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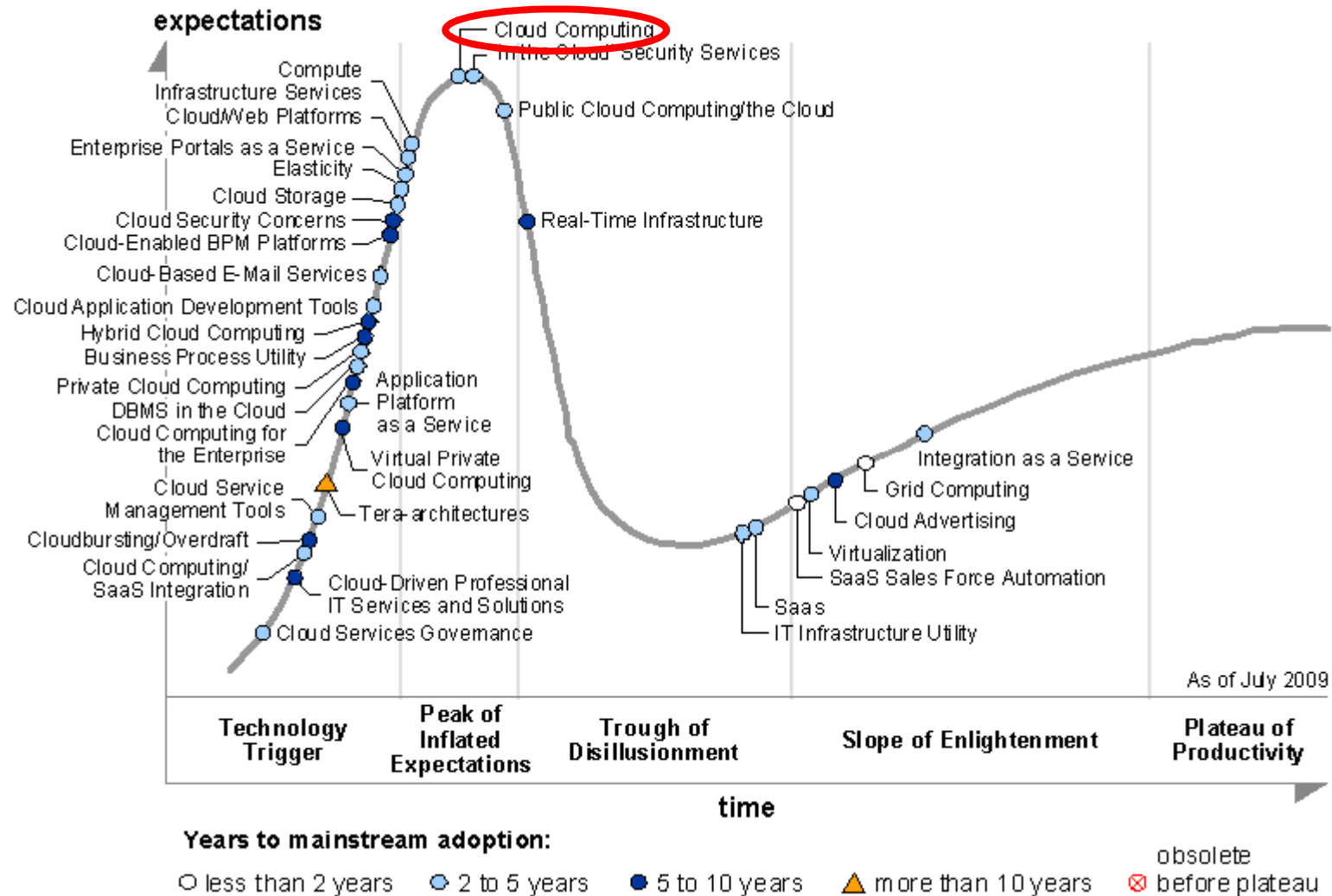
## **The Coming of Age of Enterprise IT and Cloud Computing**

Richard Sarwal, SVP Product Development  
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# Cloud Is at the Peak of the Hype Cycle



Source: Gartner "Hype Cycle for Cloud Computing, 2009" Research Note G00168780

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# Cloud Computing is Top of Mind



CIO strategic technologies reflect increased interest in “lighter-weight” solutions

CIO technologies	Ranking of technologies CIOs selected as one of their top 5 priorities in 2010				
Ranking	2010		2009	2008	2007
Virtualization	1	↑	3	3	5
Cloud computing	2	↑	16	*	*
Web 2.0	3	↑	15	15	*
Networking, voice and data communications	4	↑	6	7	4
Business intelligence (BI)	5	↓	1	1	1
Mobile technologies	6	↑	12	12	11
Data/document management and storage	7	↑	10	9	9
Service-oriented applications and architecture	8	↑	9	10	7
Security technologies	9	↓	8	5	6
IT management	10		*	*	*

\* New question for that year

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Source: Gartner. Leading in Times of Transition. The 2010 CIO Agenda



# NIST Definition of Cloud Computing



Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

This cloud model promotes availability and is composed of:

## 5 Essential Characteristics

- On-demand self-service
- Resource pooling
- Rapid elasticity
- Measured service
- Broad network access

## 3 Service Models

- SaaS
- PaaS
- IaaS

## 4 Deployment Models

- Public Cloud
- Private Cloud
- Community Cloud
- Hybrid Cloud

Source: [NIST Definition of Cloud Computing v15](#)



