ORACLE VM

ORACLE VIRTUALIZATION

ORACLE

Oracle VM – Application Driven Virtualization

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Principal Program Manager – Oracle Linux and Virtualization

NZOUG - March 2013

Evolving IT Needs

- “Data Centers” are becoming “Service Centers”
- Cloud computing is driving the need to deliver complete integrated stacks, not just components
- On-going need for greater optimization & efficiency
- Requirements are going beyond “just” operating systems provisioning
- Isolated hypervisors are not good enough
- Users need full stack provisioning and management

IT Needs to Deliver Ready to Run Services

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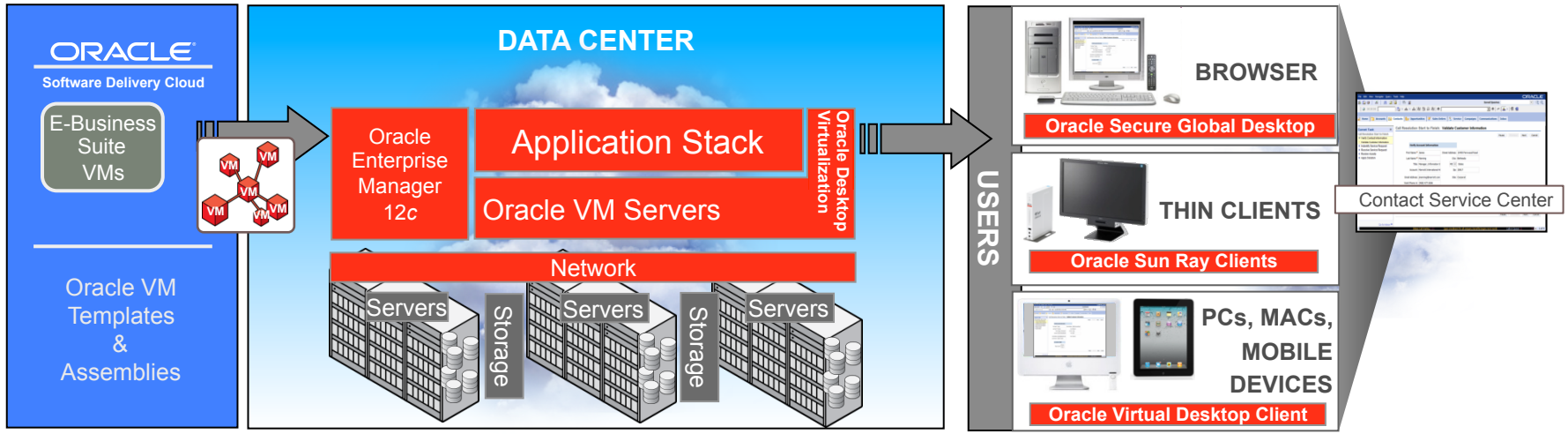
Oracle Virtualization

The Full Stack, End-to-End



Server Virtualization	Network Virtualization	Desktop Virtualization
• Oracle VM Server for x86 • Oracle VM Server for SPARC (LDoms) • Oracle Solaris Zones • Dynamic Domains	• Oracle Xsigo Data Center Fabric	• Oracle Virtual Desktop Infrastructure • Sun Ray Clients • Oracle Secure Global Desktop • Oracle VM VirtualBox

Application-Driven Virtualization

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Oracle VM

Server Virtualization and Management

- For both Oracle and non-Oracle applications
  - Oracle VM Server for x86/x64
  - Oracle VM for SPARC
  - Oracle VM Manager
  - Oracle Enterprise Manager

- The only server virtualization software supported and certified with Oracle products

- **Free license**
- **High performance**
- **Enterprise-quality support**
- **Faster application deployment**
- **Integrated full-stack management**

ORACLE VM

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Oracle VM
State of the Art

- State of the art features
  - Live migration, high availability, template deployment, dynamic resource scheduling, automatic power management
- Virtualize your entire data center
  - Oracle Linux, Oracle Solaris, and Microsoft Windows guests
  - Runs on x86 and SPARC
- Designed to run production database and middleware workloads

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Oracle VM Server for SPARC

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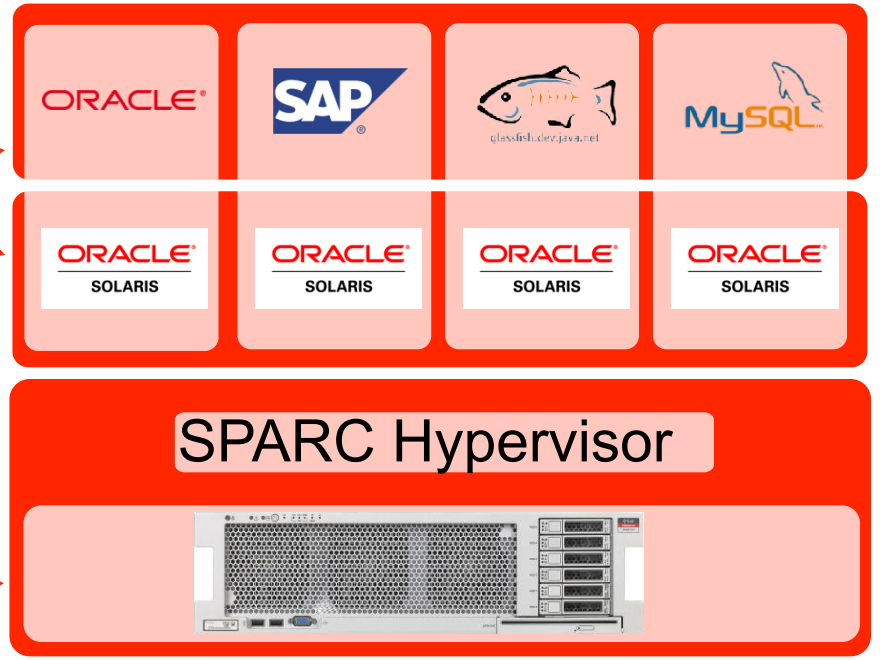
Oracle VM Server for SPARC

The Virtualization Platform combining the best of Oracle Solaris and SPARC for Your Enterprise Server Workloads

Isolated OS and applications in each logical (or virtual) domain

Firmware-based hypervisor

Each logical domain runs in dedicated CPU thread(s)



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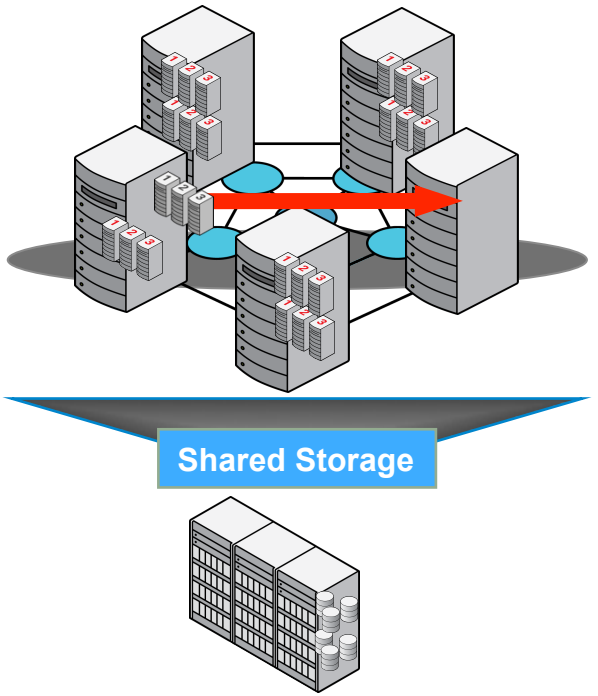
Secure Live Migration

Eliminates Application Downtime

- Live Migration Now Available on SPARC T-Series Systems
  - SPARC T4
  - SPARC T3
  - UltraSPARC T2 Plus
  - UltraSPARC T2
- On-chip Crypto Accelerators Deliver Secure, Wire-Speed Encryption for Live Migration
  - No additional hardware required
  - Eliminates requirement for dedicated network
- More Secure, More Flexible



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Oracle VM for x86

Application-Driven

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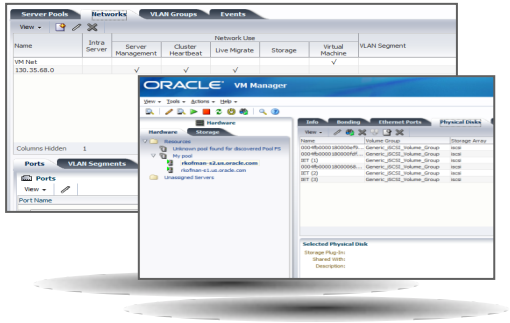
Oracle VM for x86 Architecture

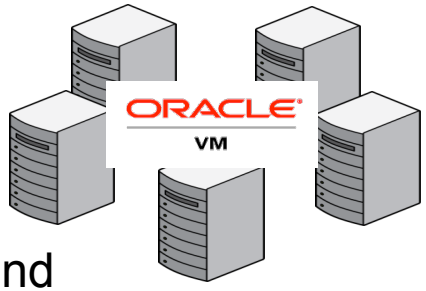
Oracle VM Manager

- Centralized management server
- Web browser-based: No client required
- Manage hundreds or thousands of VMs centrally
- Advanced virtualization management included



Oracle VM Server

- Installs on “bare-metal” servers in about a minute
- Guest operating systems: Solaris on x86, Linux, & Windows: Support for paravirtualized- and hardware-virtualized kernels & drivers
- High performance at scale: Up to 160 physical CPUs and 4TB memory/VM; Up to 128 vCPU / VM and 2TB memory



