

Disassembling the Cloud

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Cloud Computing Perspective

Cloud Engineering

- Enterprise Architecture
- Transition Planning
- Cloud ROI
- Cloud Readiness Testing
- Reengineering for Cloud

Data Center Mission Applications

Cloud Transition

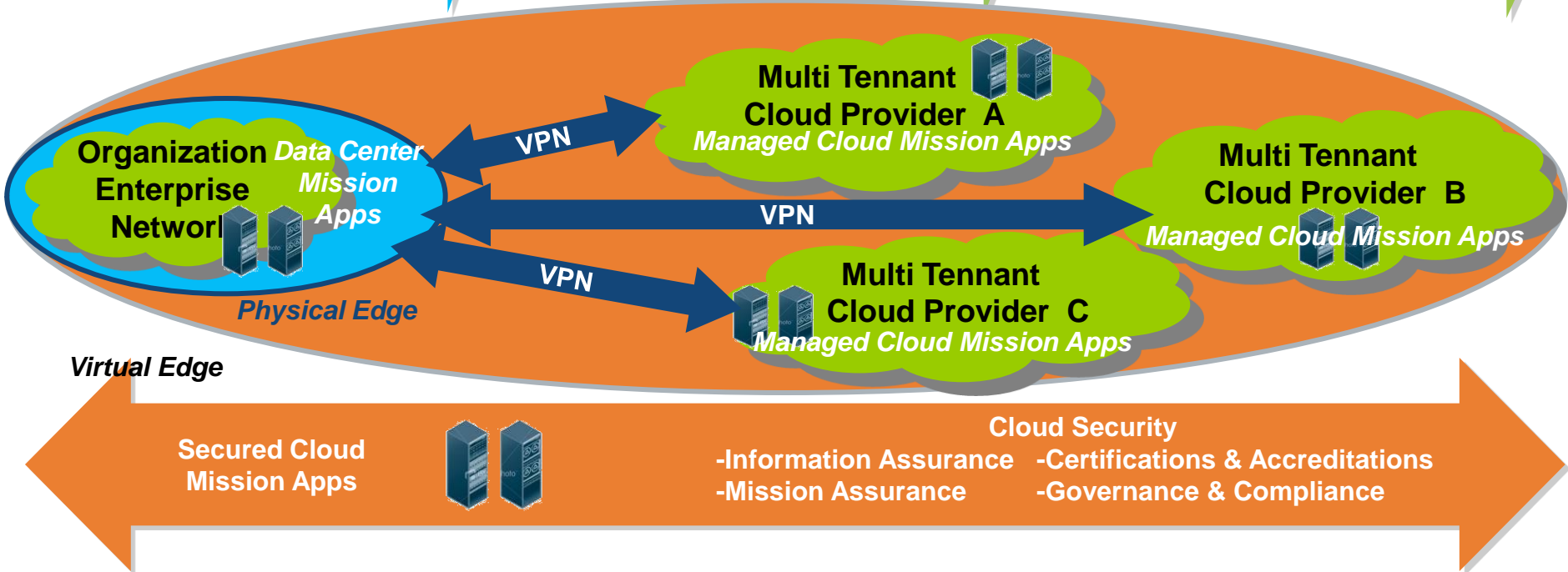
- Cloud Contracting
- Cloud Provisioning
- Mission App & Data Migration
- Mission App & Data Validation
- Mission Continuity

Cloud-Ready Mission Applications

Cloud Operations

- Service Level Agreements
- CM in the Cloud
- Multi Cloud Management
- COOP Validation

Cloud-Deployed Mission Applications



The Business of the Cloud: What's Old is What's New

“Gray Hairs” – this is time-sharing revisited

“Newbies” - Cloud Computing allows companies to scale applications in a way they could never do before



The truth...