# SaaS, PaaS and IaaS

## **Software as a Service**

Applications delivered as a service to end-users over the Internet

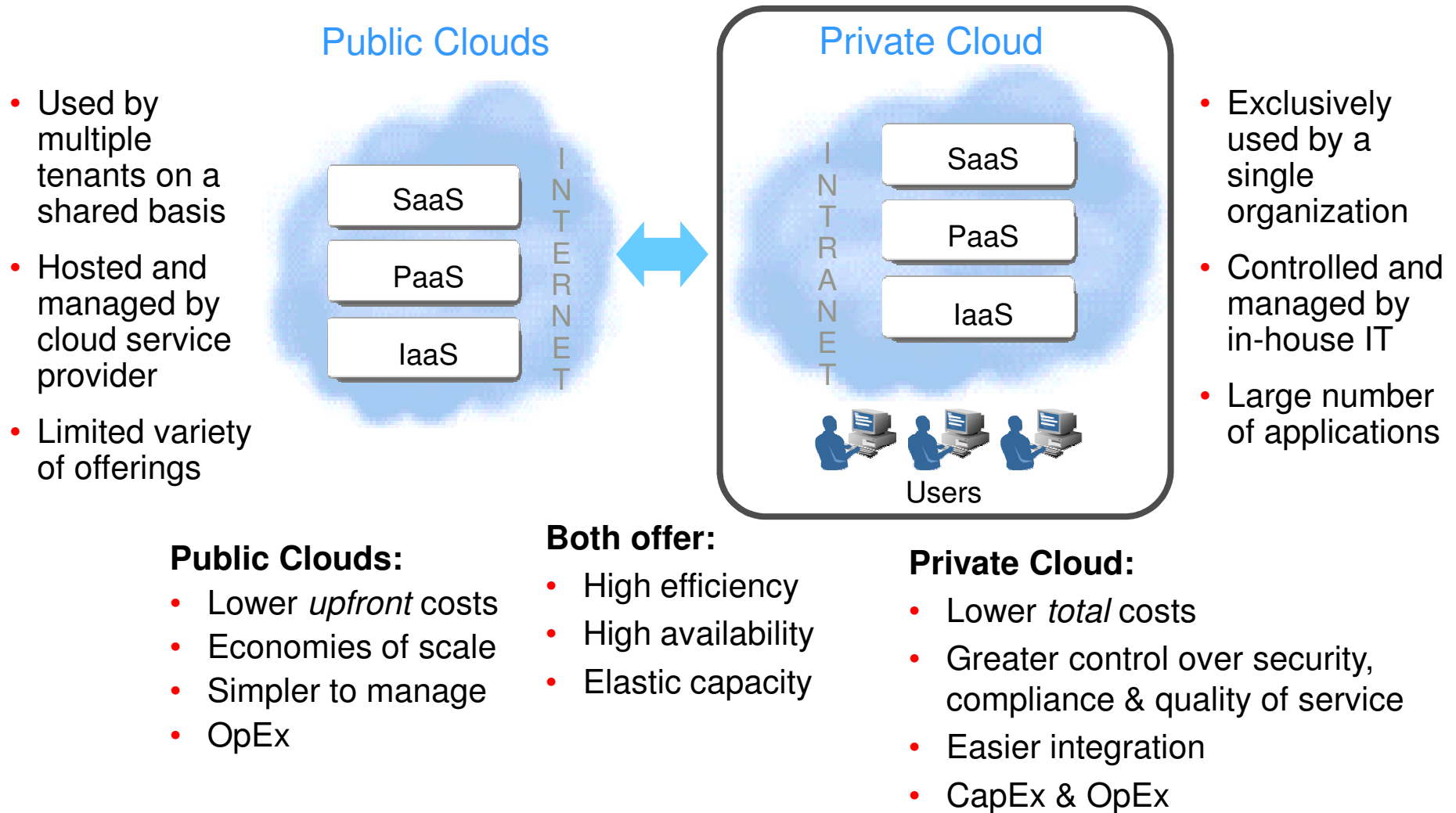
## **Platform as a Service**

App development & deployment platform delivered as a service

## **Infrastructure as a Service**

Server, storage and network hardware and associated software delivered as a service

# Public Clouds and Private Clouds

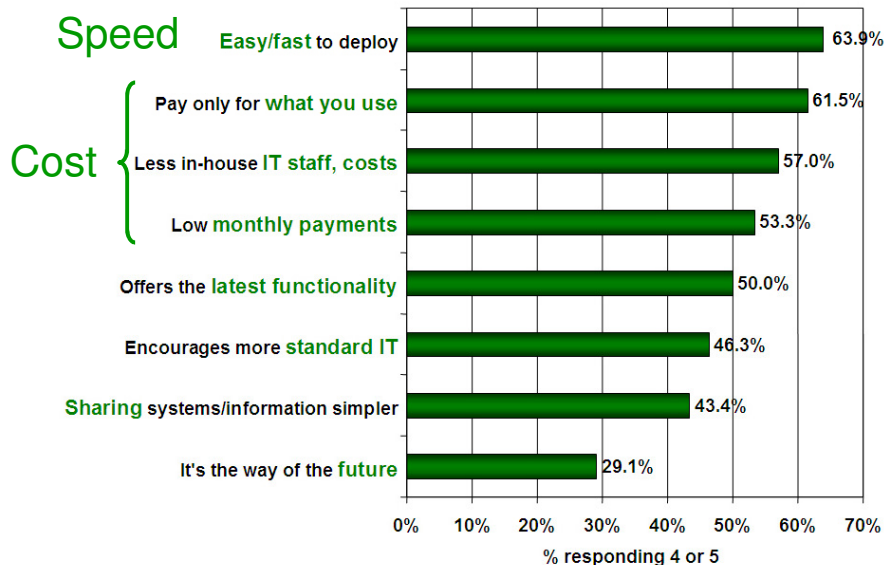


# Why Are Enterprises Interested in Cloud?

## What Are the Challenges Enterprises Face?

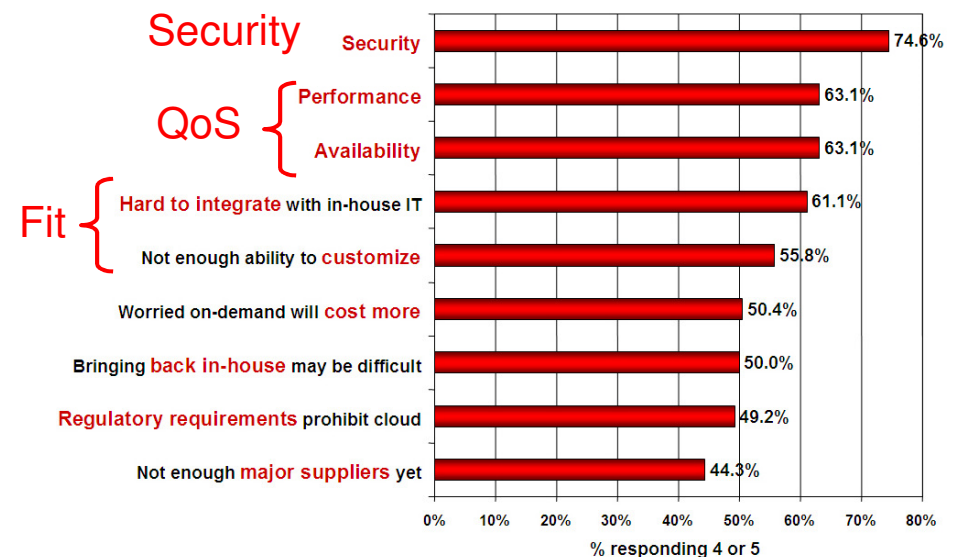
### Benefits

Q: Rate the **benefits** commonly ascribed to the 'cloud'/on-demand model  
(1=not important, 5=very important)



### Challenges/Issues

Q: Rate the **challenges/issues** ascribed to the 'cloud'/on-demand model  
(1=not significant, 5=very significant)

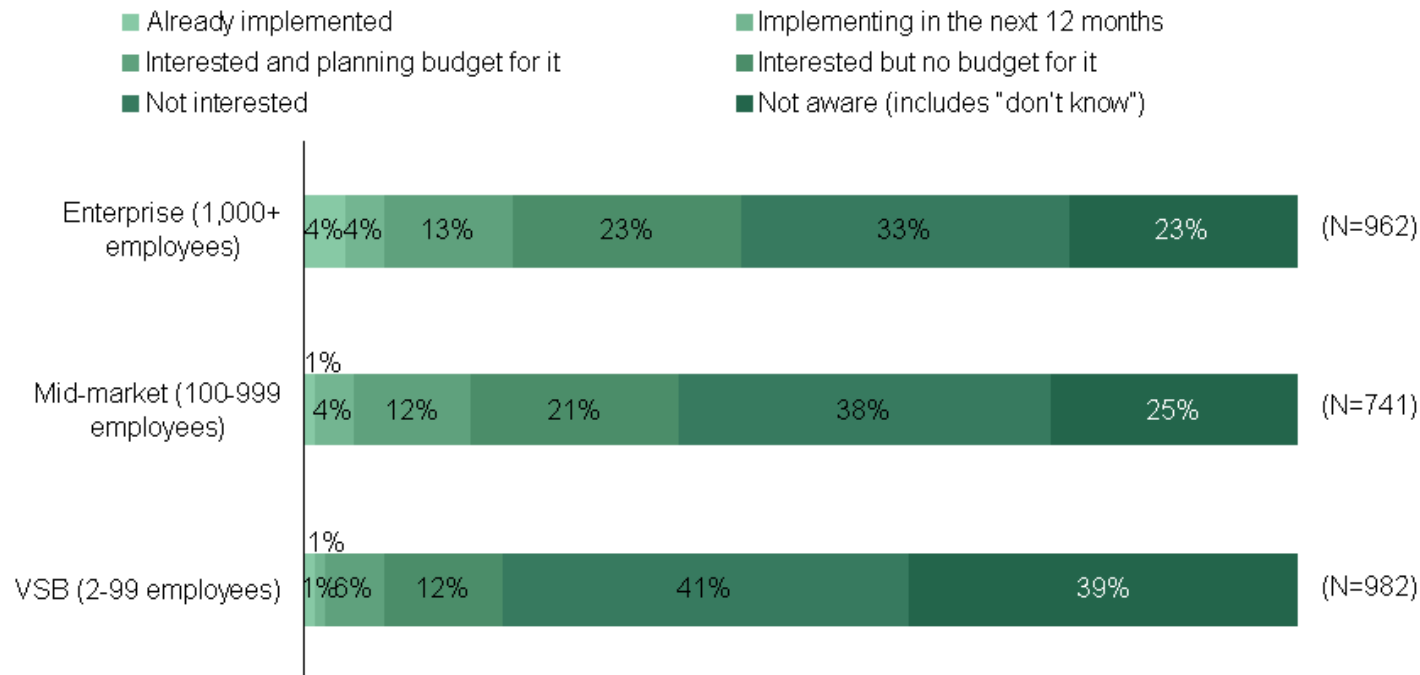


Source: IDC eXchange, "IT Cloud Services User Survey, pt. 2: Top Benefits & Challenges," (<http://blogs.idc.com/ie/?p=210>), October 2, 2008

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# 44% of Large Enterprises Are Interested In Building An Internal Cloud

“What is your company’s highest level of awareness or interest in building and operating an internal “cloud” or pool of pay-per-use virtual servers?”

