

# Building a Service Provider Cloud with IBM & Capgemini

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## Pulse2011

The Premier Service Management Event

**Optimizing the World's Infrastructure**

February 27–March 2 Las Vegas, Nevada

# Session Objectives



- **Abstract**

- This session will describe the experiences and lessons learned from the implementation of a multi-tenancy IaaS Cloud for Capgemini in the UK and US, using IBM's Cloud management platform. This is a joint presentation from the Capgemini and IBM teams responsible for the deployment of the solution.

- **Key Points**

1. Why Capgemini chose IBM to partner with on this important Cloud initiative.
2. Key challenges of implementing a multi-tenant IaaS in a leading Global IT Services Provider.
3. Project and technical lessons learned of deploying a multi-tenant Cloud platform, using Tivoli based solutions (TSAM/ISDM).

# Agenda

- The New Business model for Cloud computing
  - Capgemini's drivers for Cloud computing.
  - An outsourcer and global integrator, not a Cloud Service Provider
  - Capgemini value proposition
- Why Capgemini chose IBM as the IaaS technology partner?
  - Why partner with a competitor?
- What did we jointly build?
  - Important use cases & capabilities
  - Solution overview
  - Cloud Management Platform
- What were the key challenges to overcome?
- What were the key lessons learned during the project?
- Summary

