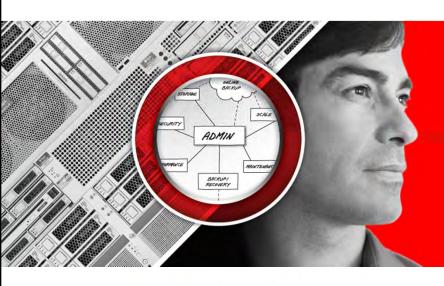
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#### **Advanced E-Business Suite Architectures**

Elke Phelps, Senior Principal Product Manager Sriram Veeraraghavan, Senior Principal Software Engineer

## **Program Agenda**

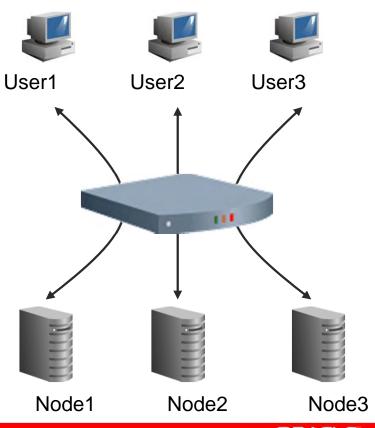
- Performance & Scalability
- Business Continuity
- Security
- Virtualization
- Business Intelligence
- External Integrations
- Systems Management
- Oracle E-Business Suite 12.2





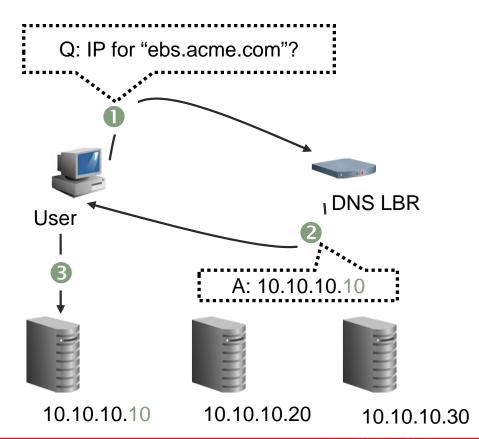
## **Load-Balanced Configuration**

- Types of Load-balancing
  - DNS-based
  - HTTP Layer (Web and Forms Servlets)
- Additional Types of Load-balancing
  - Apache Jserv Layer/OC4J
  - Forms Metric Server (R11i)
  - Concurrent Processing Layer (PCP)
  - Database Layer



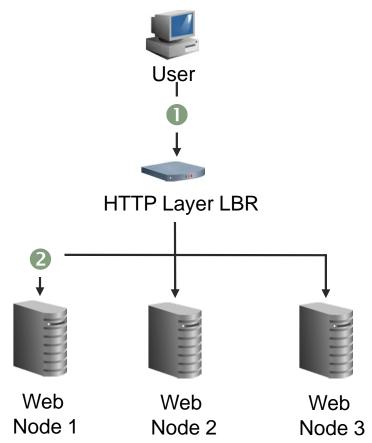
## **DNS-Based Load-Balancing**

- Users query DNS LBR for IP address of URL
- DNS LBR supplies different IP addresses to different users depending on load of a given node
- Vendor-dependent: heartbeat checks against nodes, sophisticated algorithms for loadbalancing



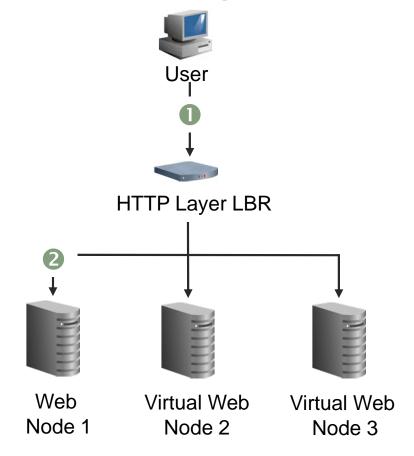
# **HTTP Layer Load-Balancing**

- Users navigate to Web Entry Point
- HTTP Layer LBR routes all subsequent traffic for a specific user to a specific Web Node
- LBR must support persistent session connections
- LBRs may use heartbeat checks for node death detection & restart, and sophisticated algorithms for load-balancing



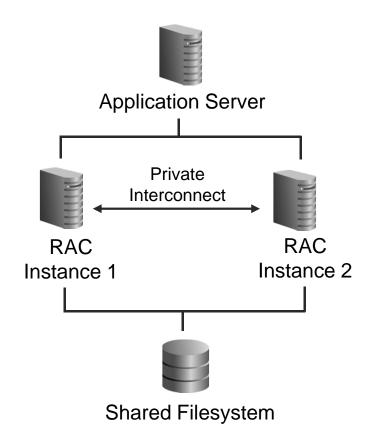
# Hybrid Virtual/Physical Load-Balancing

- Ideal resources for spikes: easy to provision, remove, reallocate
- Virtual machines integrate transparently with physical machines
- VM's can run on fixed hardware, private clouds, public clouds



# Real Application Clusters (RAC)

- Allows multiple database servers to access the same data in parallel
- Improves scalability & faulttolerance
- Supports Automatic Storage Management (ASM), Cluster Ready Services (CRS), Parallel Concurrent Processing (PCP)



# Oracle E-Business Suite on Exadata & Exalogic

- **Lowers Costs**
- **Reduces Complexity**
- Improves Performance
- **Strategic Direction**



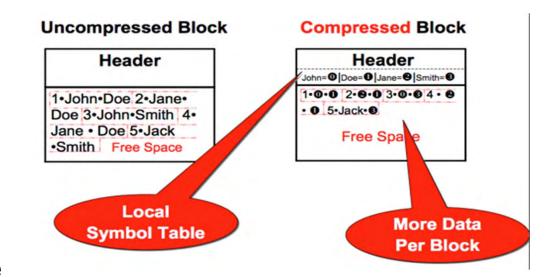
## **Summary of EBS Performance Results Exastack**

- Faster Response Advantage:
  - 3x For O2C Forms transactions.
  - 8x For Self Service transactions
- Users per Core Advantage
  - Two-to-One users per core.
  - Headroom for additional loads.
- **Higher Throughput** 
  - Push more transactions through a single Exa\* core.
- Linear Scaling Advantage
  - Support very large deployments of EBS with ease



# **Advanced Compression 11g Database Option**

- Table Compression Advisor \*
- Reduces table sizes
- Reduces network bandwidth overhead
- Improves performance of concurrent programs
- Improves backup performance



<sup>\*</sup> http://www.oracle.com/technology/products/database/compression/compression-advisor.html

### Results: Oracle's Use of Advanced Compression

 Oracle's Internal E-Business Suite Production system deployed ACO in 2009

Average overall storage savings3x

Table compression

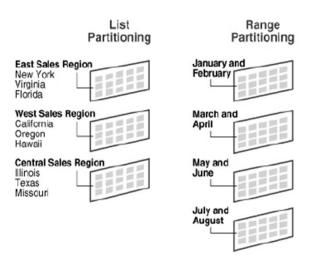
Index compression2x

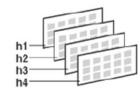
LOB compression
2.3x

- 231TB of realized storage savings primary, standby & test systems
  - Additional benefits also accrued in Dev clones and backup
- Payroll, Order-2-Cash, AP/AR batch flows, Self-Service flows run without regression, Queries involving full table scans show speedup