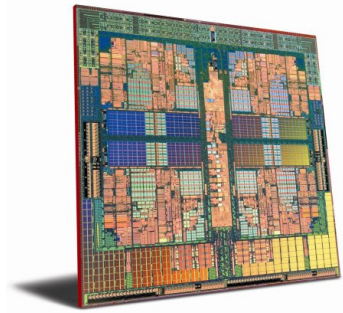


Base: North American and European hardware decision-makers at enterprises, mid-market, and very small businesses

Source: Cloud Computing, Compute-As-A-Service: Interest And Adoption By Company Size, Forrester Research, Inc., February 27, 2009

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# What Makes Cloud Computing Possible?



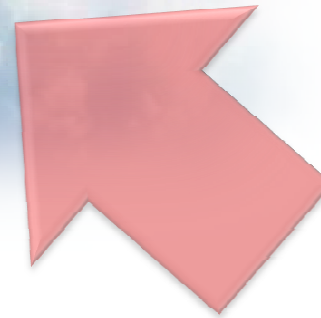
**Zero-Cost  
Computing**



**Ubiquitous  
Shared Storage**



**High-Bandwidth  
Networking**



**Virtualization**



# Cloud = Virtualization



**Cloud = ~~Virtualization~~**



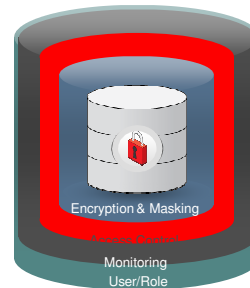


**Cloud = Isolation  
Consolidation  
Elasticity**

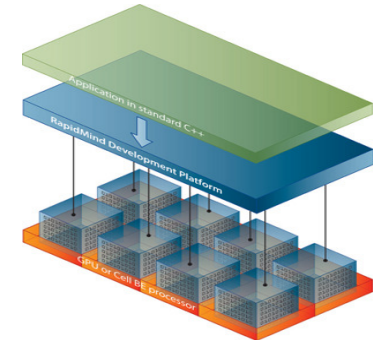
# Isolation, Consolidation and Elasticity



