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Management in the Cloud

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Principal Product Manager, EM Product Suite

Program Agenda

- What is this “cloud” stuff?
- Cloud computing
  - Essential characteristics
  - Service models
  - Deployment models
- Q & A

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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 is composed of:

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

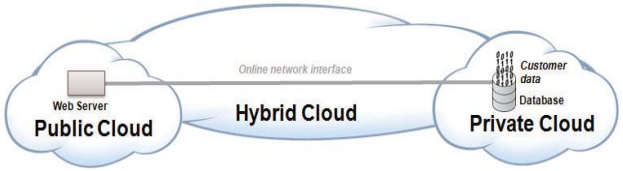
3 Service Models
- IaaS
- PaaS
- SaaS

4 Deployment Models
- Private Cloud
- Community Cloud
- Public Cloud
- Hybrid Cloud

Source: NIST Cloud Computing Synopsis and Recommendations , May 2012

Stakeholder Management

Stakeholders, Goals & Cloud Benefits



As an **Architect**, I want **platform standardisation**, To **reduce number of technologies**

As a **Procurement Mgr**, I want **platform standardisation**, To **reduce number of vendors**

As an **Application Owner**, I want **self-service on demand**, To **achieve faster provisioning**

As a **CFO**, I want **public cloud**, To **convert CAPEX to OPEX**

As a **Risk Mgr**, I want **internal private cloud**, To **preserve data security**

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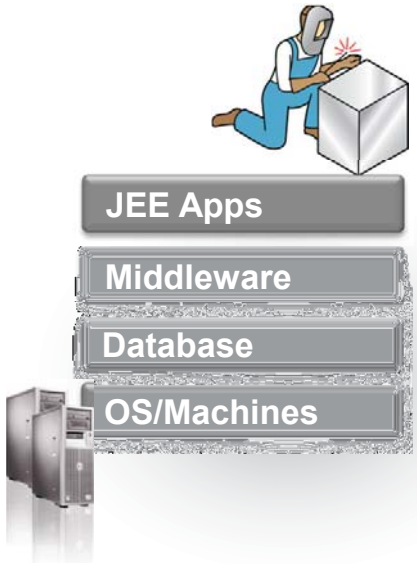
Essential Cloud Characteristics

- On-demand self-service
  - A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service's provider.

Source: NIST Cloud Computing Synopsis and Recommendations , May 2012

Self Service vs Traditional IT Operations

Traditional App Deployment
(Admin driven)



Specify and procure hardware

Configure hardware

Deploy hardware

Deploy middleware and database

Deploy app and configure settings

Add hardware and reconfigure stack as demand grows

DEPLOYMENT PORTAL

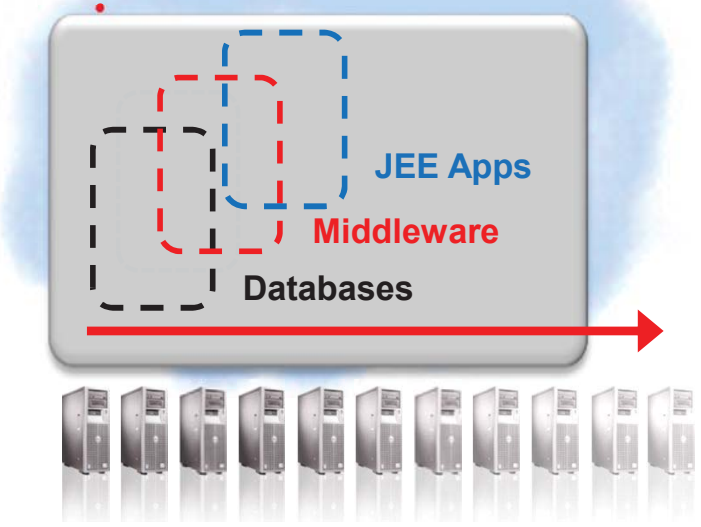
Request Deployment via Cloud

Adjust capacity as demand changes

Retire app when not needed

User unaware of underlying infra

X-as-a-Service Deployment
(End-user driven)



