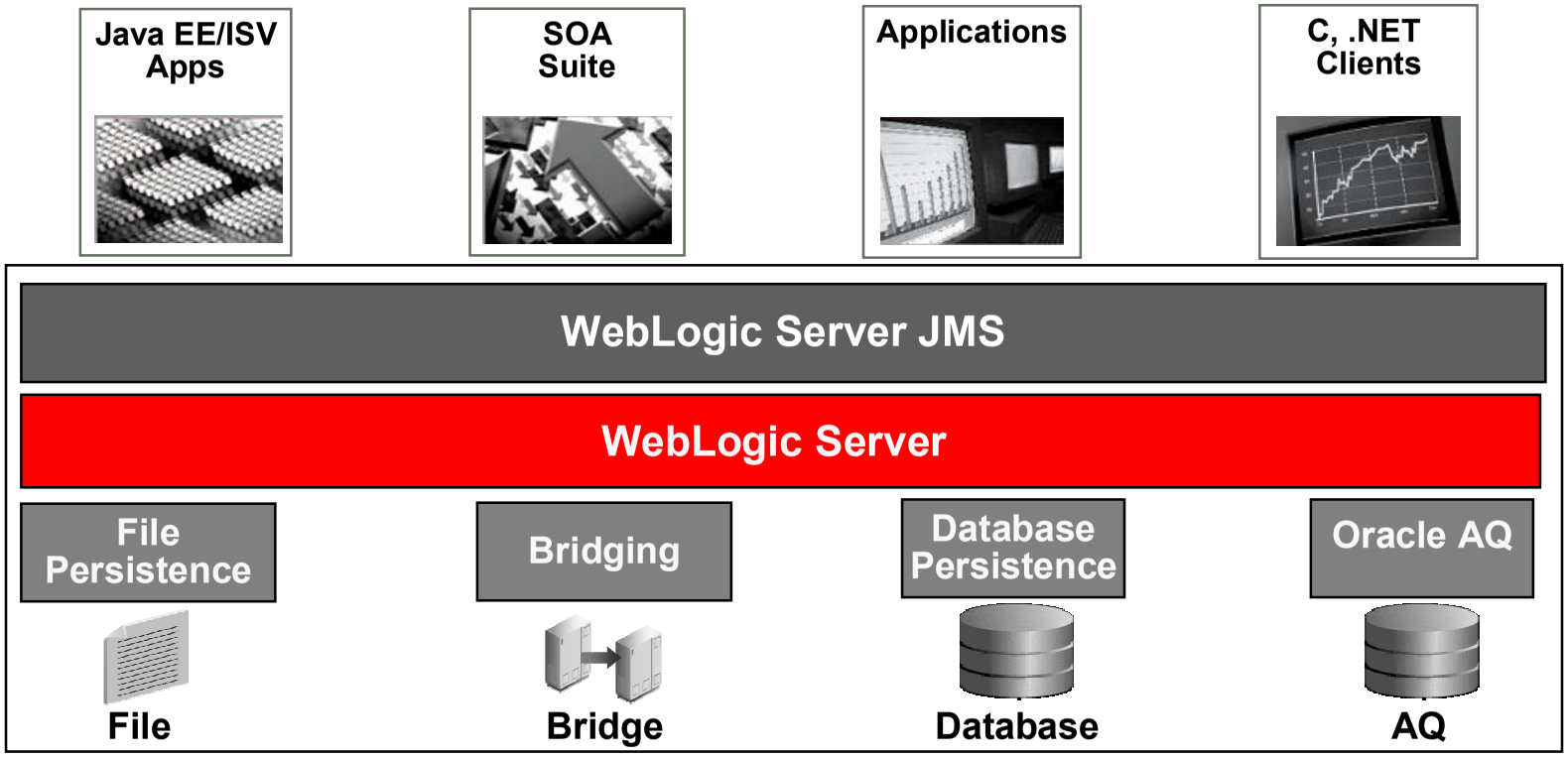
Reliable, High Performance Database Access with WebLogic Data Sources

- Standard data source connectivity
  - Connection pooling with min, max
  - Death detection, retry, keep alive, polling …
- GridLink for RAC
  - An abstraction over multiple data sources for each RAC node
  - Applications use the multi data source versus the underlying data source – transparent to applications
  - WebLogic load balances and handles RAC node failure with XA support



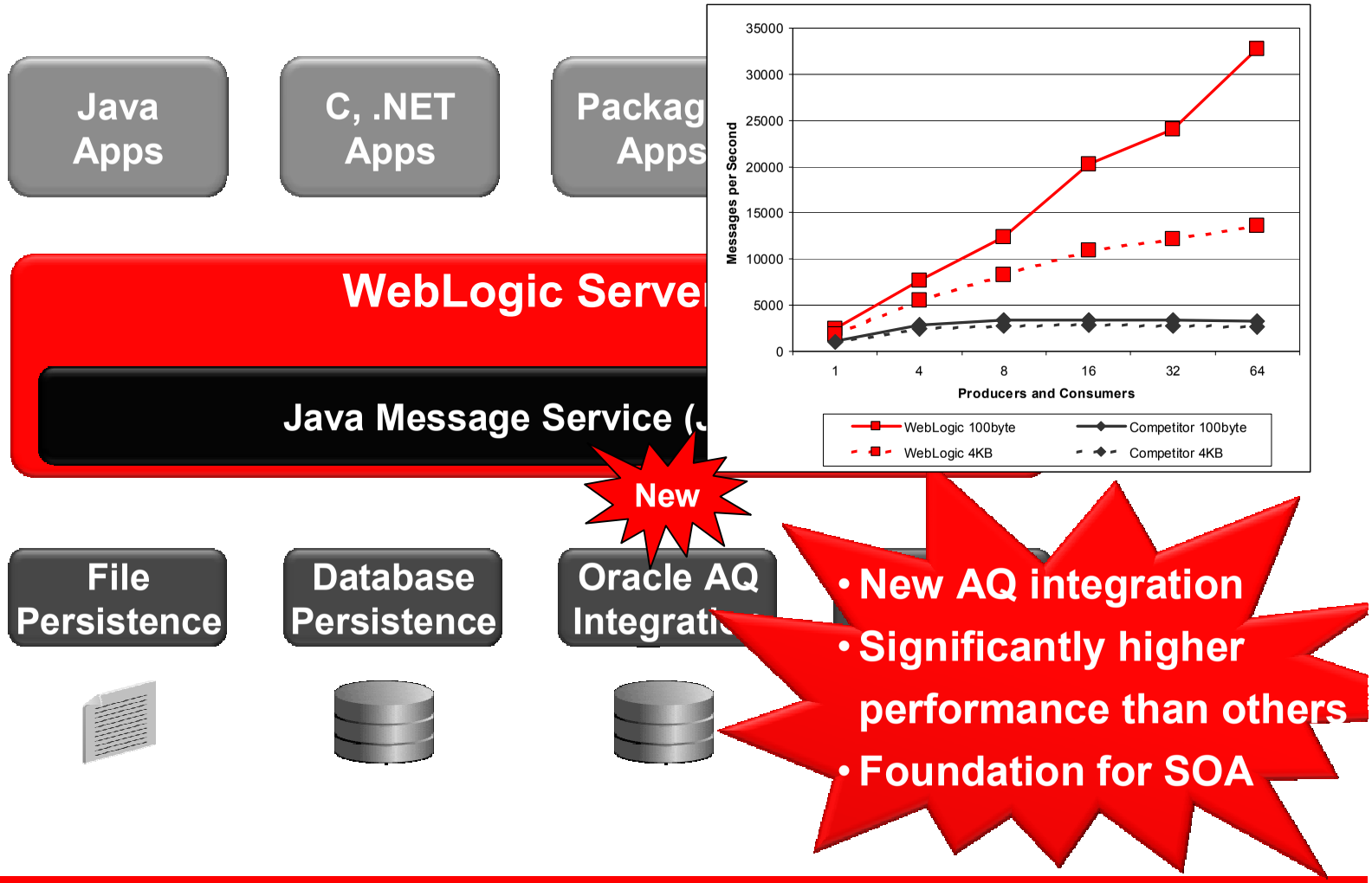
WebLogic Messaging Infrastructure

Foundation JMS for Java EE, SOA and Applications



New in 11*g*: Enterprise Grid Messaging

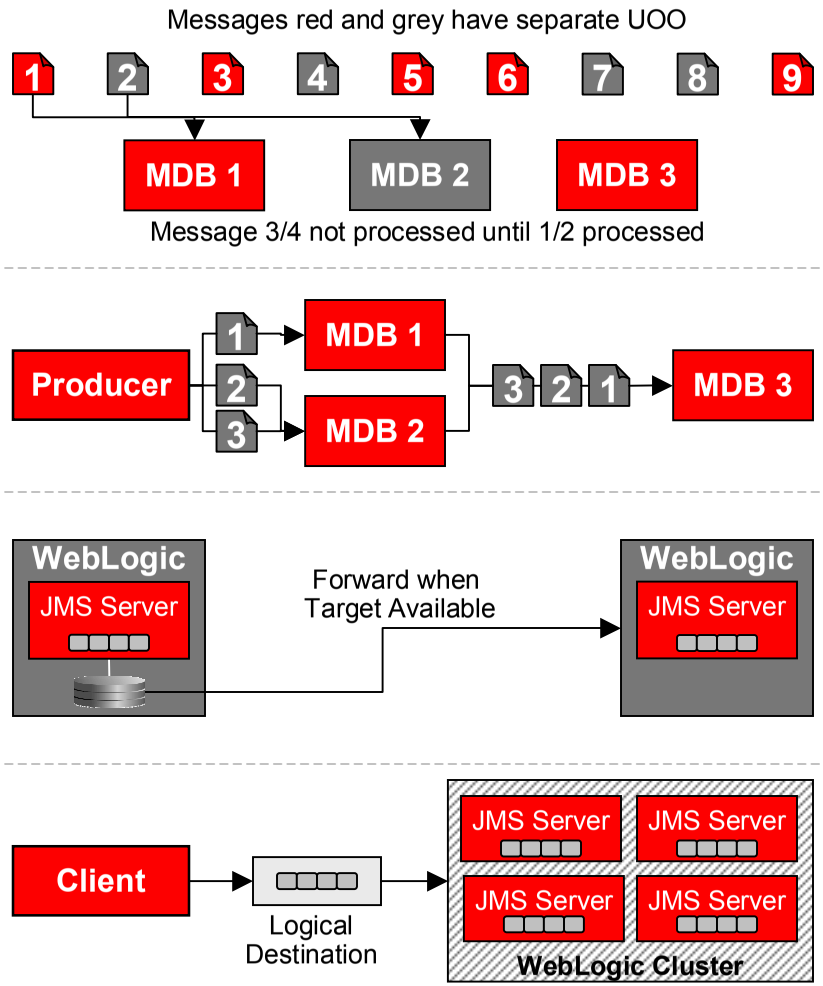
Grid-Enabled Messaging Backbone for the Entire Enterprise