## **Database Partitioning Option**

- Keep legacy data for historical business analytics
- Break large tables into smaller partitions
- Optimize long-running queries & reports
- Can be used with Information Lifecycle Management (ILM) solutions





Hash

Partitioning

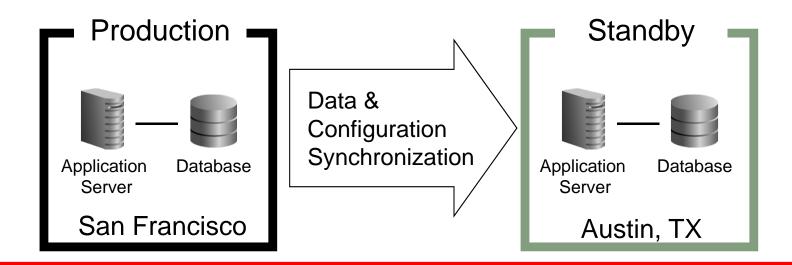


## **Business Continuity**

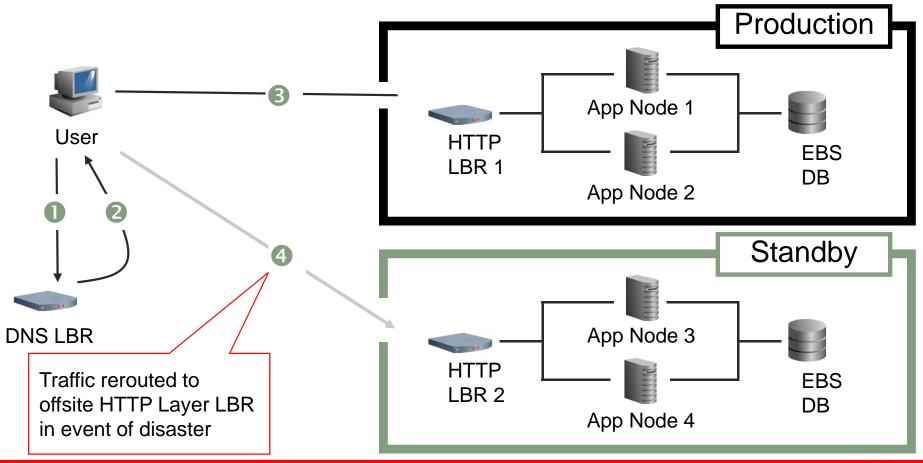
- A.k.a. "Disaster Recovery"
- Catastrophic site failures
- Operational failover (not just tape backups)
- Planned outages may also benefit from the infrastructure
- Operational priorities must be reviewed
- Potentially expensive

### **Active-Passive Business Continuity Architecture**

- Completely standalone, self-contained sites
- Data and configurations synchronized constantly between sites via Oracle DataGuard and physical standby



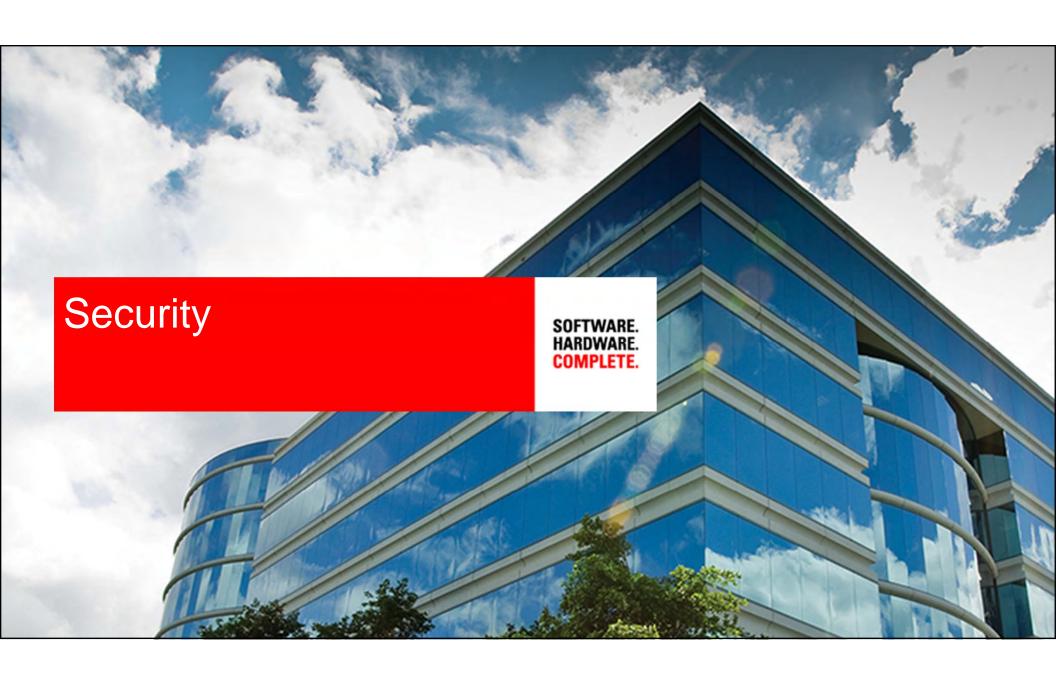
## **Case Study: Business Continuity Architecture**



## **Business Continuity Project Delivery**

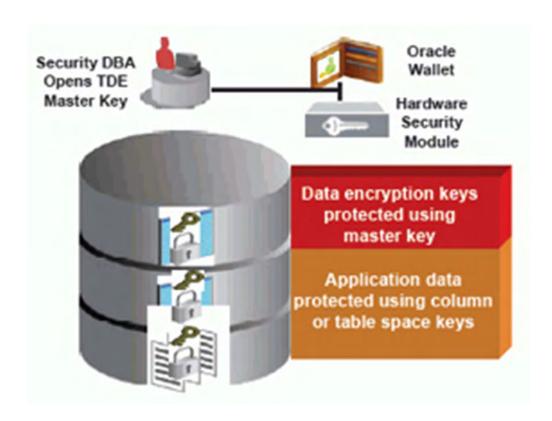
- Work closely with users, stakeholders, executive sponsors
- Prioritize disaster recovery needs carefully
  - Mirrored production environment (scale and scope)
  - Reduced scale (such as fewer web nodes)
  - Reduced in scope (such as support internal employees but not external users
- Research options, check references
- Work with platform hardware vendors, experienced consultants and partners
- Deploy proof-of-concept testbeds
- Test thoroughly





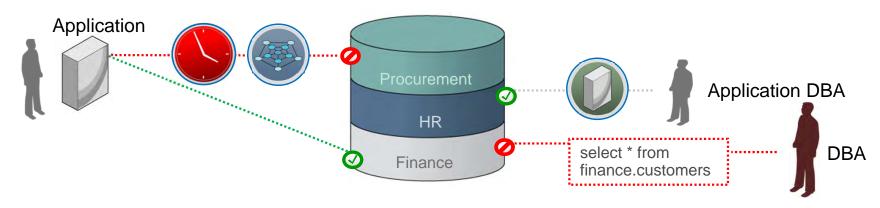
## **Transparent Data Encryption**

- Data at rest is encrypted
- Decrypted on-the-fly while EBS is running
- Encrypt tablespaces or individual columns
- Store keys in Oracle Wallet Manager



