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Using Cloud Computing to operate a Spatial Data Infrastructure efficiently

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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.

Essential characteristics: On-demand self-service,
Resource pooling, Rapid elasticity, Measured service,
Broad network access



Spatial Data Infrastructure (SDI)

Distributed Responsibility for Data Provisioning

- Distributed Web Services
 - Highly standardized
 - Unpredictable load requirements
 - eg. for INSPIRE – 727 services operational in Germany (May 2012)
- Heterogeneous, distributed source systems
- New requirements
 - Business specific: 3D data support, crowd sourcing, ...
 - Technical: data volumes, access rights, ...
- Limited resources



Cloud Computing for SDIs

- more efficient management of data and services by using a platform hosted on the cloud
 - Economy of scale
- reduce CapEx by using hosted services
- achieve elasticity to address variable load
- reduce time-to-market through self-service and higher degree of automation

Running SDIs on a Cloud Infrastructure

Deployment Model

Service Model

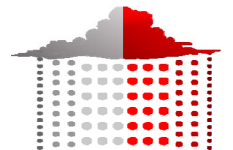
Operating Model



Private



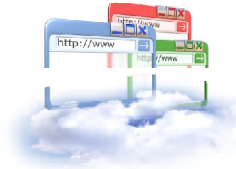
Public



Hybrid



Applications
(SaaS)



Platform
(PaaS)



Infrastructure
(IaaS)