Self-Service Provisioning

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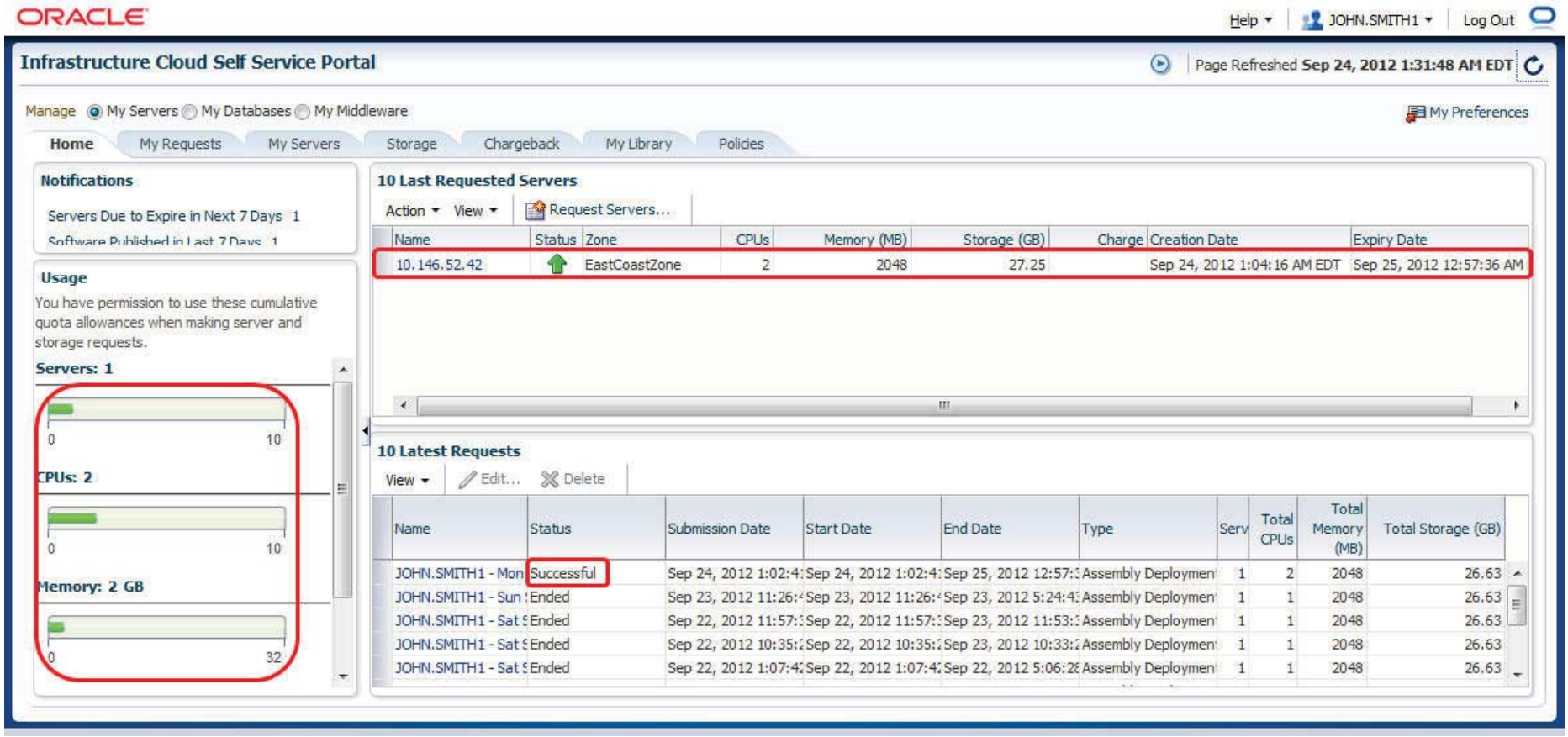
IaaS Example



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Essential Cloud Characteristics

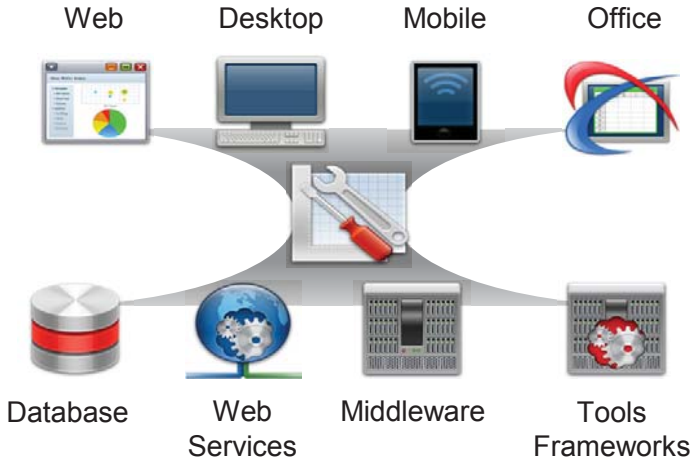
- Broad network access
  - Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, tablets, laptops, and workstations).

Source: NIST Cloud Computing Synopsis and Recommendations , May 2012

Competing Priorities at Odds

Developers Demand Flexibility BUT IT Requires Standardization

- Rapid development
- Choice of components and configurations



- Supported products and frameworks
- Known environments and patterns
- Common standards for security, monitoring, management, and HA