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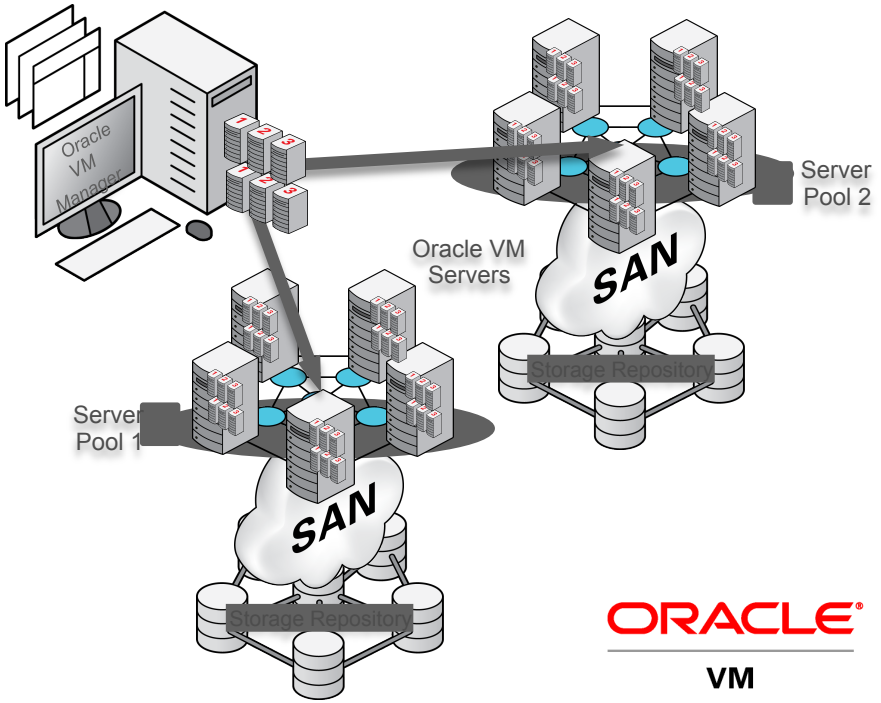
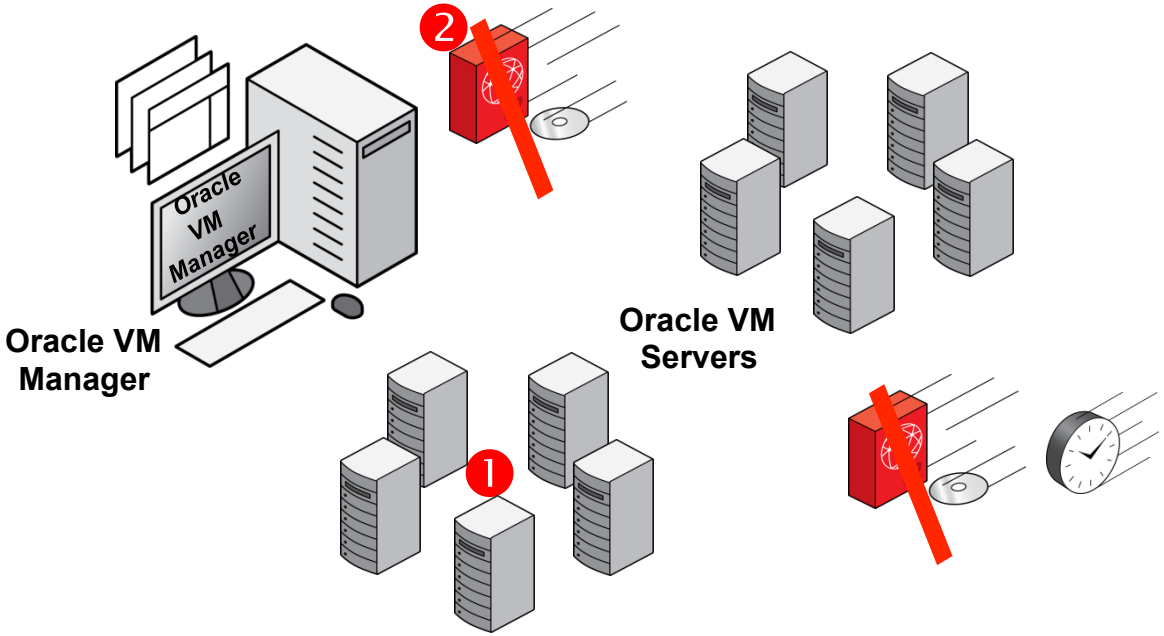
Oracle VM Server for x86

- Latest Release: Oracle VM 3.2
- Significantly Enhanced Oracle VM Manager
- Dynamic, policy-based management and automation
- Centralized network and storage configuration
- Improved ease of use
- High performance and scalability



Simple Install of Server and Manager
Up and Running Fast



- Oracle VM Manager installation
- Oracle VM Server installation
- Automatically discover Oracle VM servers

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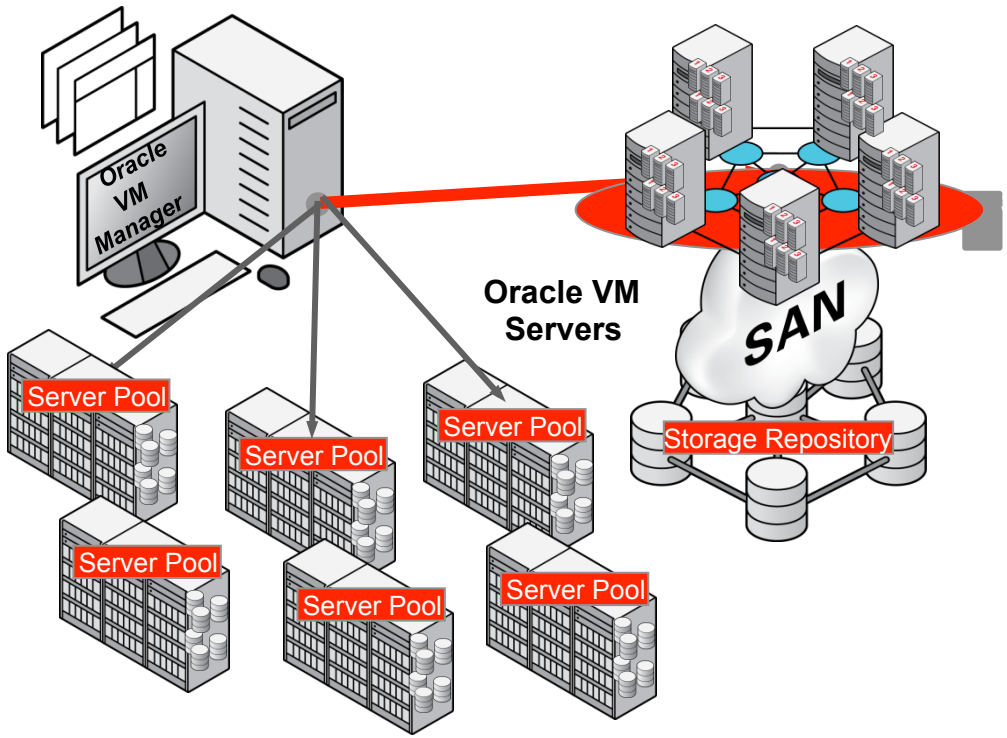
Server Pools, Networking, and Storage Centrally

All from the Manager GUI…



- Policy-based Server Pool Management
- Guest VM creation and management
- Linux, Solaris, and Windows
- Server network configuration
- Storage Connect storage management

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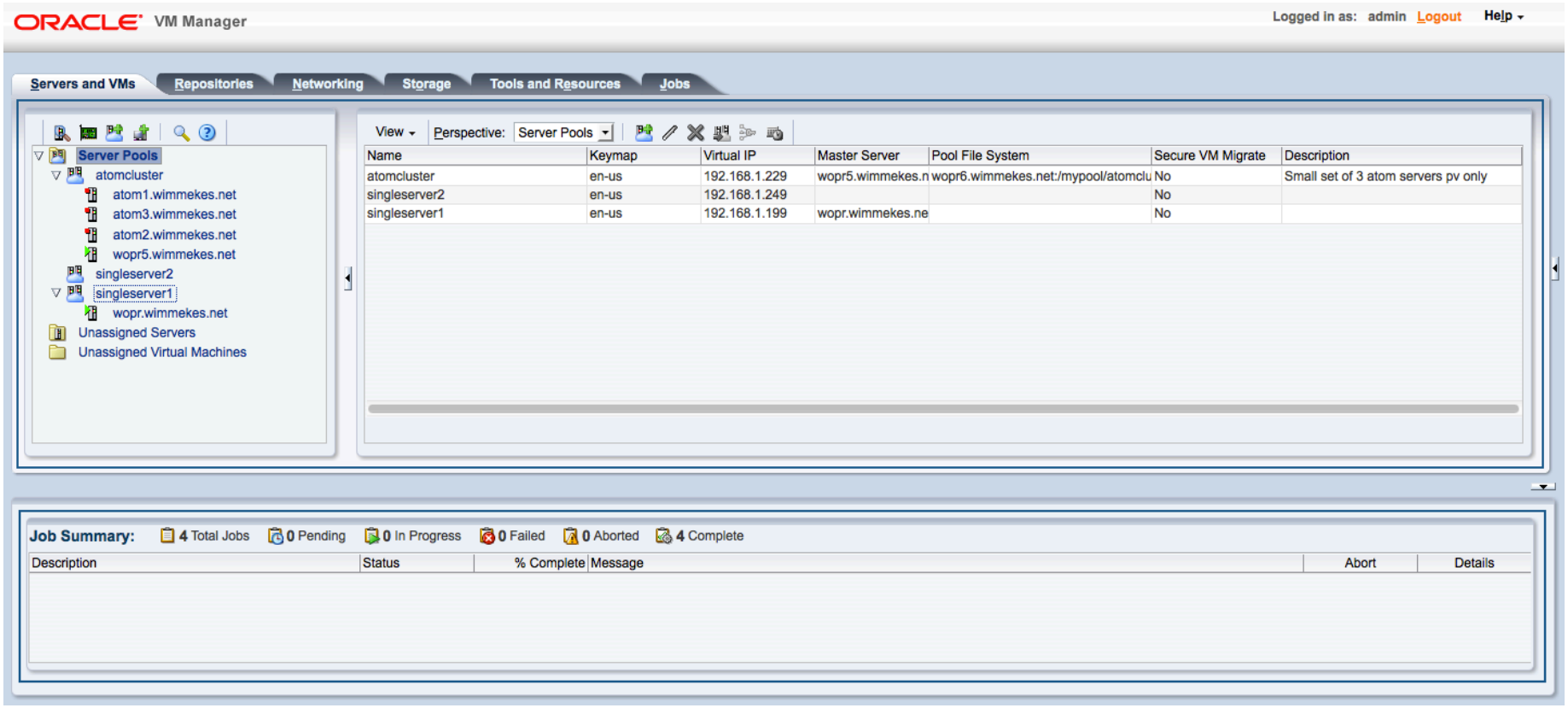
Oracle VM 3 Server Pool