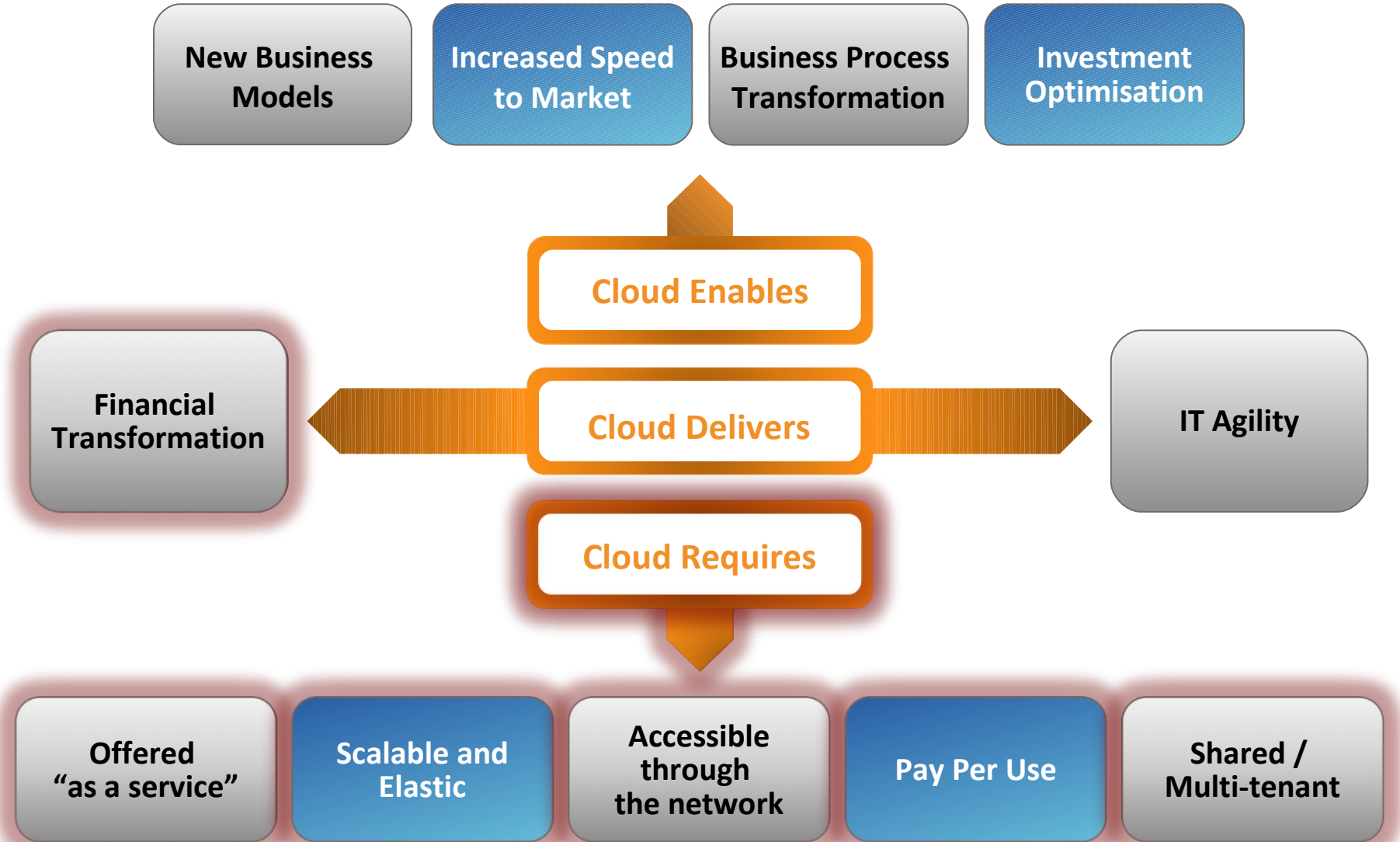


# The New Business Model

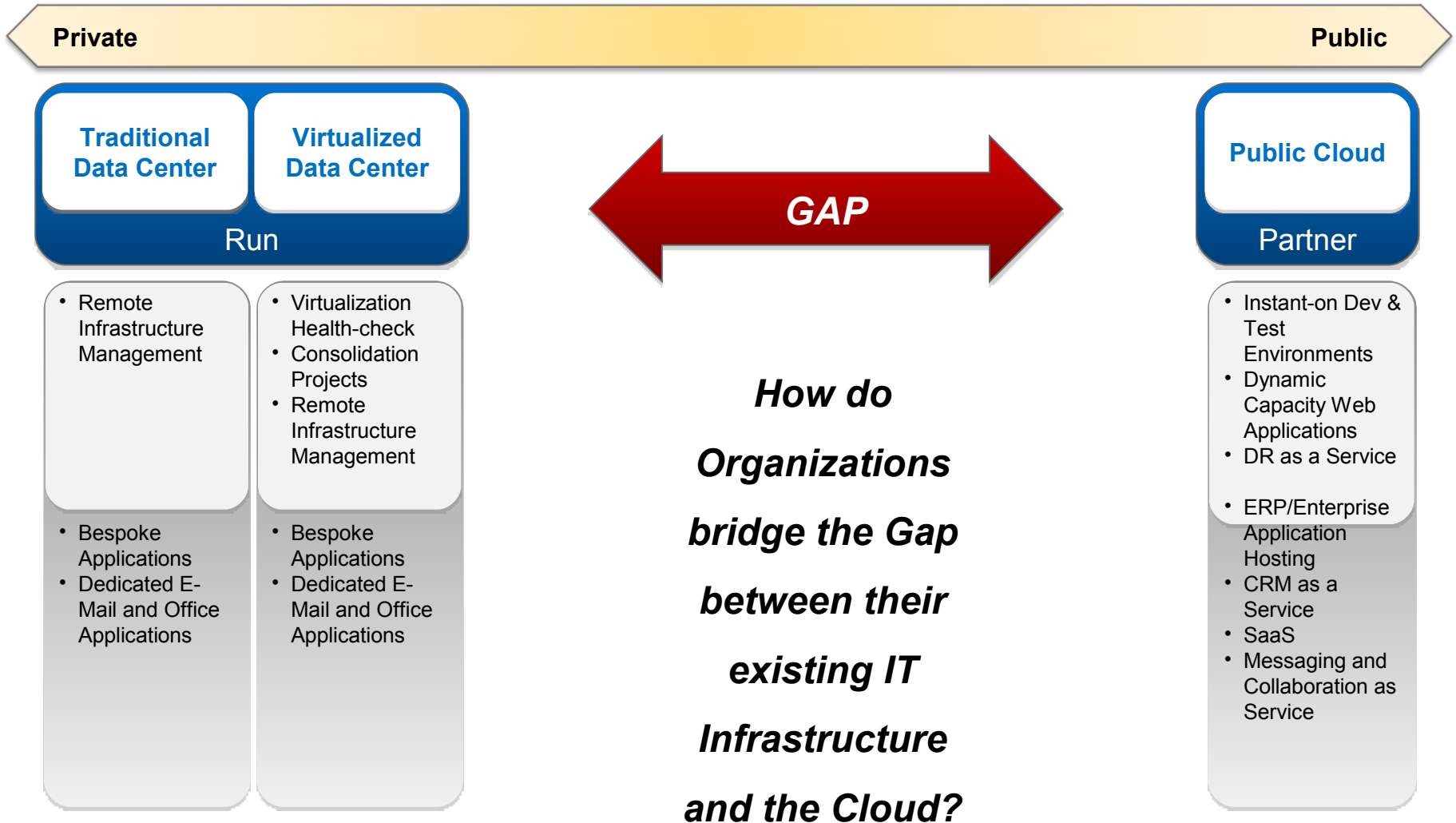
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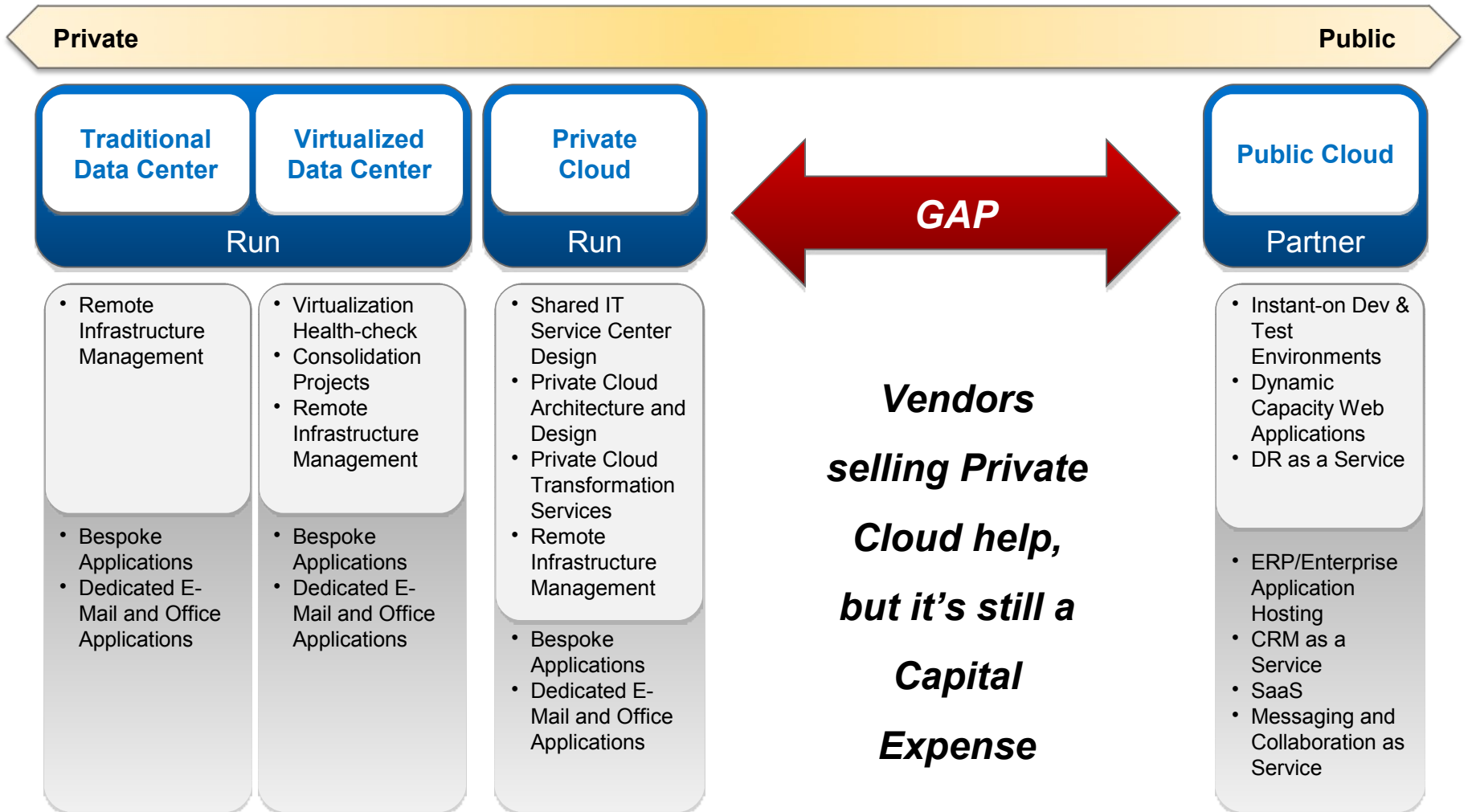
# What is the Cloud?