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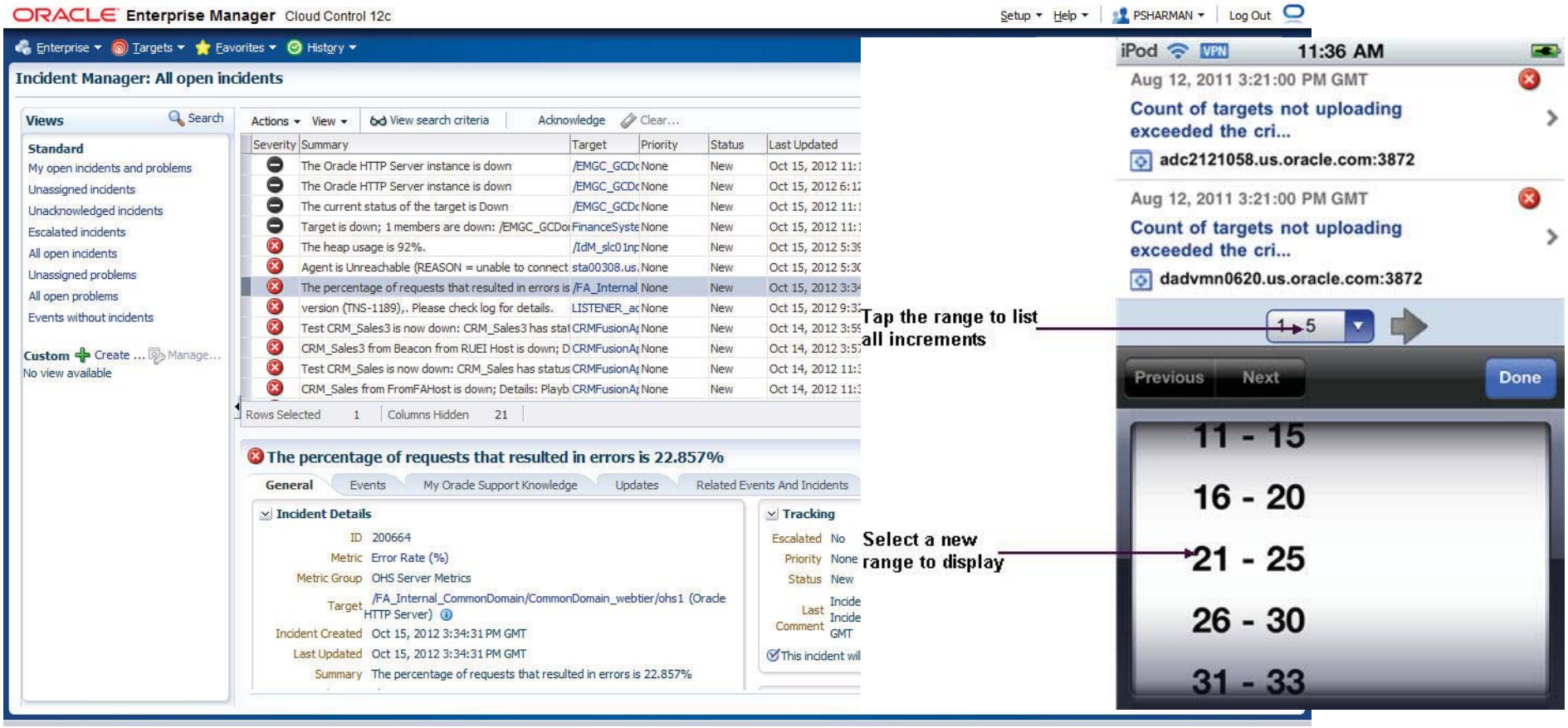
Incident Management Examples



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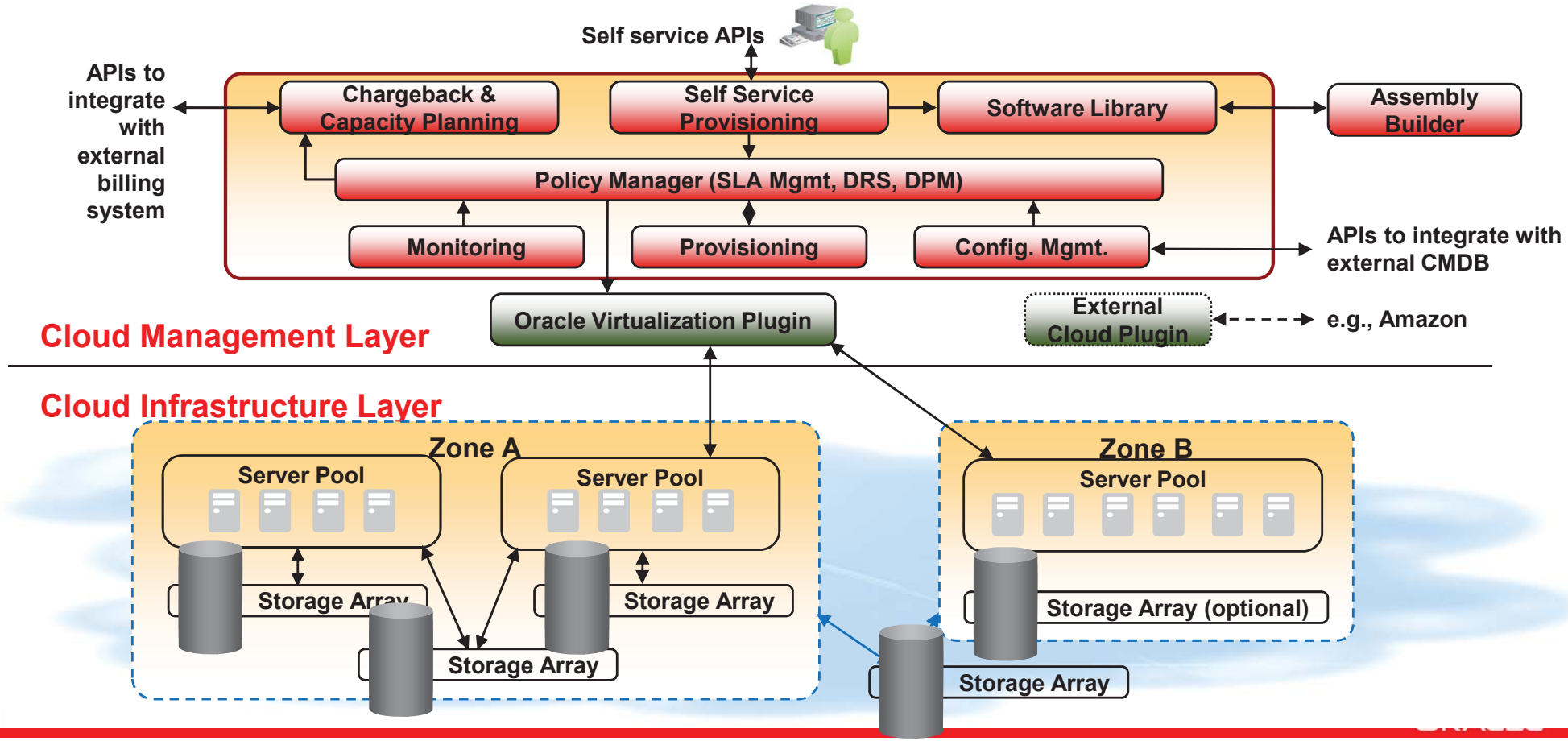
Essential Cloud Characteristics