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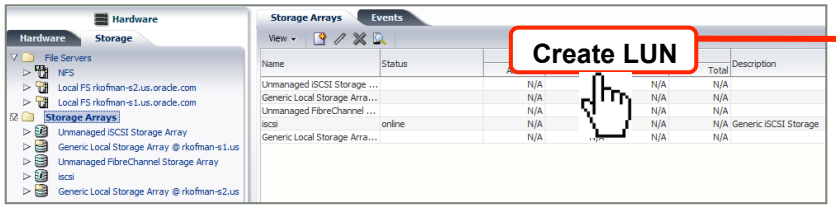
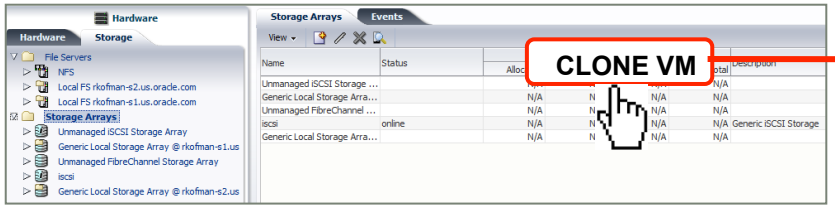
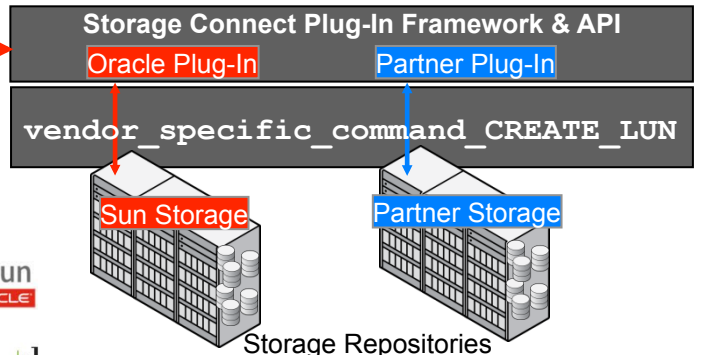
Storage Connect

Advanced Storage Operations

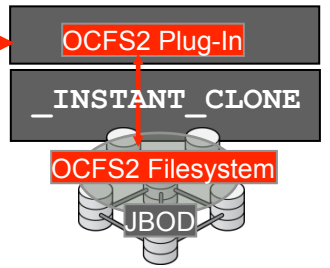






NetApp HITACHI DATA SYSTEMS Sun ORACLE

EMC² where information lives FUJITSU pillar DATA SYSTEMS . . .



Storage Connect Plug-Ins for Management…

- Oracle and 3rd party storage…from the Manager UI

More than just provisioning…

- Create LUNs or Volumes
- Expand LUNs or Volumes
- Associate, share with VMs

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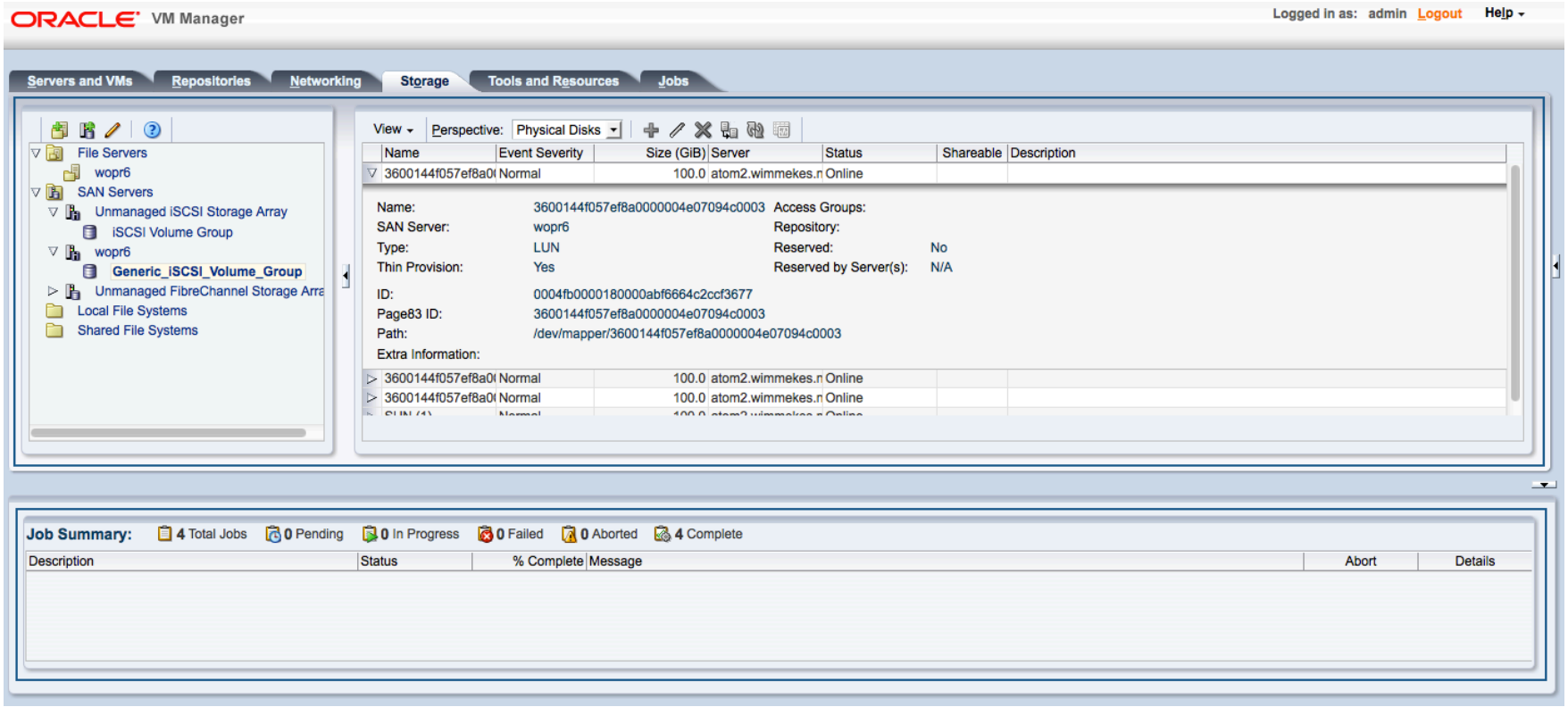
Oracle VM 3 Storage Device Plug-In

Oracle VM Storage Connect



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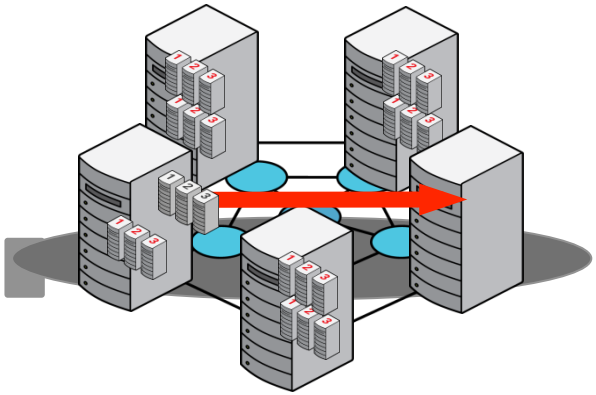
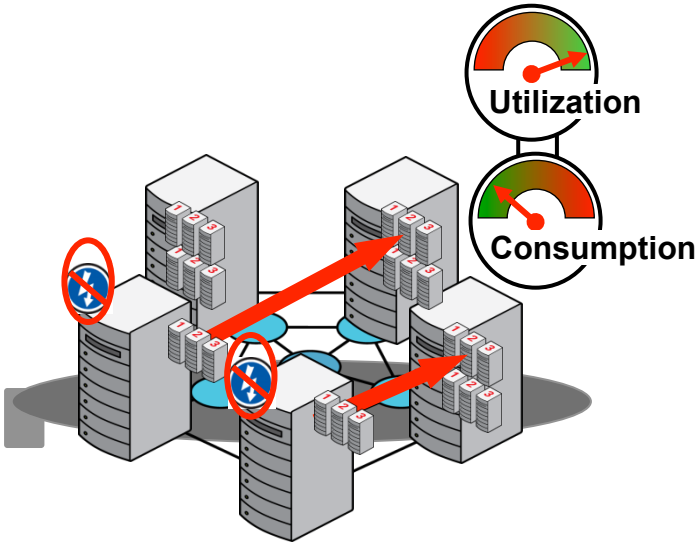
Advanced Policy Management of VMs



NEW! Dynamic Resource Scheduling (DRS)

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



NEW! Dynamic Power Management (DPM)