WebLogic JMS Extensions

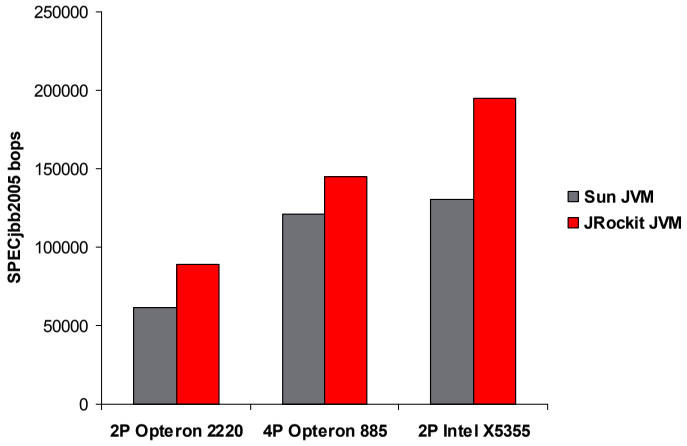
Designed to Scale to the Most Complex SOA Integrations

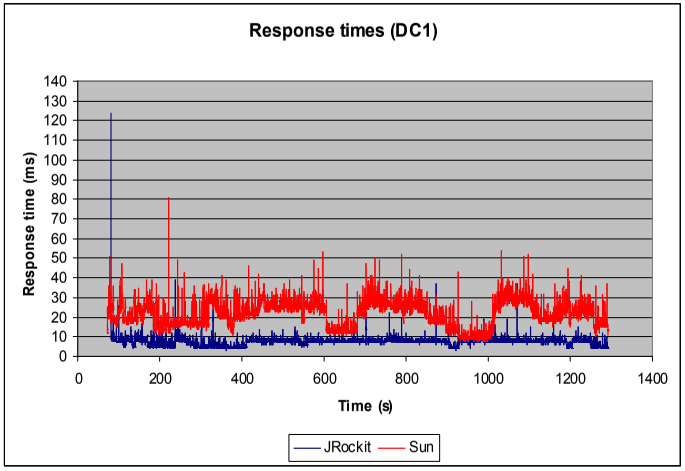
- Unit of Order
  - Messages tagged with same Unit of Order (UOO) are processed in order
  - Stronger ordering semantics than the JMS specification
- Unit of Work
  - Messages are grouped with a group identifier
  - Messages at final destination become available only when entire group arrives
- Store and Forward Messaging
  - Store messages on local server and forward to remote server when available
  - Store and forward for clients to server and server to server
- Distributed Destinations
  - All queues and topics in a cluster appear as a single logical destination to clients
  - Provides high availability and scalability; parallel processing and load balancing



Running on the World's Fastest Java VM

- Complete implementation of Java
  - 100% compatible with the Java SE and "bug compatible" with the Sun Java implementation
- Underpins Oracle Fusion Middleware product stack
  - One-stop shop for support issues
  - Optimized stack
- Architected and optimized for server-side Java
  - High Performance
  - Typical benefit is ~20% over Sun Java VM based on benchmarking
  - Customer feedback & surveys





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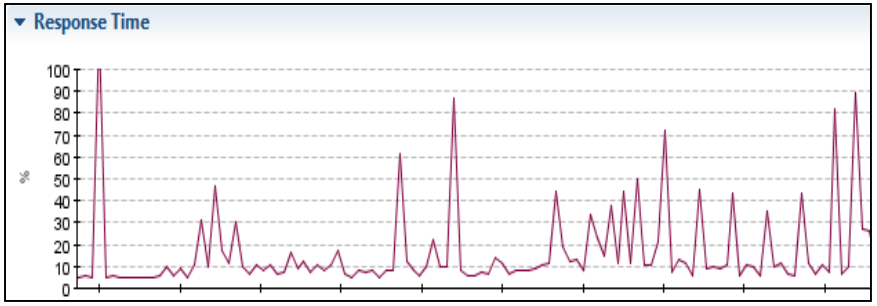
* Oracle JRockit has been used for all world record SPECjbb2005 publications since Q2 2006. Best results based on Sun, JRockit and IBM as of September 8, 2008 are (bops/bops per JVM): Sun Fire E25K (2105264/29240), SGI Altix 4700 (5180451/80945), IBM Power 595 (3435485/107359). For full details see http://wws.spec.org. SPEC and SPECjbb2005 are trademarks of Standard Performance Evaluation Corporation.

With Near Zero Application Pause Times

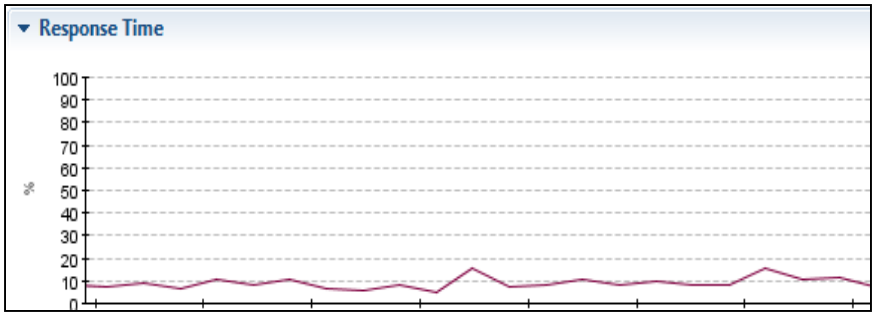
JRockit Real Time

- Guaranteed maximum response times
  - Java EE applications consistently under 100ms pause times
  - Java SE tuned can be single-digit ms pause times
- Deterministic QoS under heavy load
  - No code re-writes
- Remove weeks of tuning with simple declarative setting
  - Deterministic setting
  - Pause time target

Traditional Java VM – Stop the World Pauses



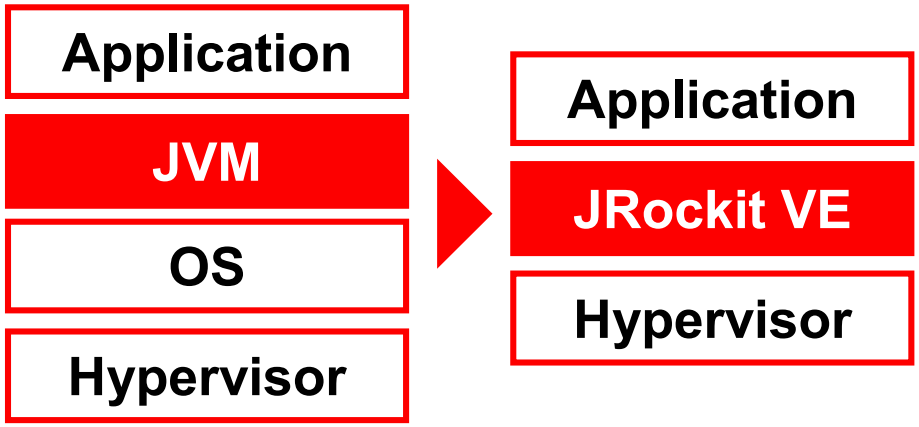
JRockit - < 10 ms Pause



JRockit Virtual Edition

Efficient *Java SE* in a Virtualized Environment

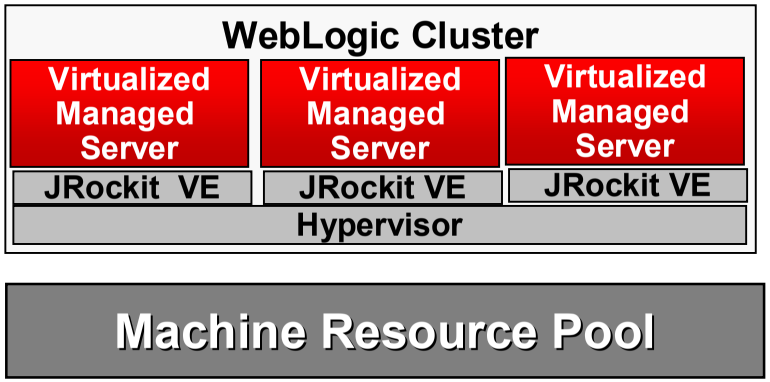
- JRockit running directly on a Hypervisor
- Faster
  - More efficient use of HW resources
- Simpler
  - Simpler patching, better security
- Easier
  - Fewer knobs and dials, self-tuning container



WebLogic Server Virtual Edition

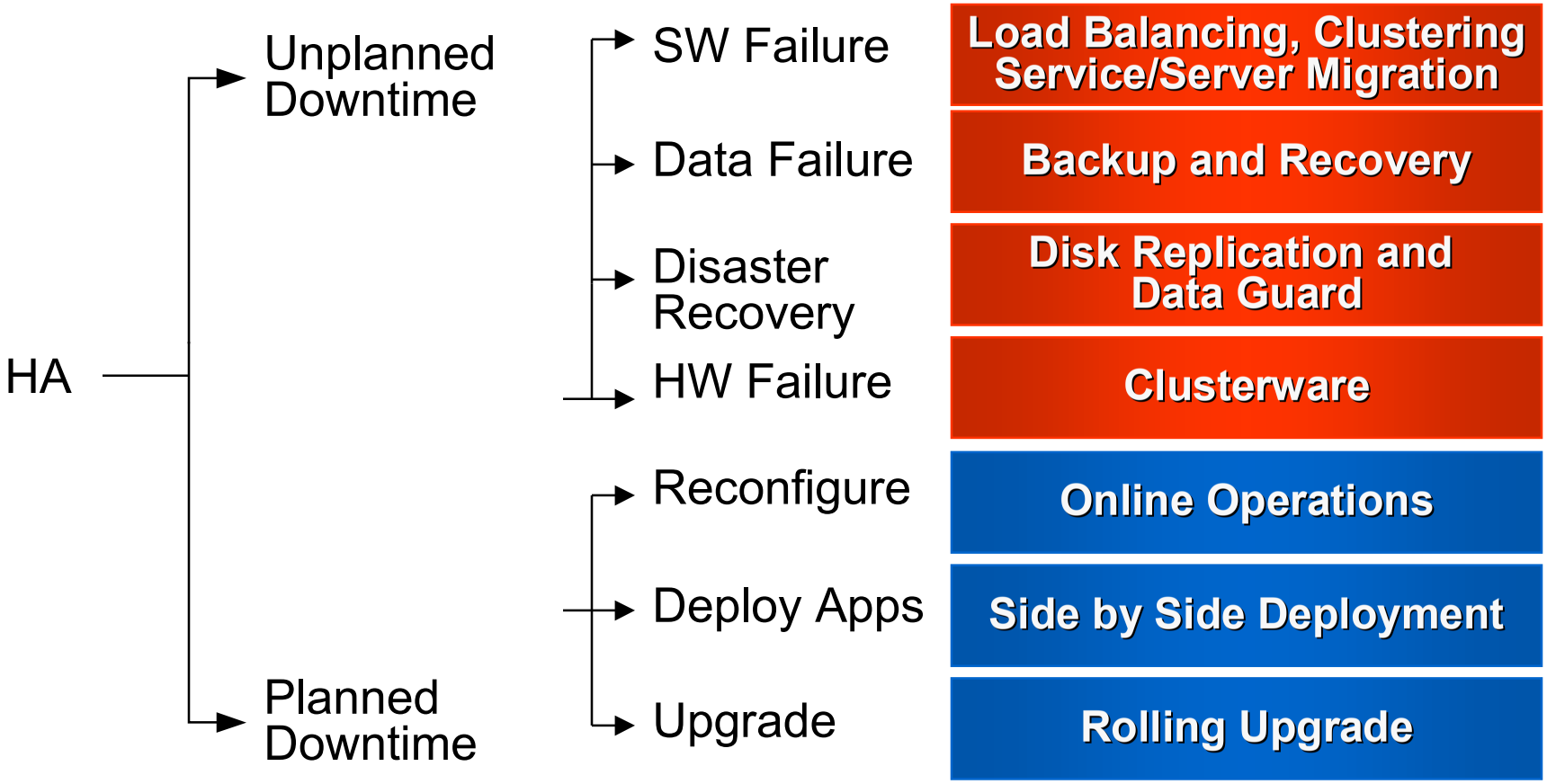
Efficient *Java EE* in a Virtualized Environment