#### **Oracle Database Vault**

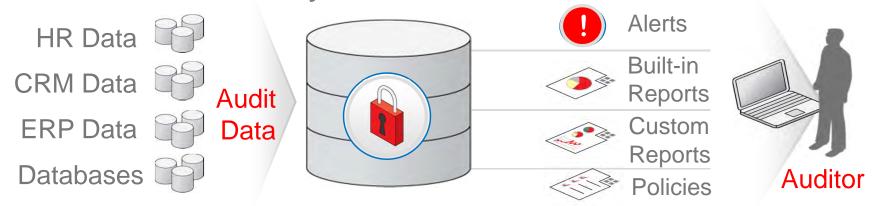
## **Privileged Account Controls**



- Enforce least privilege and prevent DBA access to apps data
- Enforce who, where, when, and how data can be accessed using rules and factors
- Securely enable applications consolidation and outsourcing / off-shoring
- Default realm for E-Business Suite is available use it as-is or choose a subset

#### **Oracle Audit Vault**

Audit Database Activity in Real Time



- Consolidate database audit trail into secure centralized repository
- Detect and alert on suspicious activities, including privileged users
- Out-of-the box compliance reports for SOX, PCI, and other regulations
  - E.g., privileged user audit, entitlements, failed logins, regulated data changes
- Integrates with E-Business Suite security system

## **Data Masking**

	Production		Non-Production		
LAST_NAME	SSN	SALARY	LAST_NAME	SSN	SALARY
AGUILAR	203-33-3234	40,000	ANSKEKSL	111—23-1111	60,000
BENSON	323-22-2943	60,000	BKJHHEIEDK	222-34-1345	40,000

#### What

 The act of anonymizing customer, financial, or company-confidential data to create new, legible data that retains the data's properties, such as its width, type, and format

#### Why

 To protect confidential data in nonproduction environments when the data is shared with non-production users without revealing sensitive information

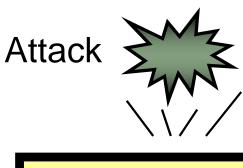
**How:** - Enterprise Manager Data Masking Pack

## **Additional Database Options**

- Advanced Networking Option (ANO)
- SecureFiles
- Virtual Private Database (VPD)
- Oracle Label Security (OLS)

## **Demilitarized Zone (DMZ)**

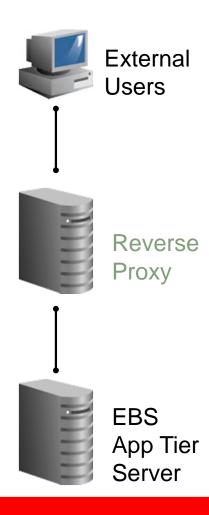
- Perimeter network
- Single or multi-segment
- DMZ-based servers have restricted responsibilities
- Security breaches remain contained within DMZ



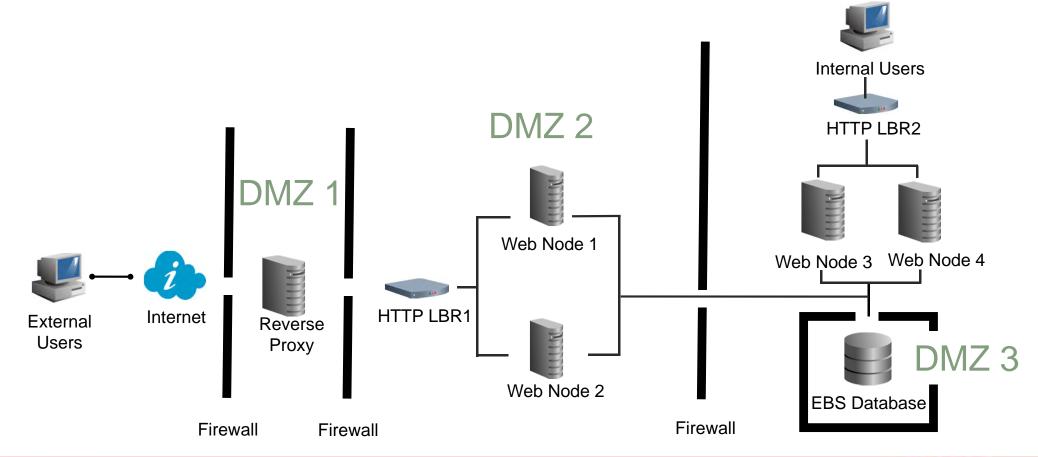


## **Reverse Proxy Server**

- Makes requests to the web server on behalf of the client
- Allows use of standard ports (80, 443) on external side; higher ports internally
- Filters requests to web server via rules
- Allows for content caching (optional)



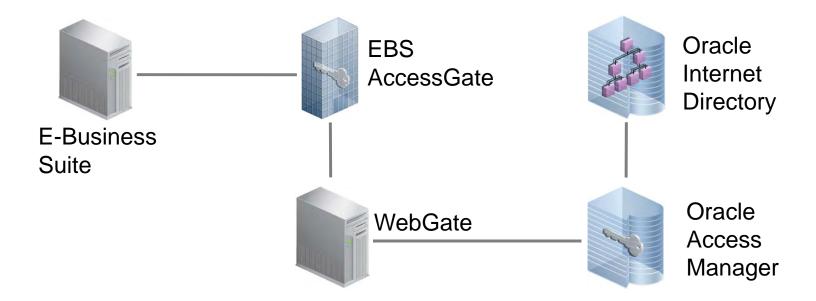
## Case Study: DMZs, Reverse Proxy and Load-Balancing



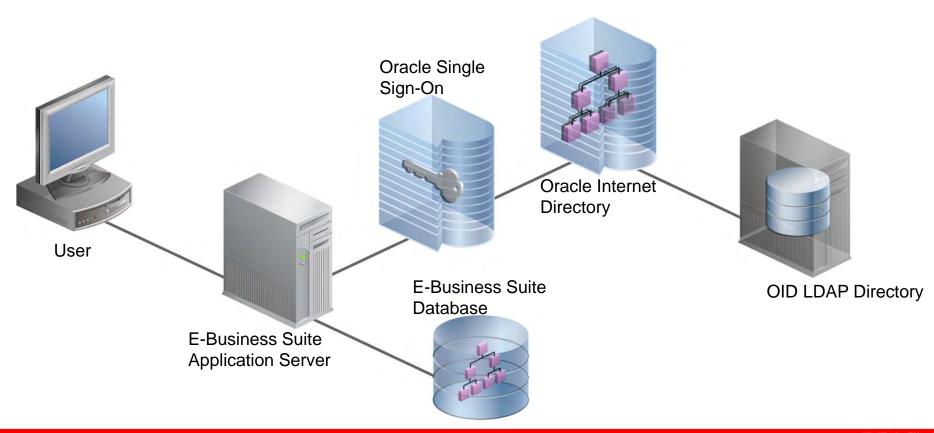
## E-Business Suite & Identity Management

- E-Business Suite has a built-in security model, handling authentication and authorization
- Other options:
  - Authenticate users with Oracle Access Manager (OAM 11g or **OAM 10g)**
  - Authenticate users with Oracle Single Sign-On (OSSO)
  - Authenticate users with third-party authentication tools via OAM
  - Manage users with Oracle Internet Directory (OID)
  - Integrate with third-party LDAP directories via OID