- Automatically power-off under-utilized servers

H.A. Auto-restart

- Automatically restart VMs on failed servers

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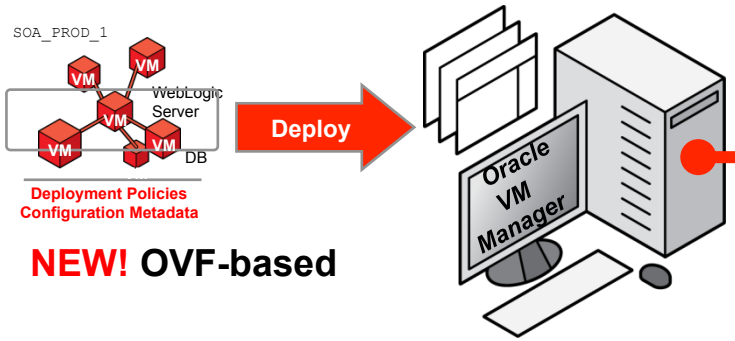
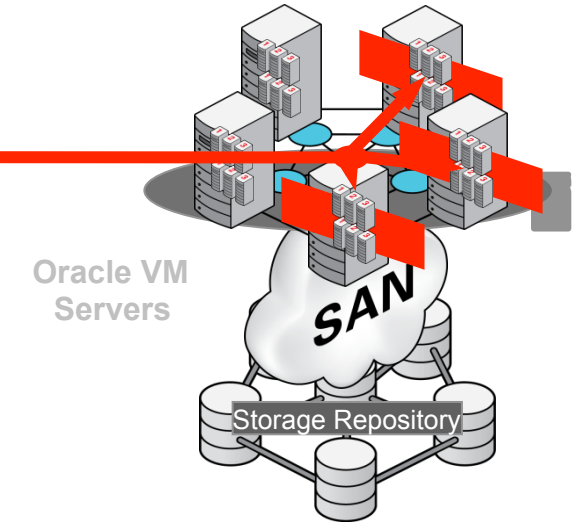
ENHANCED Support for Application Templates & Assemblies

Oracle VM Assembly:
Production Environment SOA_PROD_1



NEW! OVF-based

Deployed:
Production Environment SOA_PROD_1



- **Deploy Assembly into Oracle VM Manager as 'Golden Image'**

- **NEW! Guest VM API**
- Direct integration between guest software and virtualization layer

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Oracle VM 3

Engineered for Oracle

- At the core of Oracle's middleware and cloud strategy
- Virtual platform for Oracle applications
- Integrated management of the virtual stack with Oracle Enterprise Manager 12c and Ops Center
- Rapid application deployment and management

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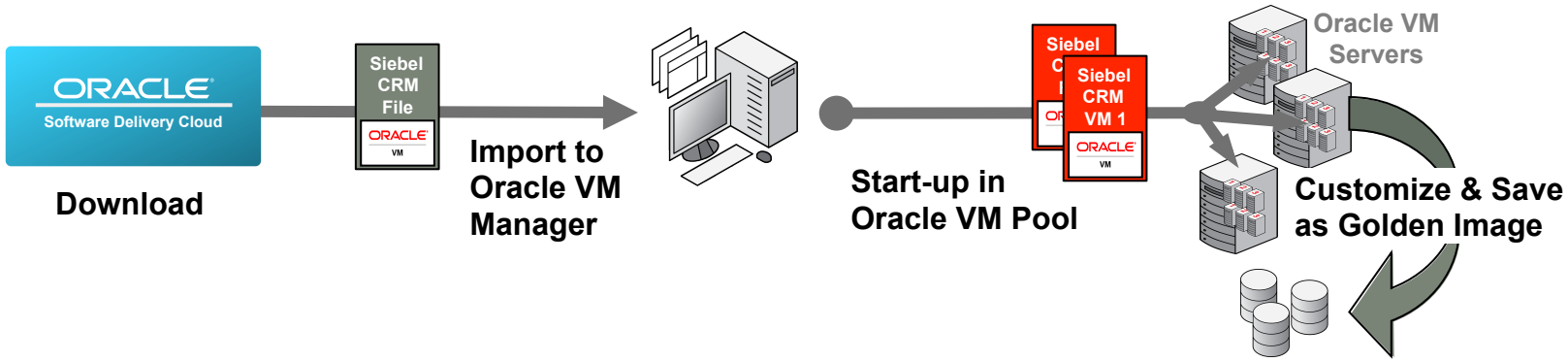
Oracle VM Templates for Applications

Rapid Deployment; 100+ Templates Available

- Pre-built, pre-configured, production-ready VMs
- Apps, Databases, Middleware, OS; Siebel CRM, Oracle RAC, More…
- Near zero knowledge of OS, Application installation required
- Automate deployment of a complete production ready 8 node RAC cluster in minutes through a simple single configuration file



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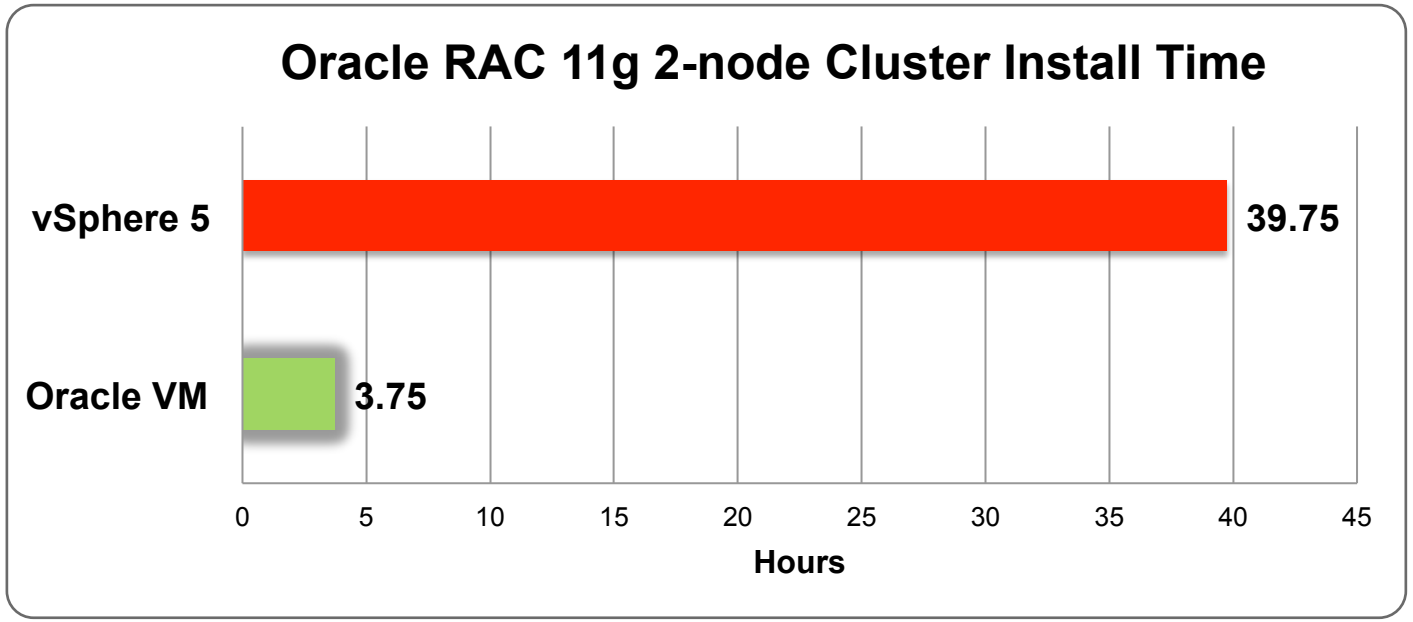
Deploy Oracle RAC 10x Faster than VMware



Oracle VM Template vs. Traditional Install of Oracle RAC on vSphere 5

Evaluator Group Lab Validation: "Oracle VM – Quantifying The Value of Application-Driven Virtualization"

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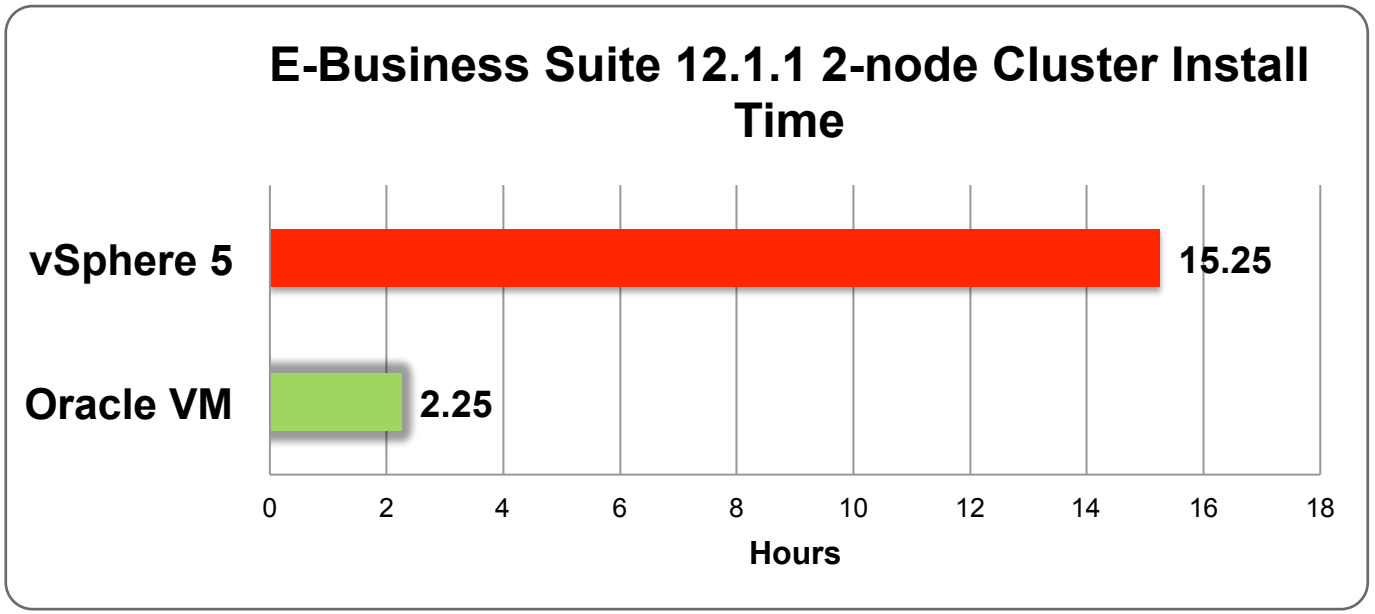
Deploy E-Business Suite up to 7x Faster Than VMware