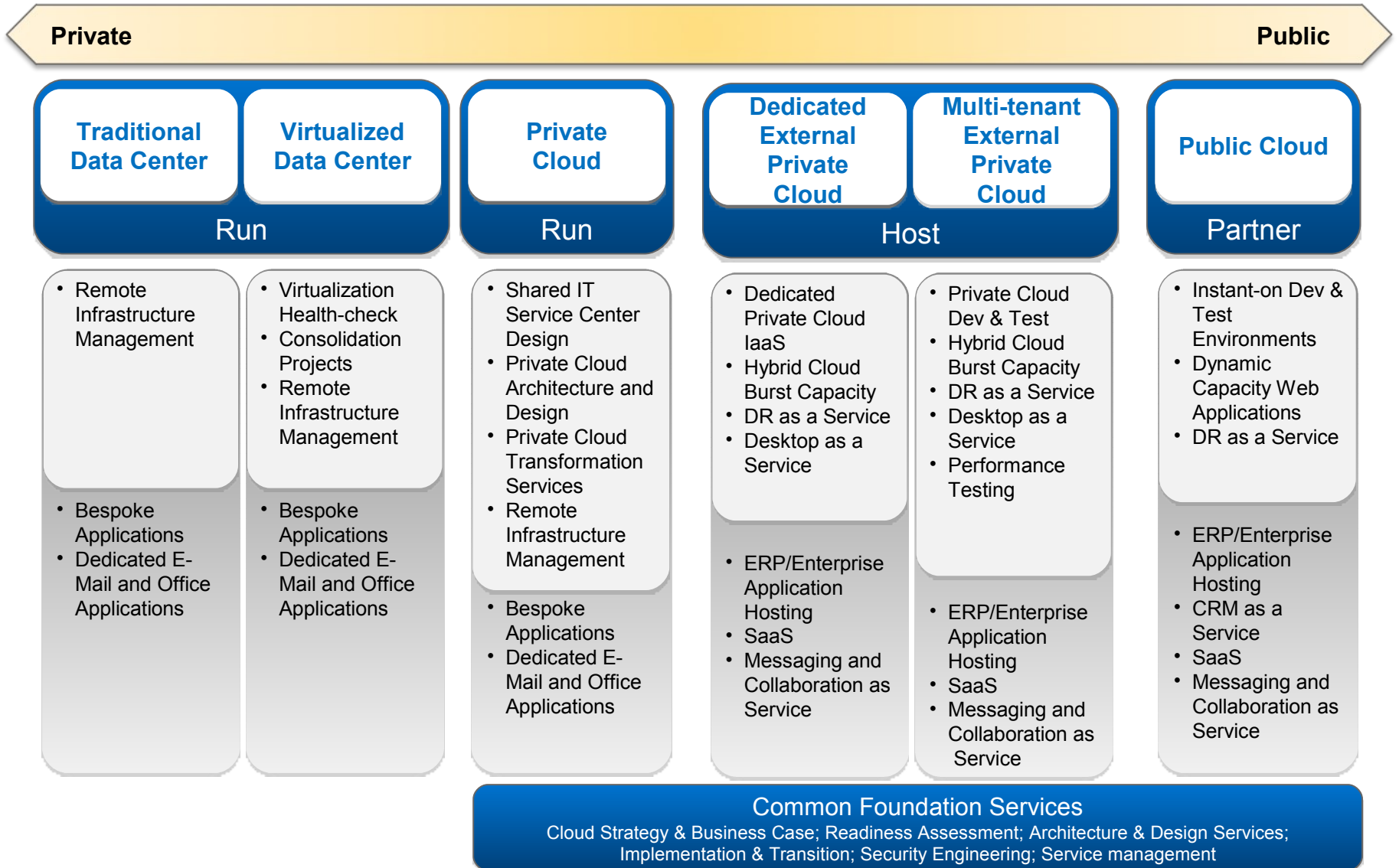
# The Compute Continuum



# The Compute Continuum

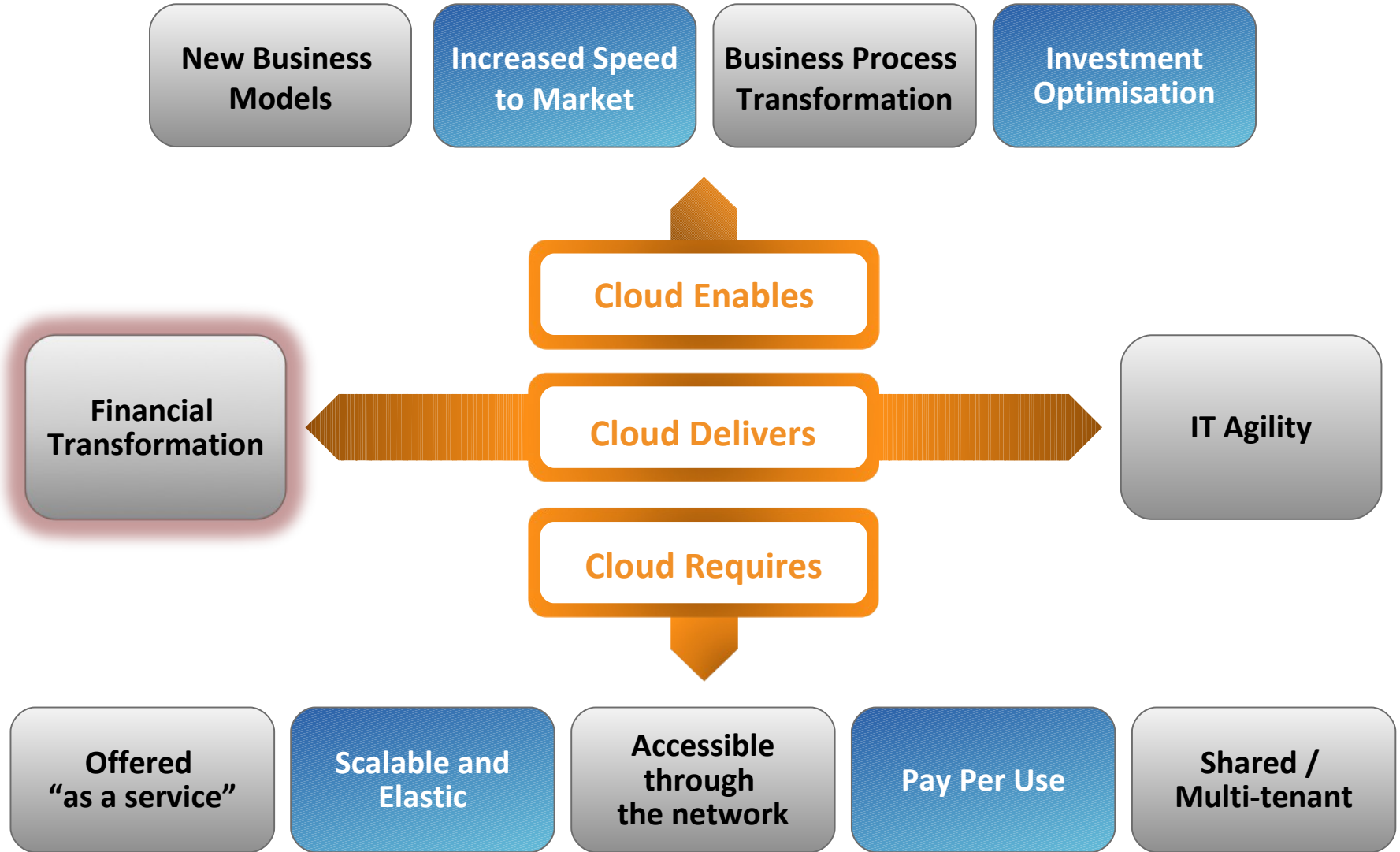


# The Compute Continuum



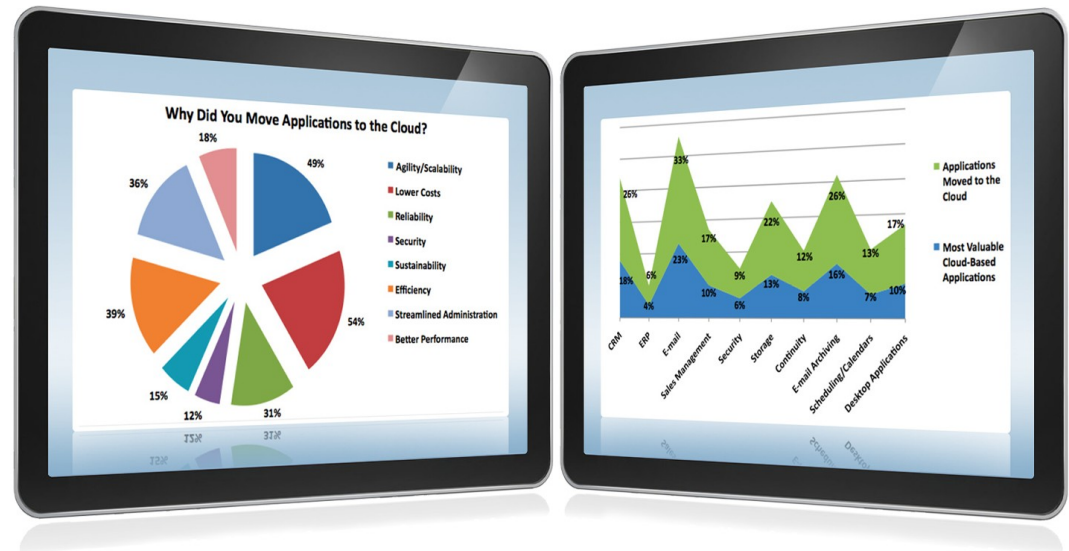


# What is the Cloud?



# What's the impact for Service Providers?

- Changing Business Model
  - From Cost-Plus to Cost-Volume-Price (CVP)
  - The Hotel Occupancy Model
  - Capacity
  - Competitive Rates
- Value Add
  - Outsourcing. Systems Integration, Applications
  - Portfolio of services
  - Service Levels
- Market-Driven
  - Reduced Cost
  - Flexibility



Why Capgemini chose IBM as the  
IaaS technology partner?

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# Our Evaluation Process