Customer Owns
Customer Operates



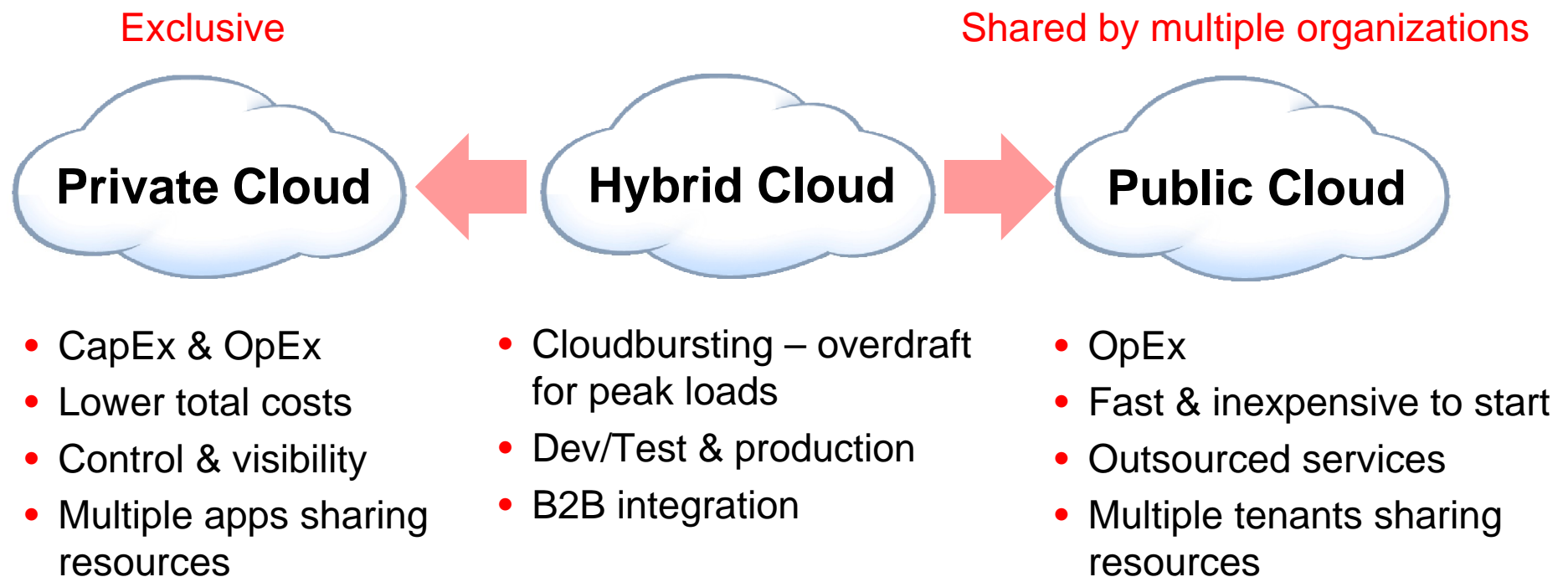
Customer Owns
Provider Operates



Provider Owns
Provider Operates

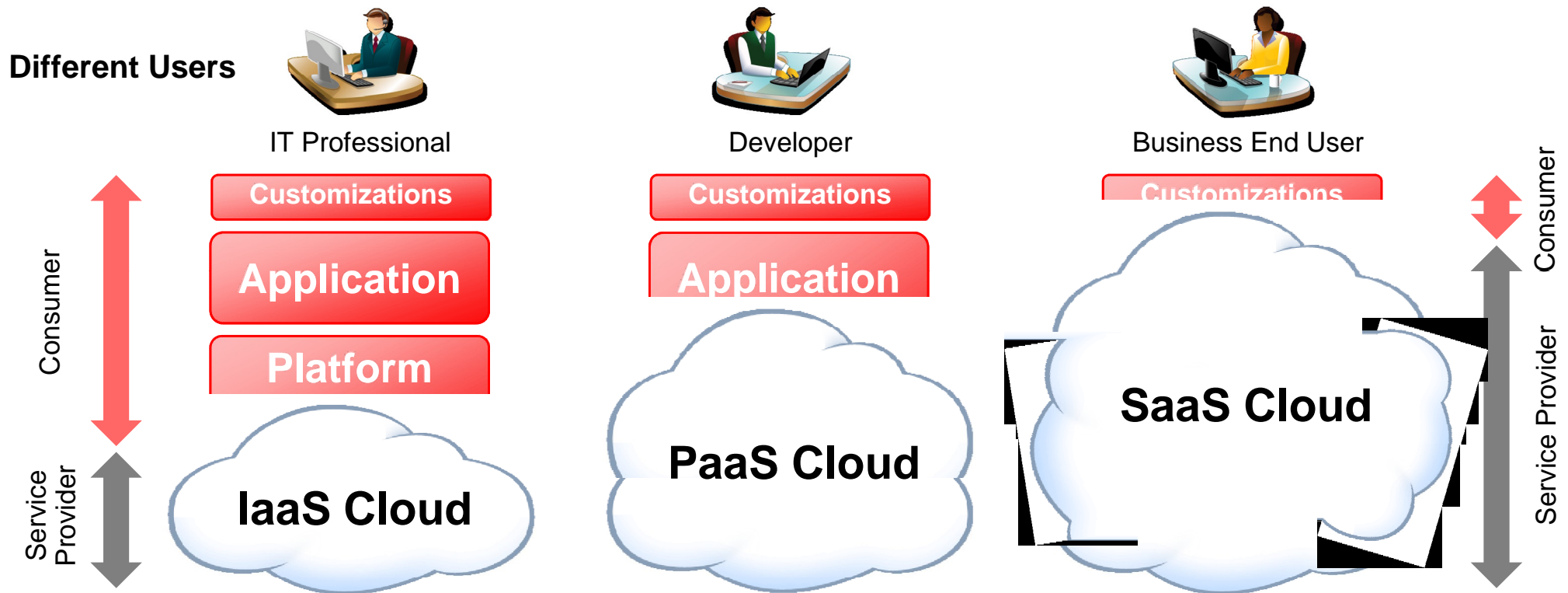
Customers Have a Choice of Clouds

Private, Public, Hybrid



Customers Have a Choice of Clouds

IaaS, PaaS, SaaS



Flexible Adoption – Roadmap to Cloud



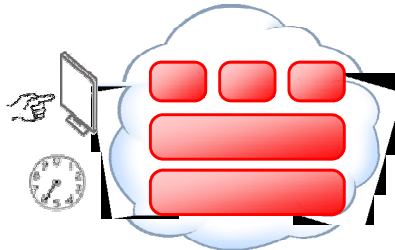
Traditional Silos

- Physical
- Dedicated
- Static
- Heterogeneous
- Disparate Spatial Data



Consolidated

- Virtual
- Shared platform
- Dynamic
- Standardized platform & infrastructure
- Integrated Spatial Data