Oracle VM Template vs. Traditional Install of E-Business Suite 12.1.1 on vSphere 5

Evaluator Group Lab Validation: "Oracle VM – Quantifying The Value of Application-Driven Virtualization"

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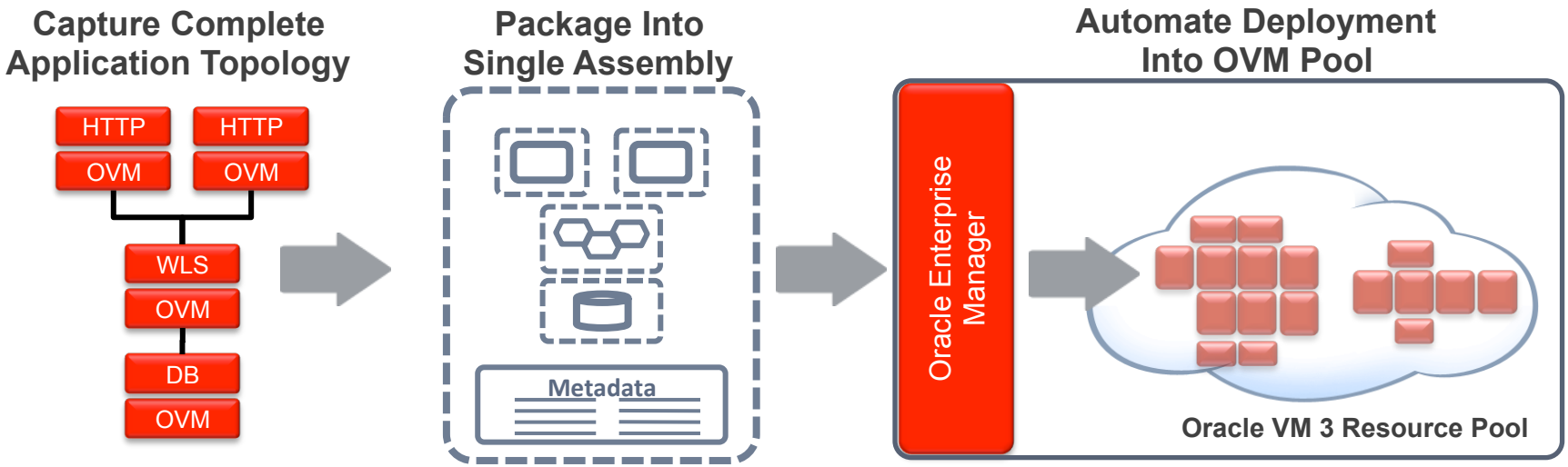
Oracle Virtual Assembly Builder

Standardize Configurations, Automated Provisioning



- Package complex, multi-tier, multi-VM applications into single, portable assembly
- Deploy assembly onto Oracle VM pool with automated configuration and late-binding parameters

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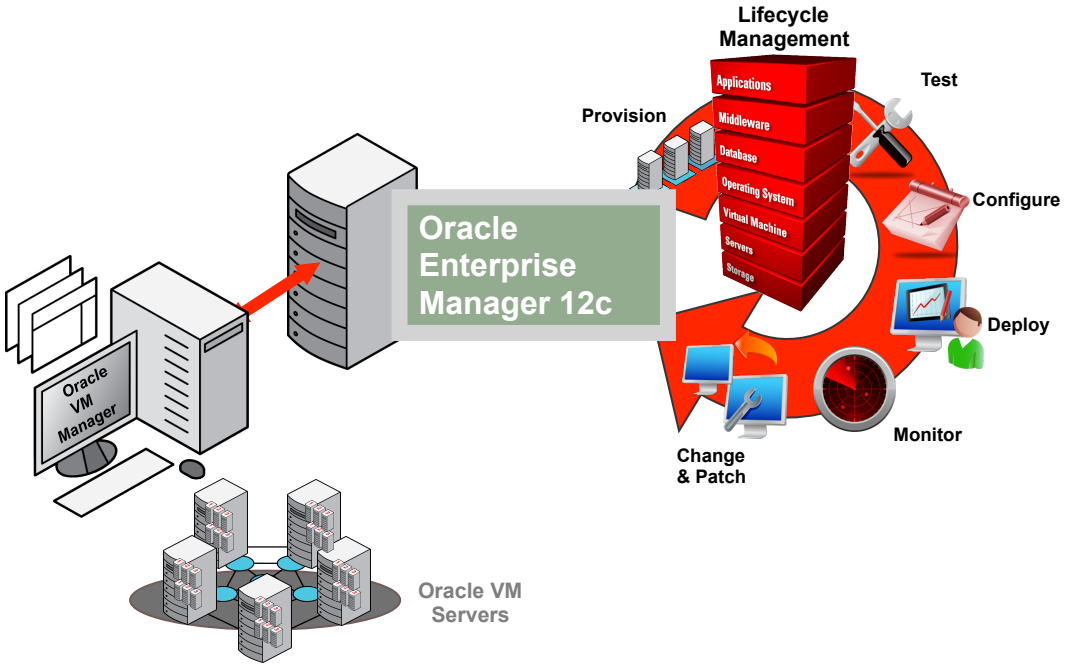
Easy Integration: Oracle Enterprise Manager



Full management functionality
- Everything you can do from Oracle VM Manager
- Integrated life-cycle management

Easy integration
- New- or existing Oracle VM Manager instance
- Just point Enterprise Manager instance to Oracle VM Manager instance
- No migration or re-discovery required
- No new EM agent deployments required

Easy to use, flexible access
- Access from EM GUI or Manager GUI or both
- Use one GUI if the other is off-line
- EM GUI for application admins, Oracle VM Manager GUI for virtualization admins

Application Driven Full Stack Management

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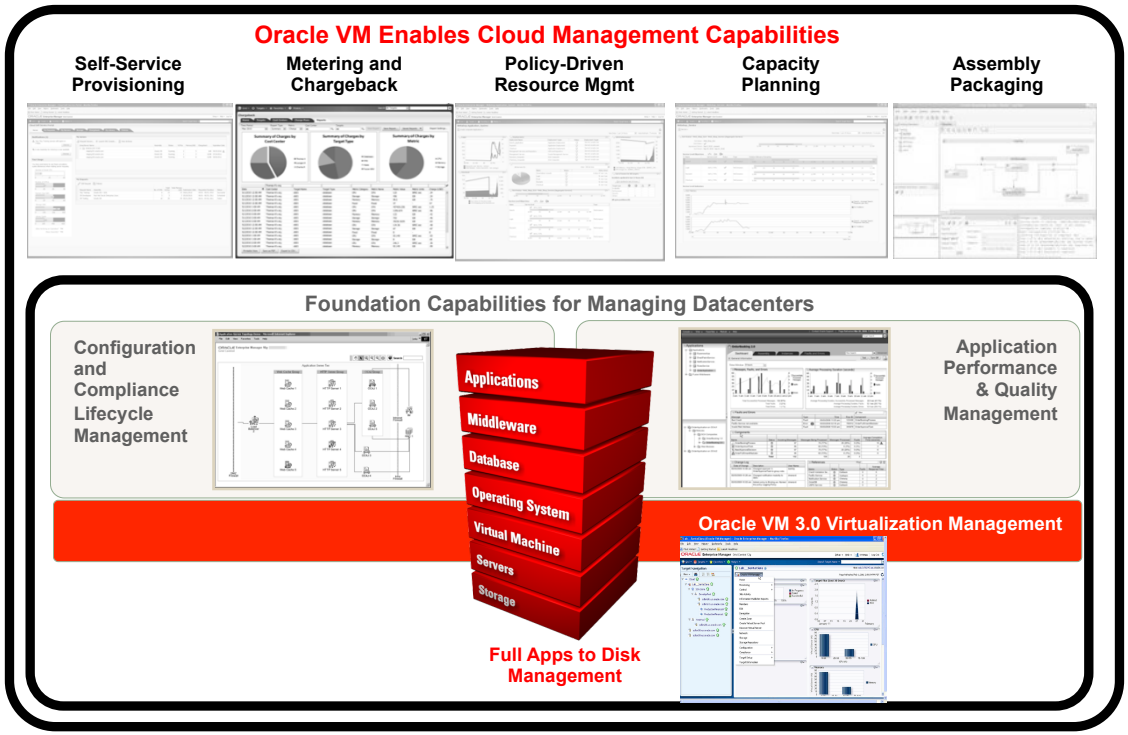
Oracle Enterprise Manager 12c

Cloud Management with Oracle VM 3.2



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Latest Release

Oracle VM 3.2.1

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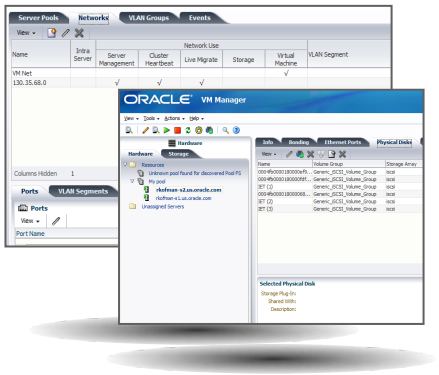
Oracle VM Manager Enhancements

- Enhanced GUI: streamlined operations
  - Fewer clicks and drag-and-drop operations
  - More logical, efficient layout and flow in wizards
- Infrastructure for future multi-hypervisor management:
  - Oracle VM Server for SPARC and for x86 Servers together
- Storage Connect expansion:
  - NetApp and others to join Hitachi, Fujitsu, EMC, and Oracle on the list of plug-ins



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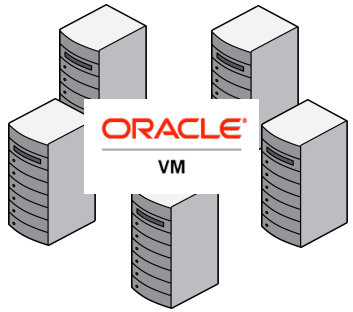
Oracle VM Server for x86 Enhancements

- Updated Server Software
  - Now with Unbreakable Enterprise Kernel 2
  - Oracle Linux drivers = Oracle VM Server drivers
  - Rapid driver availability, streamlined partner certifications
  - Latest Xen hypervisor version to support the latest hardware
- Storage / Network Enhancements
  - Performance improvements
  - Expanded configuration options
  - Export server storage for backup and recovery
  - Move storage repositories around allowing easier disaster recovery or standby server pools.