- WebLogic Server running on JRockit Virtual Edition
- Less complexity in provisioning, patching, deployment
- Better performance with removal of operating system
- Higher density on multi-core infrastructure

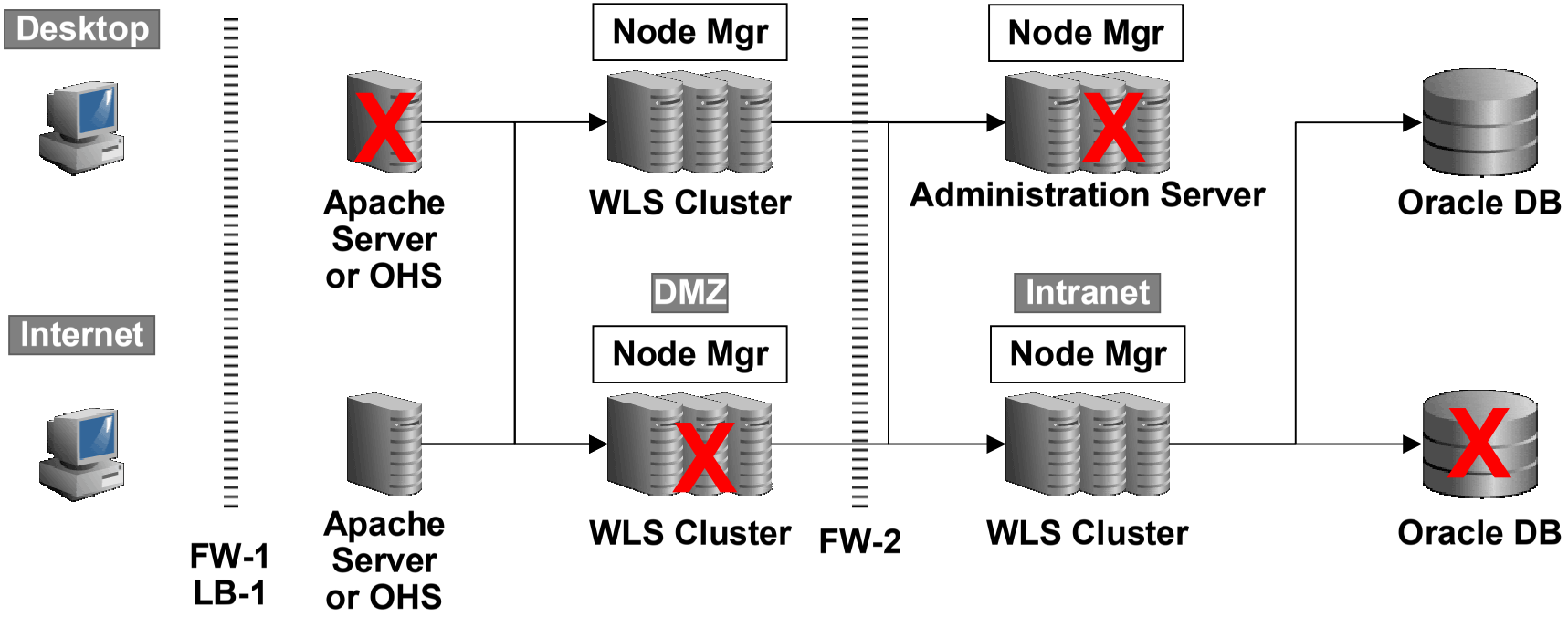


High Availability

Built in HA Infrastructure



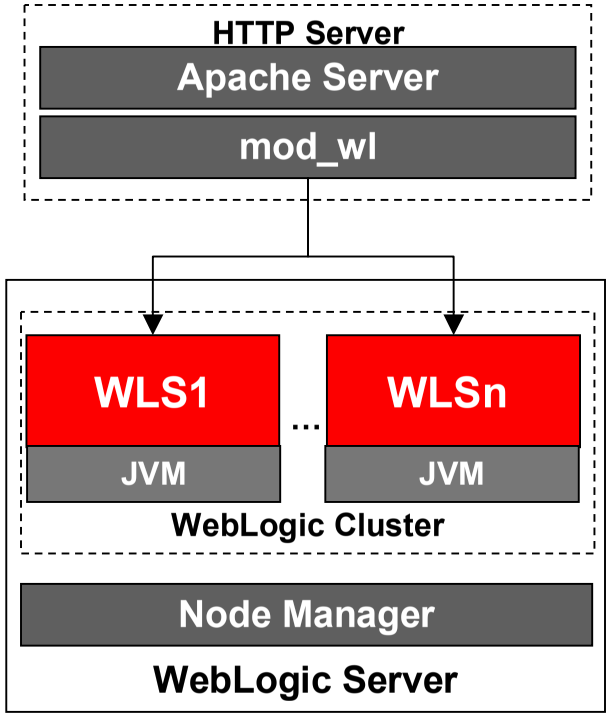
WebLogic Typical High Availability Topology



HA with Web Tier Load Balancing

Surviving a Failed HTTP Server

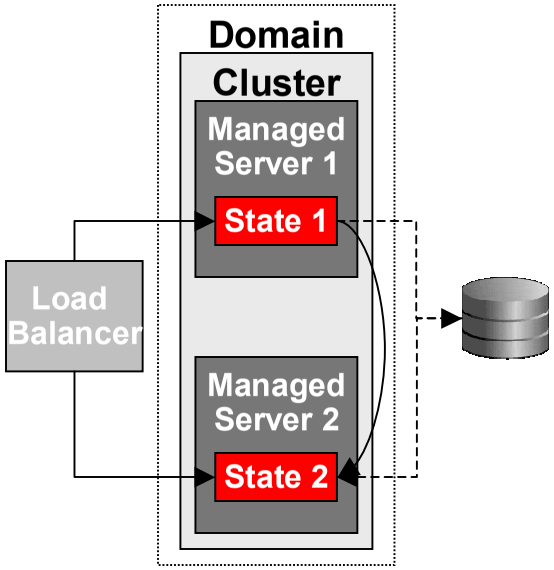
- **Load balancing**
  - Round robin
- **Supported Web servers**
  - IIS, SunOne, Apache
- **Multi-machine cluster aware**
  - Uses HTTP piggy backing
- **Failure aware**
  - Failed WLSs removed from cluster
  - Restarted WLSs added to cluster
- **Routing**
  - Static routing
- **Lightweight solution**
  - HTTPClusterServlet hosted on a WebLogic instance



HA with WebLogic State Replication

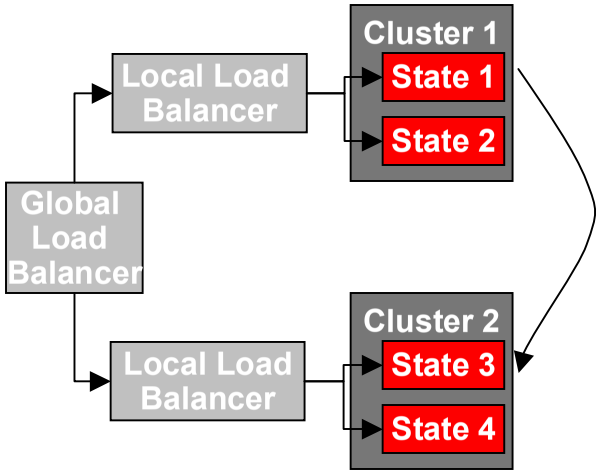
Surviving a Failed WebLogic Server

Domain State Replication



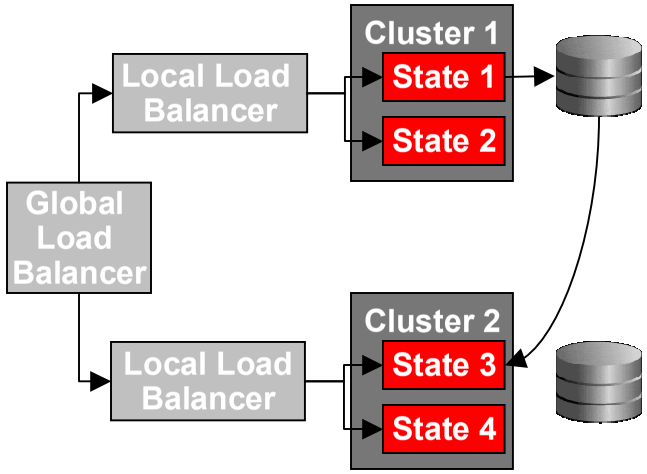
In Memory or Database Backed Asynch or Synch