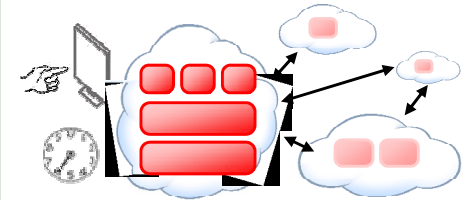
Private Cloud

- Self-service
- Auto-scaling
- Metering & chargeback
- Capacity planning



Public Cloud

- Specialized
- Shared
- Standardized



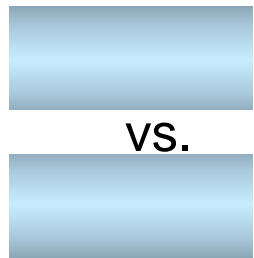
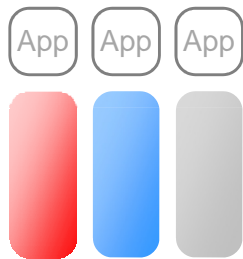
Hybrid Cloud

- Federation across public & private clouds
- Interoperability
- Cloudbursting

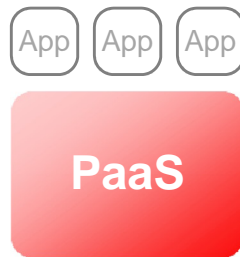
Start with consolidation • Extend to private cloud • Use public cloud where appropriate

Consolidation at PaaS and IaaS Layers

Consolidate onto **standard**, shared and elastically scalable PaaS



Consolidate onto shared IaaS
without standardization



- Standardized PaaS for all applications reduces heterogeneity, cost and complexity
- Accelerated new application development
- Cost savings from less hardware, power and data center space

- Software stack heterogeneity, cost and complexity persists
- No administration (O&M) cost savings
- Cost savings from less hardware, power and data center space