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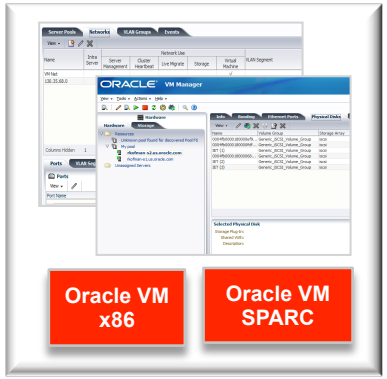
Roadmap:
Oracle VM Manager: Multi-Hypervisor Management

- One Oracle VM Manager for x86 and SPARC
  - Oracle VM Manager server for x86 Linux and SPARC Solaris
- State-of-the-art management for SPARC platform
- One management tool for mixed shops
  - SPARC and x86; Solaris and Linux
- Templates & Assemblies for SPARC & x86



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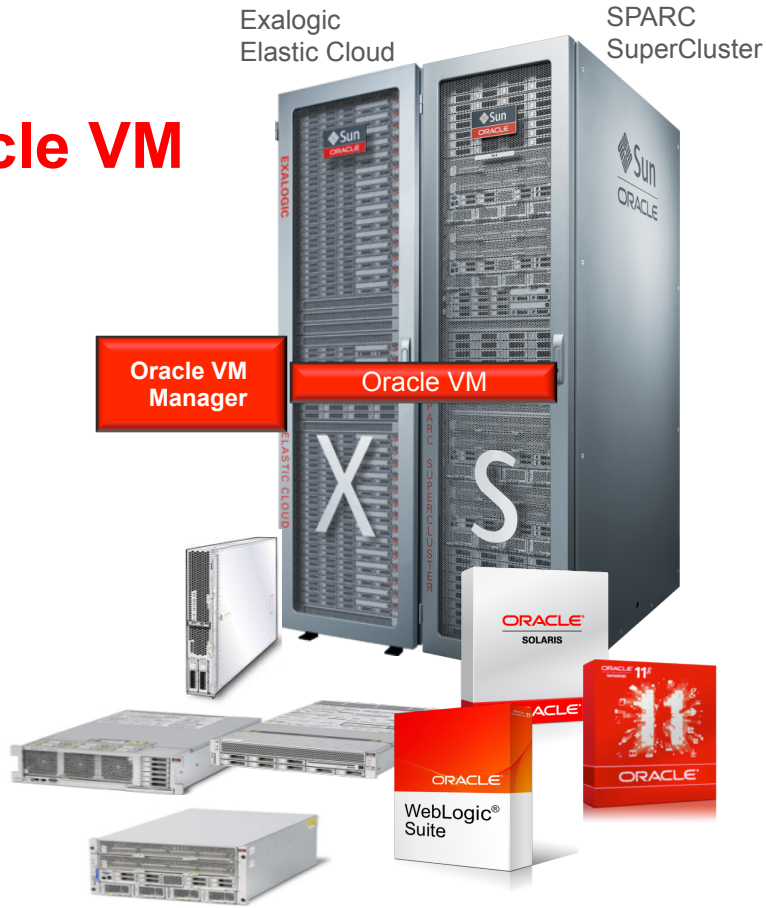
Roadmap:

Engineered Systems with Oracle VM

- Today:
  - SPARC SuperCluster T4-4 System
    - Integrates Oracle VM Server for SPARC to host Oracle Solaris VMs
  - Exalogic Elastic Cloud
    - Physical x86 servers, Infiniband fabric
- Roadmap:
  - Oracle VM integrated into Exalogic Elastic Cloud
  - Oracle VM Manager for SPARC SuperCluster and x86 Exalogic systems
  - Enables Templates & Assemblies for SPARC & x86 servers and engineered systems



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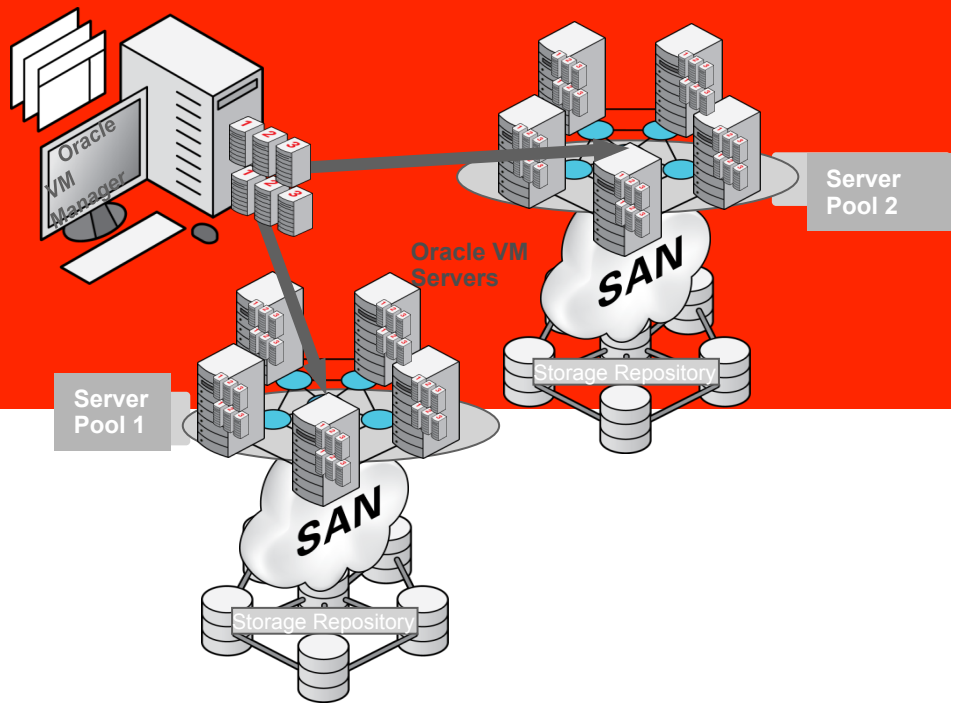
Oracle VM Manager 3.2.1 (new)



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What's New in Oracle VM Manager 3.2.1

- Offers unified server virtualization management for SPARC and x86
- MySQL database support as the management database with automated backup
- Greater automation with Oracle VM Manager CLI and Web Services APIs
- Lots of manageability, usability, scalability and robustness improvements to help users manage their large and growing environments

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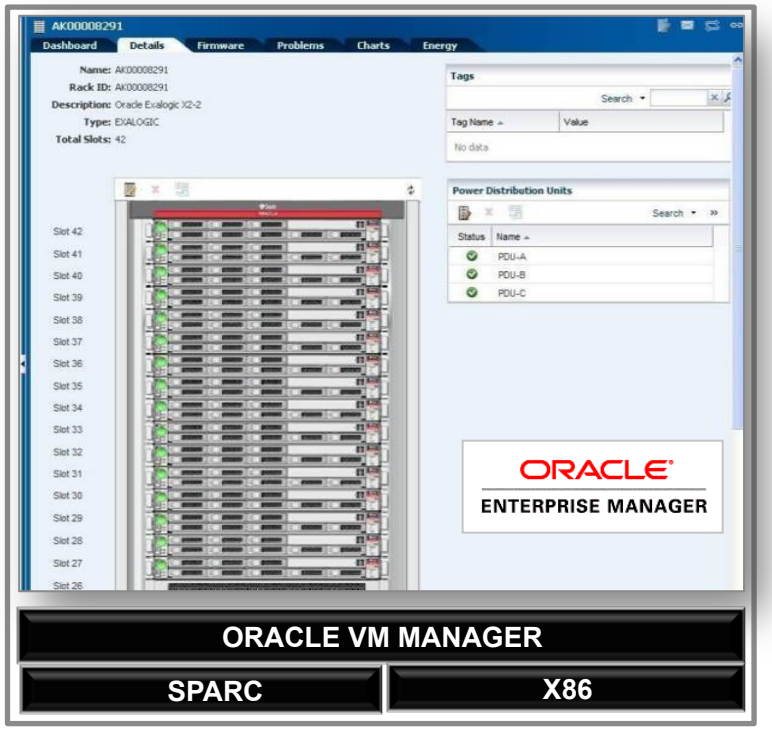
Integration with Oracle VM Manager