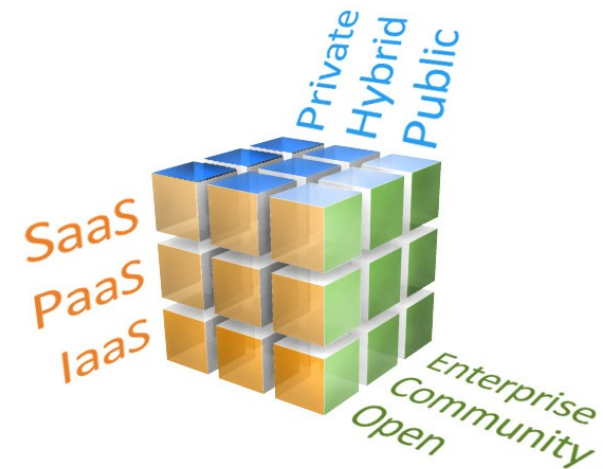
- Build vs. Buy
  - “Private Cloud” versus “Service Provider”
  - The Cloud Market is nascent and dynamic
  - Balancing “Leading Edge” against Reliability
- Scale
  - Start small, but think Big
  - From 10s of thousands to 100s of thousands
  - Respect the various Global Regulatory Environments
- Total Cost of Ownership
  - Capital, One-time and Operating Expenses
  - Technology AND Process AND People

# Why IBM

- Leverage IBM's Cloud deployment experience
- Broad portfolio of technology capability
- Roadmap to extend cloud service provider capability
- Competitors working together!