Consolidation of data and Services

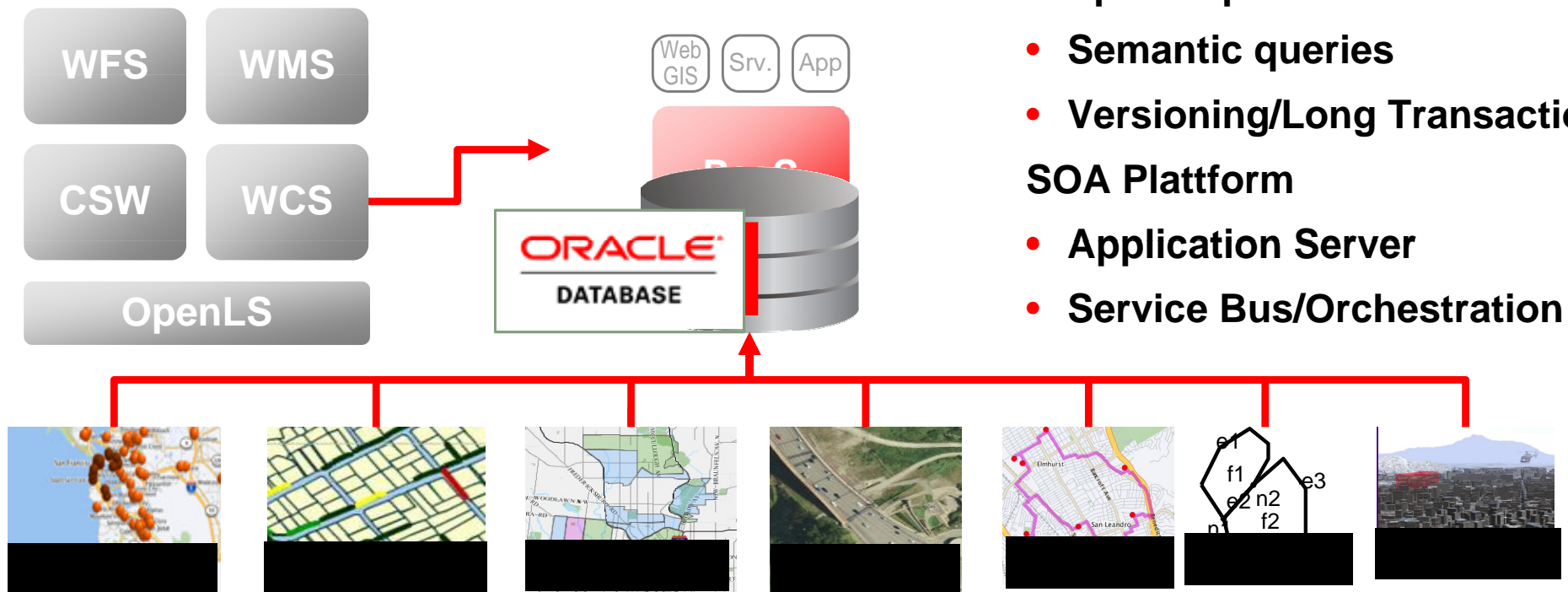
Required platform capabilities

Database functionality such as

- Spatial queries
- Semantic queries
- Versioning/Long Transactions

SOA Platform

- Application Server
- Service Bus/Orchestration



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Exadata, Exalogic, SPARC SuperCluster

Extreme Performance, Engineered Systems

- Building blocks for consolidation and cloud computing
- Unmatched performance, simplified deployment, lower total cost



Complete Cloud Lifecycle Management

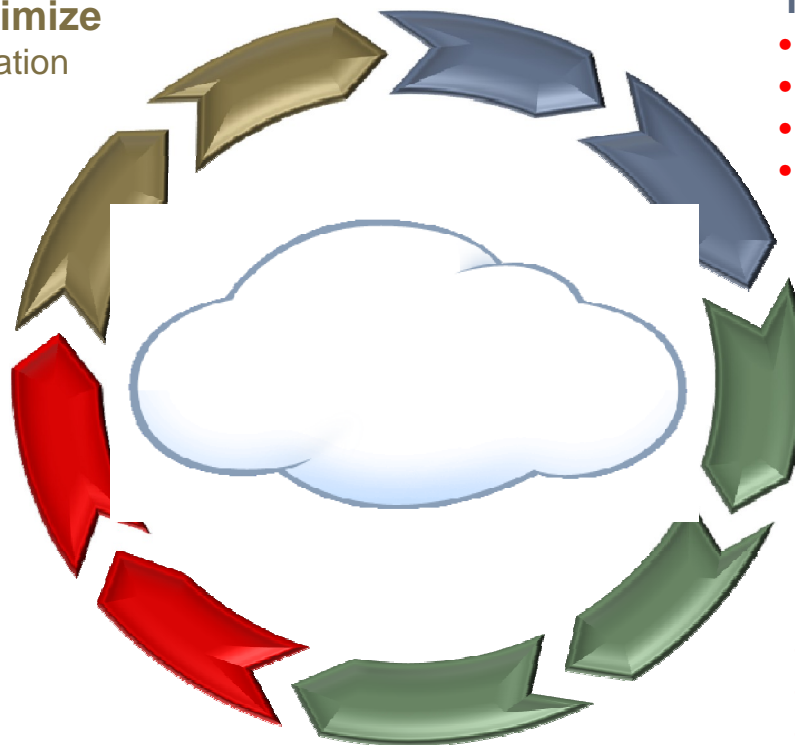
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ENTERPRISE MANAGER

4. Meter, Charge, Optimize

- Metering resource utilization
- Chargeback/Showback
- Optimize performance, capacity, QoS

3. Manage & Monitor the Cloud

- Auto-scaling
- Full stack management
- End-user, business-level, app monitoring