- Oracle VM Manager - control plane for the virtualization layer
  - Provides one set of APIs for x86 and SPARC
  - Brings common customer experience across x86 and SPARC
- Oracle VM Manager required by Oracle Enterprise Manager (and Ops Center) for full stack management
- Deploy Templates & Assemblies
  - Oracle VM Manager APIs also utilized by Oracle Virtual Assembly Builder



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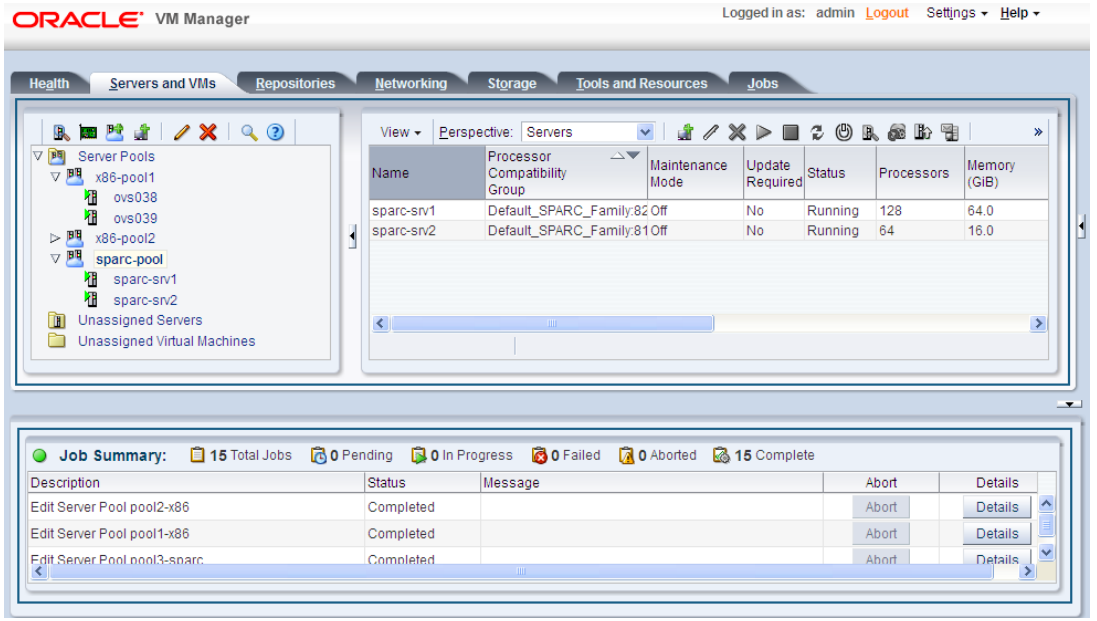
Unified Server Virtualization Management

- Oracle VM Manager manages x86 and SPARC server virtualization
- Brings consistent customer experience
  - Create VM from ISO, Templates or Assemblies
  - Start or stop VMs
  - Perform secure live migration



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MySQL Database Support

- MySQL Database Enterprise Edition bundled as the management repository for Oracle VM Manager as the simple install option
  - Bundled MySQL Enterprise Edition Database includes fully automated database backups and a quick restore tool that can help with easy database restoration.
  - Migration path from XE database to MySQL
- Custom install option available to support an existing Oracle Database (SE / EE)

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Why Oracle VM?

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Oracle is “Challenger” in Magic Quadrant (6/11/12)

Magic Quadrant

Figure 1. Magic Quadrant for x86 Server Virtualization Infrastructure

Source: Gartner (June 2012)

“ Oracle VM is a solid and maturing solution for Oracle-centric architecture, and is becoming a valuable component of an integrated Oracle-managed architecture as more management features are added."

"Gartner is receiving a growing number of inquiries from clients considering and using Oracle VM."

[Get the full report]

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Lower Cost: Oracle VM 3 vs. VMware vSphere5

100 2-Socket Servers, each with 6 VMs and 48GB RAM per Server

	Oracle	VMware vSphere5
Virtualization	Oracle VM (2-socket system, Premier Support, unlimited VMs, unlimited vRAM) License - $0 Support - $599 / server / year	VMware vSphere 5 Enterprise Plus Edition (per socket 96GB vRAM) License - $3495 x 2 sockets = $6990 Support (Production) - $874 x 2 = $1748/year
Management	Oracle VM Manager and Ops Center License - $0 Support - $0	VMware vCenter Server Enterprise License - $4875 per 25 VMs Support - $1219 (1 year Production SnS per 25 VMs)
Total Cost (First Year)	License: $0 Oracle VM (annual): $59,900	VMware Lic (perpetual): $816,000 VMware Support (annual): $203,400
Total Cost (3 Years)	**$179,700**	**$1,426,200 (7.94X Oracle)**

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Lower Cost: Oracle VM 3 vs. VMware vSphere5

250 2-Socket Servers, each with 6 VMs and 96GB RAM per Server

	Oracle	VMware vSphere5
Virtualization	Oracle VM (2-socket system, Premier Support, unlimited VMs, unlimited vRAM) License - $0 Support - $599 / server / year	VMware vSphere 5 Enterprise Plus Edition (per socket 96GB vRAM) License - $3495 x 2 sockets = $6990 Support (Production) - $874 x 2 = $1748/year
Management	Oracle VM Manager and Ops Center License - $0 Support - $0	VMware vCenter Server Enterprise License - $4875 per 25 VMs Support - $1219 (1 year Production SnS per 25 VMs)
Total Cost (First Year)	License: $0 Oracle VM (annual): $149,750	VMware Lic (perpetual): $2,040,000 VMware Support (annual): $510,000
Total Cost (3 Years)	**$449,250**	**$3,570,000 (7.95X Oracle)**

What could you do with the $3,120,750 you save with Oracle VM 3?

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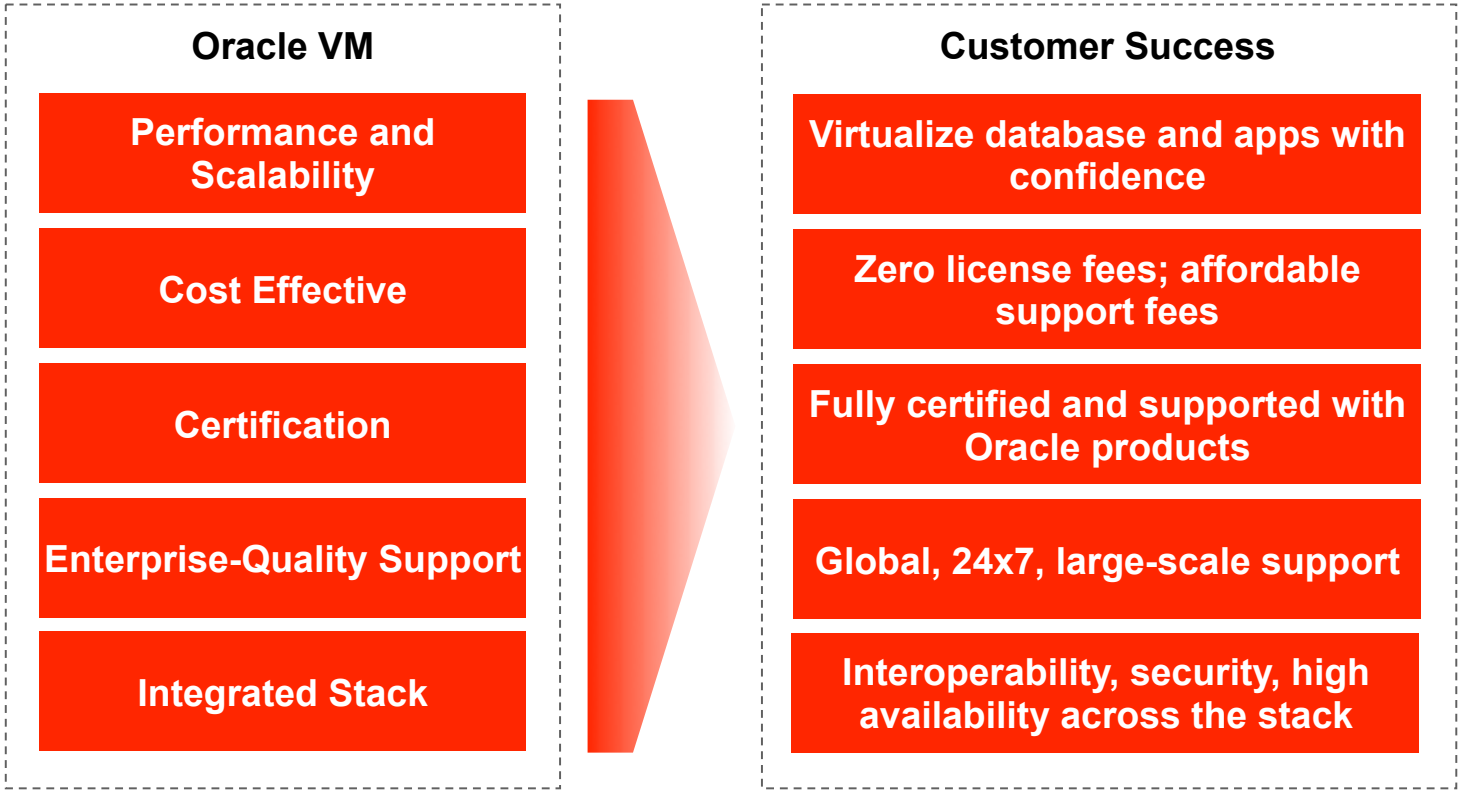
Why Customers Choose Oracle VM



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Customer Success

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Challenge: (1) Rapid sales and infrastructure growth (2) New website features for our customers (3) Keeping costs down to help keep prices low

Results: 100% system uptime ; 6x scalability over VMware
100% capacity for quarterly failover to Overstock DR site
15% reduction in existing virtualization budget ; Lower overall software licensing costs
10% Increase data center capacity for 2012 growth; **75% saving in capex**