MAN State Replication



In Memory

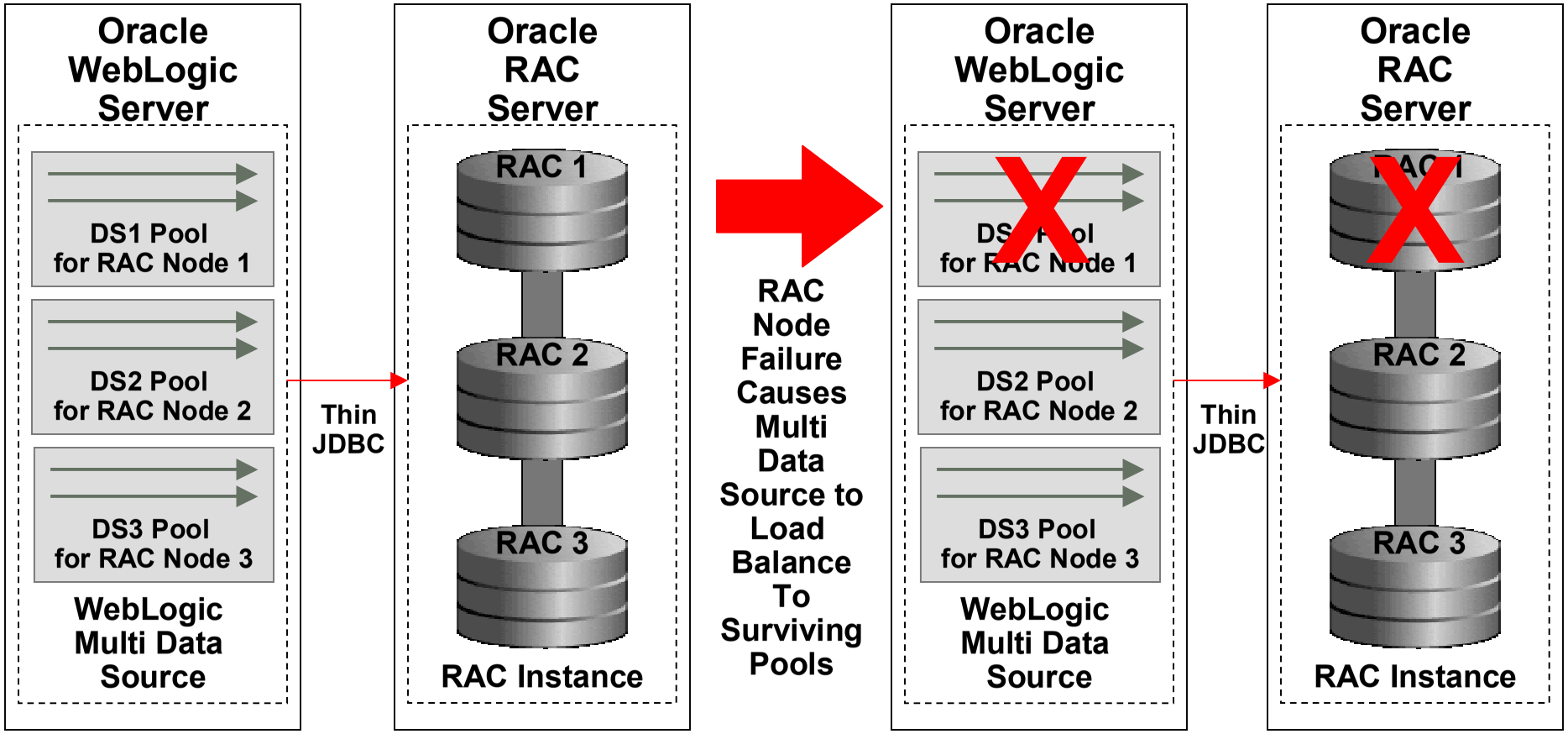
WAN State Replication



Database Backed Asynch

HA with WebLogic GridLink for RAC

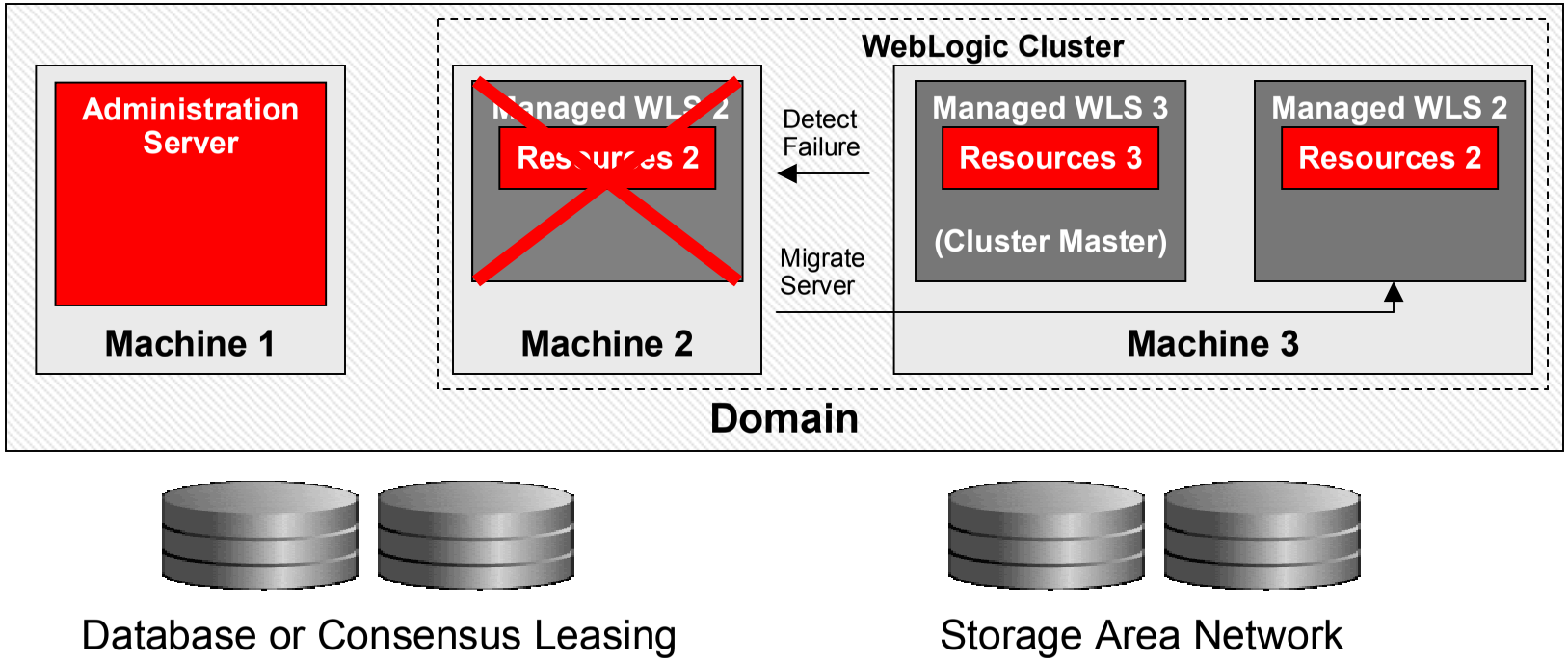
Surviving a Failed Oracle RAC Node



HA with Whole Server Migration

Application and Resource Recovery with Continuous Capacity

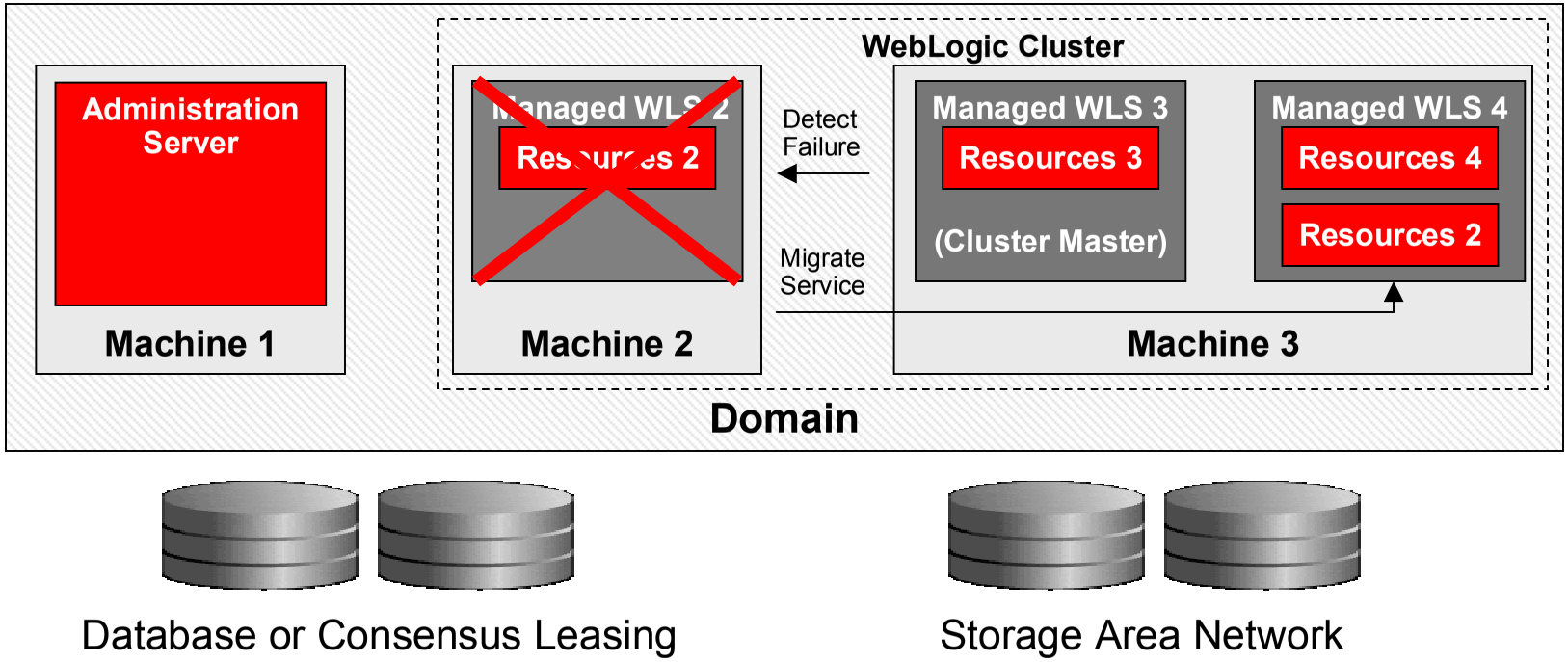
- Automatic migration of failed servers within a cluster
- Effectively a server restart and recovery on another machine



HA with Service Migration

Resource Recovery with Fast Recovery

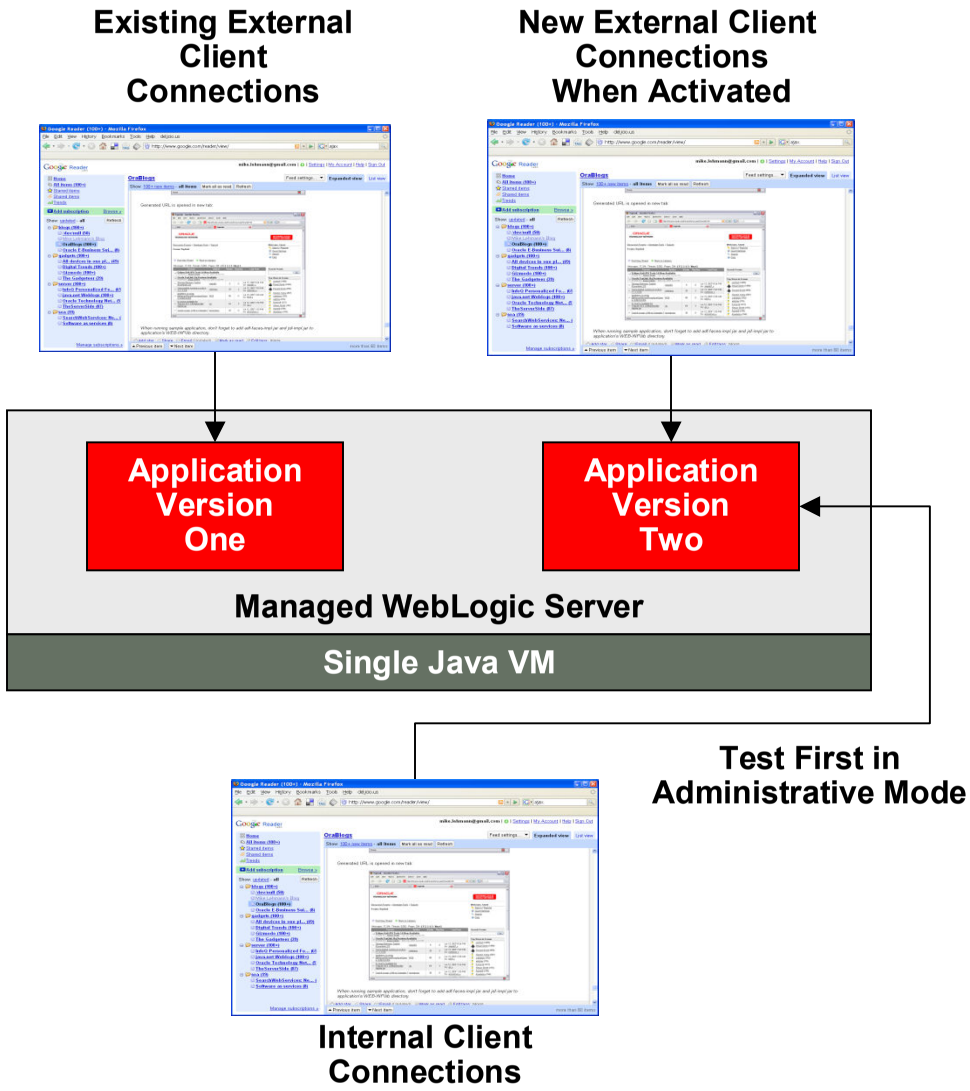
- HA for singleton services
- Restart and recover services on another running server in the cluster