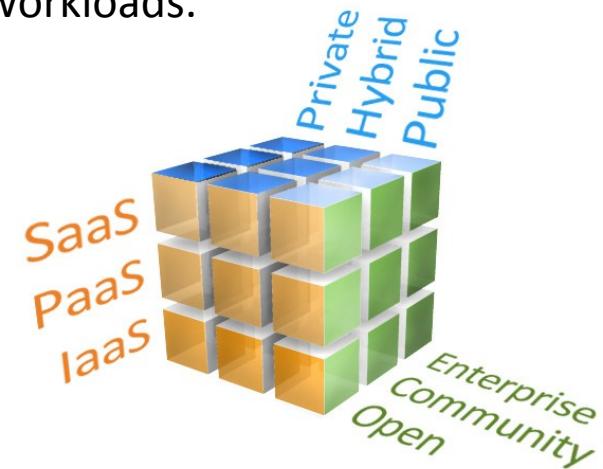
# IaaS Functional Requirements

- Fully automated delivery of IaaS into Private Cloud.
- Secure self-service portal for access to service catalog.
- **Resource pools with different quality of service.**
- Multi-Customer shared infrastructure.
- **Network separation between customer environments.**
- Simple branding of portal.
- Resource reservation.
- Role based access & approval.
- Automated de-provisioning of workloads.
- **Metering of cpu, memory, storage & images.**
- Different pricing schemes per customer.



# IaaS Non-Functional Requirements

- Resilient global infrastructure deployment.
- **Single CMP managing multiple CRPs.**
- Regional resource pools.
- Highly available CMP and CRP design.
- **Modular design, quick to scale out.**
- Secure multi-tenancy of VMs.
- Multiple network domains per customer.
- Local image libraries.
- Quickly extensible in service catalog richness.
- Secure portal access.
- Integrated monitoring.
- **No hypervisor lock-in.**
- Ability to on-board existing Capgemini customer workloads.



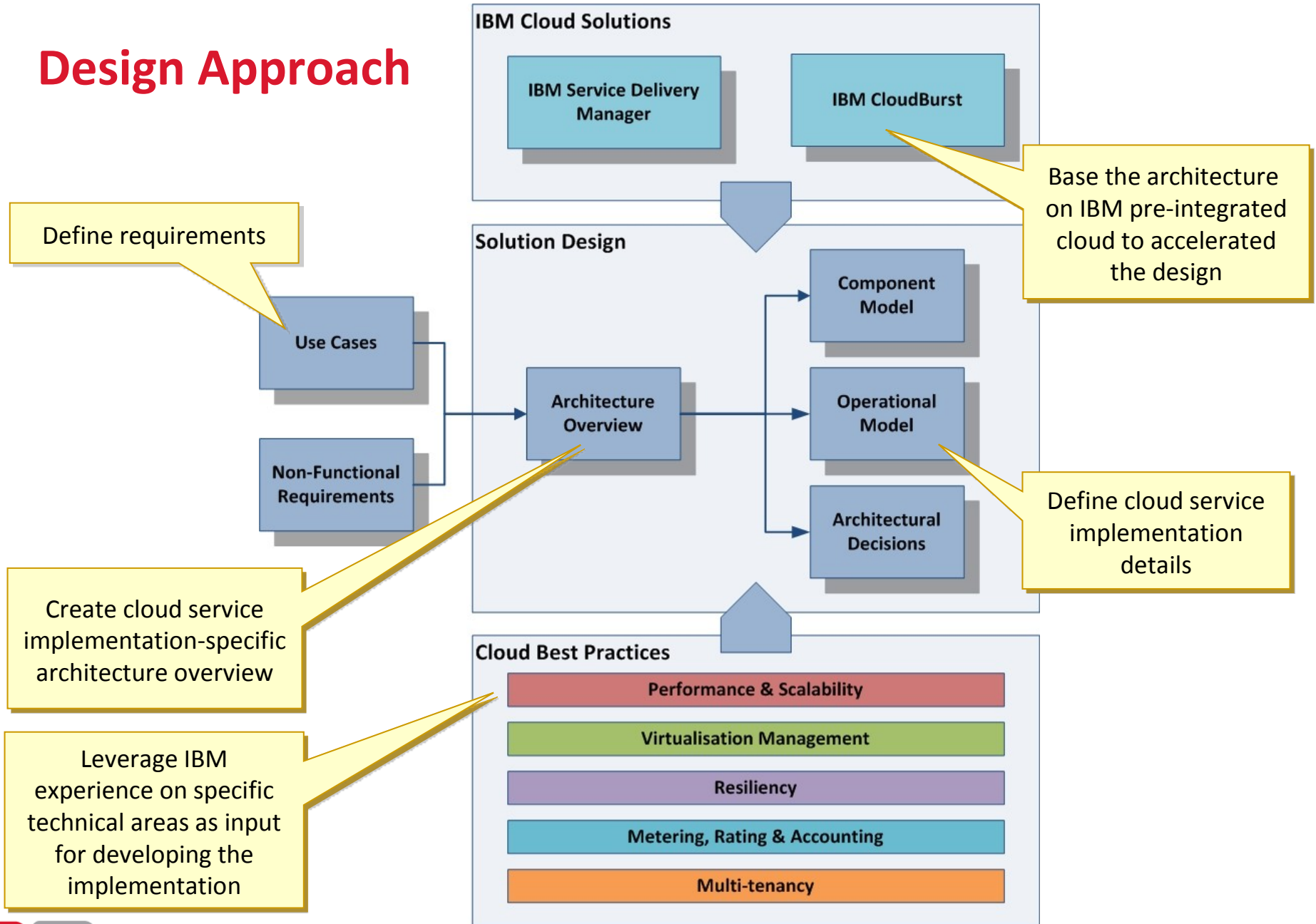
What did we jointly build?

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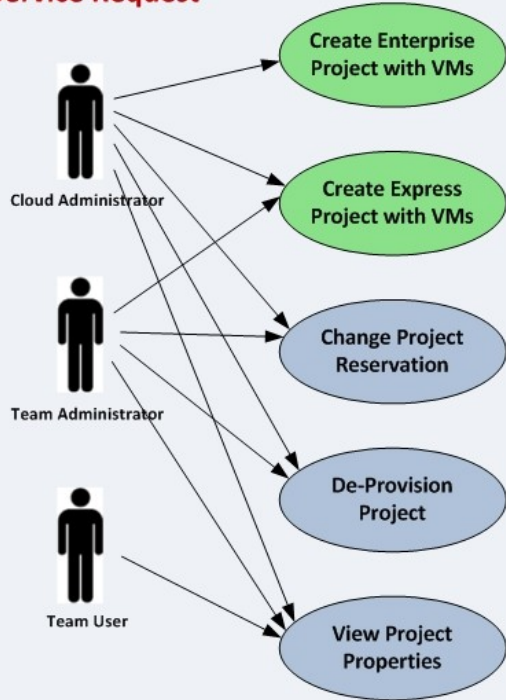


