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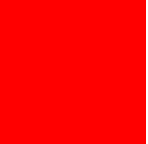
Virtualization Management Strategy

Wim Coekaerts
Senior Vice President Virtualization and Linux engineering

Overview

- Oracle VM product family

- Oracle VM for SPARC roadmap

- Oracle VM Management

- Full stack Management

- Compelling Benefits

Industry's Most Complete Virtualization Portfolio

STORAGE VIRTUALIZATION

- Exadata
- ASM
- Storage Connect
- Open Storage

SERVER VIRTUALIZATION

- Oracle VM Server for x86
- Oracle VM Server for SPARC
- Solaris Containers
- Dynamic Domains

DESKTOP VIRTUALIZATION

- Sun Ray thin client
- Oracle Virtual Desktop Infrastructure
- Oracle Secure Global Desktop
- Oracle VM VirtualBox

Overview of Oracle VM product family

- Oracle VM Virtualbox
- Oracle VM server for x86
- Oracle VM server for SPARC (formerly called LDOM)
- Oracle VM Manager

Oracle VM VirtualBox
Workstation

- Support for x86/x64 hardware
- Support for Solaris, Linux, Windows, Mac OS hosts and guests

Roadmap:

- Oracle VM x86 / x64 Server and VirtualBox workstation VM interoperability
- Oracle VM VirtualBox workstations to support running Oracle VM Templates

Oracle VM Templates

User developed VMs

Deploy

VM Servers

- Develop
- Evaluate
- Test
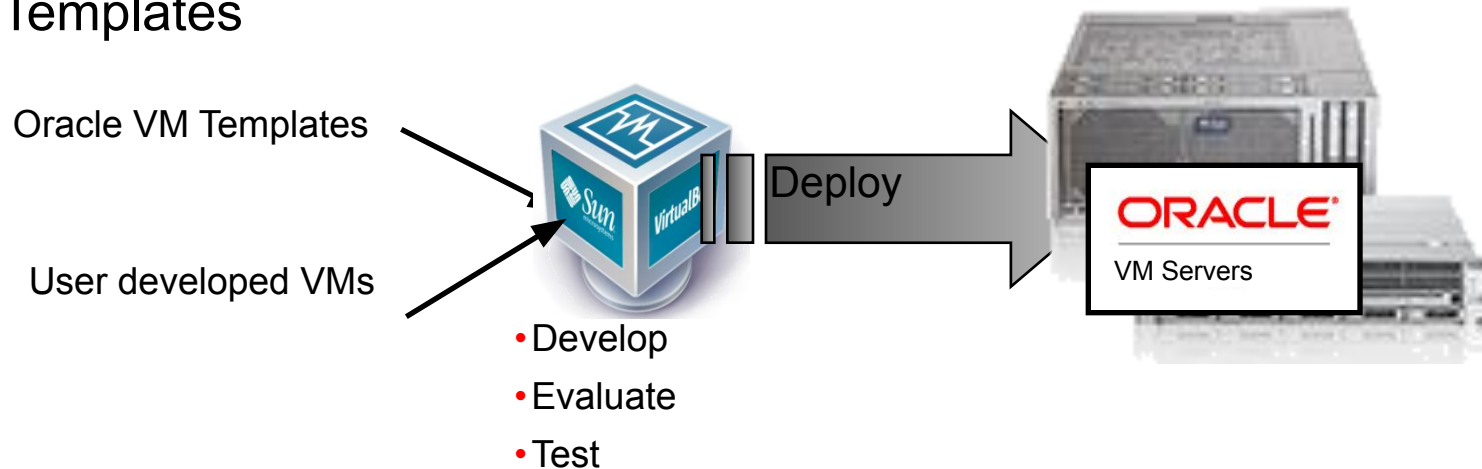
Oracle VM Server Virtualization

- High performance 86 and SPARC (CMT) virtualization

- Virtualization solution for both Oracle and non-Oracle applications

- The only server virtualization software supported and certified for all Oracle software across both platforms

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VM

Oracle VM Server Virtualization
Platform Choice & Flexibility

Solaris

Oracle VM Server for SPARC

SPARC (CMT) Hardware

Solaris	Linux	Windows

Oracle VM Server for x86

x86 Hardware

- Evolution of Solaris Logical Domains; Integration with Oracle VM family
- Highly efficient hypervisor for Sun Chip Multithreading (CMT) servers
- Multiple, independent Solaris OS instances

- High performance hypervisor for x86/x64 architecture
- Supported guests: Linux, Windows, Solaris