HA with Side by Side Deployment

Zero Application Downtime

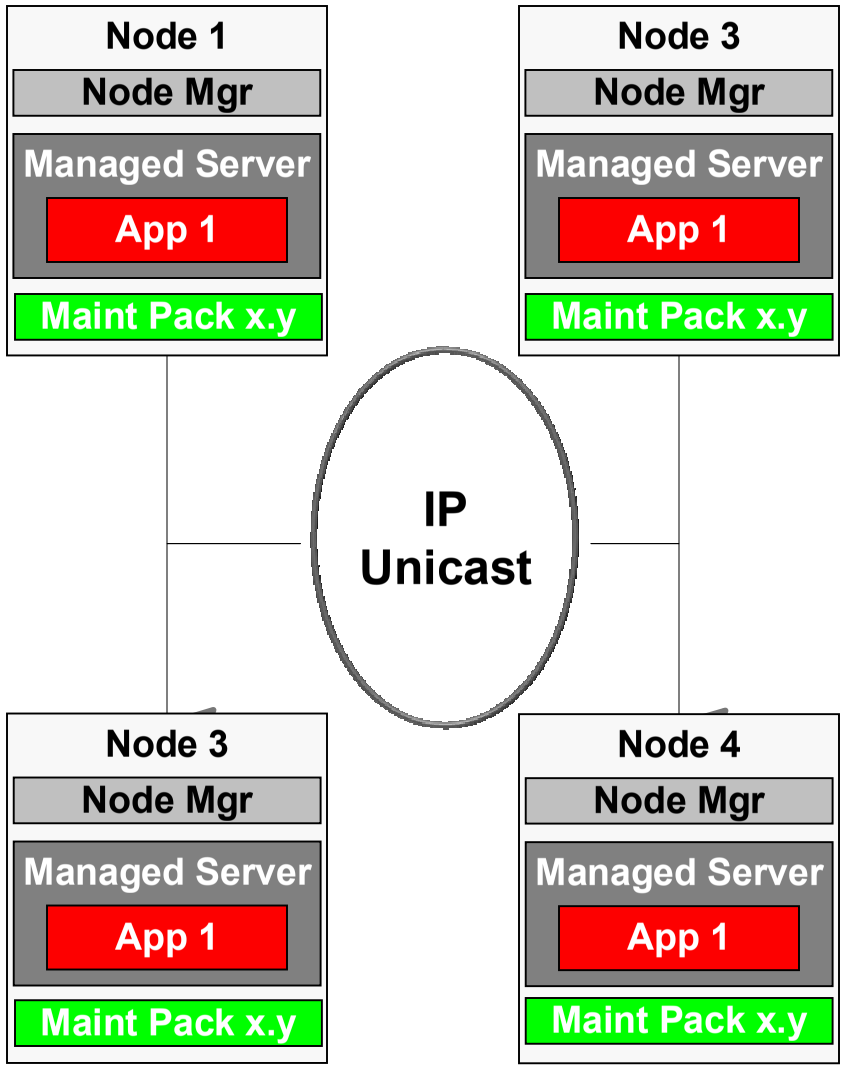
- Newer version of application deployed **side-by-side** with older version **in same JVM**
- Clients already connected continued to be served by older version
- New clients connect to newer version
- Test versions before opening up to users
- Rollback to previous versions
- Automatic retirement – graceful or timeout



HA with Rolling Upgrade

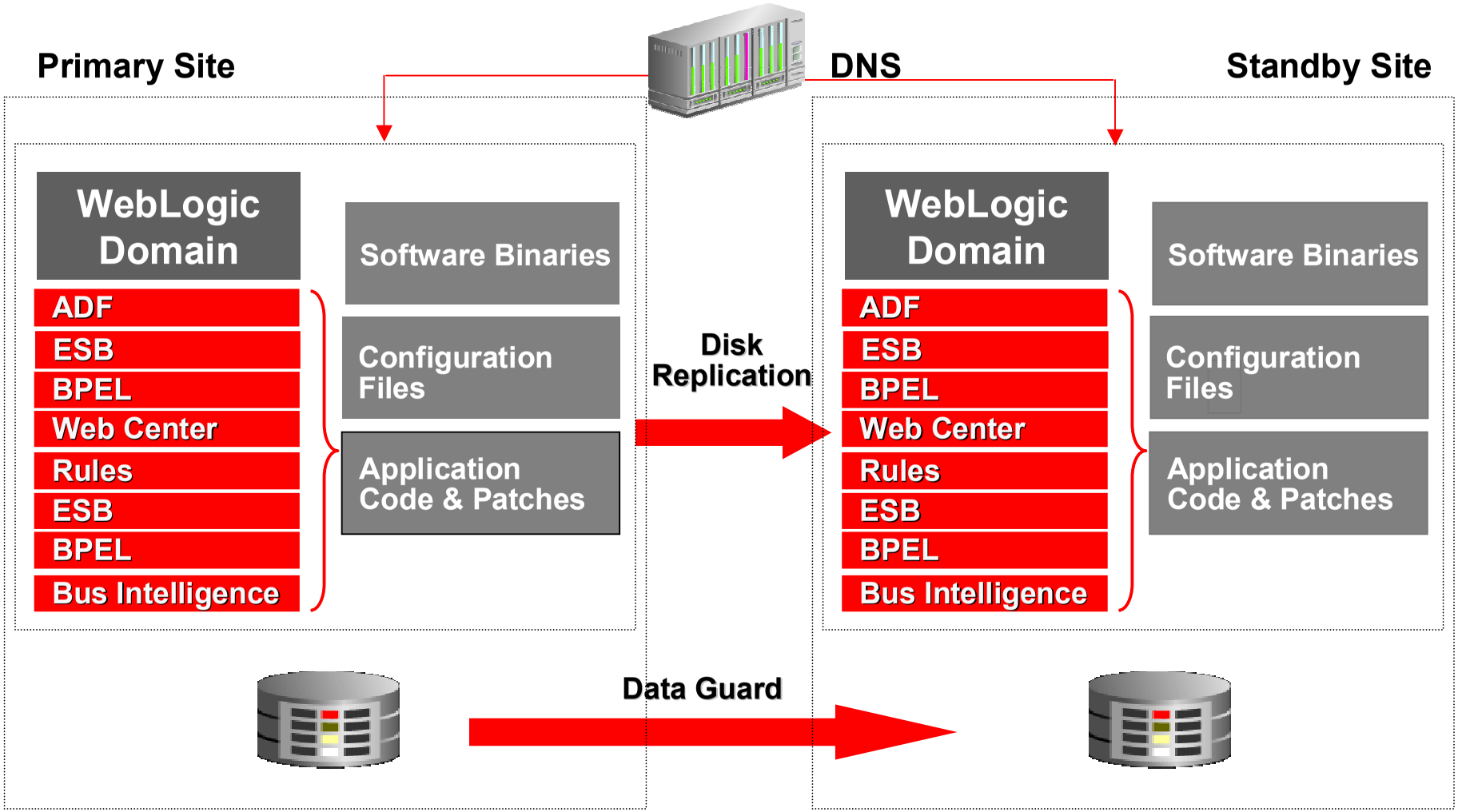
Zero Server Infrastructure Downtime

- **Upgrade a running cluster** with a patch, maintenance pack, or minor release without shutting down the entire cluster
- During the rolling upgrade of a cluster, **each server** in the cluster **is individually upgraded** and restarted while the **other servers** in the cluster **continue to host** your application
- You can also **roll back** the patch, maintenance pack, or minor release in a similar fashion



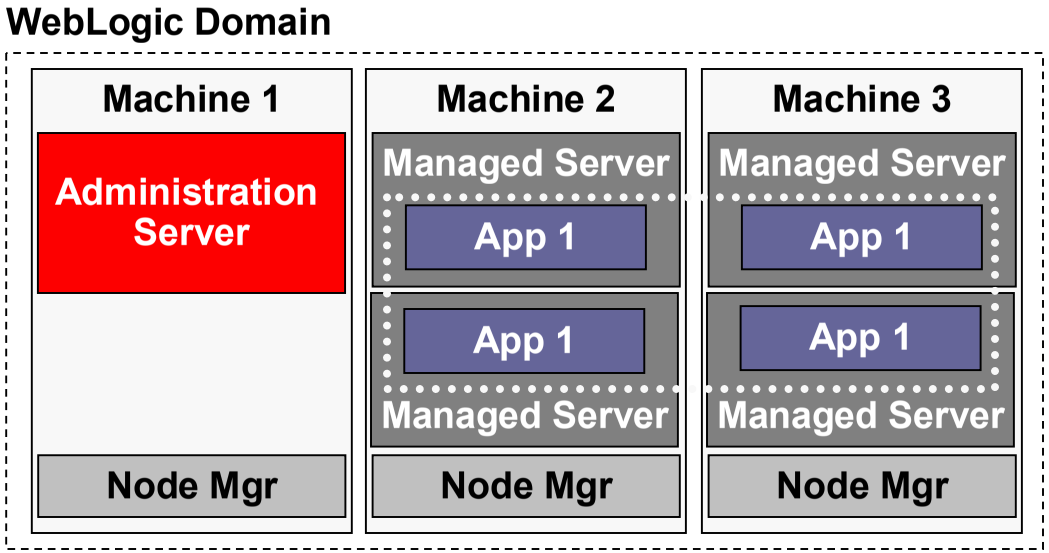
Disaster Recovery

Disk Replication Certified with Data Guard



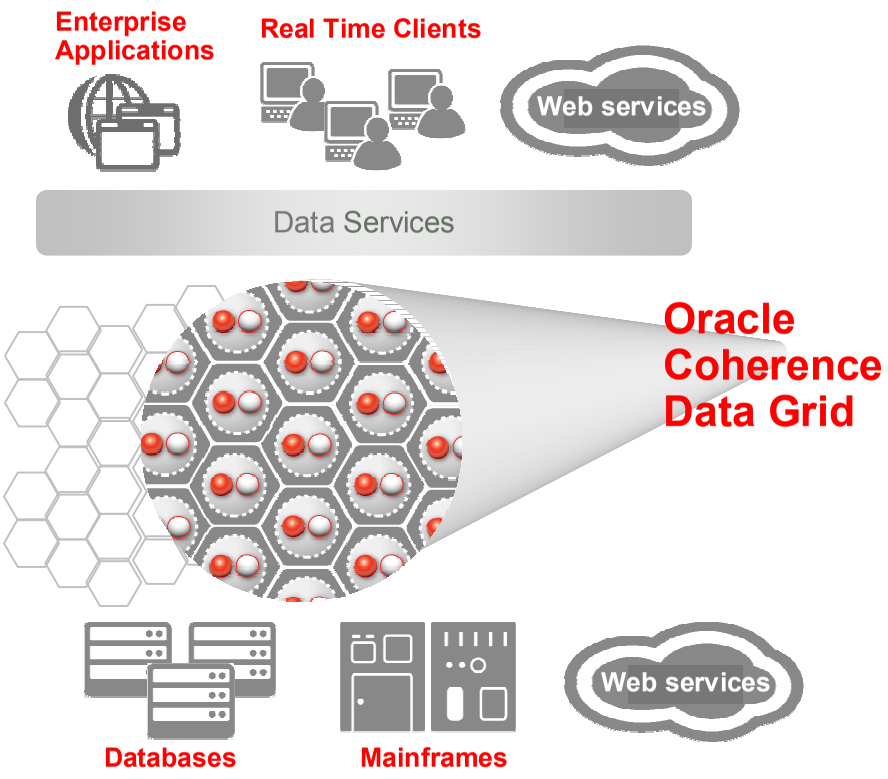
WebLogic Scale Out Vertically and Horizontally