# Design Approach

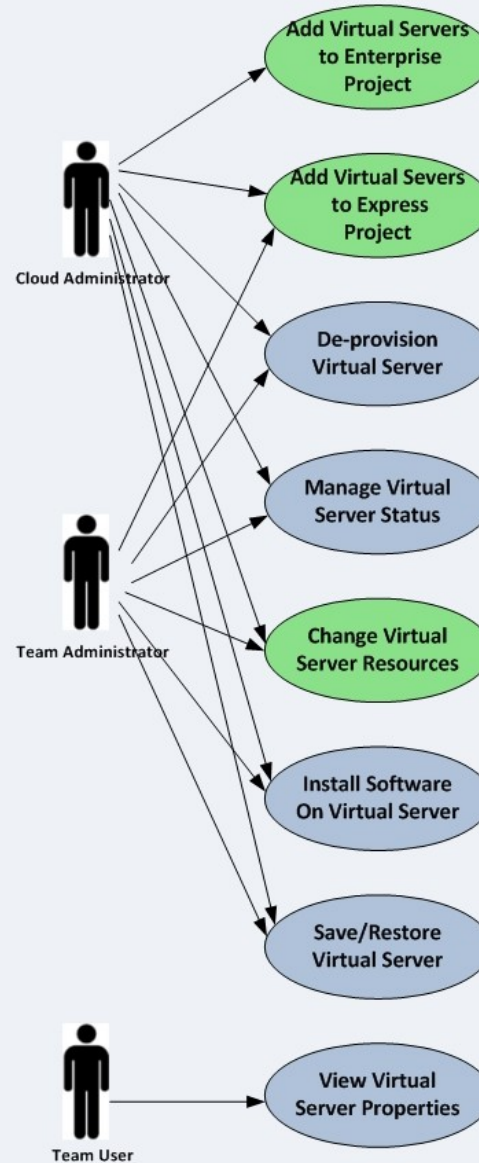


# Key Use Cases

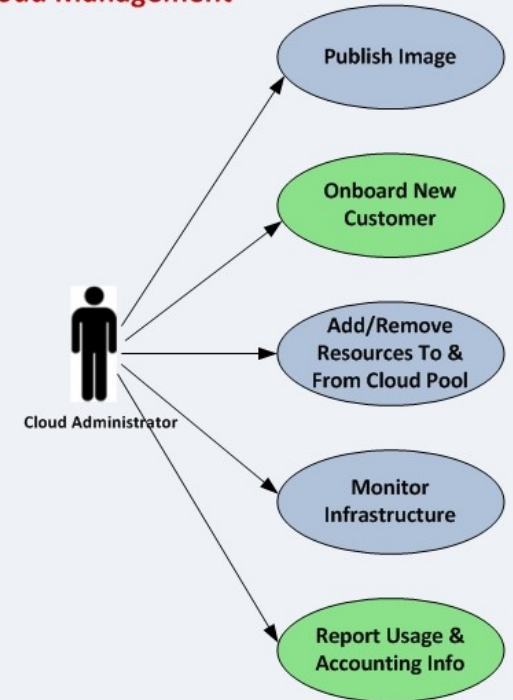
## Service Request



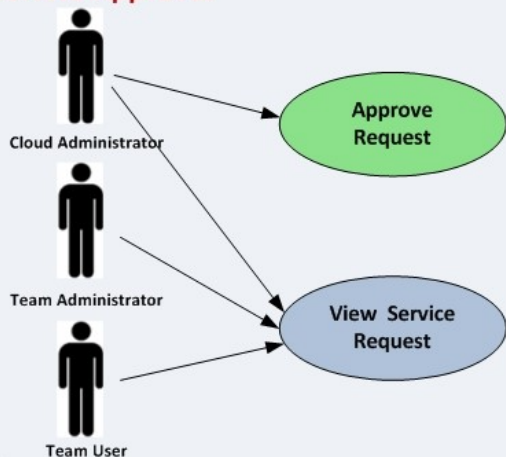
## Service Management



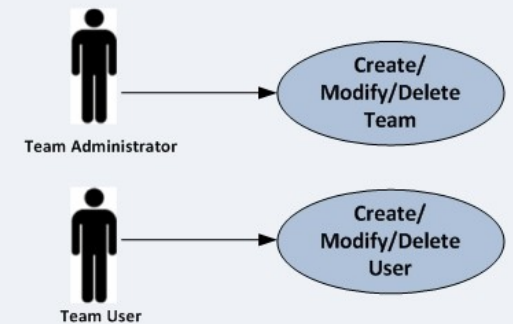
## Cloud Management



## Service Approval



## User Management



# Solution Overview

Client Administrators



Client A

Client B

Client C

Multi-Client Data Center Networking

Cloud Management Platform

Self-Service Portal

Cloud Mgmt System

Service Management, Provisioning, Availability, etc.

Virtualization Management

Hypervisor management

Hardware Management

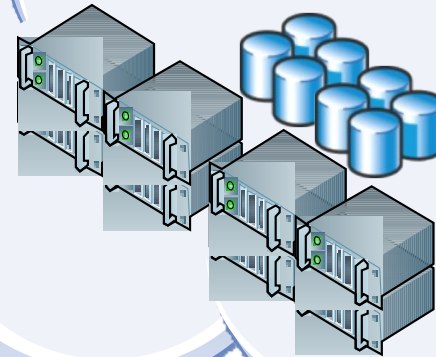
Servers, Network, Storage management

Administration



Cloud Administrators

Client Resource Pools

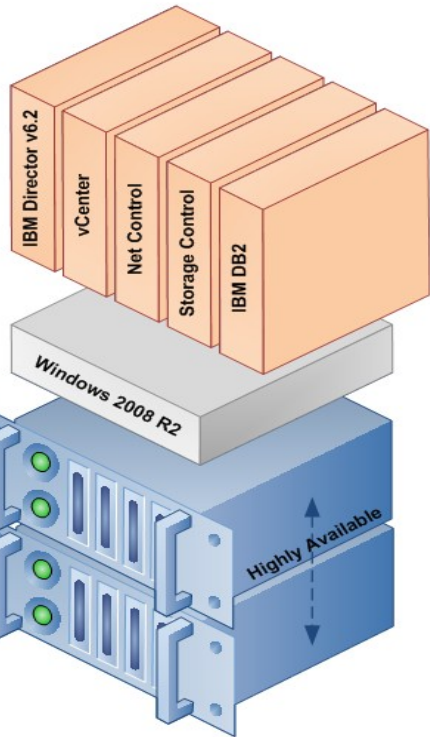


Enterprise Management System  
(Authentication, Event management, etc)