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Solaris Server Virtualization
Complete Portfolio Meets Broad Enterprise Demands

Oracle Solaris Containers

- Available for all Solaris – x86/x64, SPARC CMT, M-Series
- Native, bare metal performance
- High SMP scalability
- Consolidate older Solaris versions

Dynamic Domains

- Available for M-Series
- Highest isolation – dedicated hardware
- Bare metal level performance & high SMP scalability
- No software single point of failure
- Run multiple OS versions on the same system

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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

SPARC Hypervisor

Each logical domain runs in dedicated CPU thread(s)

T-Series Server

Optimized for SPARC / Oracle Solaris

Oracle VM Server for SPARC
For T-Series Servers

- Create up to 128 independent logical domains isolated via hardware/firmware

- Optimize with Oracle Solaris ZFS, DTrace, Predictive Self Healing and Solaris Containers

- Dynamically re-configure computing resources to meet business demands

- Utilize redundant virtual networks and disks to create more highly available domains

- Perform domain migration from system to system quickly with very little latency

Oracle VM Server for SPARC 2.0 (Sep 2010)
Advanced Virtualization For SPARC T3 Servers

- T2, T2+, T3 processor support

- Renamed LDOM to Oracle VM server for SPARC

- PCIe Direct I/O
  - **Native throughput for guest domains**

- Dynamic memory reconfiguration
  - **Grow and shrink domains as required**

- Throttle CPUs and memory based on utilization
  - **Reduce power consumption**

Set system power limit
  - **Automatically reduce power state for system resources if the limit is reached**