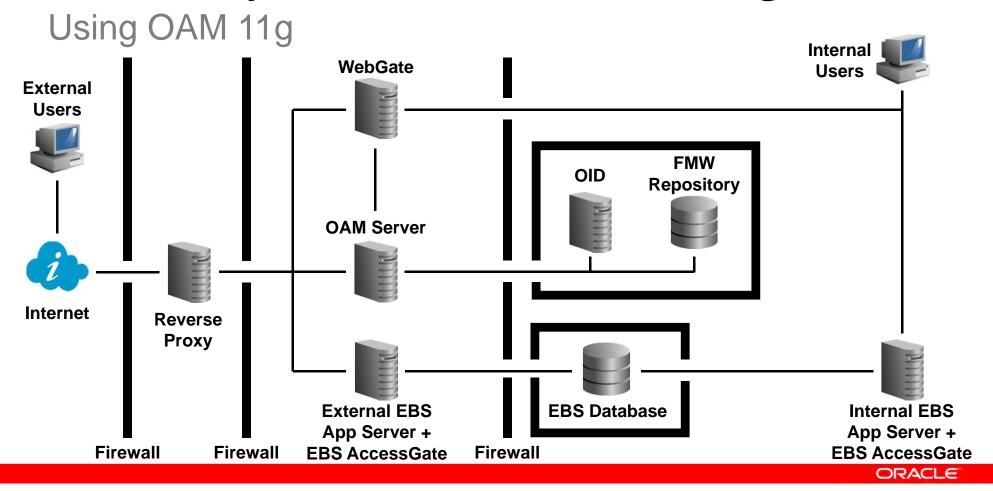
## **Enable Single Sign-On with Oracle Access Manager**



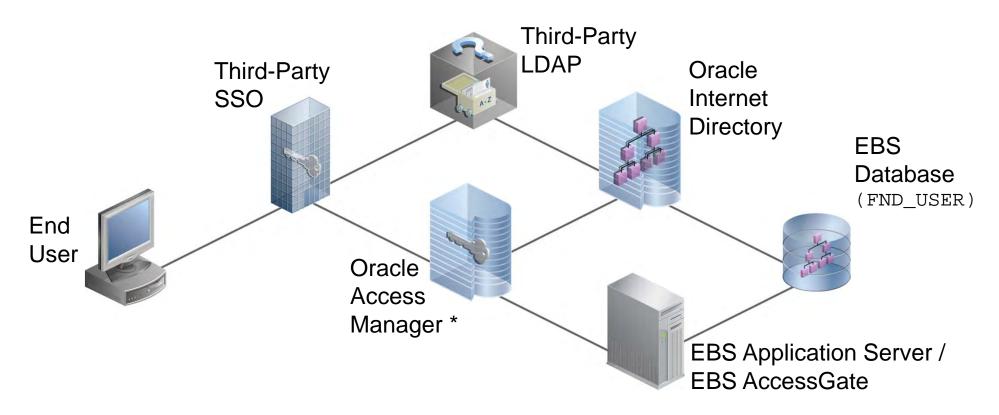
# **Enable Single Sign-On with Oracle Single Sign-On**



## Case Study: Internal / External Configuration



## **Third-Party Integration Architecture**



<sup>\*</sup> WebGate not shown.

# Case Study: Integration with Microsoft

Manager

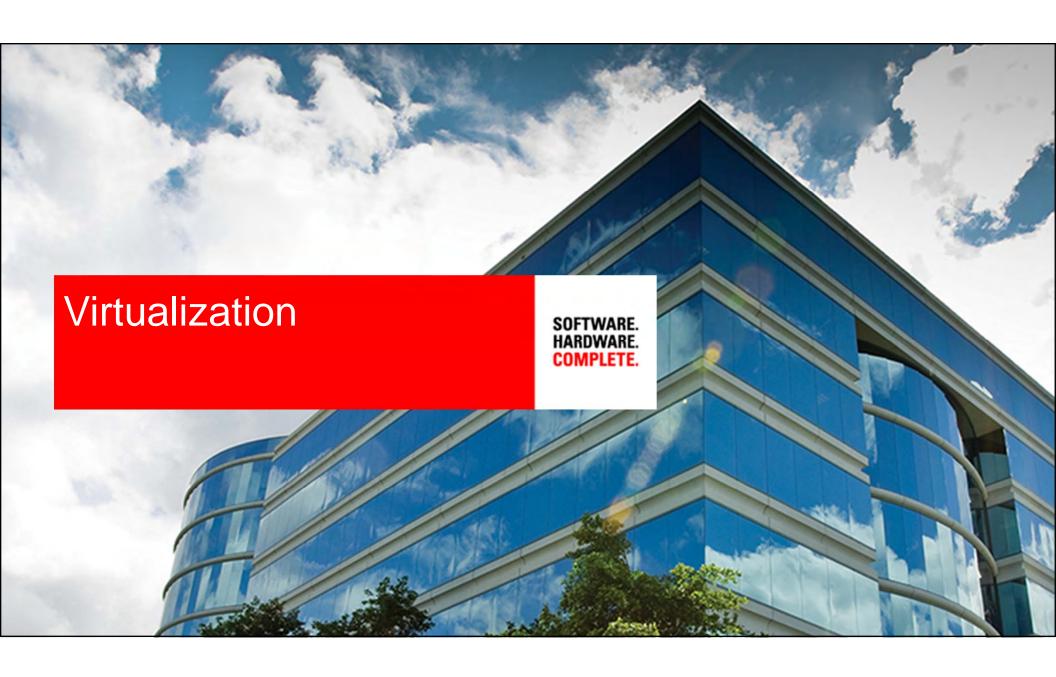
**Active Directory & Kerberos Microsoft** Microsoft Windows Active Oracle Native Authentication Directory Internet via Kerberos Directory **EBS** End Database User (FND USER) Oracle Access EBS Application Server /

**EBS** AccessGate

## **Other Identity Management Certifications**

Product	Latest Versions for EBS
Oracle Identity Manager	9.1.0.7, 11.1.1.5
Oracle Identity Federation	11.1.1.5
Oracle Adaptive Access Manager	11.1.1.5
Oracle Enterprise Single Sign-On Suite Plus	11.1.1.5

All certifications here are performed by Fusion Middleware product teams.



#### **Virtualization**

- Increase value by faster provisioning and packing more environments on same hardware
  - Virtualization frees resources from "ownership lock"
  - Provisioning times improve by order of magnitude
  - Customer use cases show average utilization jumping from 20% to 70%, and provisioning times of minutes / hours
- Lower the cost
  - Less hardware required to do more
  - Provision spike hardware from public clouds
  - Use operating budget instead of capital budget

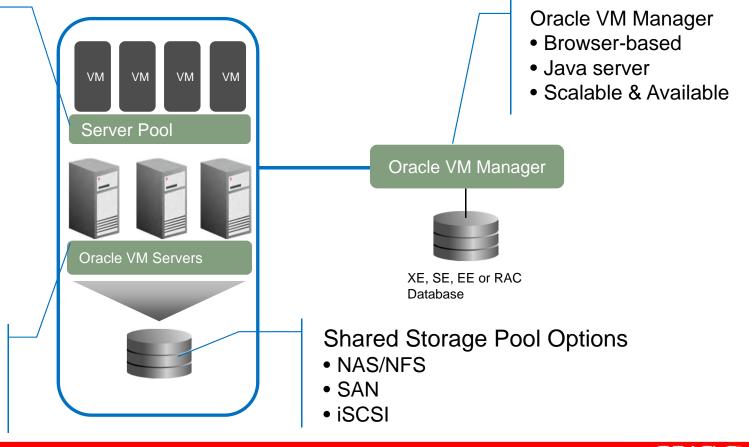
### **Oracle Virtualization Architecture**