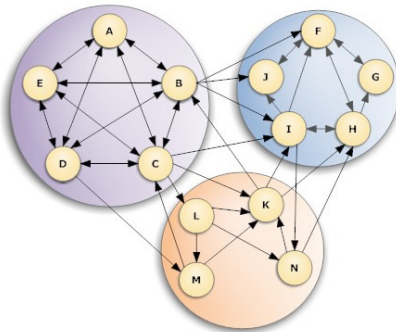
**Multi-tenant**



**Data and Database**



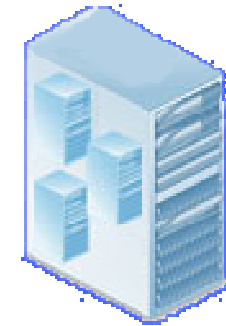
**Server and Chip**



**Clusters and Grids**

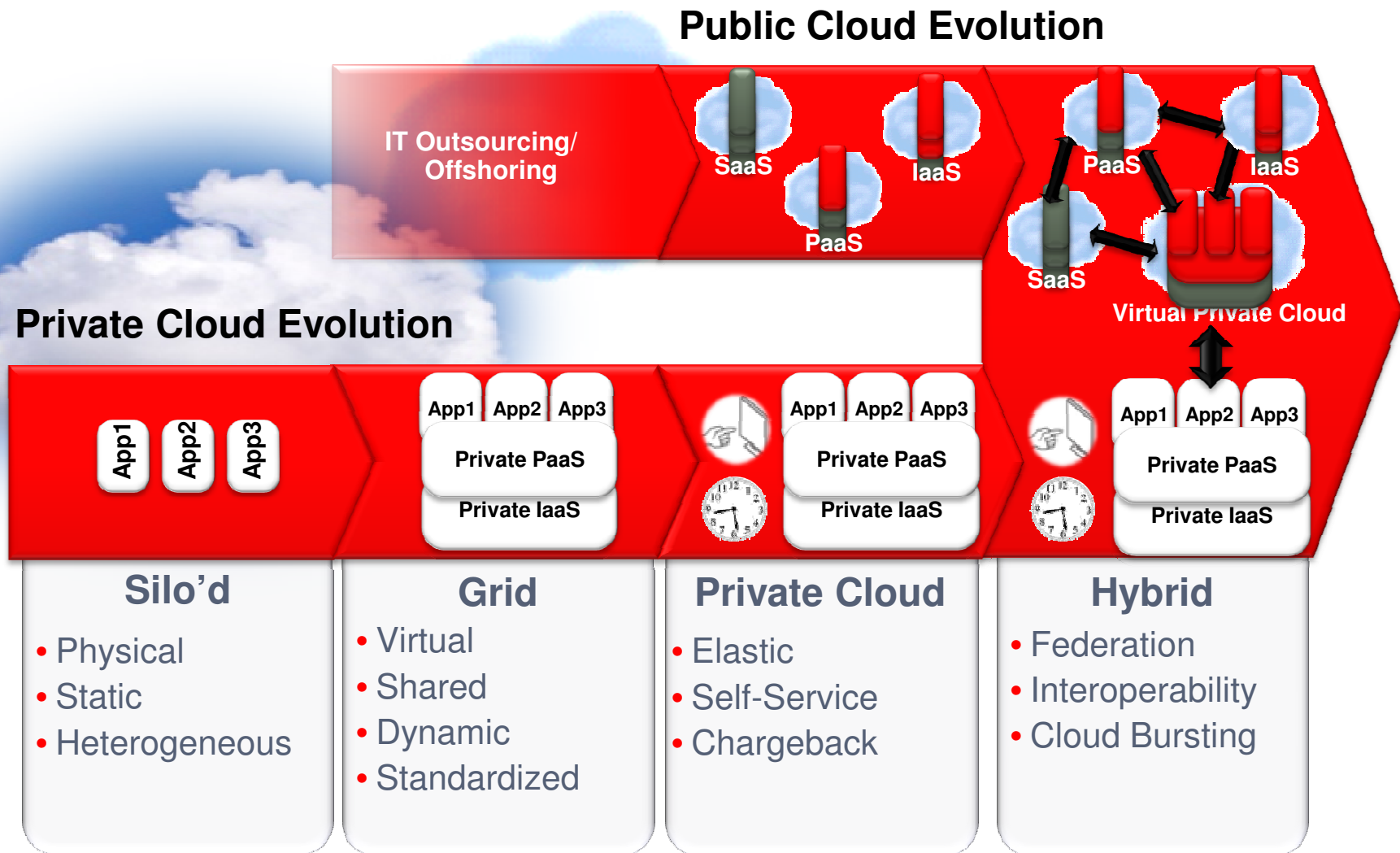


**Network**



**Virtual Machine**

# Evolution of Public and Private Cloud

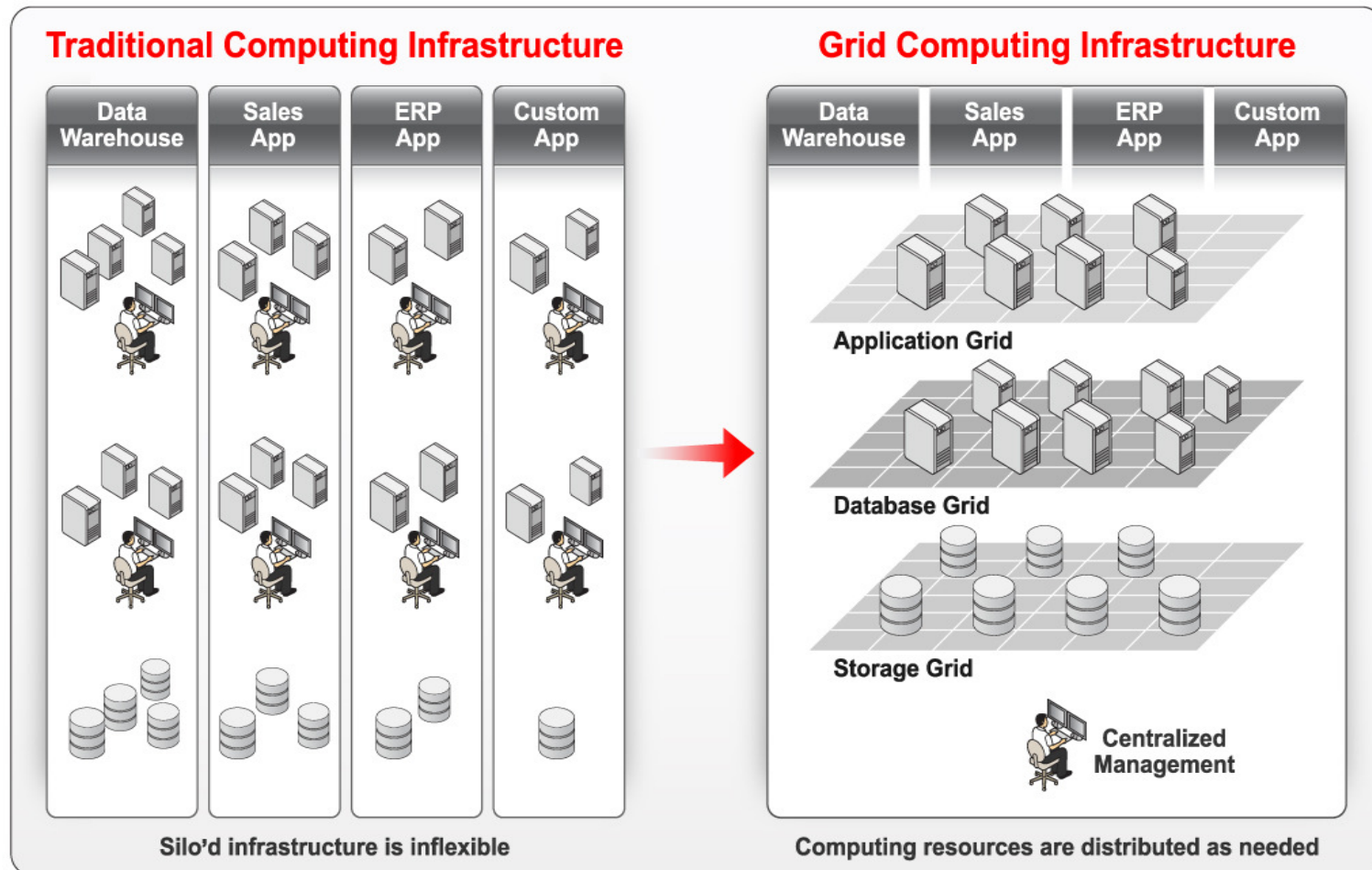


# Evolving Enterprise IT for Cloud

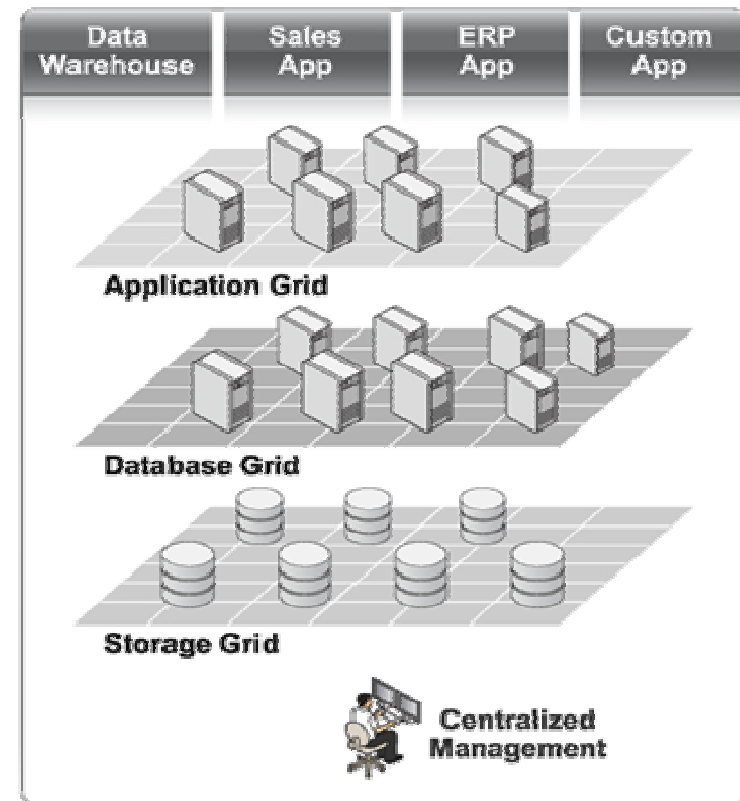
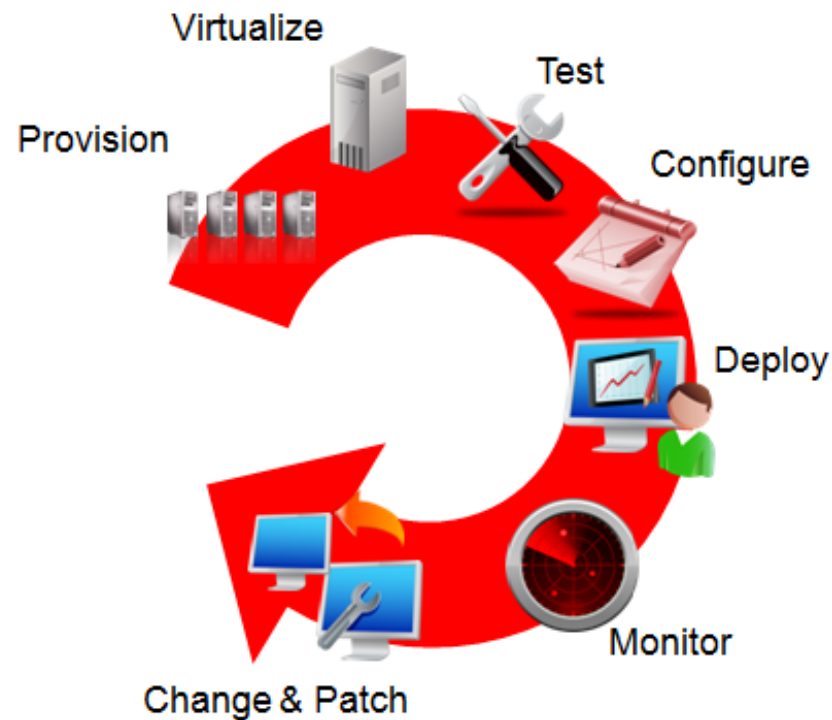
	<b>Traditional</b>	<b>Evolving</b>	<b>Evolved</b>
<b>Infrastructure</b>	<b>Physical</b>	<b>Virtual</b>	<b>Elastic</b>
<b>Virtualization</b>	<b>Dev/Test</b>	<b>Production</b>	<b>Optimized</b>
<b>Systems Management</b>	<b>Server-Centric</b>	<b>Application-Centric</b>	<b>End-to-End</b>
<b>IT Resource Accounting</b>	<b>Measured</b>	<b>Metered</b>	<b>Monetized</b>
<b>Application Design</b>	<b>Monolithic</b>	<b>Service Oriented</b>	<b>Advanced SOA</b>
<b>Application Deployment</b>	<b>Static, Brute Force</b>	<b>Software Appliances</b>	<b>Software Assemblies</b>