Oracle VM for SPARC roadmap

- Focus on enhancing the hypervisor features

    - Use the latest SPARC T-series features

    - Live migration of domain

    - SRIOV

- Integration of Oracle VM for SPARC into Oracle VM Management

    - Integrate Oracle VM for x86 agents into Solaris control domain

    - Provide same generic virtualization features

    - Integrate Oracle VM Storage Connect

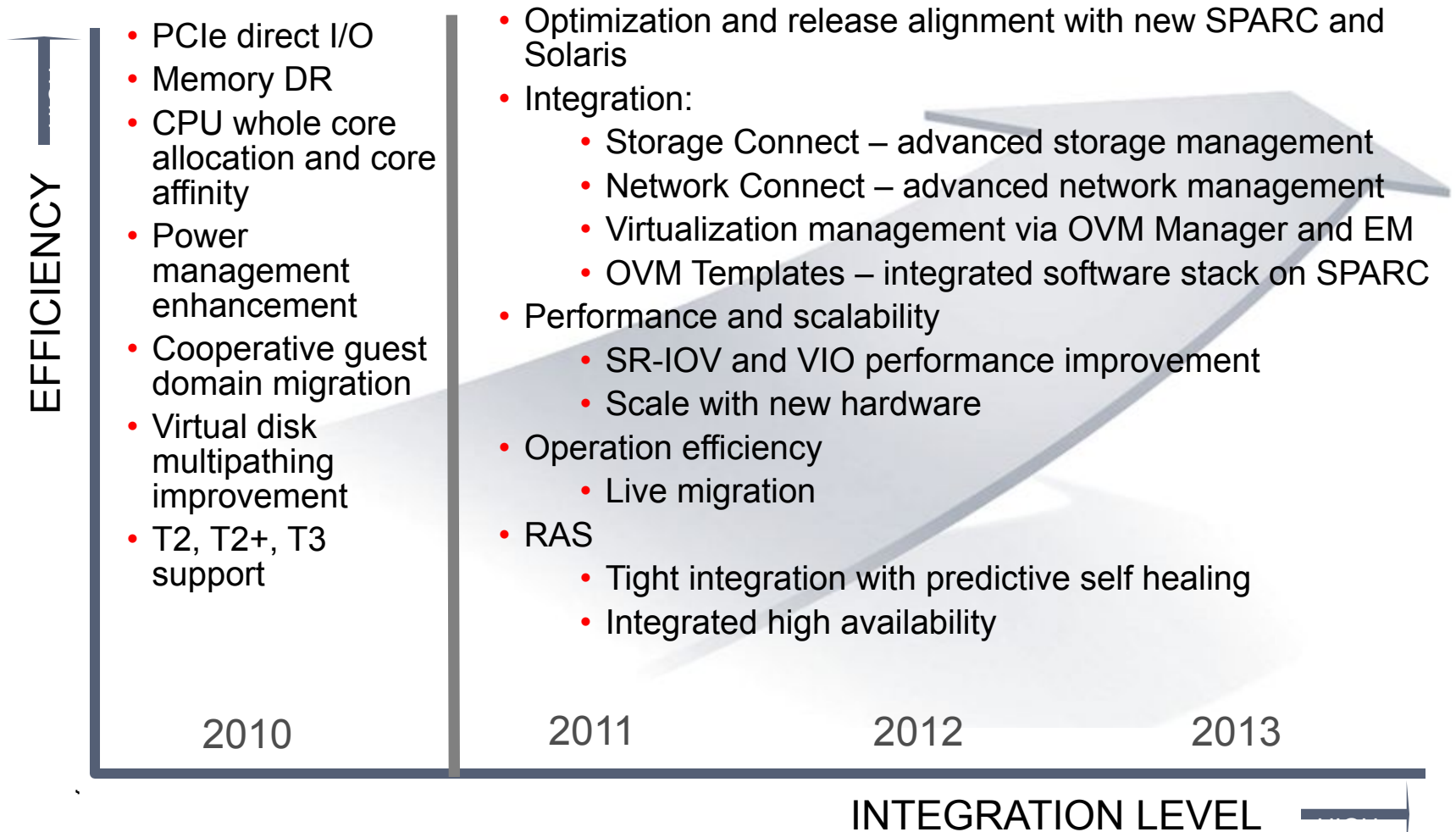# Oracle VM for SPARC roadmap

- Feature direction
    - Dynamic resource management enhancements
    - Affinity binding enhancements
    - P2V enhancements
    - Support for new features in future processors
    - Cross CPU migration
    - New virtual disk driver stack
    - Dynamic / rebootable Io domains

Oracle VM Server for SPARC
Integration into Oracle VM Family

EFFICIENCY

- PCIe direct I/O
- Memory DR
- CPU whole core allocation and core affinity
- Power management enhancement
- Cooperative guest domain migration
- Virtual disk multipathing improvement
- T2, T2+, T3 support

- Optimization and release alignment with new SPARC and Solaris
- Integration:
  - Storage Connect – advanced storage management
  - Network Connect – advanced network management
  - Virtualization management via OVM Manager and EM
  - OVM Templates – integrated software stack on SPARC
- Performance and scalability
  - SR-IOV and VIO performance improvement
  - Scale with new hardware
- Operation efficiency
  - Live migration
- RAS
  - Tight integration with predictive self healing
  - Integrated high availability

2010   2011   2012   2013

INTEGRATION LEVEL

Oracle VM Management

- Integration of Virtual Iron technology

- Dynamic resource management (DRM)

- Dynamic server power management (DPM)

- Rich set of APIs to control the system

- Dynamic web based management console (based on fusion middleware/adf11)

- Centralized storage management (Storage Connect)

Policy-Based Resource Automation

- Distributed resource scheduling (DRS) for capacity management
  - **Real-time monitoring of server utilization**
  - **Policy-based automation to rebalance Server Pool**
    - **Migrate load away from heavily loaded servers**
    - **Automatically powering up capacity as needed**
- Distributed Power Management (DPM) to optimize server pool for minimal power consumption
- Benefits:
  - **Lower operating costs per server**
  - **Increase admin:server ratios dramatically**
  - **Improve SLAs via "instant" problem detection and remediation**
  - **Higher resource utilization**

Resources

VM Server

Resources

VM Server

Dynamic Resource Management

Server Pool
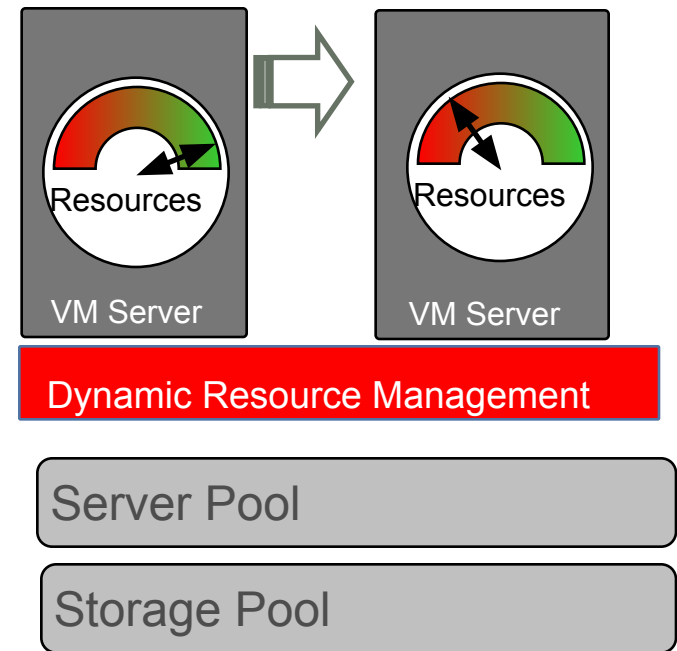
Storage Pool

Oracle VM Storage Connect Framework
Integrated Server and Storage Management

- Integrated virtualization and storage management for Sun and 3rd party storage via a common interface

- Storage provisioning and discovery API for Oracle VM 3.0

- Leverage all the resources and functionality of existing storage systems in the Oracle VM environment.