#### Server Pool Pool resources

- Load-balance
- Migrate
- Auto-Failover

**Oracle VM Servers** 

- Hold guest VMs
- Linux, Solaris, Windows



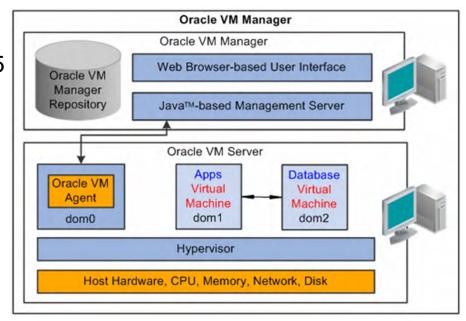
## **Virtualization**

#### **Oracle VM Templates for EBS:**

- EBS 12.1.3 Prod or Vision Database tier (OEL 5) + 11.2 DB)
- EBS 12.1.3 Application Server tier (OEL 5)
- 32-bit and 64-bit

#### **EBS Virtualization Kit:**

- Scripts to configure and wire together the EBS **VMs**
- Set instance names, IP addresses upon first boot



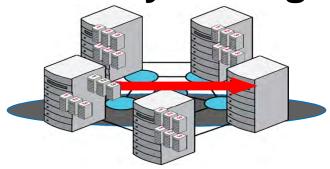
Sample Oracle VM architecture with deployed E-Business Suite templates

# Virtualization and Storage

#### **Economies** of Virtualization

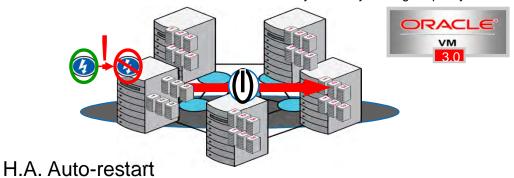
- Unused VM's CPU, memory, network are free
- Storage costs, whether used or not
- Minimize unused storage costs
  - Most virtual environments are highly similar
- Use shared storage for binaries
- Use file systems with block-level normalization for dbf's
  - For example, ZFS does not duplicate identical blocks

**NEW!** Advanced Policy Management of VMs

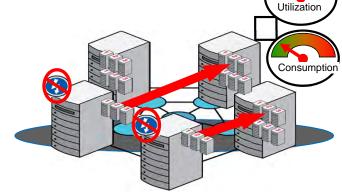


#### **NEW!** Dynamic Resource Scheduling (DRS)

- · Live Migrate VMs based on server load
- · Dynamically managed quality of service



- Automatically restart VM(s) on Server- or VM failure
- True clusterware logic for reliable failure detection
- Triggers even if Oracle VM Manager is unavailable



#### **NEW!** Dynamic Power Management (DPM)

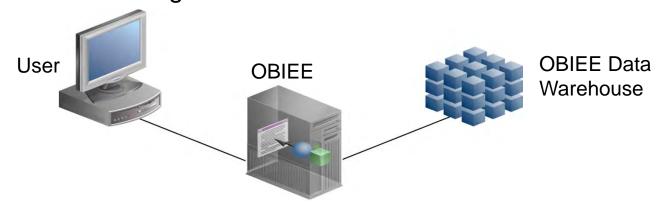
- Automatically power-off under-utilized servers
- Consolidate VMs onto fewest servers
- · Reverse the process when load increases

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# **Oracle Business Intelligence Enterprise Edition+** (OBIEE)

- Sophisticated business analysis tools
- High-volume production reporting
- Exception-based alerts
- Predictive intelligence
- Microsoft Office integration



# **Oracle Business Intelligence Applications** (OBIA)

- Provide end-user reporting via prebuilt dashboards, ad hoc queries
- Drill-down into data via tabular & graphical analytical tools
- Consolidates data from EBS, Siebel, PeopleSoft, and others

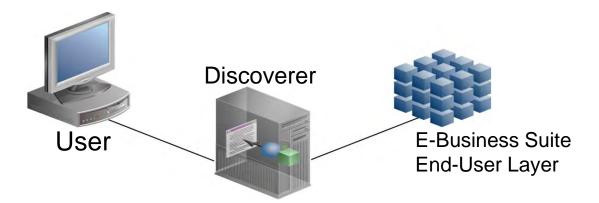






# **Oracle Discoverer**

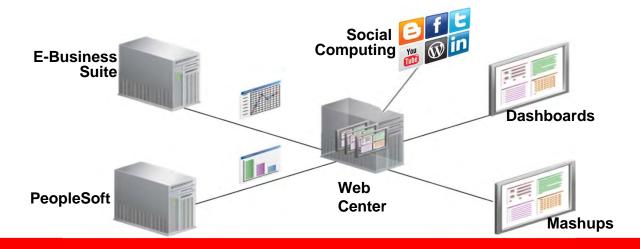
- Access APPS\_MODE End-User Layer via Business Intelligence System Discoverer workbooks secured by Applications responsibilities
- Discoverer 11g End-User Layer resides in E-Business Suite database
- Run Discoverer on separate cluster for enhanced scalability, wide deployment





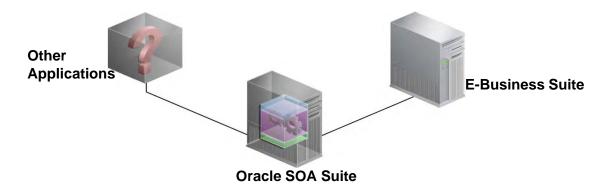
#### **Oracle Web Center**

- Build websites, collaborative and composite applications in Web Center
- Add EBS R12 portlets via WSRP 1.0 / JSR-168
- Pull data from PSFT, Siebel, JDE, and social computing services
- Display data in EBS portlets based on EBS responsibilities



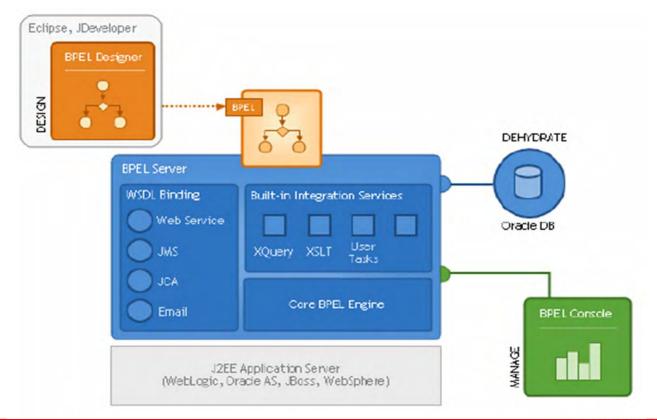
### **Oracle SOA Suite**

- Build integrations via Service Oriented Architecture (SOA) technologies
- Over 250 adapters for Enterprise Application Integration J2EE and open standards-based integration, including:
  - E-Business Suite, third-party applications, database sources
  - XML, JMS, JCA
  - Web Services: SOAP, WSDL, UDDI
  - B2B Protocols: RosettaNet, HIPAA, EDI

