Infrastructure as a Service (IaaS)
Cloud Computing for Enterprises

Speaker
Title
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.
Agenda

• Why Private Clouds?
• Cloud Computing Service Models
• Oracle’s Infrastructure as a Service (IaaS) Capabilities
  • Key Infrastructure Building Blocks
  • Resource Pooling and Management
• Oracle VM Blade Cluster Reference Configuration
• Case Studies
• Next Steps
REALITY CHECK

• No single vendor is responsible for optimizing end-to-end infrastructure

• Unmanageable proliferation of data centers to support growing business needs

• Existing infrastructure creates obstacles to delivering new applications
Datacenters Are Evolving

Silo | Consolidated | Optimized | Cloud

Transforming the Technology Stack

Compute, Storage, Network Building Blocks | Optimized Systems and Solutions | Engineered Systems

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Datacenter Trends

Physical → Virtual
Dedicated → Shared
Heterogeneous → Standardized
Manual management → Automated management
IT managed → Self-service
Components assembled by customer → Engineered systems assembled at factory
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Evolution of Private and Public Clouds

**Public Cloud Evolution**

- **Silo’d**
  - Physical
  - Dedicated
  - Static
  - Heterogeneous

- **Grid**
  - Virtual
  - Shared services
  - Dynamic
  - Standardized appliances

- **Private Cloud**
  - Self-service
  - Policy-based resource mgmt
  - Chargeback
  - Capacity planning

- **Hybrid**
  - Federation with public clouds
  - Interoperability
  - Cloud bursting

**Private Cloud Evolution**

- Consolidate
- Standardize

**Public Clouds**

- ISP
- MSP
- CSP/Telcos
- ASP
- ISV

**Virtual Private Cloud**
Public Clouds and Private Clouds

Public Clouds
- Used by multiple tenants on a shared basis
- Hosted and managed by cloud service provider

Private Cloud
- Exclusively used by a single organization
- Controlled and managed by in-house IT

Trade-offs
- Lower upfront costs ↔ Lower total costs
- Outsourced management ↔ Greater control over security, compliance, QoS
- OpEx ↔ CapEx & OpEx

Enterprises will adopt a mix of public and private clouds
Cloud Computing Service Models

SaaS

- Application
- Application
- Application

PaaS

- Security Identity
- Integration Workflow
- Application Grid
- UI Services
- Database Grid

IaaS

- Virtual Machine
- Virtual Storage
- Virtual Network

Admin Services
- Packaging
- Configuration
- Deployment
- Scaling
- Lifecycle Management
- Utilization
- User Mgmt
- IDE Integration
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Oracle Private IaaS Cloud Capabilities

Platform as a Service

Shared Services
Integration: SOA Suite
Process Mgmt: BPM Suite
Security: Identity Mgmt
User Interaction: WebCenter

Application Grid: WebLogic Server, Coherence, Tuxedo, JRockit

Database Grid: Oracle Database, RAC, ASM, Partitioning, IMDB Cache, Active Data Guard, Database Security

Infrastructure as a Service
Oracle Solaris
Oracle Solaris Containers
Oracle VM for SPARC
Oracle Linux
Oracle VM for x86
Servers
Oracle VM for x86
Storage

Cloud Management
Oracle Enterprise Manager
Configuration Mgmt
Lifecycle Management
Application Performance Management
Application Quality Management
Oracle Enterprise Manager
Ops Center
Physical & Virtual Systems Management
Key IaaS Building Blocks
Sun Blade Modular Systems for Private Clouds

- Choice of optimized operating and virtualization platforms
- Industry leading SPARC and Intel (Westmere) x86 blade servers
- Increased storage capability and flexibility using SAS2
- 10GbE and InfiniBand Networking options with easy integration
- Unified Oracle ILOM Remote Management
Key IaaS Building Blocks
Sun x86 Rack-Mount Servers for Private Clouds

- Comprehensive portfolio refreshed with Intel Xeon Processor 5600 & 7500 Series
- Array of flash options to accelerate application performance and lower operating cost
- Choice of leading operating systems and virtualization platforms
Key IaaS Building Blocks
SPARC Enterprise Servers for Private Clouds

- Deploy 1000s of VMs in seconds w/Solaris Containers
- Embedded VM security (T-Series)
- Extreme capacity and scale, one OS
- Unmatched RAS features
- Accelerated performance

New!

Deploy 1000s of VMs in seconds w/Solaris Containers
Key IaaS Building Blocks
Oracle’s Network Fabric for Private Clouds

Datacenter LAN

Cloud, Middleware, Database, Virtualization

10GbE Fabric

Servers
Storage

InfiniBand Fabric

Gateway
Servers
Storage

Engineered System

Fabric technology selected and engineered for application and datacenter LAN requirements
Key IaaS Building Blocks
Oracle Storage for Private Clouds

- Aligns the value of your data assets with the most appropriate storage media
- Reduce cost and effectively manage data throughout its lifecycle
Key IaaS Building Blocks
Solaris & Linux Offer Choice for Private Clouds

Reduce Complexity
- Oracle Solaris offers the best built-in virtualization for improving server utilization
- More efficient storage management with Oracle Solaris’ file system, ZFS
- Best Linux performance and single support call for Oracle software running on Linux
- Single support offering for Linux, Solaris and Virtualization with x86 hardware

Increase Innovation
- Superior scale, security and availability of Oracle Solaris enable it to run any application
- Best options for Infrastructure-as-a-Service (IaaS) or Platform-as-a-Service (PaaS)
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Server Virtualization and Clustering
Deliver Resource Pooling and Elastic Scalability