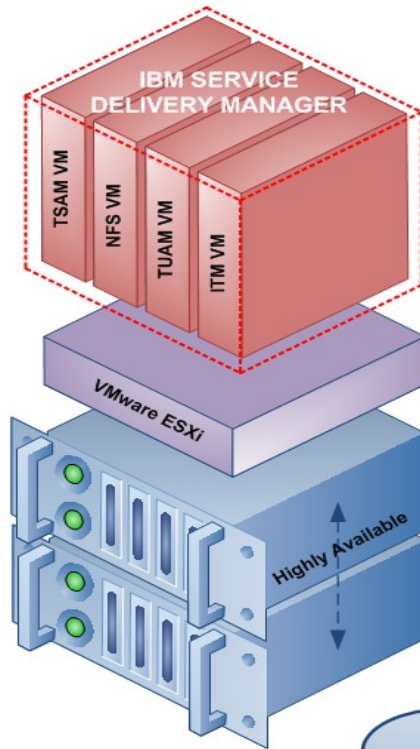
# Cloud Management Platform & Resource Pools

## MANAGEMENT ENVIRONMENT

### HARDWARE MANAGEMENT CONSOLE



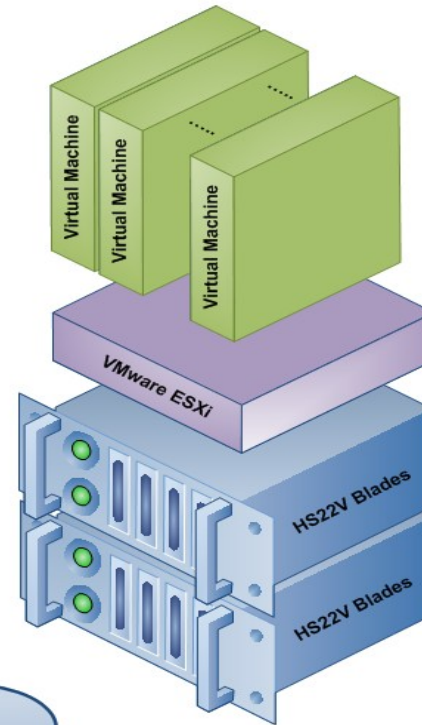
### CLOUD MANAGEMENT PLATFORM (CMP)



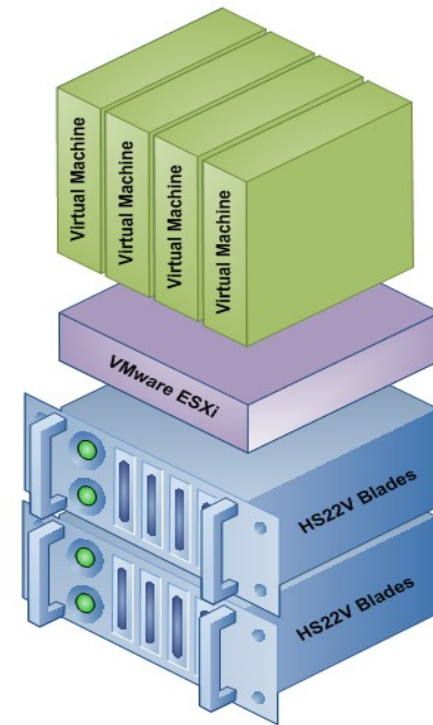
## MANAGED ENVIRONMENT

### ← CLOUD RESOURCE POOLS →

### EXPRESS RESOURCE POOL



### ENTERPRISE RESOURCE POOL



# IBM Tivoli Service Automation Manager

Automate requesting, deployment, monitoring and management of cloud computing services