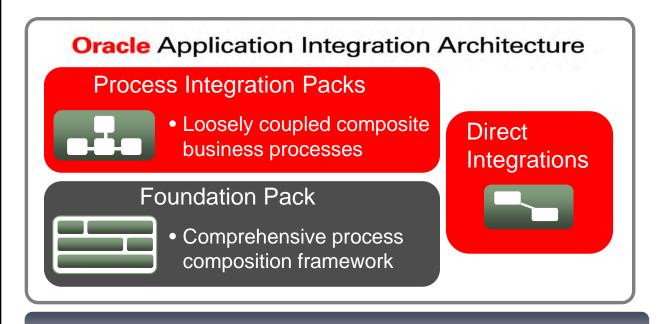


## **Oracle BPEL**

 Use Oracle BPEL Process Manager to integrate third-party applications via custom business processes



# **Application Integration Architecture**



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#### **Direct Integrations**

Manage. Pre-built integrations to support data flows between systems

#### **Process Integration Packs**

Optimize. Pre-built composite business processes across enterprise Applications

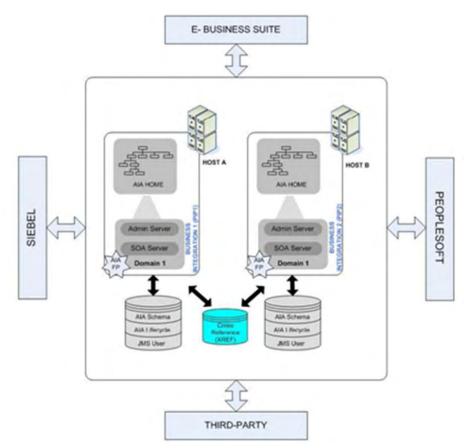
#### **Foundation Pack**

Standardize. Common Object and Shared Service Library with supporting SOA programming model and best practice implementation methods

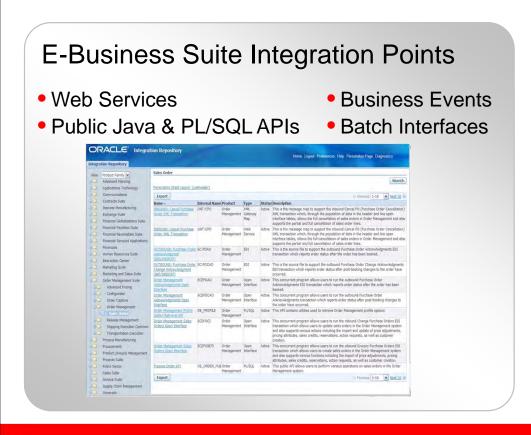
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# **Application Integration Architecture**

- AIA Foundation pack with pre-built PIP (Process Integration Packs) and CBPs (Composite Business Processes).
- Based on SOA
- Standards compliance
- Multiple integration styles
- Application agnostic Shared Services inventory



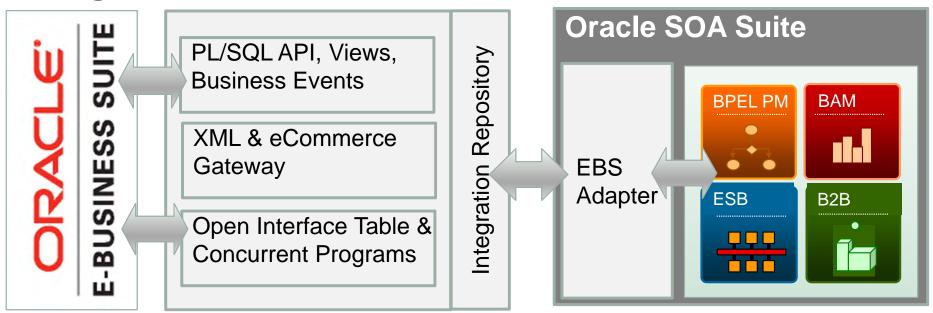
# **Oracle Integration Repository**



- Search and view available interfaces. by product family, standard, or interface type
- Hosted for 11.5.10: http://irep.oracle.com
- Shipped with Release 12 automatically matches the patch level at your own site
- Supports custom service interfaces

# **Oracle E-Business Suite Adapter**

Integration Solution Overview



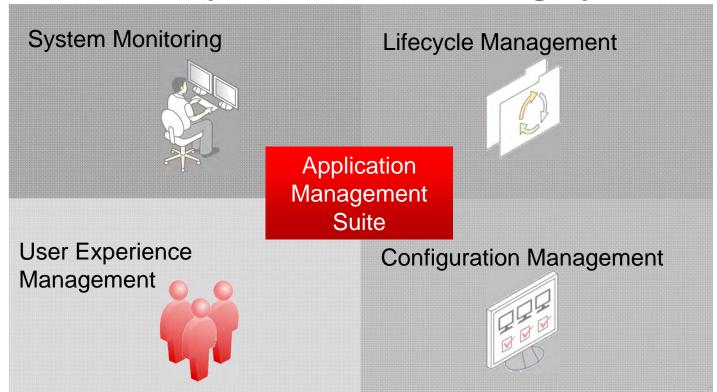
- Leverages Integration Repository
- Secured and Trusted Connection
- **Function Security Enabled**

- Application Context Ready
- Transaction Support
- **Customization Support**



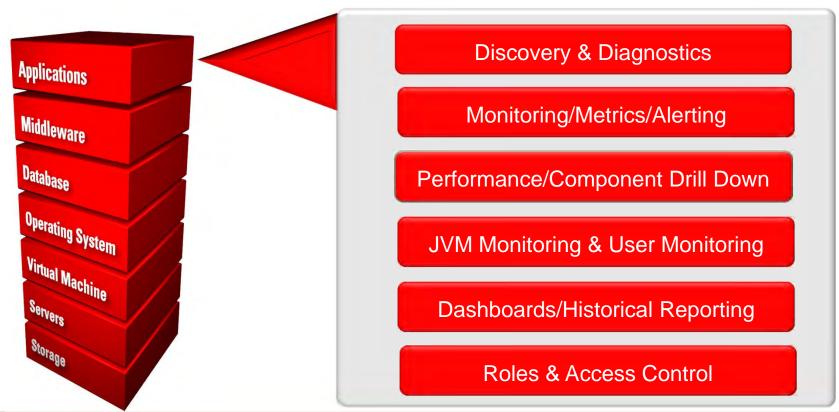
# **Application Management Suite for EBS**