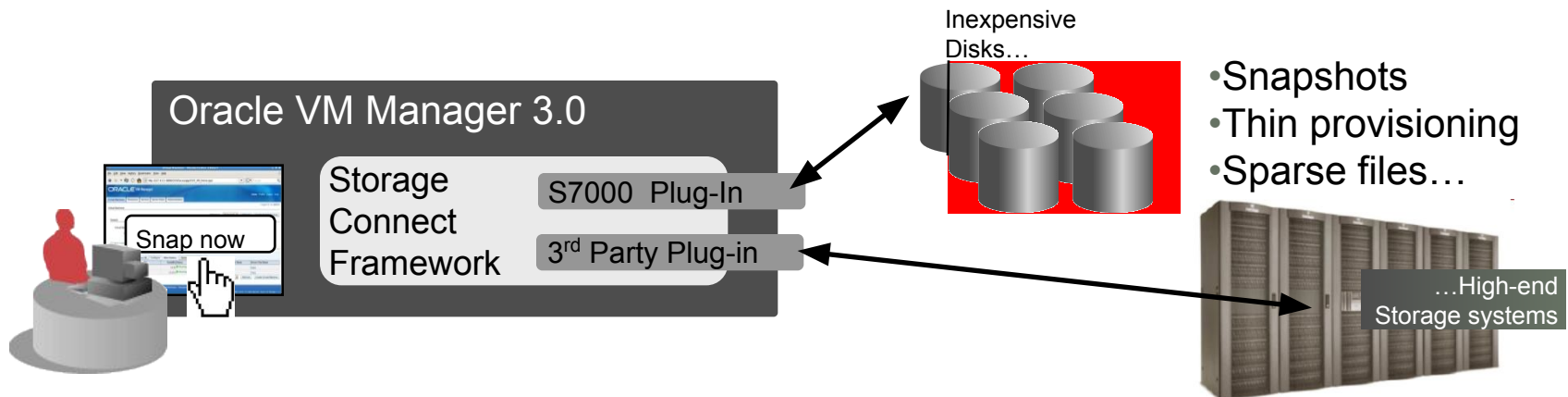- Reduce cost and complexity in virtual and cloud environments.

Oracle VM

Data

Oracle VM Manager

Storage Connect

Control

NAS / SAN
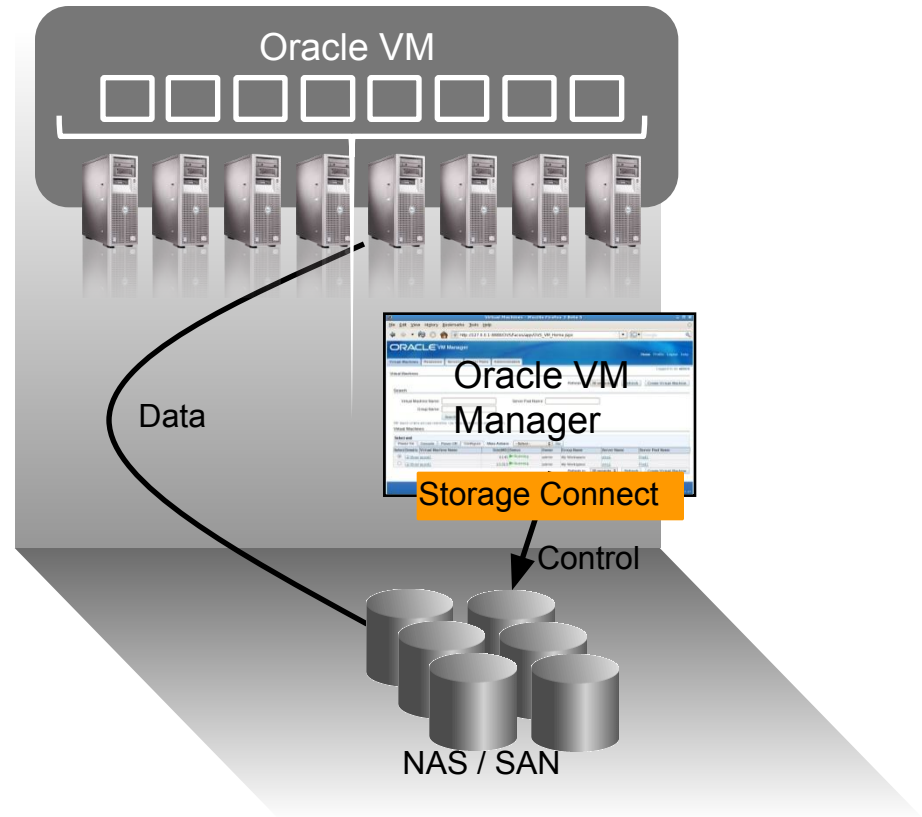
More choice for users, an open ecosystem for partners