...Cloud computing leverages old concepts of **shared computing** with novel **dynamic provisioning** and **elasticity**

The Business of the Cloud: Cloud Computing Use Cases

I want to scale my application to support peak usage periods, e.g. end of month processing, and I don't want to design my infrastructure to support this aberration from average usage

- Includes start-up where large volumes anticipated, but too costly for build it and they will come

Managing a data center is outside my company's core competency, and there's no value to developing that competency in-house

- I am acquiring a particular service because it is unique and it's more costs-effective to have the vendor manage it than develop that knowledge in-house

I don't want to deal with the issues related to packaging, selling, distributing and installing my software to customers

The Six Cloud Layers

Hardware

Network

Operating System

Access

Metering

Application



The Six Cloud Layers: Level 1—Hardware

Hardware requires capital expenditures

Hardware ages more rapidly relative to new advances in technology

Hardware requires supporting infrastructure

- Cooling, network, storage, DR, backup, etc.



The Six Cloud Layers: Level 2—Network

The network is the life line for most applications being developed and/or deployed today

Network communications are often the most complex vendor relationships to manage

- Bills are so complex and componentized that carriers can make money on the margin error

Network bandwidth is often underutilized and needs to support peak usage

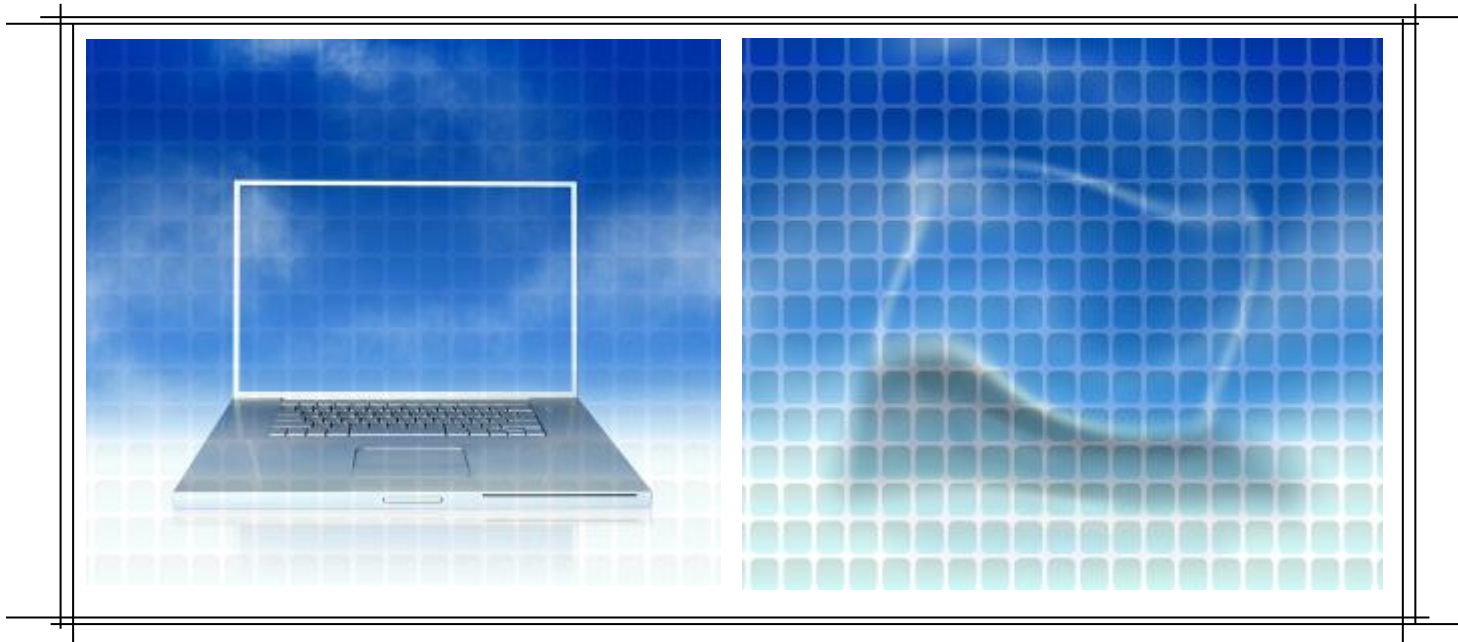
- Network Neighborhood – carrier-neutral co-location facilities allow sharing of bandwidth