- Resource pooling
  - The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, and network bandwidth.

Source: NIST Cloud Computing Synopsis and Recommendations , May 2012

Cloud Management Architecture



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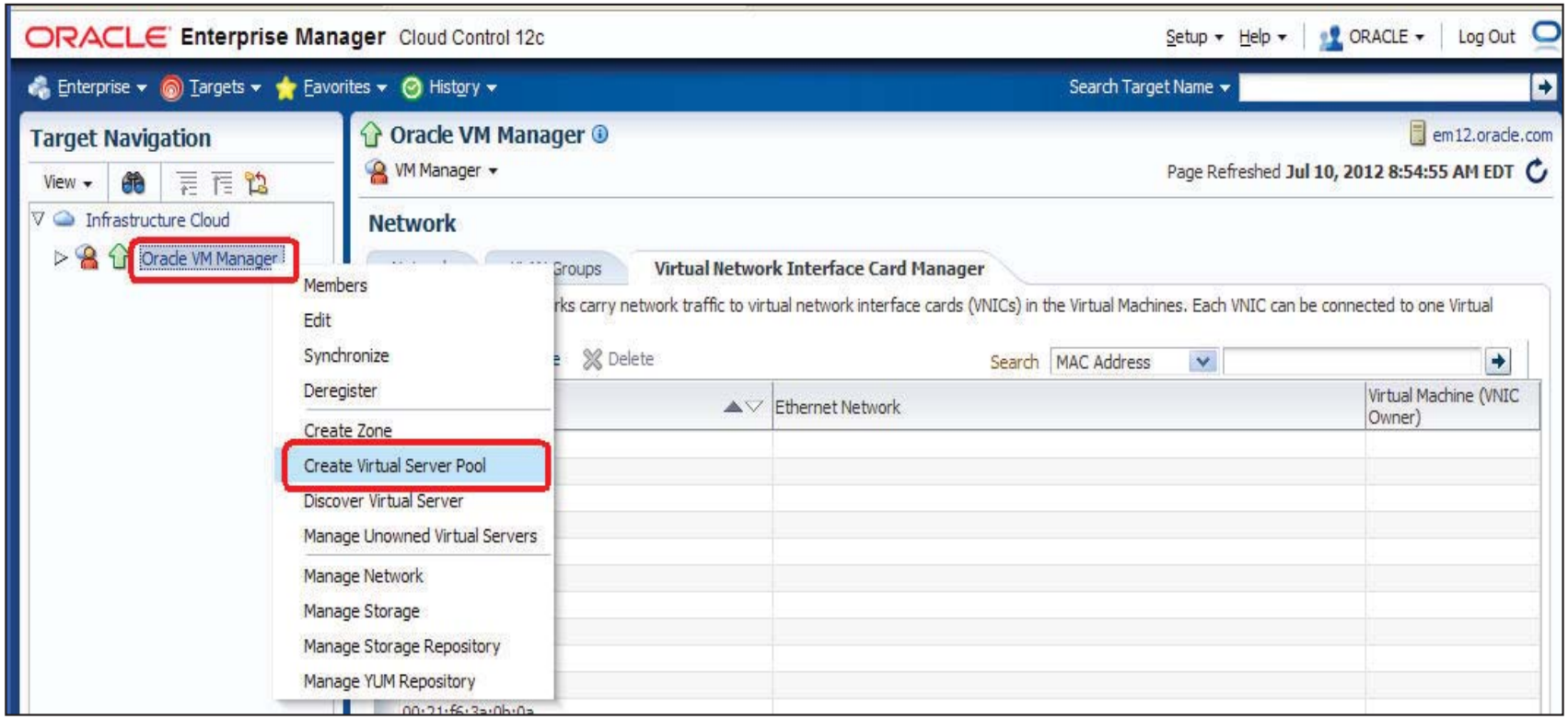
VM Server Pool Example