# Evolving From Physical to Virtual

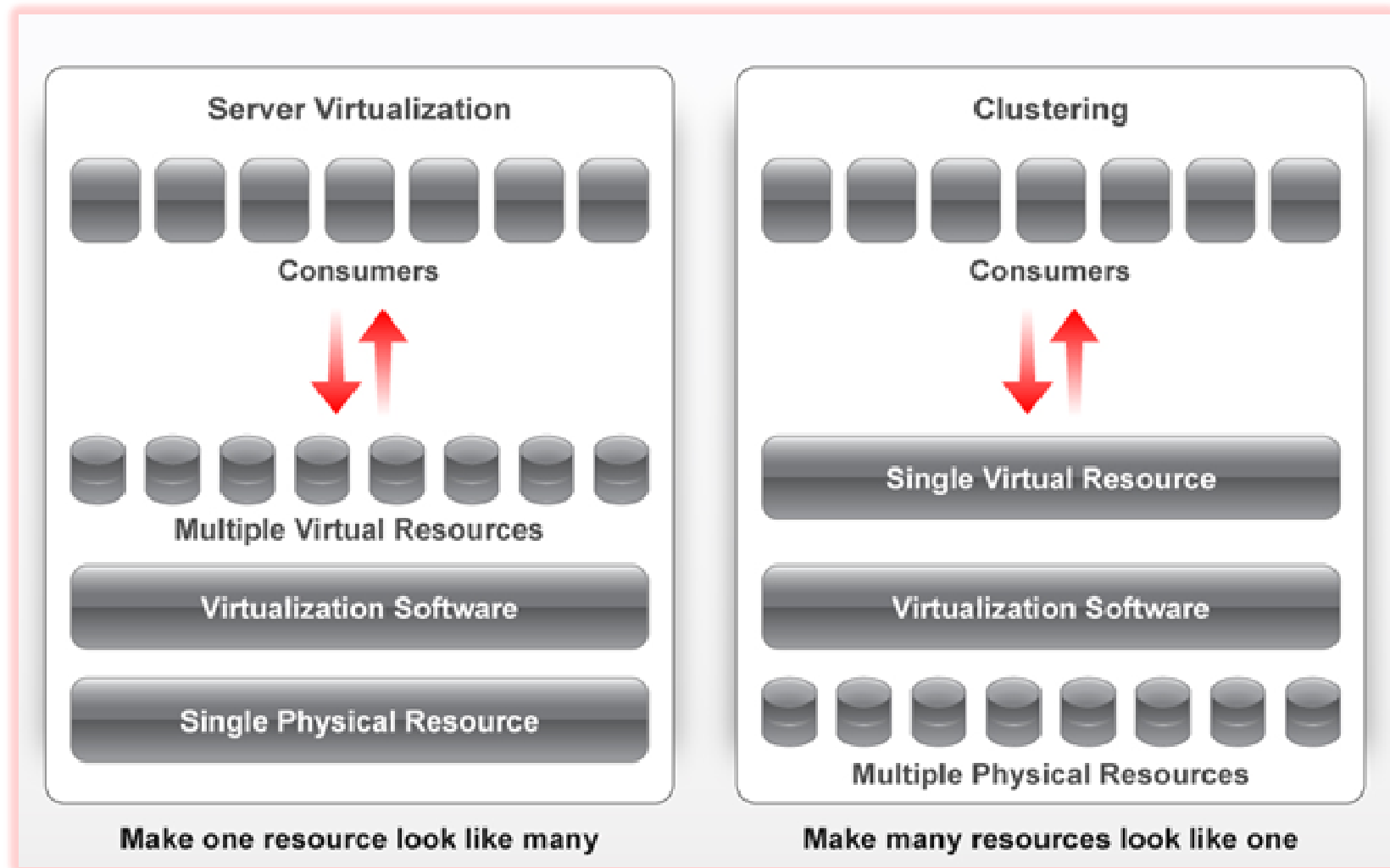
## Silos to Grid



# Cloud IT: Shared Service, Shared Infrastructure

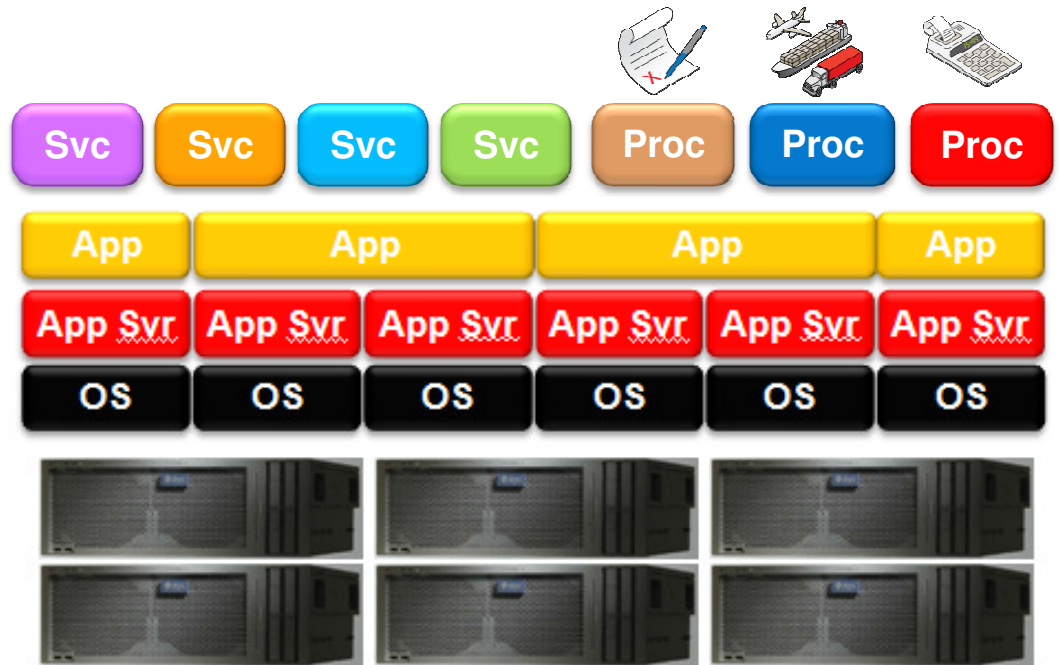


# Unlimited Scale: Clusters and VMs





# Self Service in Enterprise IT





# Self Service in Enterprise IT



**ORACLE Enterprise Manager 11g Grid Control** Help Logout  
Cloud Self Service Portal Logged in as Bob

Home My Requests My Servers Storage Chargeback My Library Preferences

**Notifications (2)**

⚠ Your April Training servers will expire in 5 days [Dismiss](#)

📢 A new Assembly for Oracle + EM 11.1 is now available [Dismiss](#)

**Your Quotas**

You have permission to use these cumulative quota allowances when making server requests.

Number of Guest VMs: 10 total/8 in use  
Number of CPUs: 20 total/17 in use  
Memory Size (GB): 500 total/453 in use  
Storage (GB): 500 total/387 in use  
Allow Archiving on Expiration: Yes  
Software Library Folder Size: 500 total/232 in use  
Allow Save to Community Folder: Yes

**My Servers**

[Request Servers](#) ☒ Open Console ☒ View Archives

Zone/Server Name	Assembly	Status	CPU	Memory	Chargeback	Expiration Date
East Coast						
stage101.acme.com	Oracle DB	Running	42%	37%	\$346	09/01/2009
stage103.acme.com	Oracle DB	Paused	42%	37%	\$346	09/24/2009
stage105.acme.com	Oracle DB	Running	42%	37%	\$346	09/24/2009
West Coast						
qa134.acme.com	JDEV	Running	42%	37%	\$346	09/24/2009
qa153.acme.com	JDEV	Halted	42%	37%	\$346	09/24/2009
qa125.acme.com	JDEV	Running	42%	37%	\$346	09/24/2009

**My Requests**

[Edit Request](#) ☒ Policies

Request Name	Assembly or Storage	# of Servers	Date Opened	Dates Requested	Status
May Training	Oracle DB + Fusion Middleware	6	04/01/2009	04/01 - 10/30, 2009	Completed
DB Developers	Red Hat Oracle Enterprise Linux	3	04/23/2009	04/25 - 05/31, 2009	Pending
EM Testing	Oracle DB	10	04/30/2009	06/10 - 07/30, 2009	Completed

**ORACLE Enterprise Manager 11g Grid Control** Help Logout  
Cloud Self Service Portal : New Servers Request Wizard Logged in as Bob

Select Software Configure Software Configure Servers Storage & Networking Scheduling Review & Submit

Cancel Step 1 of 6 Next

Name Your Request (this will help you track it later)