- Scale out vertically
  - Multiple managed servers for each application for each machine
- Scale out horizontally
  - Multiple machines each with multiple managed servers
- Cluster replication scheme considers location in determining secondary servers



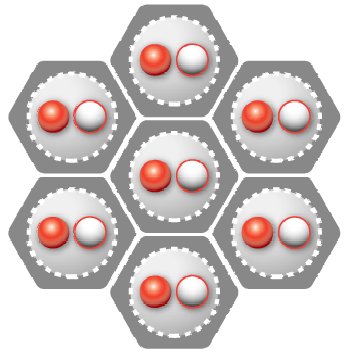
Oracle Coherence Data Grid

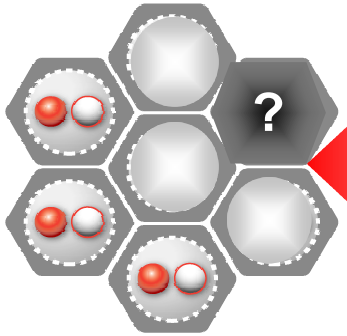
- Provides a reliable data tier with a single, consistent view of data
- Independent of yet integrated with database and application server
- Enables dynamic data capacity including fault tolerance and load balancing
- Ensures that data capacity scales <u>with</u> processing capacity



How Does Oracle Coherence Data Grid Work?

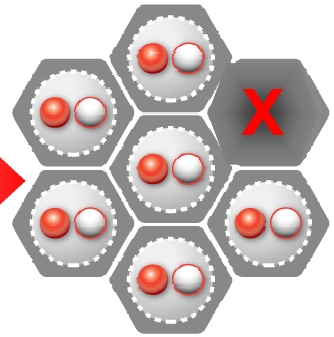
- Data load-balanced in-memory across a cluster of servers
- Data automatically and synchronously replicated to at least one other server for continuous availability
- Single System Image: Logical view of all data on all servers





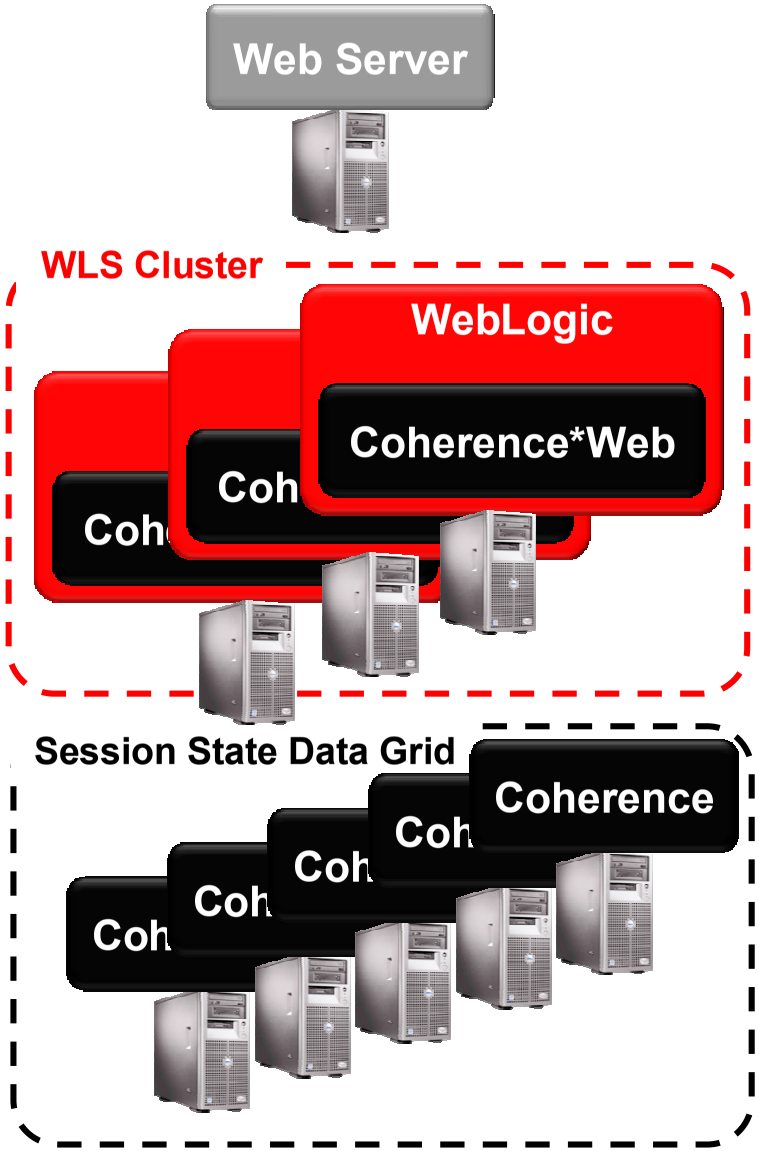
- Servers monitor the health of each other
- In the event a server fails or is unhealthy, other servers cooperatively diagnose the state

- The healthy servers immediately assume the responsibilities of the failed server
- Continuous Operation: No interruption of service or loss of data due when a server fails



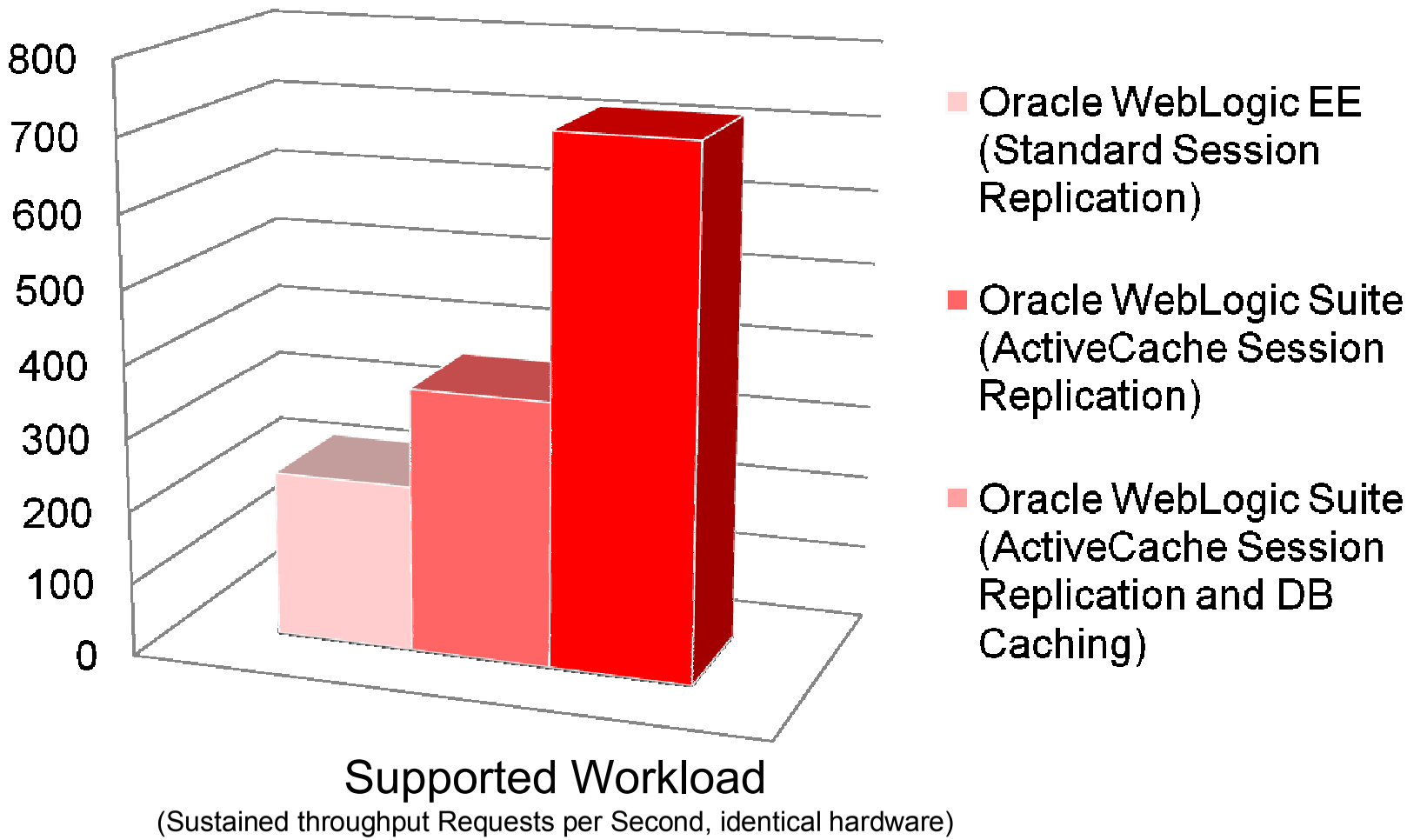
New for 11*g*: ActiveCache

- WebLogic application state/data caching in Coherence data grid
- Direct integration with HTTP session and TopLink
- Ideal for Web applications with
  - large data objects
  - memory constraints
  - volatile scaling needs
- Enhances performance and reliability
- Simple to set up; no code change