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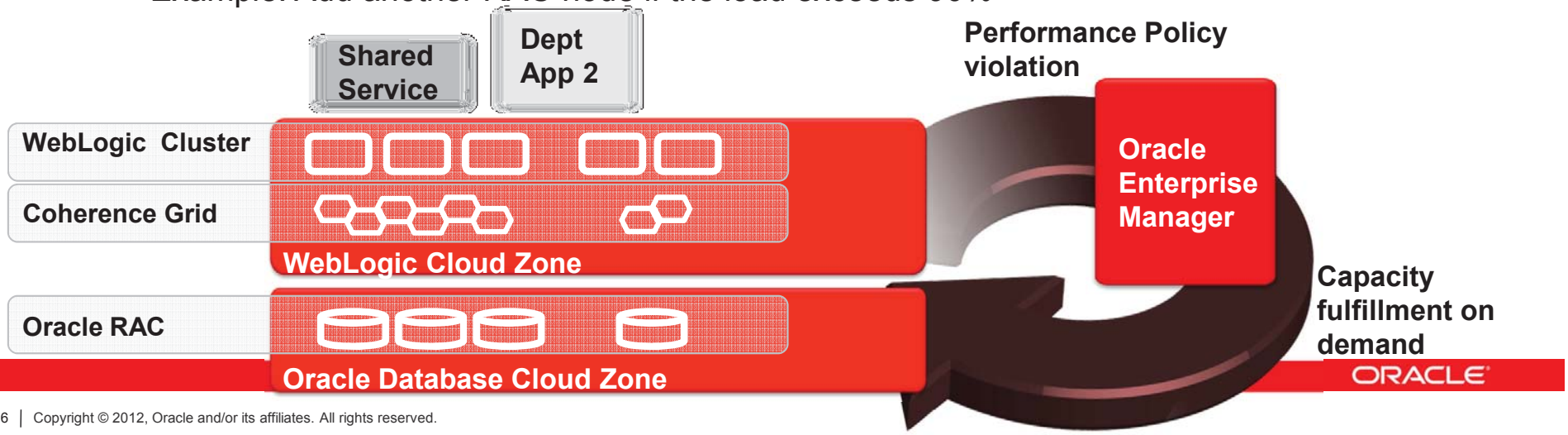
Essential Cloud Characteristics

- Rapid elasticity
  - Capabilities can be rapidly and elastically provisioned, in some cases automatically, to scale rapidly outward and inward commensurate with demand. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time.

Source: NIST Cloud Computing Synopsis and Recommendations , May 2012

Policy-based Elasticity (Software Assemblies)

- Dynamically allocate resources based on pre-defined policies
  - Scale out and scale back actions to support Capacity On Demand
- There are two policy categories:
  - Schedule based: Invoke actions based on schedules
    - Example: Quiesce VMs on weekends
  - Performance based: Invoke actions based on performance (metrics) of targets
    - Example: Add another RAC node if the load exceeds 90%



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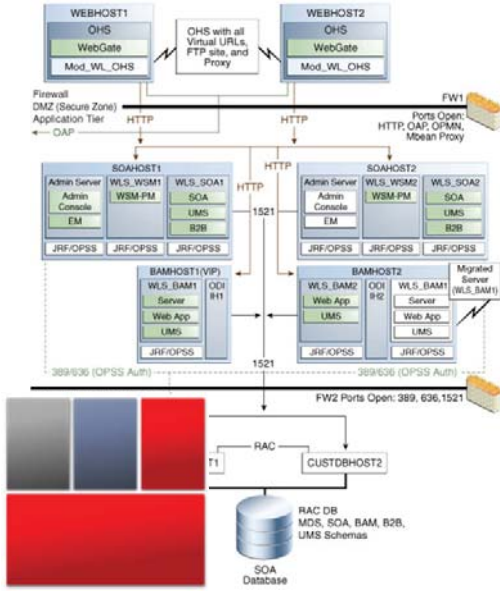
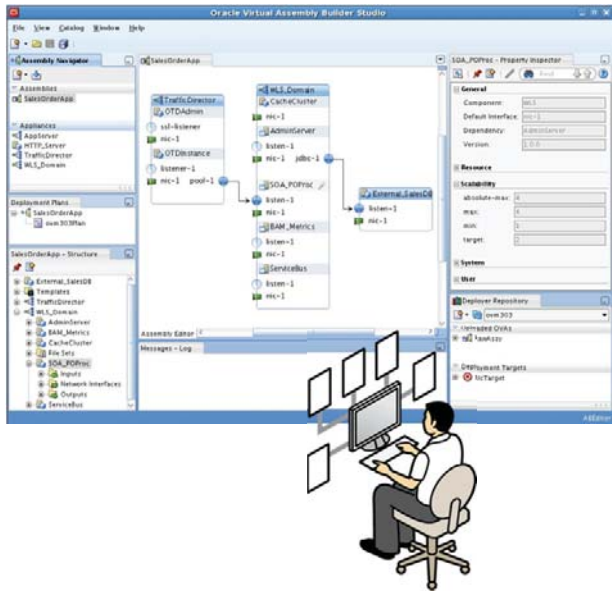
Assemblies: Standardization with Flexibility