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Storage Management: Enabling Better Choices
Oracle VM Storage Connect Architecture

- Manage all types of storage from Manager (NFS, OCFS2, iSCSI, FC/SAN, S7000)

- Use advanced storage features of S7000 or directly leverage 3rd party storage system capabilities

- Allows use of advanced "intelligent" devices or more basic, lower-cost devices

- Storage management updates independent of Oracle VM release schedule

Inexpensive Disks...

Oracle VM Manager 3.0

Snap now

Storage Connect Framework

S7000 Plug-In

3rd Party Plug-in

- Snapshots
- Thin provisioning
- Sparse files...

...High-end Storage systems

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Oracle VM Manager
Advanced Functionality Included

Live Migration

HA / Auto-restart

VM | VM | VM | VM

Cluster

Browser

Clustered Manager

Oracle VM Servers

NFS, SAN, iSCSI

XE, SE, EE, or RAC Database

VM | X | VM | VM

Cluster

Oracle VM Servers

NFS, SAN, iSCSI

Planned Events:
- E.g. maintenance or upgrades
- Secure Live Migration
- Zero interruption

Pool Masters assure Secure Migration or HA restarts complete in the event of a Manager outage

Unplanned Events
- E.g. Server or VM failure
- HA Auto-restart in pool
- No manual intervention

Oracle VM Templates
Rapid Application Deployment

ORACLE E-Delivery

Download from Oracle

- Pre-built, pre-configured VM

- Complete app, middleware, DB installation
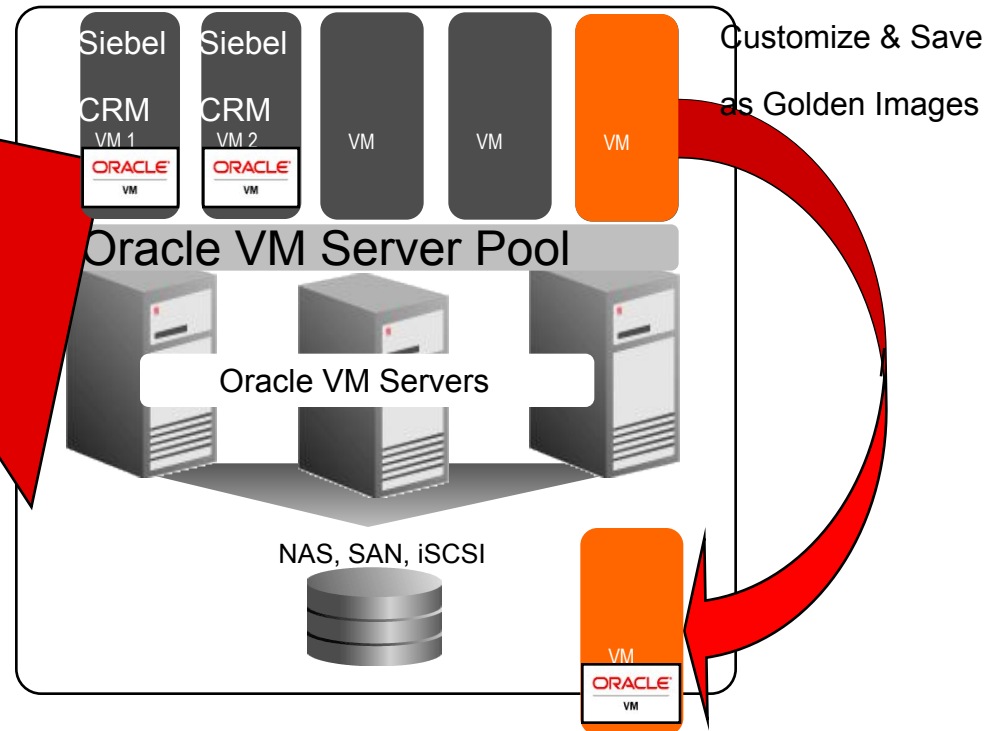
- Complete Siebel CRM, ~~11g, Enterprise Ma~~