Lower TCO with ActiveCache

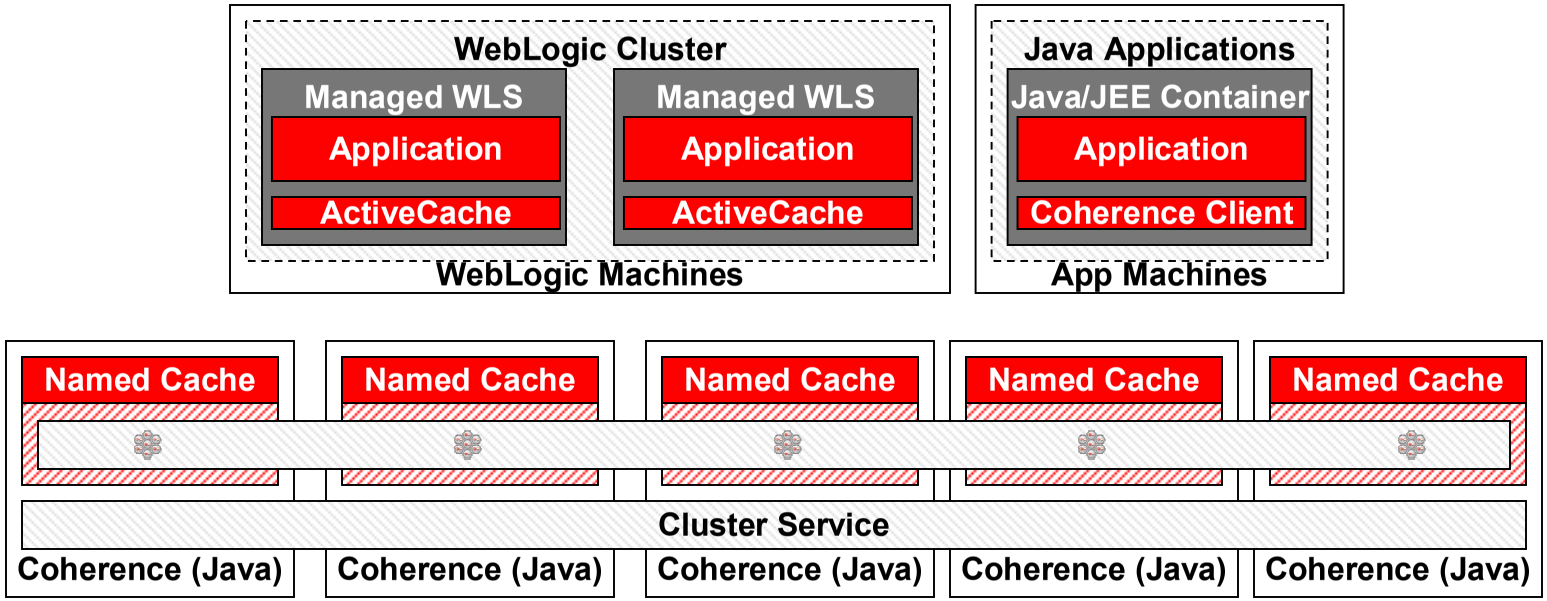
Example test result, dramatic efficiency/performance gains



Scaling WebLogic with ActiveCache

Clustered Caching and State Sharing

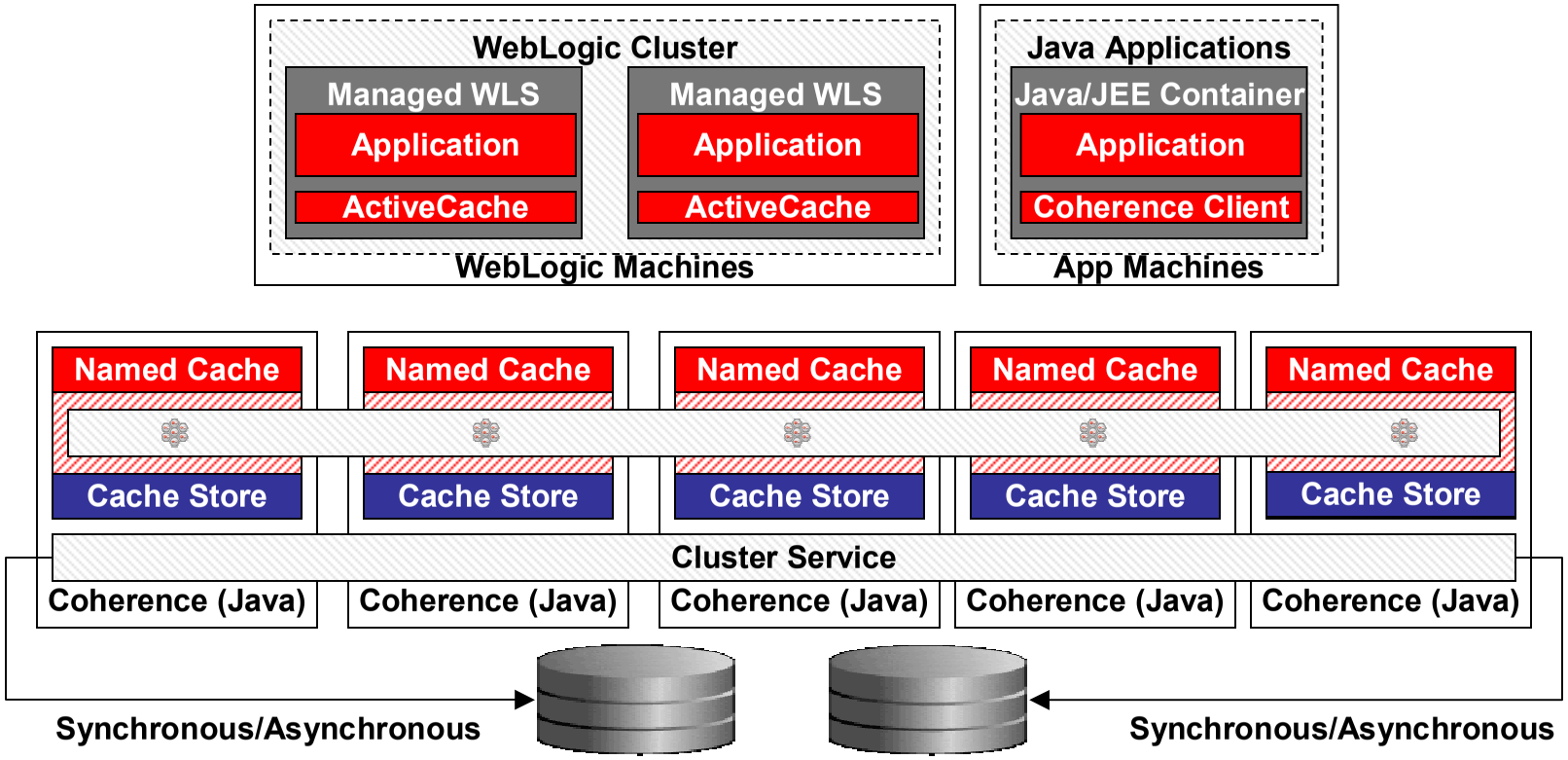
- Share cached data, manage state independent on heterogeneous Java infrastructures



Scaling WebLogic with ActiveCache

Database Surge Protection and Buffering

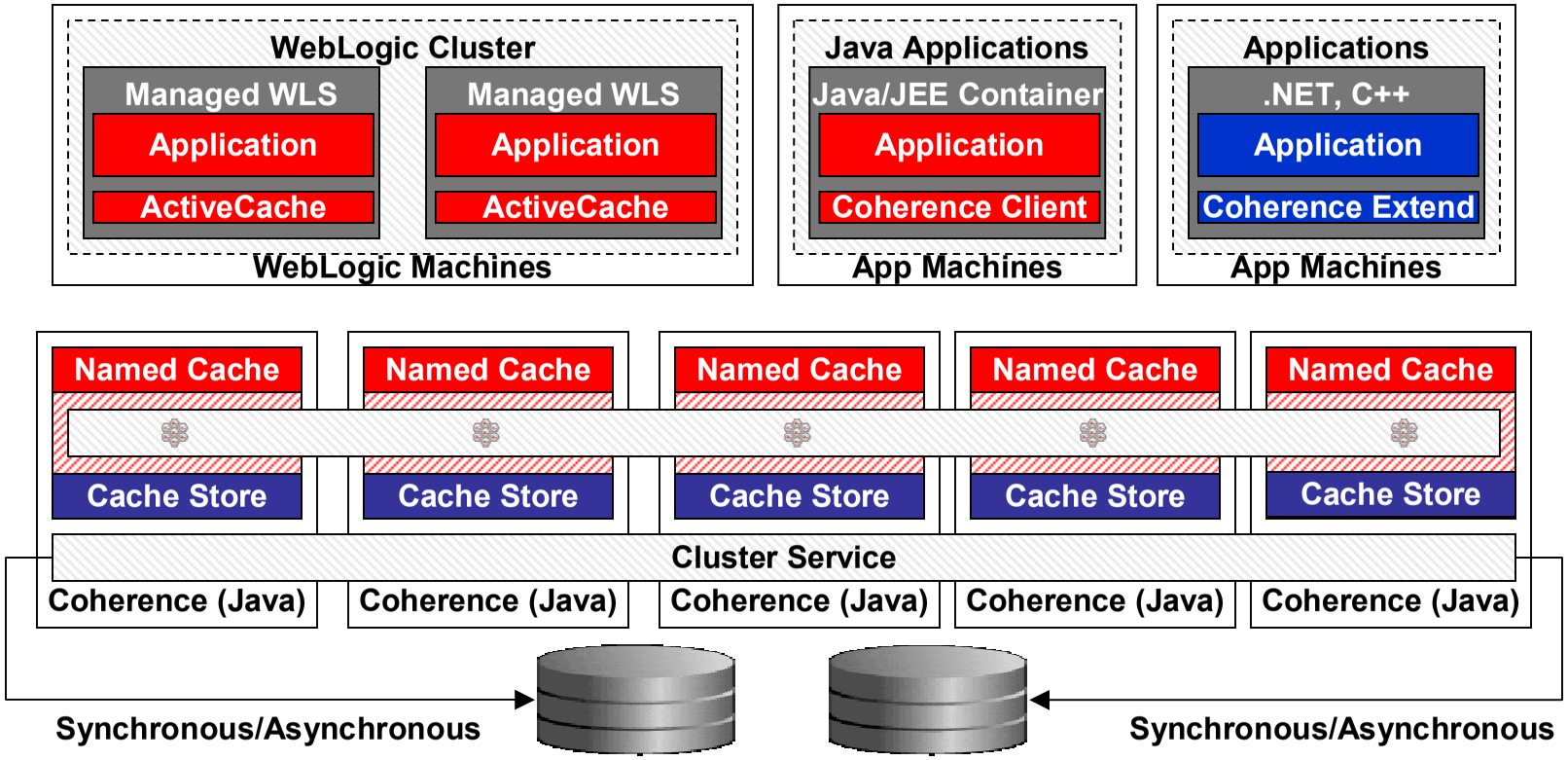
- Read through and asynchronous write through to databases with TopLink, Hibernate, JDBC, Kodo …