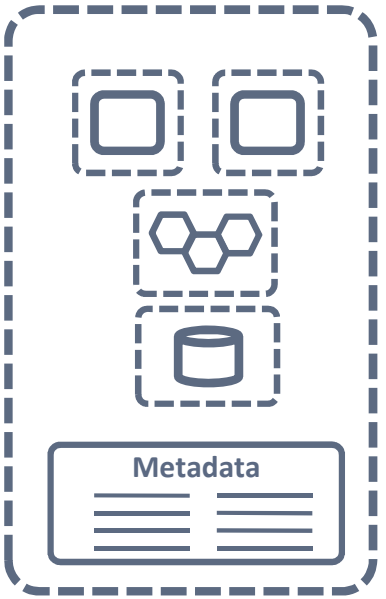
Capture Complete Application Topology



Oracle Virtual Assembly Builder Studio



Package Into Single Assembly



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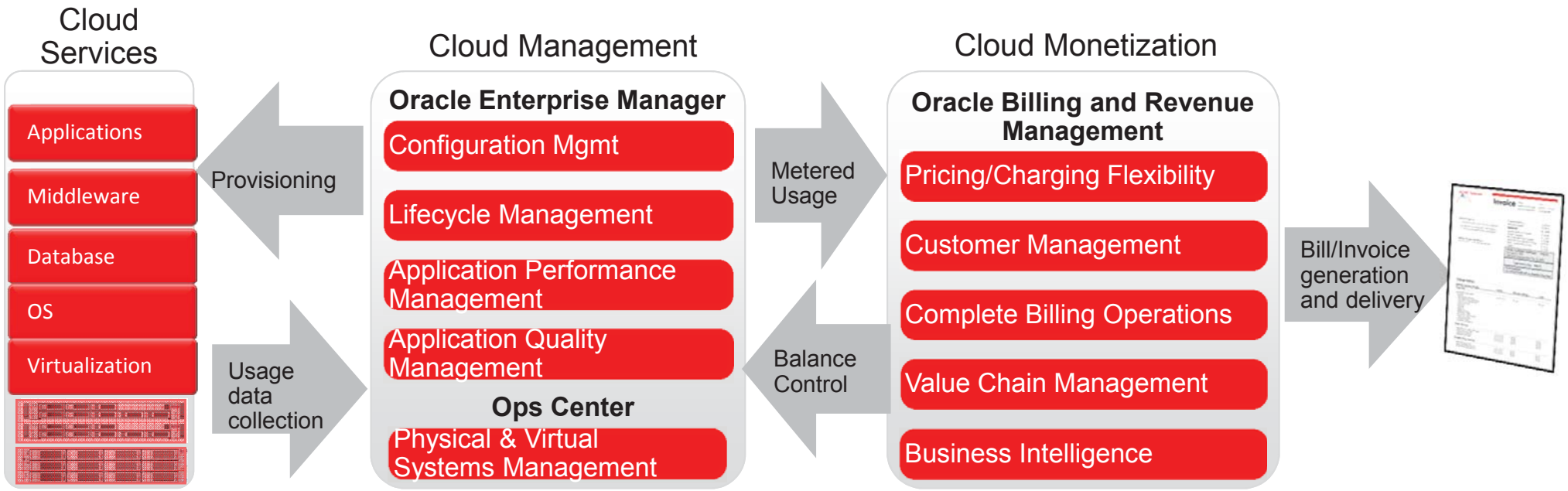
Essential Cloud Characteristics

- Measured service
  - Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

Source: NIST Cloud Computing Synopsis and Recommendations , May 2012

Metering and Resource Usage



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Service Models

- Infrastructure as a Service (IaaS)
  - The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications; and possibly limited control of select networking components (e.g., host firewalls).

Source: NIST Cloud Computing Synopsis and Recommendations , May 2012

Service Models

- Platform as a service (PaaS)
  - The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or -acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.