Cloud computing offers the opportunity to balance peak usage needs with average network utilization in a more cost-effective manner

The Six Cloud Layers: Level 3—Operating System

The operating system is the software that interfaces applications to the hardware

The Cloud consumer's view of OS and the Cloud provider's view of OS are typically very different



The Six Cloud Layers: Level 4—Access

Access is the layer that enables provisioning, configuration and monitoring of the cloud computing environments

- Amazon Web Services
- 3Tera

The access layer is under heavy scrutiny because it lends itself to vendor lock-in

- Cloud Computing Interoperability Forum (CCIF) seeking standardization
- EUCALYPTUS is compatible with Amazon EC2 interface, allowing EC2 tools to be used

Unified Cloud Interface (UCI)

- A means of collecting and aggregating Cloud metadata
- An ontology that describes the features and services of various Cloud provider offerings in a common vocabulary
- A means of capturing the description of a particular deployment design for re-deployment on any comparable Cloud provider's offering

The Six Cloud Layers: Level 5—Metering

The metering layer is critical for pay-for-use Cloud offerings

Metering is a very immature component of most Cloud offerings available today

- Amazon EC2, S3
- GoGrid – metering interface



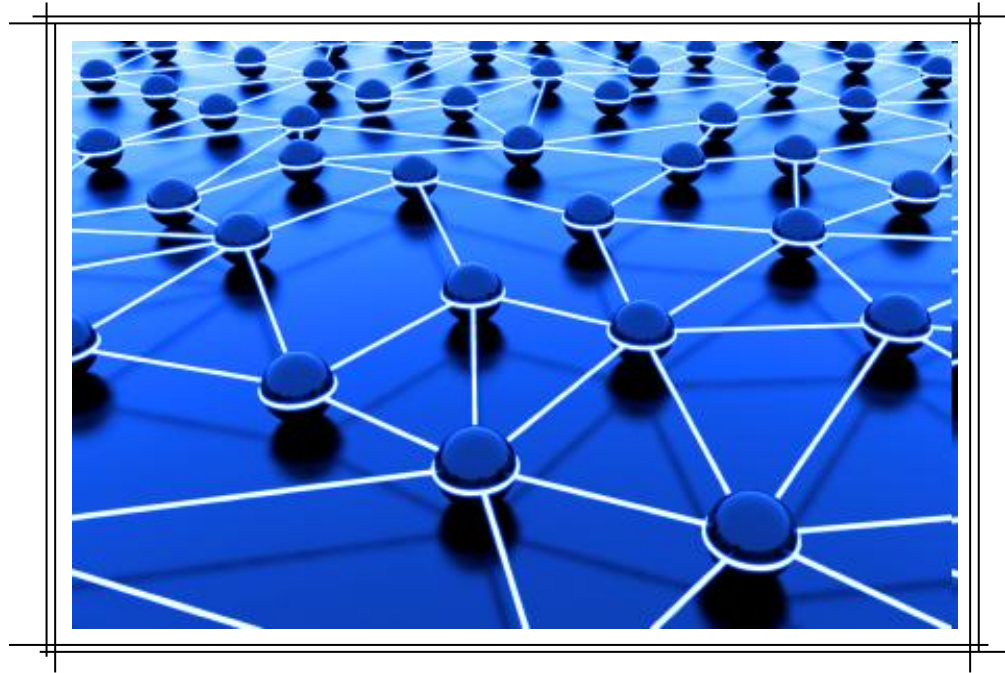
The Six Cloud Layers: Level 6—Application

Everything that runs in the operating system is an application

For the Cloud provider using a hypervisor to deliver IaaS, the guest operating system is an application

For the Cloud provider delivering PaaS & SaaS, the OS is typically a traditional OS (e.g. Windows, Linux, etc.)

For the Cloud consumer, the application is always running on a guest OS



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