Nate Auwerda *Director Website Operations, Overstock.com Corporation*

"If I had to operate without Oracle VM I would be spending up to 87 percent more on just the hardware and the Oracle Database licenses than what I'm spending with OVM. "

Location: Salt Lake City, Utah, USA
Industry: World's #1 online retailer for surplus product sales & liquidation. First $1.1 Billion revenue in 2011
Awards: 2011 Gomez Best of Web Winner;
Ranked #4 in ALL retailers for customer service (NRF/Amex)
Oracle products: Oracle VM, Oracle Linux, Oracle Database, Oracle RAC

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Challenge: (1) Need for flexible infrastructure and automation of all deployment functions (2) Reduce operational expenses & TCO (3) Need vendor certification for HA using RA with 300+ database instances

Results: Oracle RAC provision time decreased to 2-3 hrs from 2-3 days
Power consumption reduced to 40kW from 190kW
Floor space consumption decreased to 4 racks from 35 racks
Database restore time reduced to 30 minutes from 16+ hours
With Oracle VM Database back up time reduced to 10 minutes from 14+hrs

Steve Bartholomew *Distinguished Member of Technical Staff, Verizon*

Our goal was to virtualize everything regardless of size. By decoupling the hardware from the OS and applications we were able to address many of our issues. With Oracle VM, virtual servers can be allocated as soon as the project is approved.

verizon
Verizon Services Operations

Location: New York City, New York, USA
Industry: Verizon is a global leader in delivering broadband, video and other wireless and wireline communications services with operations in 150 countries. $111 billion revenue in 2011
Business Focus: Manages all ERP environments (Financials, SCM, HR) for all Verizon lines of business (Verizon Corporate, Verizon Wireless and Verizon Telecom & Business).
Oracle products: Oracle VM, Oracle Database, Oracle RAC, Oracle PeopleSoft, Oracle Enterprise Manager

ORACLE

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Challenge: (1) Need to improve application deployment time, increase performance and save on IT costs

Results: Deployed fully managed stack of enterprise applications in hours
Reduced number of physical servers by 40 percent, rack space by 25 percent and power consumption by 45 percent.
Reduce virtualization-related costs by 50 percent, while doubling the number of cores in production.

Gian Giacomo Ferraris, *CEO of Versace*

"Our ultimate goal was to improve application deployment time, increase performance and save on IT costs," said Gian Giacomo Ferraris, CEO of Versace. "The support that we have received from Oracle has helped us dramatically reduce licensing and management costs, while ensuring our architecture can scale to meet the changing dynamics of our growing business."

VERSACE

Location: Milan, Italy
Industry: Consumer Goods. High end fashion apparel and home furnishings
Revenue: €340 in 2011; 422 employees; Operates 82 boutiques globally
Business Focus with Oracle VM: Manages all IT environment and operations from headquarters.
Oracle products: Oracle VM, Oracle Database, Oracle RAC, Oracle E-Business Suite, Oracle Enterprise Manager, Oracle Hyperion solutions, Oracle Business Intelligence and BI Publisher

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Challenge: Very high IT spend on Software & Hardware; 35-40% CPU utilization on existing hardware

Results: 11-month pay back;
5% utilization per VM even at peak usage; Simplified IT management and application deployment of Oracle VM, Oracle Database, Oracle Linux, Oracle E-Business Suite

Jim Thomas *Director of IT Operations, Pella Corporation*

"The move to Oracle VM significantly improved performance of our Oracle E-Business Suite environment while reducing our IT support costs by tens of thousands of dollars"

Location: Pella, Iowa
Industry: 85 years in Industrial manufacturing of Windows & Doors
Operation: 8,600 employees; 12 manufacturing locations; 200 showrooms
Oracle products: Oracle VM, Oracle WebLogic Server, Oracle Linux, Oracle Database, Oracle Financials, Oracle Manufacturing, Oracle Procurement, Oracle Sales, Oracle Marketing

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Challenge: Need Fast & Reliable data access for large spatial analysis; Need same performance in Virtual Servers as in Physical Servers

Results: 700 VMs; Quicker and more reliable data access; Higher availability and quicker recovery from downtime. Improved utilization. All with existing SPARC and x86 servers

Tim Frazier *Associate project manager of NIF at LLNL in Livermore, California*

Virtualization has reduced risk. It has also normalized a heterogeneous computing infrastructure and given us a better disaster recovery story. This translates directly to greater availability of our infrastructure."

Lawrence Livermore National Laboratory

Location: Livermore, California
Industry: Government research
Employees: 6,800
Oracle products: Oracle VM, Oracle WebLogic Server, Oracle Linux, Oracle Database

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Challenge: 24/7 access to data for universities & scientists in 130+ computer centers in 34 countries; maintain high performance in multi-application server application instances running on the same server

Results: Using Oracle VM to reach 5% performance improvement goal; Rapid deployment of production databases and application servers using Oracle VM fast search and memory ballooning

Carlos Garcia Fernandez *Computer Scientist, CERN*

"We chose Oracle WebLogic Server 11g and Oracle VM because they enable us to make better use of our physical and virtual resources, covering all the needs of our applications with better efficiency, less risk and an improved quality of service. Oracle WebLogic Server easily integrates with the other Oracle products we have at CERN and provides a consistent and stable platform for deploying numerous applications in a large scale environment."

Location: Switzerland
Operation: Operates the Large Hadron Collider (LHC)
Employees: 3,145 employees, 10,000 visiting scientists
Oracle products: Oracle VM, Oracle WebLogic Suite, Oracle Weblogic Server 11g Oracle Linux, Oracle Database

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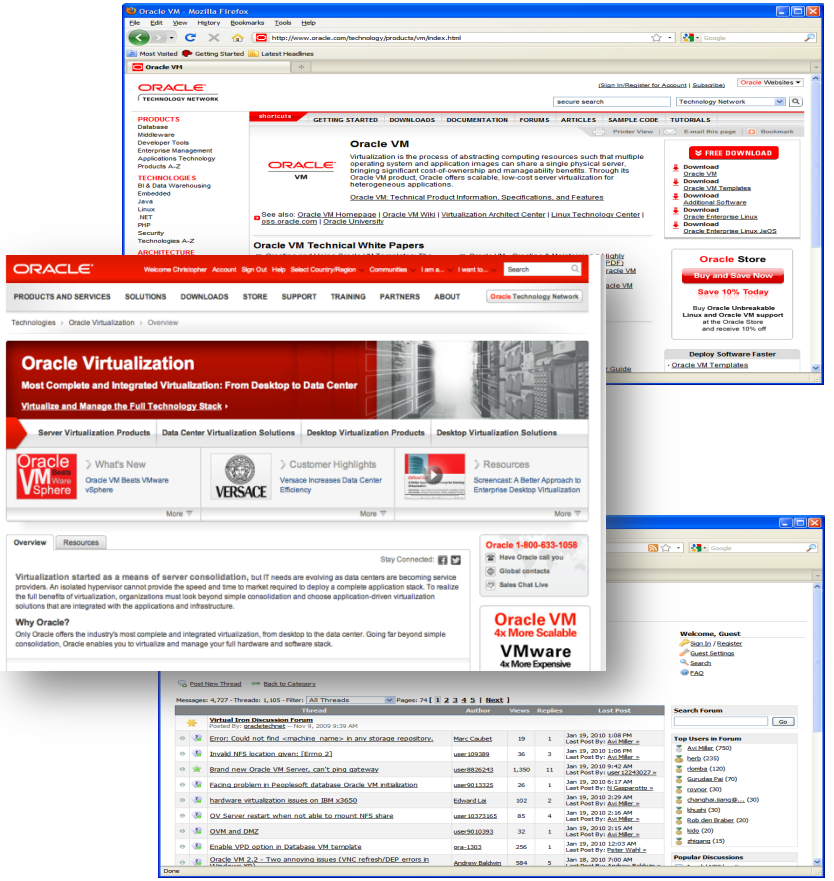

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VIRTUALIZATION

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Oracle Delivers More Value Than VMware

Reason	Details
Application Driven	• Complete apps to disk stack with virtualization fully integrated into each layer of the stack. Oracle virtualization has full awareness of what's running inside the VM and can provision and manage apps, middleware and database • VMware offers hypervisor only, without integration with apps
Lower cost	• Unlike VMware, Oracle VM is free to use, download and distribute • Affordable support fees; simple licensing • Oracle VM support included with Oracle's Sun x86 systems support at no additional fees
Integrated Management	• Single tool manages hypervisor, operating system, database and apps • Single point of support from Apps to Disk • VMware management can only manage the hypervisor
Faster App Deployment	• Oracle VM Templates and Oracle Virtual Assembly Builder enable deployment of enterprise software in minutes as opposed to days, and help create multi-tier software assemblies quickly – eg. PSFT, Siebel, EBS, more • VMware offers third party software appliances for testing and dev purposes
Better High Availability (HA)	• Unlike VMware, Oracle offers HA for the entire stack, not just the hypervisor • Oracle VM customers can use Oracle Clusterware for additional HA • Clustering and virtualization complementary; RAC works with Oracle VM

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Oracle Delivers More Value Than VMware

Reason	Details
Architected for Efficiency	• Oracle VM architected for low performance overhead when moving DB and Apps from physical to virtual servers • Same engineering team for Xen and Linux; better integration • Aggressive testing with real DB and Apps workloads • VMware's architecture is prone to high performance overhead
Virtualization Built into the System	• Besides Oracle VM, Oracle also offers Solaris Containers, virtualization built into Oracle Solaris,. And Dynamic Domains built into the M-series hardware
Comprehensive Platform Support	• While VMware only supports x86 architecture, Oracle VM supports both x86 and SPARC architectures.
Integrated Support	• One call to Oracle for the complete stack; no finger pointing • Faster time to resolution • Better performance for virtual database and apps

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