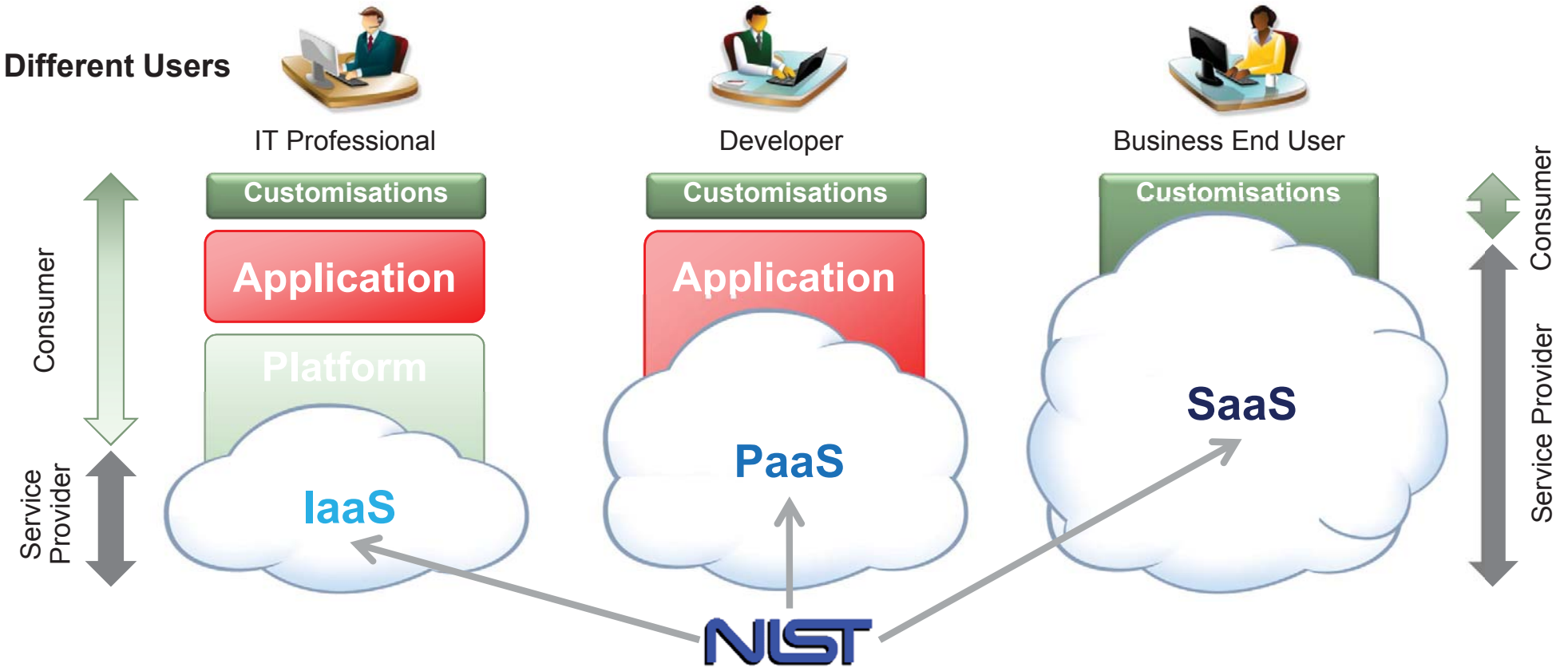
Source: NIST Cloud Computing Synopsis and Recommendations , May 2012

Service Models

- Software as a Service (SaaS)
  - The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a Web browser (e.g., Web-based email), or a program interface. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.

Source: NIST Cloud Computing Synopsis and Recommendations , May 2012

Cloud Service Models



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Deployment Models

- Private cloud
  - The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

Source: NIST Cloud Computing Synopsis and Recommendations , May 2012

Deployment Models

- Community cloud
  - The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

Source: NIST Cloud Computing Synopsis and Recommendations , May 2012

Deployment Models

- Public cloud
  - The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

Source: NIST Cloud Computing Synopsis and Recommendations , May 2012

Deployment Models

- Hybrid cloud
  - The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds).

Source: NIST Cloud Computing Synopsis and Recommendations , May 2012

Service Host		Service Owner		Tenancy Model		Cloud Type
*Any	+	*Any	+	*Any	=	Oracle Cloud Public