1. Plan & Setup the Cloud

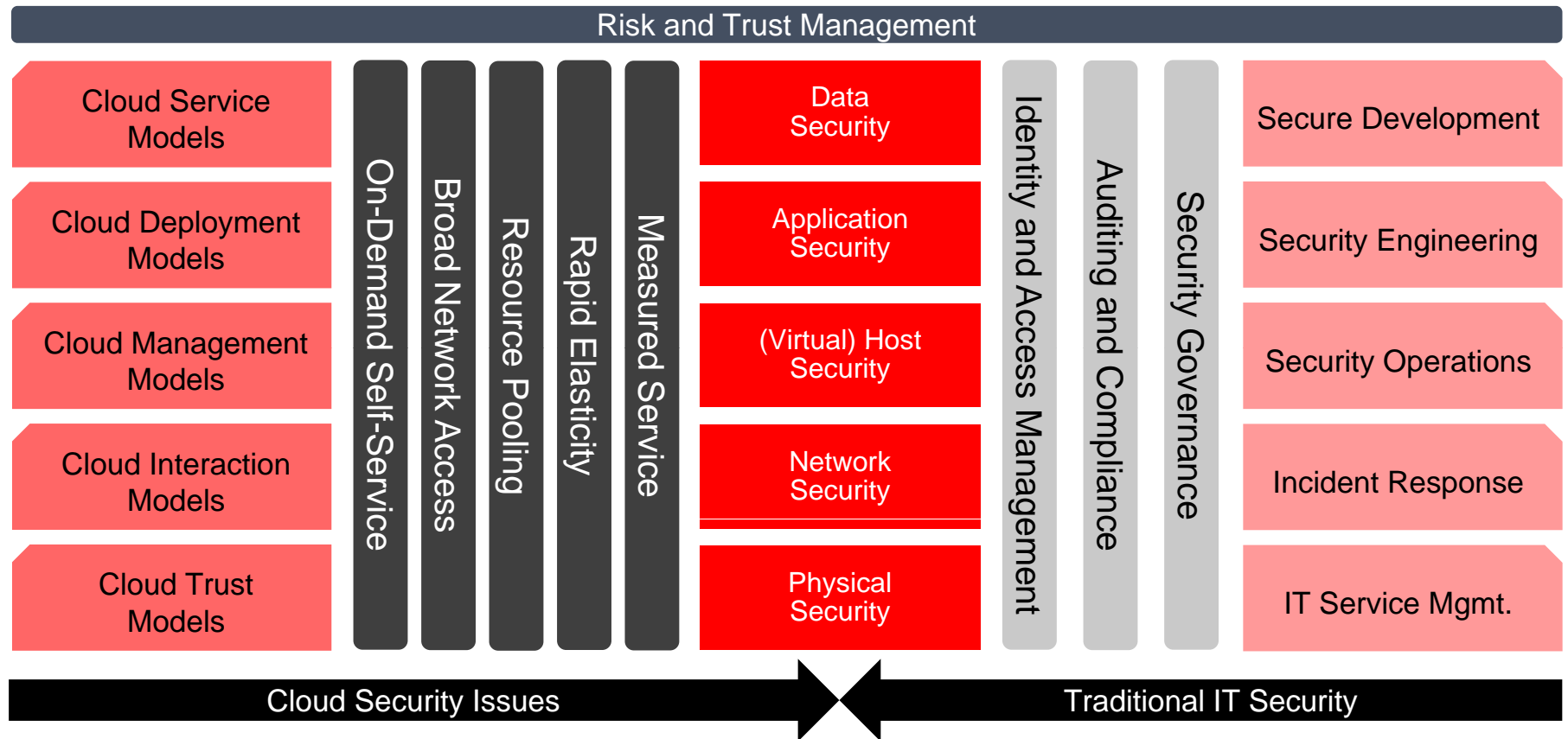
- Capacity & consolidation planning
- Asset discovery
- Bare-metal provisioning
- Policy setup

2. Build, Test & Deploy Apps on the Cloud

- Packaging apps as assemblies
- Testing applications
- Self-service provisioning

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Cloud Computing – Security Aspects





Recommendations

- develop a vision to move to cloud computing
 - save operational cost, improve time-to-market
- start with file and database consolidation
 - reduce complexity, improve security & availability
- consider engineered systems for consolidation
 - save operational cost, reduce deployment time, improve scalability
- integrate geospatial data in all layers of the stack
 - simplify SW development, improve security & availability
- use standards wherever possible
 - protect investments, improve interoperability

ITSO – IT Strategies from ORACLE

More best practices for Cloud Computing

Cloud Computing

Cloud Practitioner Guides

- [A Pragmatic Approach to Cloud Adoption](#) (PDF, 50 pages, published: March 2012)
For enterprises that seek to transform their own IT capabilities and avoid adverse disruption in the process, a structured and pragmatic approach to Cloud computing is required. This practitioner guide details a framework that can be used within any organization for developing such an approach to Cloud adoption.