[Use a Template](#)

Select Zone: East Coast

Select or Search for the Software you want to use:  [TIP](#) You may request multiple copies of appliances but only one assembly at a time

Name	Version	Type	Software Included
Public Resources			
Oracle Database Install	1.0	Appliance	
Oracle Database Install + EM	2.0	Appliance	
Web Store	3.4	Assembly	Front End Load Balancer; 3 Web Servers; 1 Mid Tier Load Balancer
Shared Resources			
Private Resources			

**Server Sizes & Quantity** [View Size Settings & Details](#)

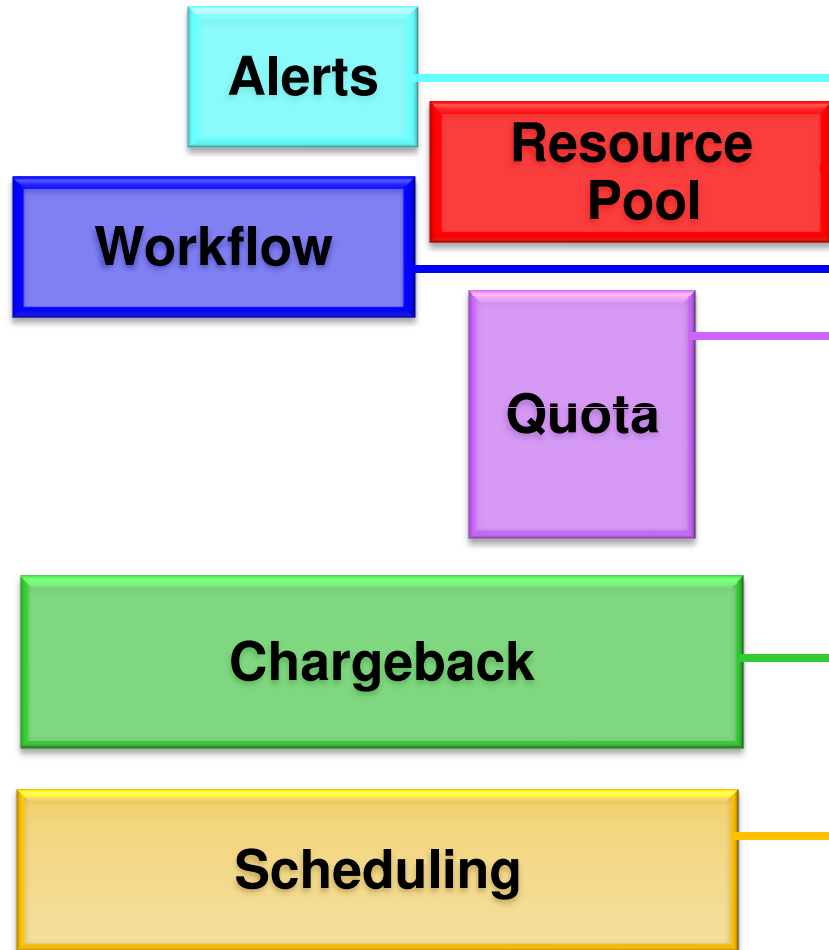
[TIP](#) Default values are shown below and can be left as is for most uses

Front End Load Balancer	Standard	Number of Servers: Default: 1
Web Server	Standard	Number of Servers: Default: 3
Mid Tier Load Balancer	Standard	Number of Servers: Default: 1
Application Servers	Super	Number of Servers: 2 (required, no variance permitted)
Databases/EM	High CPU/Medium	Number of Servers: Default: 1

☒ Save Assembly to Library for future use

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# Self Service in Enterprise IT



ORACLE Enterprise Manager 11g Grid Control  
Cloud Self Service Portal

Home My Requests My Servers Overview Chargeback My Library Preferences

Notifications (2)

- Your April Training servers will expire in 5 days
- A new Assembly for Oracle + EM 11.1 is now available

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Zone/Server Name	Assembly	Status	CPU	Memory	Chargeback	Expiration Date
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staging101.acme.com	Oracle DB	Running	42%	37%	\$346	09/01/2009
staging103.acme.com	Oracle DB	Paused	42%	37%	\$346	09/24/2009
staging105.acme.com	Oracle DB	Running	42%	37%	\$346	09/24/2009
West Coast						
ga134.acme.com	JDEV	Running	42%	37%	\$346	09/24/2009
ga153.acme.com	JDEV	Halted	42%	37%	\$346	09/24/2009
ga125.acme.com	JDEV	Running	42%	37%	\$346	09/24/2009

My Requests

Request Name	Assembly or Storage	# of Servers	Date Opened	Dates Requested	Status
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ORACLE Enterprise Manager 11g Grid Control  
Cloud Self Service Portal : New Servers Request Wizard

Select Software Configure Software Configure Servers Storage & Networking Scheduling Review & Submit

Step 1 of 6

Name Your Request (this will help you track it later)

Select Zone: East Coast

Select or Search for the Software you want to use:

Name	Version	Type	Software Included
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Shared Resources			
Private Resources			

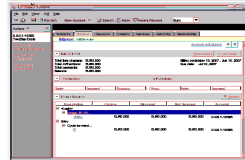
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Configuration	Value	Number of Servers	Default
Front End Load Balancer	Standard	1	Default: 1
Web Server	Standard	3	Default: 3
Mid Tier Load Balancer	Standard	1	Default: 1
Application Servers	Super	2 (required, no variance permitted)	
Databases/EM	High CPU/Medium	1	Default: 1

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# Metering and Chargeback

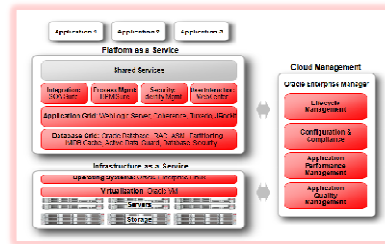
## Application Layer (SaaS)



- Games, music
- Web-conferencing
- Online Apps

- Per Application User
- Per Transaction
- # Calls, # Minutes

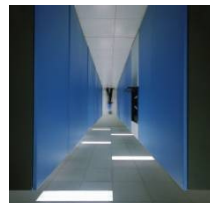
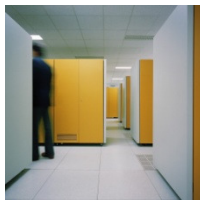
## Platform Layer (PaaS)



- Google Apps, Amazon
- APIs for CRM, Retail
- Tools to develop new apps

- Per Hour
- Per GB Transfer In/Out
- Per Message

## Infrastructure Layer (IaaS)



- Infrastructure for apps
- Storage, collocation
- General purpose computing

- Per Named Host
- Per GB
- Per Server, Per CPU

# Oracle Cloud Computing Strategy

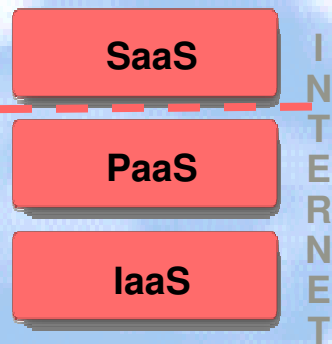
## Our objectives:

- Ensure that cloud computing is fully enterprise grade
- Support both public and private cloud computing – give customers choice

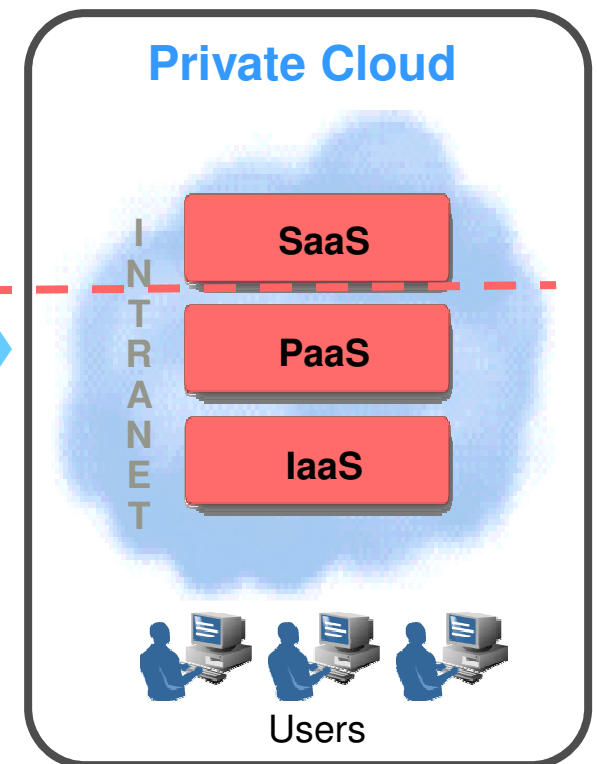
Offer Applications  
deployed in private shared  
services environment or  
via public SaaS