Enterprise

Cloud Provider

Enterprise

Cloud Provider

Single Tenant

Multi Tenant

Community of related entities

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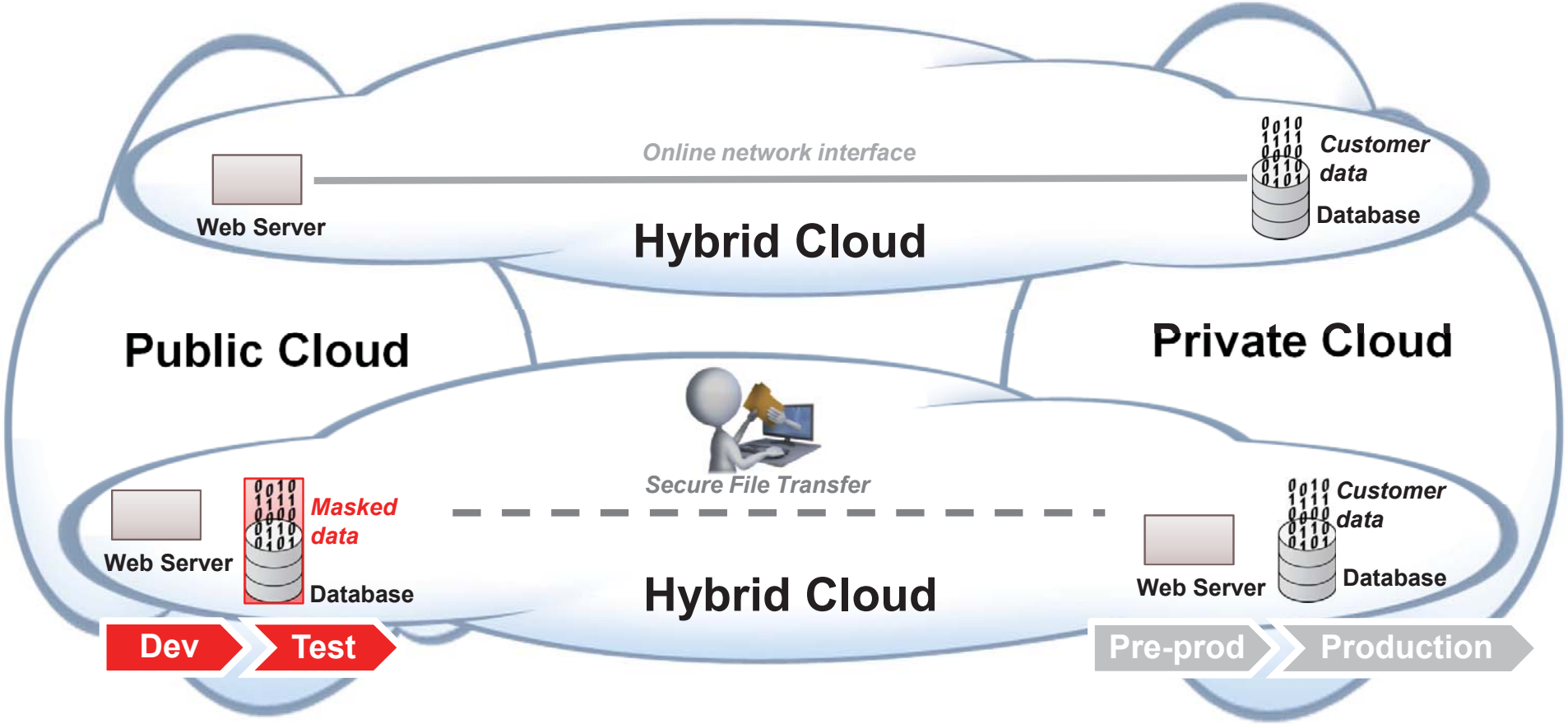
Traversing a Hybrid Cloud



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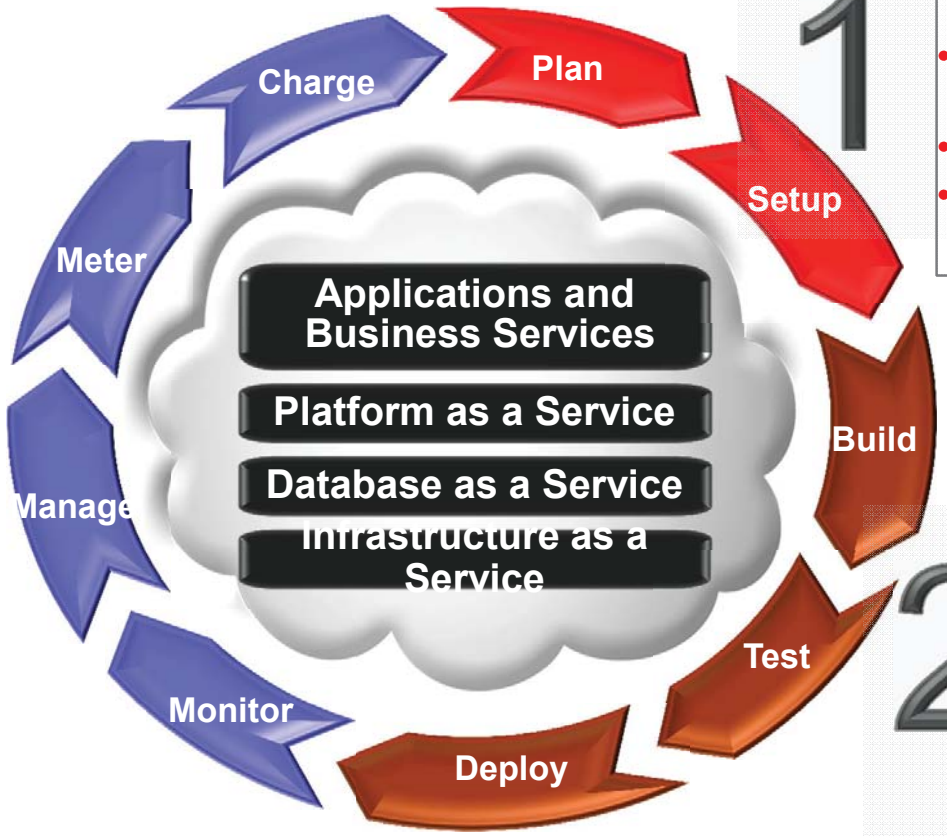
Cloud in 3 Simple Steps

1
- Discover and baseline resources
- Devise a Consolidation strategy
- Consolidate resources
- Setup Cloud



2
- Build standard platforms
- Package the applications
- Populate service catalog
- Enable self-service use

3
- Deliver services
- Monitor from end user, app owner and admin perspectives
- Operate, maintain and patch cloud
- Meter and optionally chargeback

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Cloud Computing: Complete Choice

Recommendations

1. Develop a cloud strategy and roadmap that's right for you
2. For private clouds, start with consolidation
3. Extend to self-service private cloud
4. Use public cloud if requirements are met

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