Business visibility built-into each category



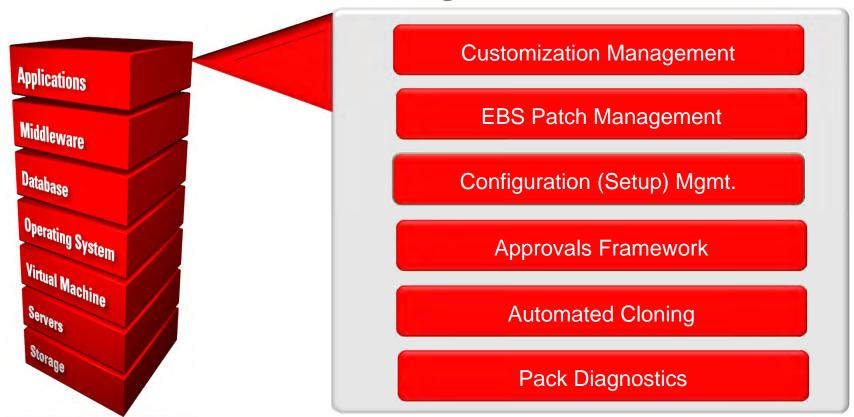
# **System Management**

# **Oracle E-Business Suite Targets**

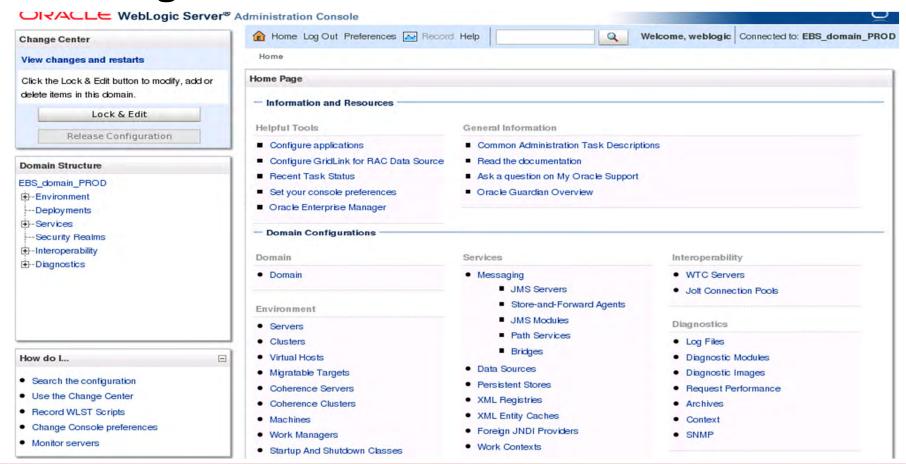


# Lifecycle / Change Management

**Oracle E-Business Suite Targets** 



# WebLogic Server Administration Console



# **Terminology**

#### Domain

- A domain is the basic administration unit for WebLogic Server instances
- Logical group of an Admin Server and one or more Managed servers

#### Admin Server

- Special instance of WebLogic Server instance
- Operates as the central control entity for the configuration of the entire domain
- Stores the configuration information of all other servers in the domain

#### **EBS Domain**

**Admin Server** 

Forms Server

Forms c4ws Server

oacore Server

oafm Server

# Terminology

#### Managed Server

- Server instances other than the Admin server in a Domain
- Does not depend on Admin server once up and running
- Can be clustered to increase availability and scalability
- All managed servers in a cluster are part of the same domain

#### Node Manager

- Separate process from WebLogic server
- Used to control Managed servers and perform startup/shutdown operations remotely

**EBS Domain** 

**Admin Server** 

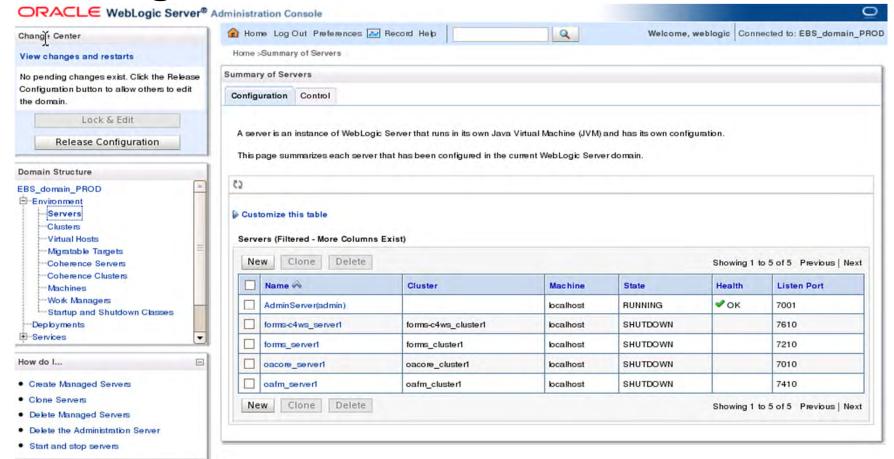
Forms Server

Forms c4ws Server

oacore Server

oafm Server

# WebLogic Server Administration Console



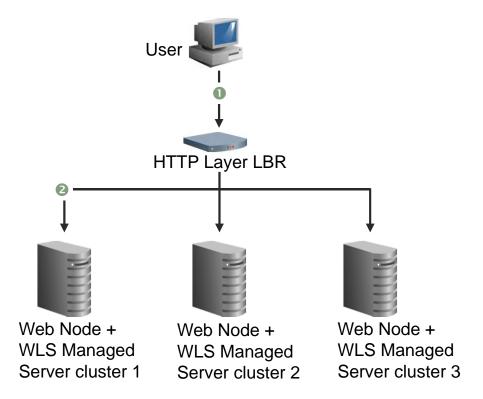
# Management Pack for WLS

- Leverages EM Grid Control
- Manage multiple WLS instances
- Application Performance Management
- **Configuration Management**
- End-to-end patch automation
- WI S Administration
  - Cloning of WLS Servers
  - Extending WLS Domains
  - Monitoring WLS targets