Enterprise Manager

Siebel CRM File **ORACLE** VM

Import via Oracle VM Manager

Start-Up in Oracle VM Pool

Save days or weeks in installation and configuration time

Siebel CRM VM 1 **ORACLE** VM

Siebel CRM VM 2 **ORACLE** VM

VM

VM

VM

Customize & Save as Golden Images

Oracle VM Server Pool

Oracle VM Servers

NAS, SAN, iSCSI
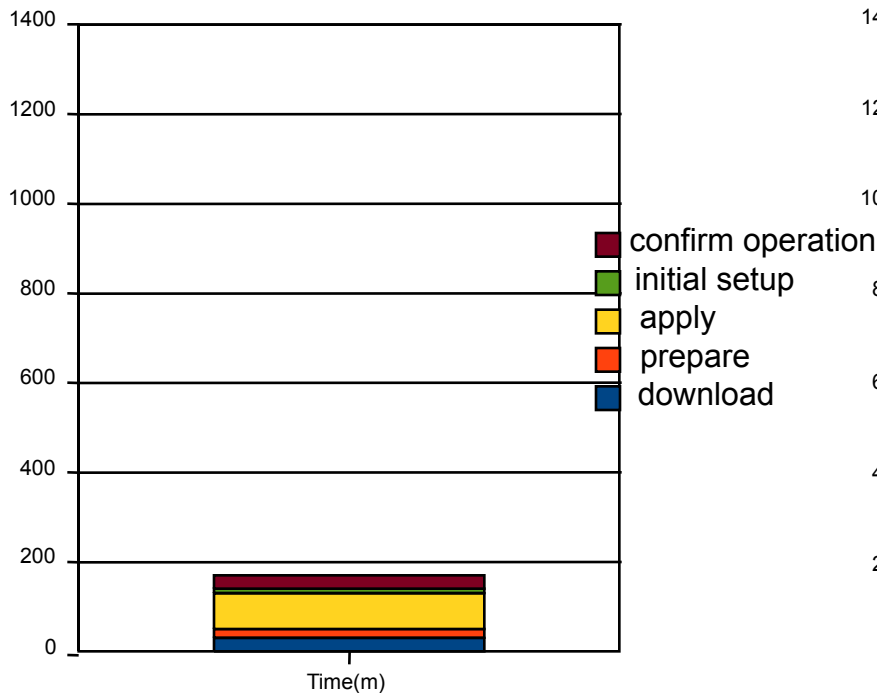
VM **ORACLE** VM

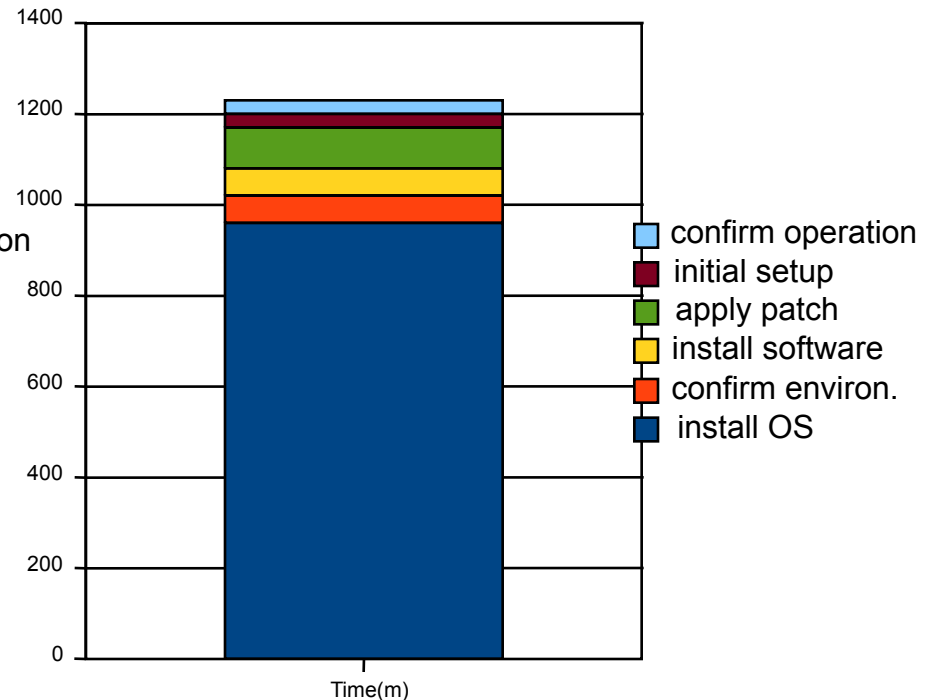**ORACLE**

Oracle VM Templates Save Time

Templates enable the set up of applications within Oracle VM partitions by using scripts that pre-set many of the necessary settings to run within a virtualized environment.