Offer Technology to  
build private clouds or  
run in public clouds

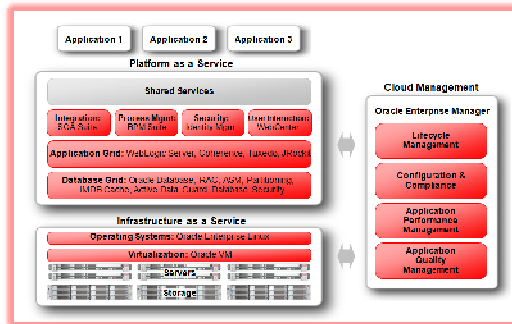
### Public Clouds



### Private Cloud



# Oracle in the Cloud



**Oracle Cloud Platform  
for PaaS/SaaS**



**Hosted APEX**

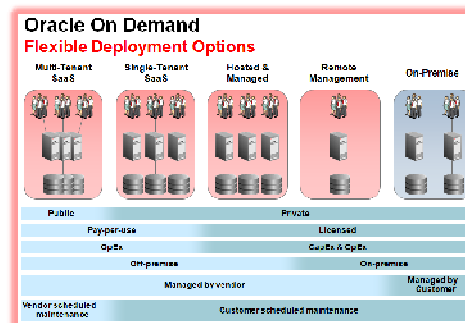


**Cloud Office**

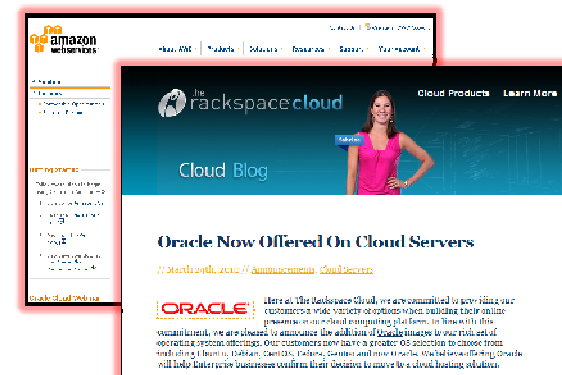
**Hosted Hyperion**



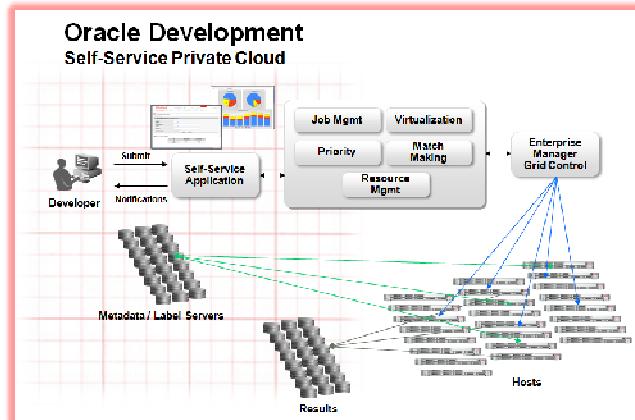
**Oracle On Demand**



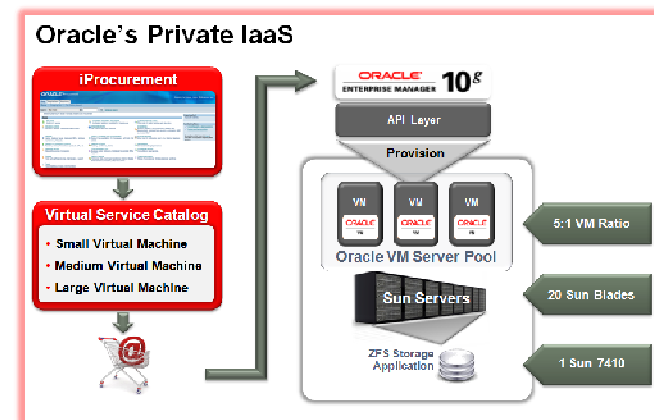
**Oracle and Public Clouds**



# The Cloud in Oracle




## Oracle Developer PaaS



## Oracle Private IaaS

**Oracle IT: Oracle University**  
Dynamic Provisioning with Grid Computing

- 2,300 system refreshes per week
- 1/10<sup>th</sup> the hardware
- CPU utilization from 7% to 73%
- Floor space reduced 50%
- Power consumption reduced 40%
- Servers: Administrator ratio increased 10X
- Revenue/Server increased 10X

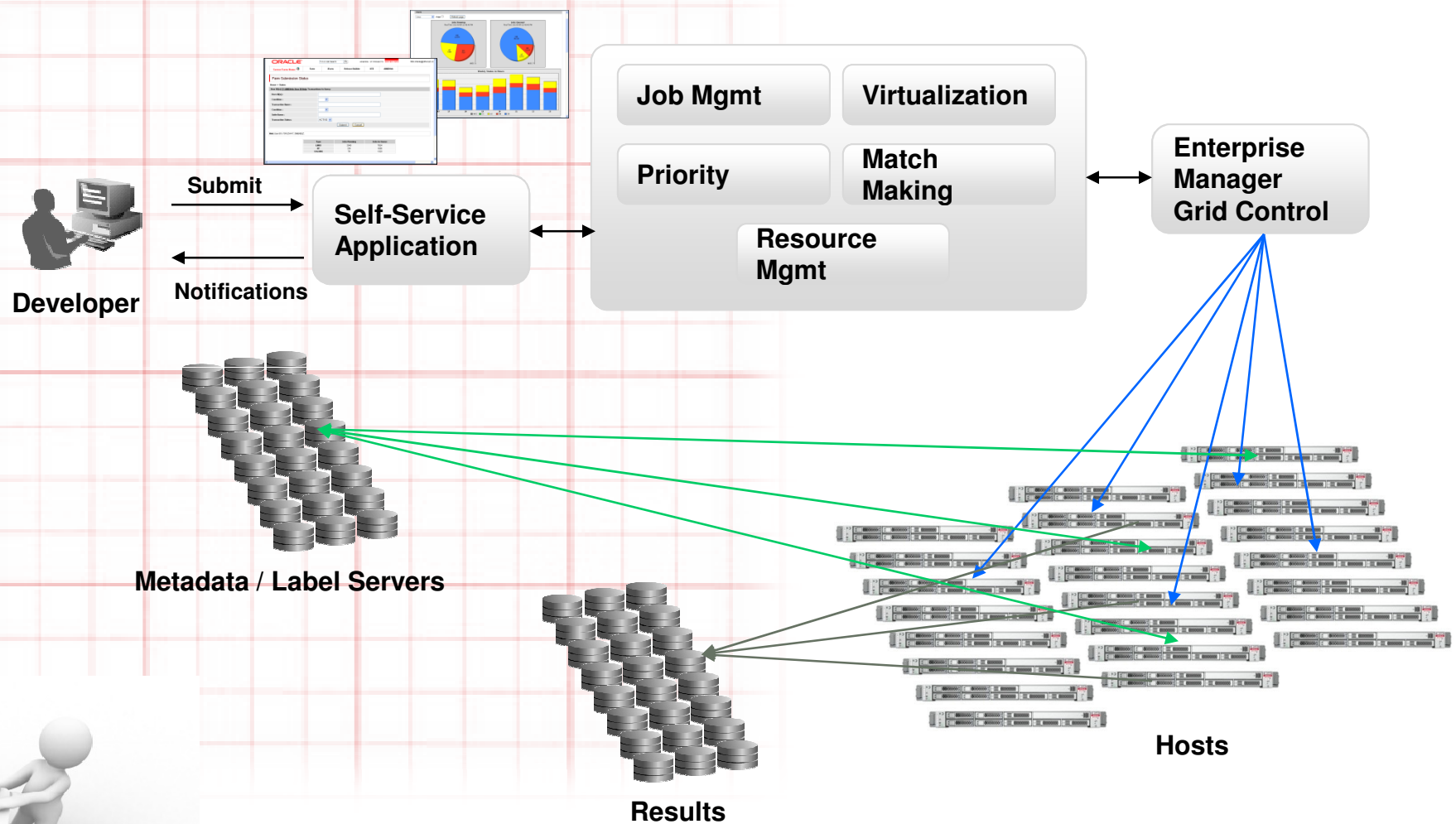


## Oracle University Cloud

# Oracle IT: Oracle Development

## Self-Service Private Cloud

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DEVELOPMENT



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# Oracle IT: Oracle Development