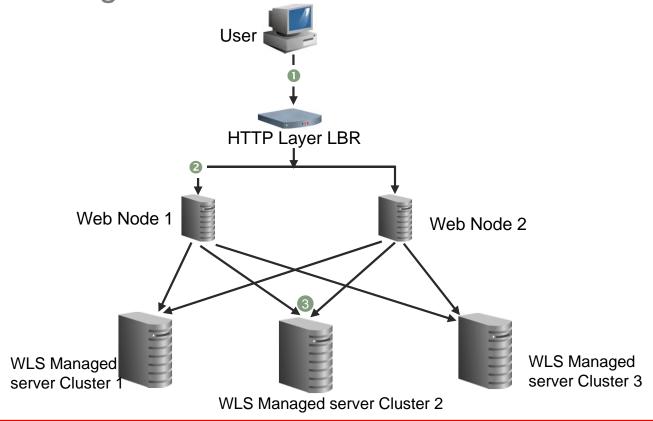


**Management Pack** for WLS

# Load Balancing - Scenario 1

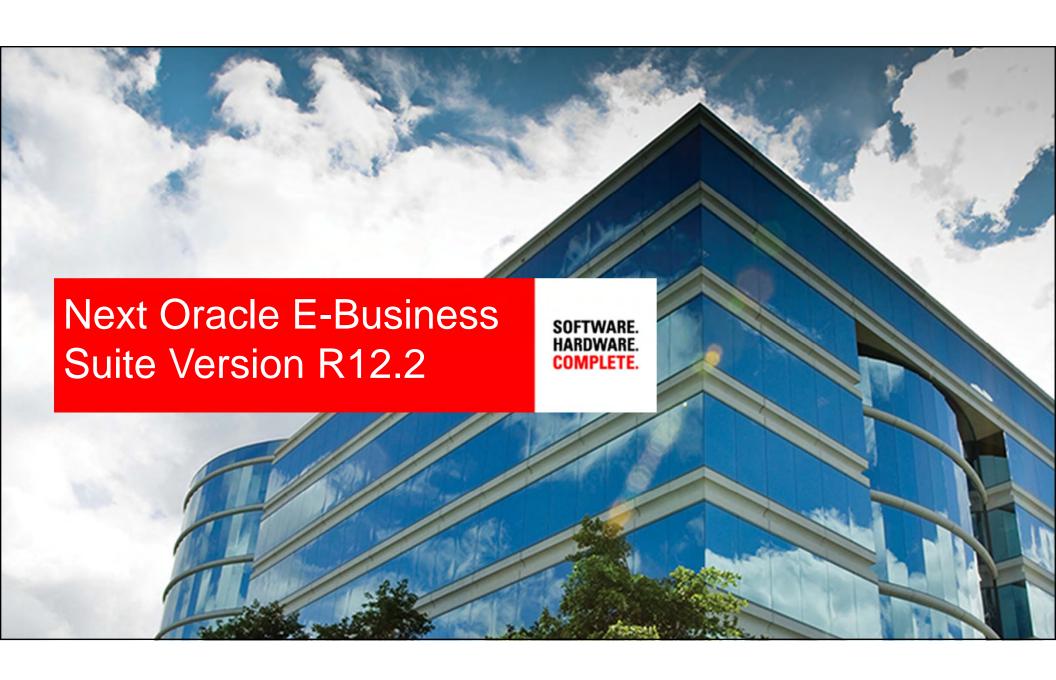


Load Balancing – Scenario 2



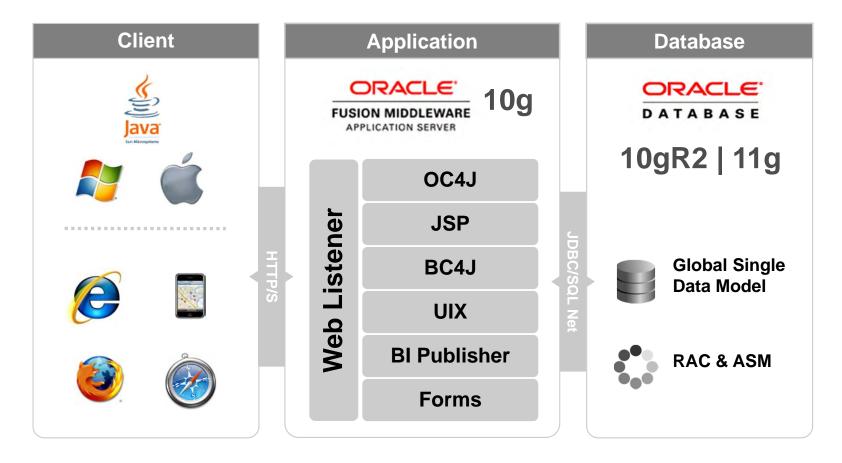
#### Benefits

- End users experience "always on" applications & services
- Comprehensive, low-overhead application monitoring and deep diagnostics
- Integration with Oracle RAC for highest levels of application availability
- Rapid development of applications without lost time due to System restarts
- Comprehensive tooling simplifies customization development and speeds new application delivery



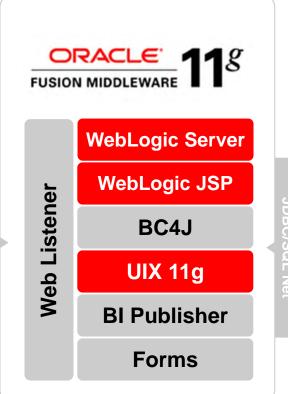
The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development,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

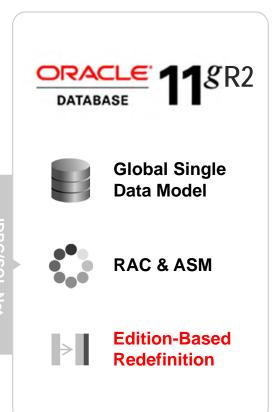
#### Release 12.1 Technology Stack: 3-Tier Logical Architecture



# **EBS Release 12.2 Technology Stack**







#### Features Planned for 12.2

- Graphical User Interface
- WebLogic Scripting Tool (WLST)
- High Availability & Failover
- Consolidated Administration

- Configuration and Deployment
- Monitoring & Messaging
- Troubleshooting Framework
- Integration with OAM

The preceding 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.

# **Additional Resources**



# References

MOS Note ID	Description
380489.1	Using Load-Balancers with Oracle E-Business Suite Release 12
384248.1	Sharing The Application Tier Filesystem in Oracle E-Business Suite Release 12
380490.1	Oracle E-Business Suite R12 Configuration in a DMZ
380486.1	Installing and Configuring Web Cache 10g and Oracle E-Business Suite Release 12
376700.1	Enabling SSL in Release 12
1110648.1	Oracle E-Business Suite Release 12.1 with Oracle Database 11g Advanced Compression
1224313.1	Getting Started with Oracle E-Business Suite Plug-in, Release 4.0

# References

Topic	Reference Guide or Web Site
Application Management Suite for Oracle E-Business Suite	<u>http://www.oracle.com</u> → Oracle Enterprise Manager → Application Management
9	<u>http://www.oracle.com</u> → Oracle Enterprise Manager → Middleware Management
Oracle E-Business Suite Technology Blog	http://blogs.oracle.com/stevenchan/

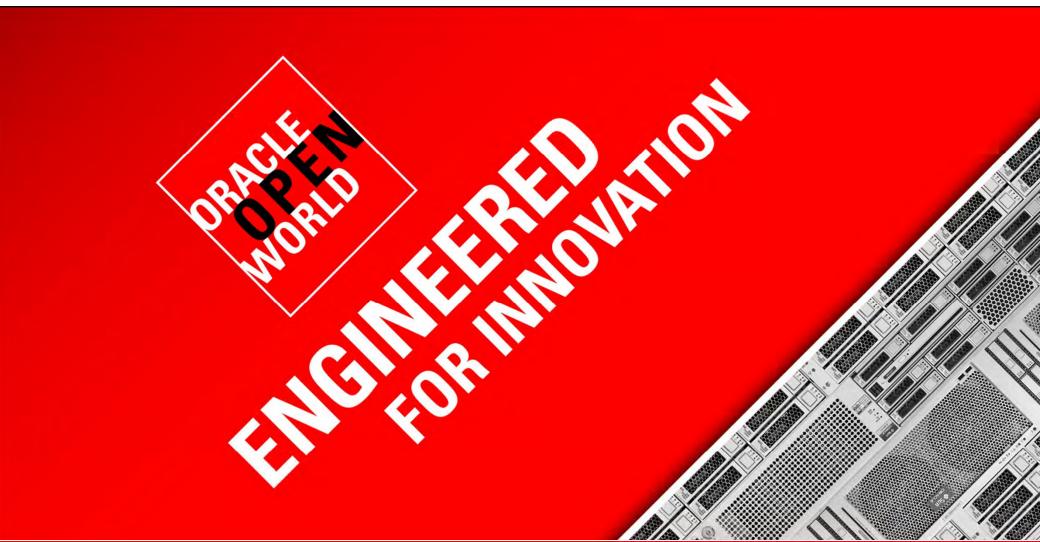
### **Related OOW 2011 Sessions**

#### http://www.oracle.com/openworld/index.html

Go to Tools → Content Catalog, then enter the Session ID in the Keyword Search text box

- 17247 Web Services and SOA Integration Options for Oracle E-Business Suite
- 17245 Advanced Performance Tips for Oracle E-Business Suite: Oracle RAC, Oracle Advanced Compression
- 17257 Integrating Oracle E-Business Suite with Oracle Identity Management Solutions
- 17242 Automating Patching with Oracle Application Management Suite for Oracle E-Business Suite
- 17249 Oracle E-Business Suite Technology Certification Primer and Roadmap
- 17240 Minimizing Oracle E-Business Suite Maintenance Downtimes

# Q&A





# **Latin America 2011**

December 6-8, 2011

**Tokyo 2012** 

April 4-6, 2012

# **Hardware and Software**

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