Server virtualization and clustering are key technologies for cloud
Oracle VM for x86 Systems
Server Virtualization and Management

• Oracle VM Manager & Enterprise Manager
  • Manage hundreds- or thousands of servers
  • Central Java management server
  • Web browser-based management console
  • Advanced virtualization management including Live Migration, HA / auto-restart, load balancing…

• Oracle VM Server for X86
  • Installs on “bare-metal” servers in about a minute
  • Pre-installed options on select Sun X86 systems
  • Guest operating systems:
    • Oracle Linux
    • Microsoft Windows
    • Oracle Solaris
Server Virtualization for SPARC Systems
Complete portfolio to meet diverse datacenter requirements

Oracle VM Server for SPARC and Oracle Solaris Containers

Oracle VM A

Oracle VM B

Oracle VM C

Container A
Container B
Container C

T-Series

Dynamic Domains and Oracle Solaris Containers

Domain A

Container A
Container B
Container C

Domain B

M-Series
Oracle Enterprise Manager 11g Ops Center
First Converged Hardware Management Solution for Sun

Integrated Infrastructure Management
+ Integrated Application-to-Disk Management
+ Integrated Lifecycle Management
+ Integrated Systems Management & Support
Oracle Enterprise Manager Ops Center 11g

Manage Your Infrastructure in One Place

Enterprise Servers

Operating Systems

Virtualization

InfiniBand & Ethernet Fabrics

Storage Systems

Engineered Systems

Exadata

Exalogic

Sun SPARC Enterprise Servers

Sun Network

SUN ZFS Storage Appliance

SUN X86 Servers

Solaris Clusters

Oracle Solaris

Red Hat Linux

SuSE Linux

VM for SPARC Containers

Oracle Solaris Containers

Oracle Exadata

Oracle Exalogic
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Oracle VM Blade Cluster Reference Configuration
Build Customized Enterprise Private Cloud IaaS

Oracle Management

Oracle and 3rd Party Applications
- Oracle Solaris / Linux OS
- Oracle VM Server + Templates
- Sun Blade Modular System
- Oracle Private Cloud Fabric Architecture
- Sun Unified Storage
- Sun Flash Storage
Oracle VM Blade Cluster Reference Configuration
Speed Deployments and Reduce Errors

• **Save Time**: Deployed together
  – Sun x86 Servers pre-installed with Oracle VM reduce virtualization server deployment times from weeks to hours

• **Reduce Errors**: Configured together
  – Ready to run Server+Oracle VM with guest OS
  – Oracle Linux + Oracle Solaris configured together at install

• **Lower TCO**: Managed together
  – Simplified management with Oracle VM Manager in the Oracle Linux Guest Image

• **Vendor Accountability**: Supported together
Easily Deploy Apps on IaaS Cloud
Oracle VM Templates

Download from Oracle
- Pre-built, pre-configured VM
- Complete app, middleware, DB installation
- Complete Siebel CRM, Database 11g, Enterprise Manager

Save days or weeks in installation and configuration time

Customize & Save as Golden Images

Oracle VM Template Builder
- Built custom Oracle VM Templates

Enterprise Manager

Import via Oracle VM Manager

Start-Up in Oracle VM Pool

Oracle VM Server Pool

NAS, SAN, iSCSI

Siebel CRM File

Oracle VM Servers

Siebel CRM VM 1

Siebel CRM VM 2

VM

VM

VM

VM

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Private IaaS Lifecycle

1. Cloud Set Up
   - Central IT
   - Set up Cloud Infrastructure

2. Dev & Test Set Up
   - Department Cloud Admin
   - Setup virtual Dev & Test environment through self-service

3. Build & Test App
   - App Developers
   - Use virtual environment to develop and test app

4. Manage Cloud
   - Cloud Admin
   - Manage Virtual Environments
   - Adjust capacity
   - Review chargeback

Oracle Linux / Oracle Solaris
Oracle VM
Oracle Servers
Oracle Storage Systems

Template Library
Self-Service Interface

Oracle Enterprise Manager Ops Center
Oracle IT: Oracle Development
Self-Service Private IaaS for Dev/Test

CASE STUDY
Oracle IT: Oracle Development
Self-Service Private IaaS for Dev/Test

• Implementation Overview:
  – **Scope/Scale** - Over 2600 physical servers with over 6000 Virtual Servers used by over 3500 developers
  – Activations – Processing over 70 jobs per day, this translates into over 45,000 jobs processed supporting production and test requirements.
  – Utilization – Rates on these servers averages 80% 7 days a week and can reach 90% during peak times.

• Results/Benefits:
  – Increase in development productivity
  – Self-Service system for creation of development environments
  – Cleaner code lines as environments are created quickly for more thorough testing/validation.
  – Physical Server/Environmental Reduction by 75%
  – Server/Apps Deployment reduced by 80%
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✓ Download Oracle whitepapers **Today**
  ✓ Oracle VM Blade Cluster Reference Configuration
  ✓ Oracle Network Fabric Architecture
  ✓ Sun Blades Architecture

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For More Information Visit

www.oracle.com/cloud
X86 Cluster Products for Enterprise Clouds
Performance, Fast ROI,

• Performance for cloud and virtualization
• Industry leading compute density
• Oracle Network Fabric Architecture
• Simplified end-to-end management

Hardware and Software
Engineered to Work Together
Oracle Enterprise Manager Ops Center 11g
Network Fabric Management

- Auto-discovery of Sun Network InfiniBand & Ethernet elements
- View network performance in context of application architecture
- Collate alarms based on topology
- Perform fabric wide maintenance and firmware upgrades
- Automated escalation of alarms