Cloud Reference Architectures

- [Cloud Foundation](#) (PDF, 60 pages, published: November 2011)
Cloud computing offers the potential for substantial reduction in IT costs while increasing IT agility. This document describes architectural characteristics and expectations of Cloud from a business and operational perspective. Architectural principles, standards, concepts, and a conceptual view for Cloud architecture are also provided.
- [Cloud Infrastructure](#) (PDF, 86 pages, published: November 2011)
Cloud computing has emerged as one of the most important new computing strategies in the enterprise. This document focuses on Cloud from a provider view. It covers the capabilities for public and private Clouds, a discussion of Cloud architectures, and provides key architecture views to jumpstart a Cloud architecture initiative.

Cloud White Papers and Datasheet

- [Oracle's Approach to Cloud](#) (data sheet) (PDF, 3 pages, published: March 2012)
Successful adoption of Cloud computing requires the definition of an approach that aligns with business drivers and operational capabilities. This is why Oracle has developed a pragmatic approach, based on experience with numerous companies, to help customers successfully adopt Cloud. This data sheet provides an executive overview of Oracle's proven approach to Cloud.
[Cloud Candidate Selection Tool](#) (PDF, 15 pages, published: December 2011)
Oracle offers a comprehensive cloud evaluation framework to help IT organizations determine which applications, services, modules, components, and more are appropriate for deployment to either a public or private cloud. This white paper describes the tool and how to use the resulting analysis.
- [Cloud Computing Maturity Model](#) (PDF, 13 pages, published: December 2011)
Oracle offers a comprehensive cloud maturity model based on collective experience and best practices. Maturity models are useful to benchmark yourself against others in your industry, gauge progress on your initiatives, and perhaps even discover that you are on track to achieving your goals. This white paper provides you a framework to evaluate your cloud initiative.

Upcoming Events

- Oracle Spatial and Graph Users Conference 2014
 - Washington, DC, May 21
 - in conjunction with Location Intelligence 2014, HERE and Location Tech Summit, May 19-20



- See <http://www.locationintelligence.net/dc/registration/>

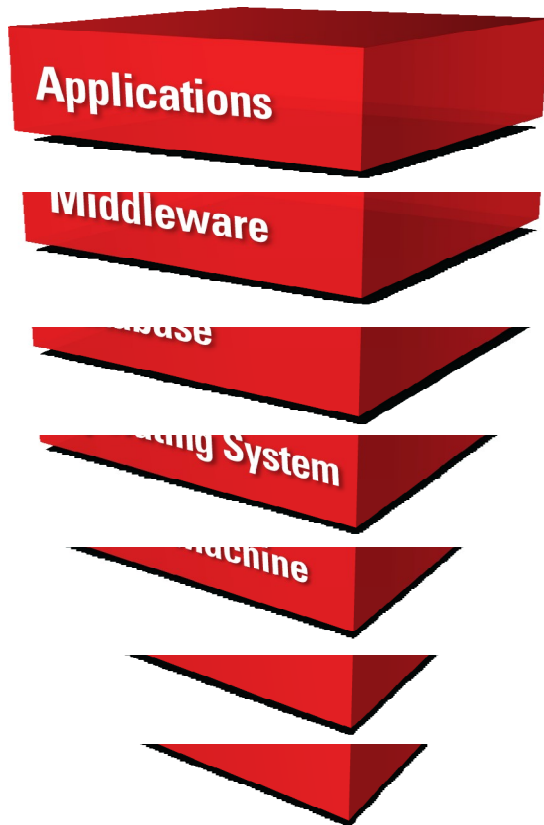
Hardware and Software

The Oracle logo, consisting of the word "ORACLE" in white, uppercase, sans-serif font, centered within a solid red rectangular bar.

Engineered to Work Together

ORACLE®

Oracle Strategy



Complete Stack

- Best-of-breed
- Open
- Vertical Integration
- Extreme Performance
- Engineered Systems

Complete Customer Choice

- On-premise
- Private Cloud
- Public Cloud
- Hybrid Cloud

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