Scaling WebLogic with ActiveCache

Arbitrary Clients – Java, .NET, C++

- C++, .NET, Word, Excel, Visual Basic …



Oracle Exalogic Elastic Cloud Overview

ORACLE

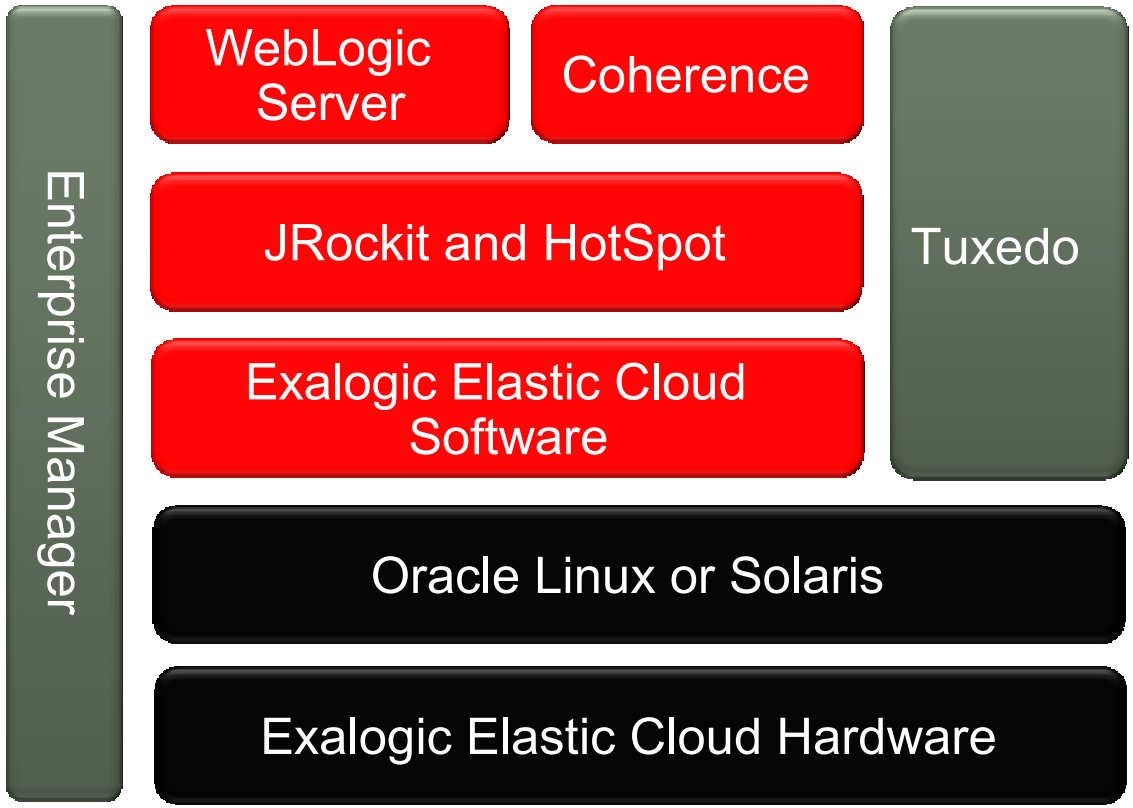
One Platform for the Whole Enterprise

Performance, reliability and simplicity

- **Fastest Java Performance**
  - Application performance improved up to 10X
- **Foundation for Mission Critical Cloud**
  - Best for application consolidation
  - Best for elastic capacity on demand
- **Engineered System**
  - Lowest cost to deploy and operate
  - Fastest path to production

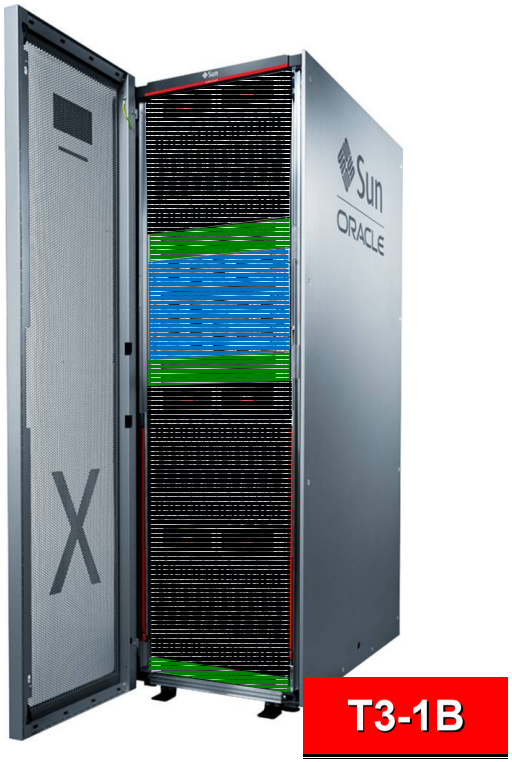
Oracle's Elastic Cloud Foundation

Application Grid, OS, Enterprise Manager and hardware



Oracle Exalogic Elastic Cloud

One Platform for the Whole Enterprise



- 30 SPARC T3 compute nodes
- 480 SPARC cores (1.6 GHz)
- 3.8 TB DRAM
- 960 GB FlashFire SSD

- 30 x86 compute nodes
- 360 Xeon cores (2.93 GHz)
- 2.8 TB DRAM
- 960 GB FlashFire SSD

Integrated Storage

- Central storage for system images
- Clustered for HA
- 40 TB SAS disk
- 4 TB read cache
- 72 GB write cache

I/O Fabric

- 40 Gb/sec links
- 1.2 microsecond latency (MPI Ping)
- 10 Gigabit Ethernet connectivity to datacenter

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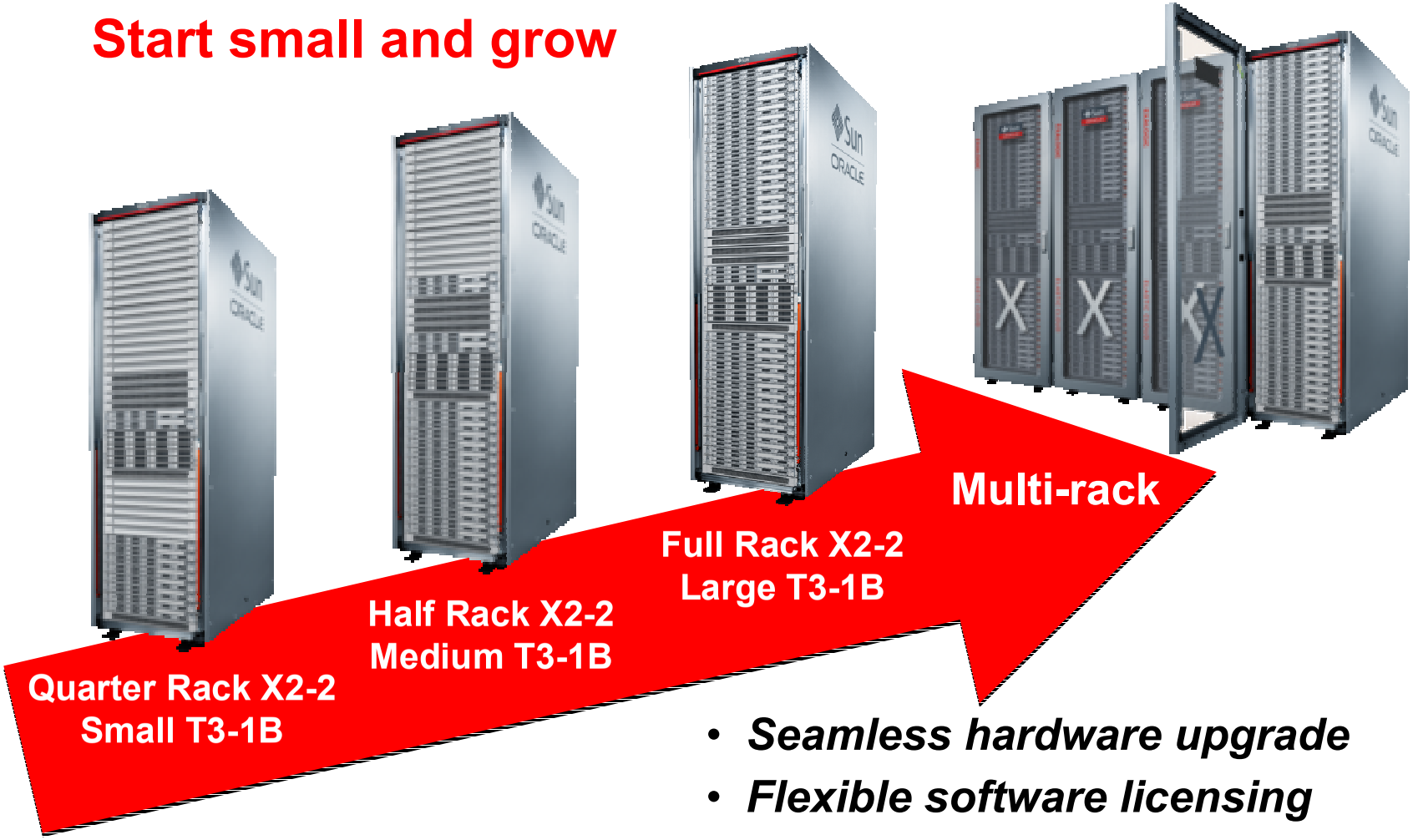
Scale from One Application to Cloud

Start small and grow



- *Seamless hardware upgrade*
- *Flexible software licensing*

Scale on Demand

Start small and grow

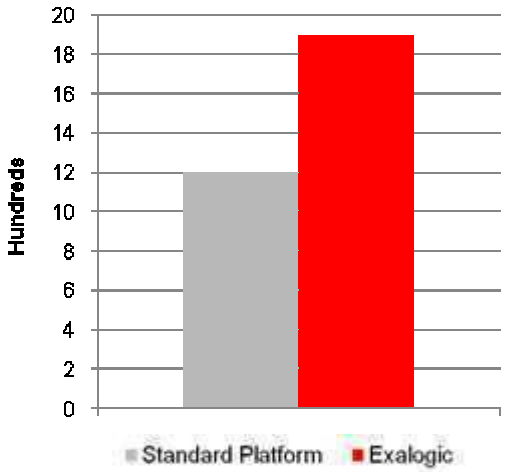
- Field upgradable to larger configurations
- Delivered and installed by Oracle

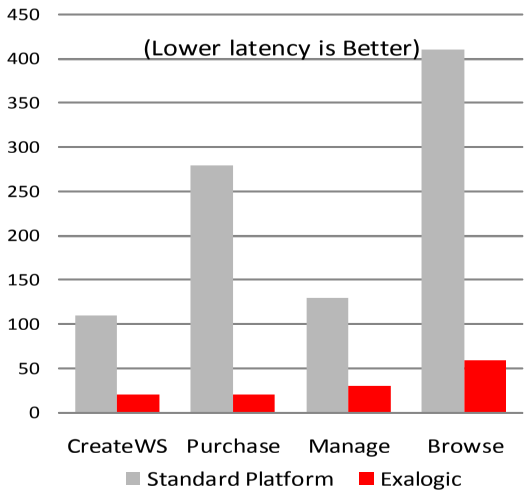
EL X2-2	Quarter Rack	Half Rack	Full Rack
Compute Nodes	8	16	30
2.93 GHz XEON Cores	96	192	360
1333 MHz DRAM	768 GB	1.5 TB	2.9 TB
Raw Disk Storage	40TB	40TB	40TB

EL T3-1B	Small	Medium	Large
Compute Nodes	10	20	30
1.6 GHz SPARC Cores	160	320	480
1333 MHz DRAM	1.3 TB	2.6 TB	3.8 TB
Raw Disk Storage	40TB	40TB	40TB

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

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Oracle WebLogic Server Strategy

Technology and Administrative Overview