## Self-Service Private Cloud

- **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%**





# Oracle IT: Oracle University

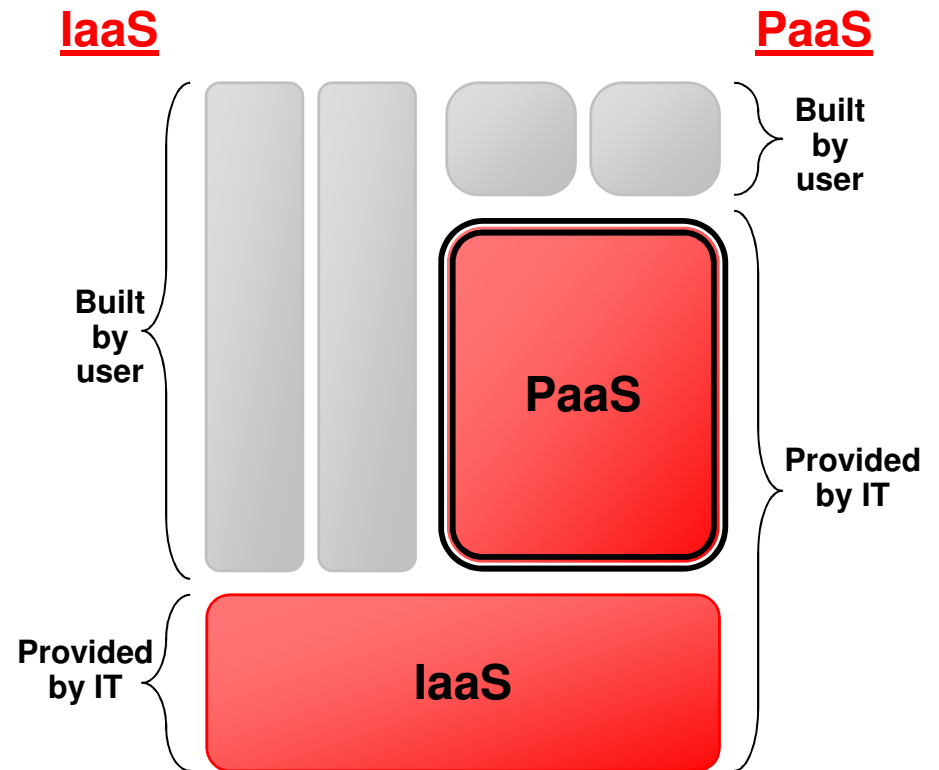
## Dynamic Provisioning with Cloud Computing

- Education Services
- **2,300** environments automatically provisioned weekly
- **1/10<sup>th</sup>** the hardware
- CPU utilization increased from **7% to 73%**
- Floor space reduced 50%
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- Servers: Administrator ratio increased **10X**
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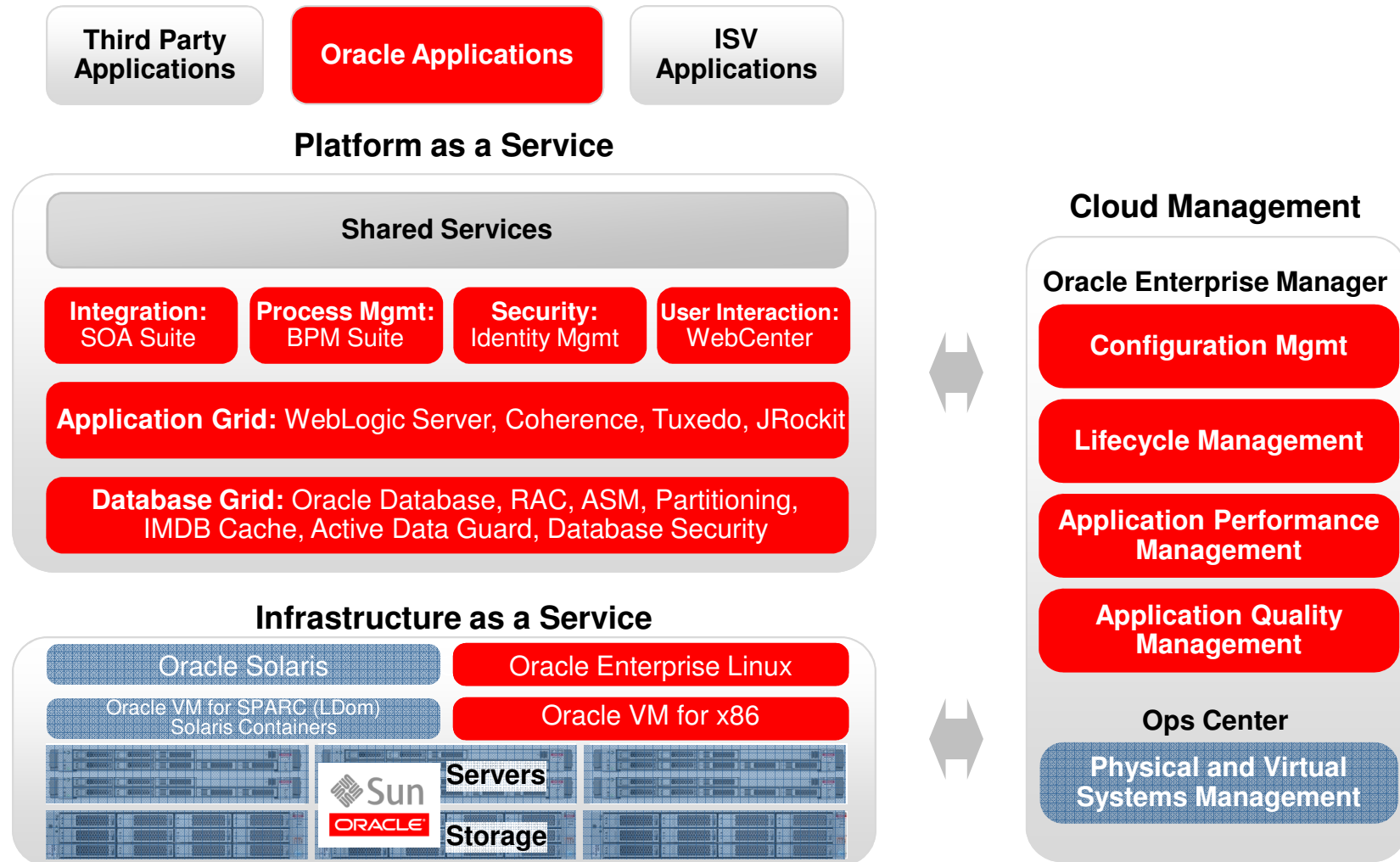


# Why Enterprise Private PaaS?

- Why Cloud?
  - Agility and speed
  - Efficiency and cost
- Why Private?
  - Security
  - Compliance
  - Control (particularly over QoS)
  - Easiest evolution of existing expertise and practices
- Why Platform?
  - Maximizes component re-use
  - Minimizes hand coding
  - Maximizes flexibility and control



# What: Oracle Cloud Platform for PaaS



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# Oracle Leadership in Cloud Computing

- Oracle provides most complete, open and integrated cloud vision, strategy and offerings in the industry
- Cloud is the evolution of capabilities Oracle has been working on for more than a decade: grid computing, virtualization, shared services and management systems
- Oracle offers:
  - Technology to build private clouds or run in public clouds
  - Applications deployed in private shared services environment or via public SaaS



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