- Implementation time for using Oracle VM Templates
  - ✔ **Required only 1/6 of the usual time required for set up a major reduction in man hours.**

Using Oracle Enterprise Manager Templates

Legend:
- confirm operation
- initial setup
- apply
- prepare
- download

Time(m)

Using normal physical environment

Legend:
- confirm operation
- initial setup
- apply patch
- install software
- confirm environ.
- install OS

Time(m)

Forward looking information is subject to change without notice at Oracle's sole decretion.

Oracle Virtual Assembly Builder
Package Multi-Tier Applications

Oracle SOA Suite

Oracle BPM Suite

Oracle WebCenter

Oracle Identity Mgt

Oracle WebLogic Suite-based Application Grid

Oracle Database

Introspection & Assembly

Assembly Builder

Oracle VM Template Builder

OVF Packaging

Deployment

Enterprise Manager

Oracle VM Manager

Application A
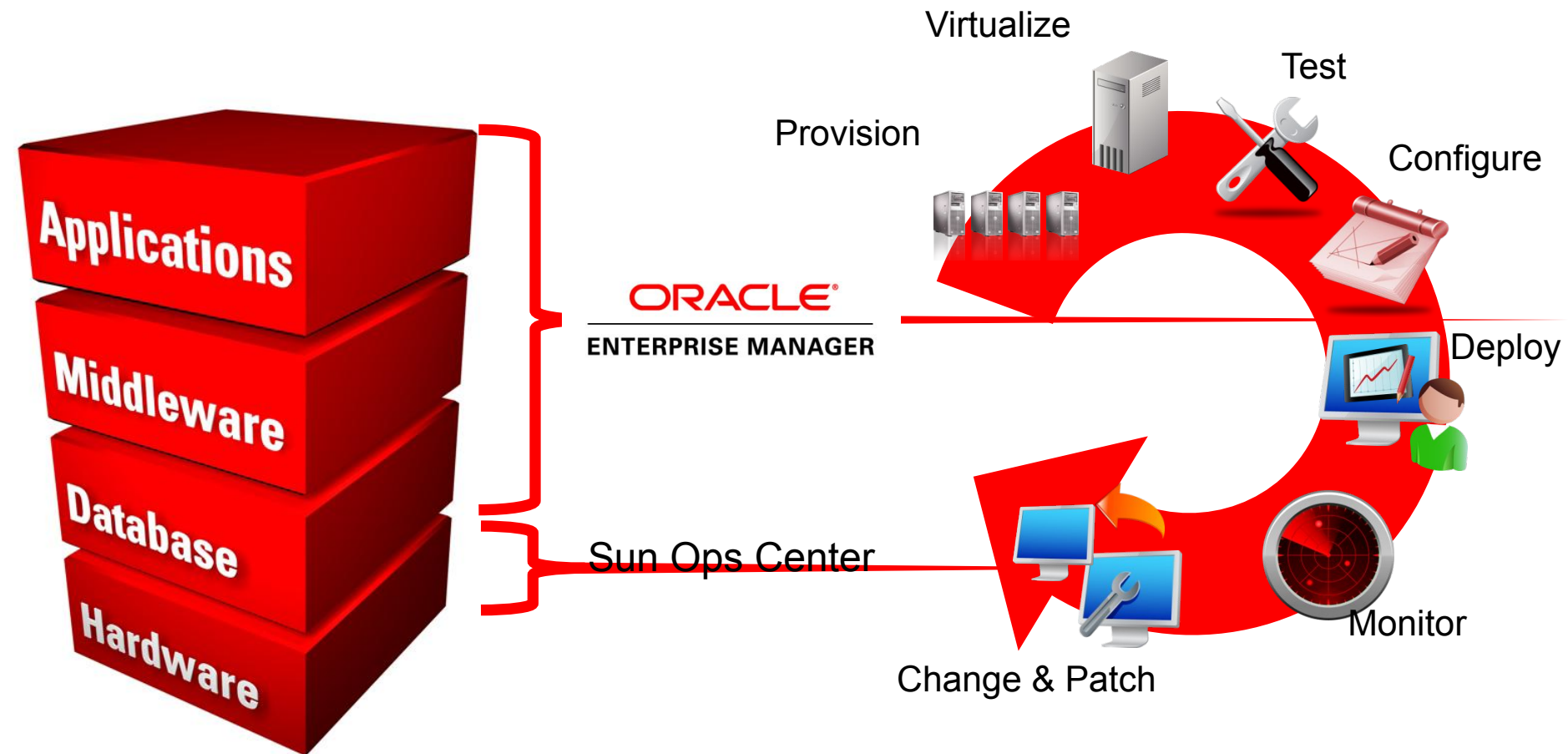
Application B

Virtualized Software Appliances

Assembly A

Assembly B

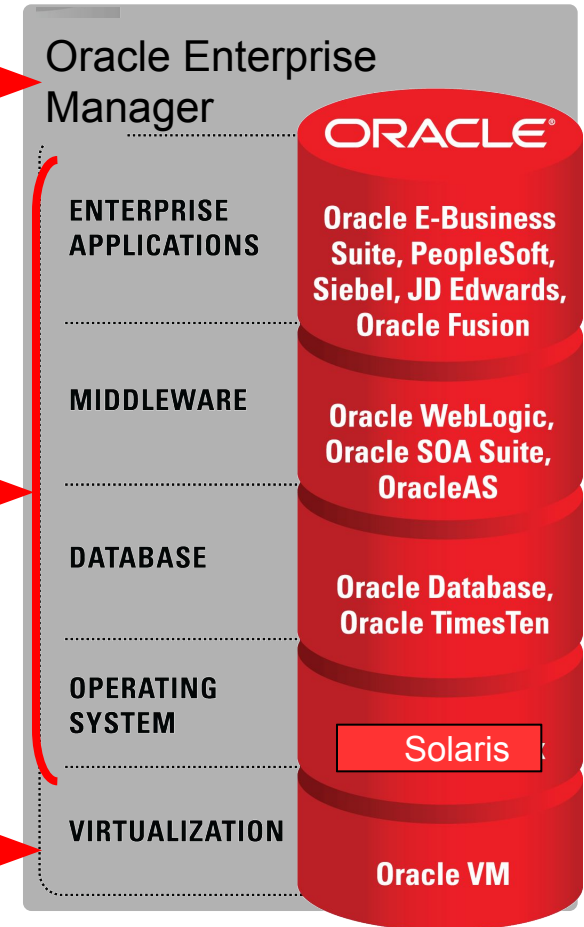Oracle VM Server

ORACLE

Comprehensive Full-Stack Management
Applications to Disk

Applications

Middleware

Database

Hardware

ORACLE®
ENTERPRISE MANAGER

Sun Ops Center

Provision
Virtualize
Test
Configure
Deploy
Monitor
Change & Patch

ORACLE®

A Superior High Availability Environment
Earlier Warning, Better Context, Minimized Impact

- Earlier Warning: Enterprise Manager
  - **Monitors & detects application <u>issues</u> to address *before* they become <u>problems</u>**
  - **Avoid HA events, minimized impact**
- Better Context: Guest Clustering
  - **Application-aware response**
  - **Middleware clustering**
  - **Real Application Clusters**
  - **Oracle HA Clusterware**
- Virtualization Layer-HA
  - **Only HA available from virtualization products: not application aware**
  - **Simple, reliable, automated restart after complete VM failure**

Oracle Enterprise Manager

ENTERPRISE APPLICATIONS

MIDDLEWARE

DATABASE

OPERATING SYSTEM

VIRTUALIZATION

ORACLE®

Oracle E-Business Suite, PeopleSoft, Siebel, JD Edwards, Oracle Fusion

Oracle WebLogic, Oracle SOA Suite, OracleAS

Oracle Database, Oracle TimesTen

Solaris

Oracle VM

Oracle: Application Aware Virtualization
Full Stack Data Center Virtualization

| Applications |
| Middleware |
| Database |
| Operating System |
| Virtual Machine |
| Servers |
| Storage |

- Most comprehensive
- Fully tested with applications
- Designed for full stack deployments
- Integrated, full stack management
- Integrated support

Taking you beyond consolidation…

Oracle provides the most COMPLETE solution

More Information

- http://www.oracle.com/virtualization

- Follow us on Twitter
  www.twitter.com/orcl_virtualize

- Oracle Virtualization Blog
  http://blogs.oracle.com/virtualization