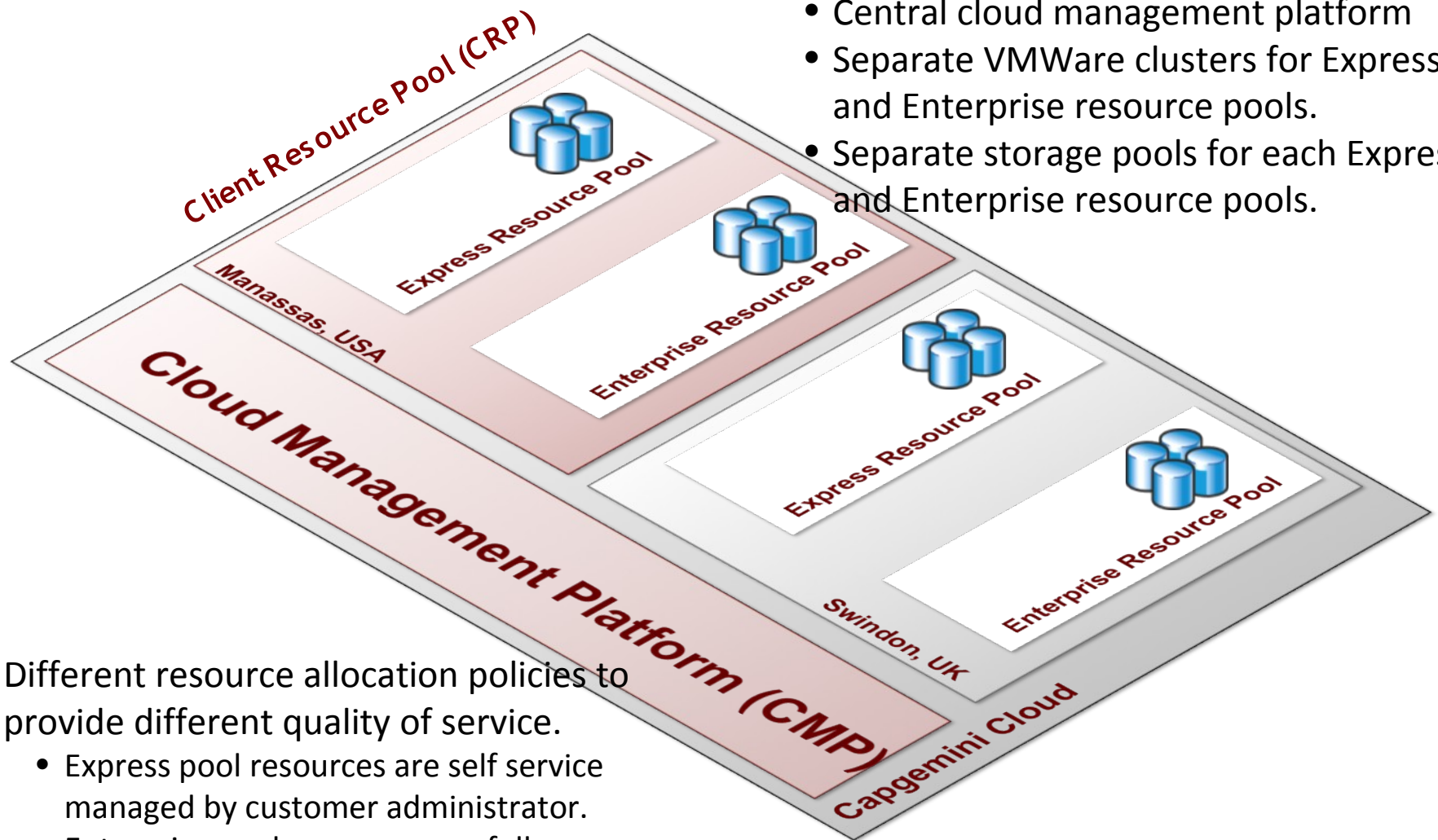
## Overview

Enables users to request automated deployment, monitoring and management of cloud computing services. Also provides traceable approvals and processes and integrates with process governance.

## Highlights

- Lowers the cost of service delivery through automation and reduced skill requirements
- Deploys IT services faster to meet the increased need for development, test, preproduction and production systems
- Delivers a higher degree of standardization and automation for deployment and management of cloud services while reserving skilled IT staff members' time for other high-value tasks
- Offers an integrated management capability that addresses the lifecycle changes of a cloud service
- Provides traceable processes and approval routings to serve as audit trails, and integrates with process governance

# Client Resource Pools

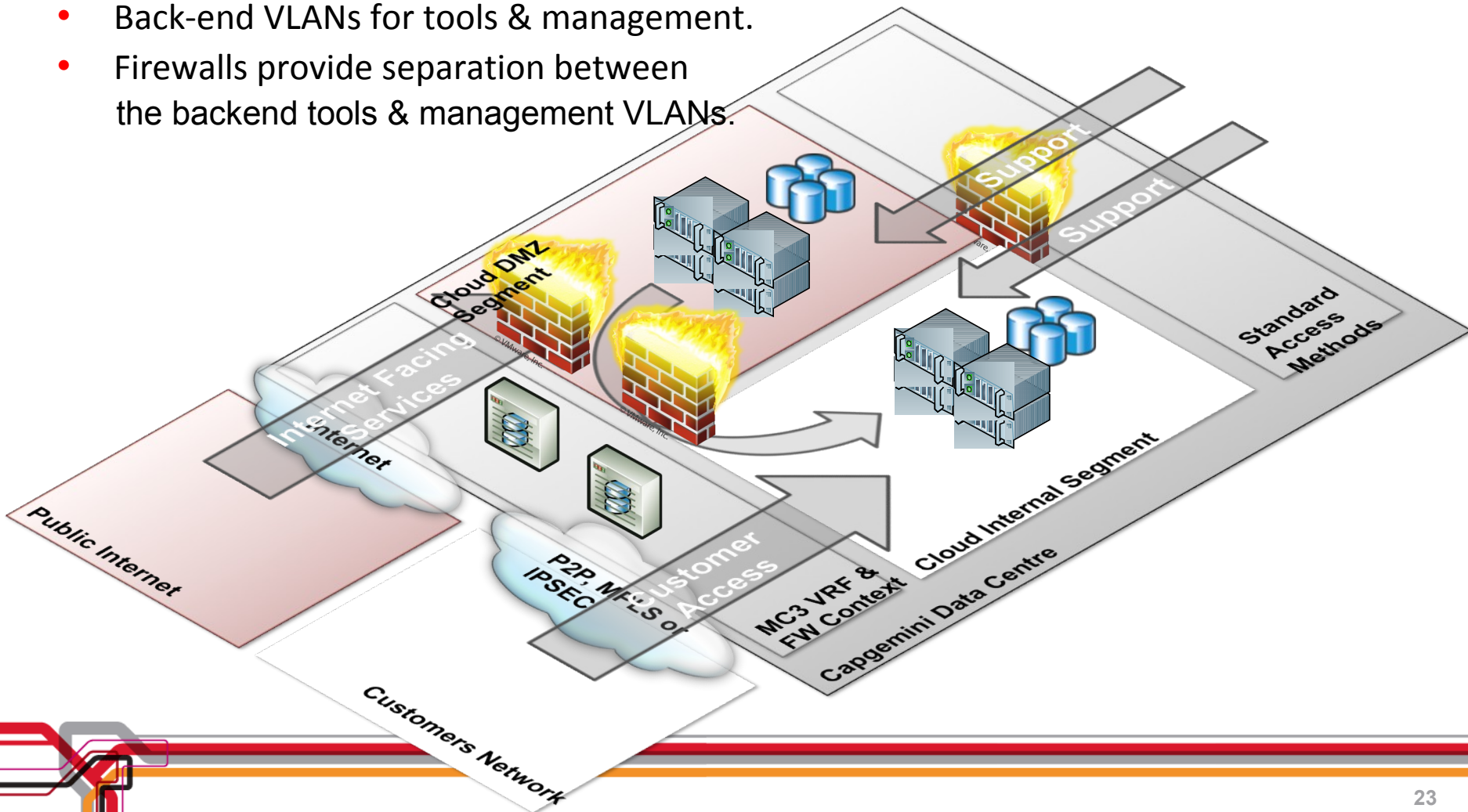


- Regionally deployed, initially in US & UK.
- Central cloud management platform
- Separate VMWare clusters for Express and Enterprise resource pools.
- Separate storage pools for each Express and Enterprise resource pools.

- Different resource allocation policies to provide different quality of service.
  - Express pool resources are self service managed by customer administrator.
  - Enterprise pool resources are fully managed by Capgemini administrators.

# Network Infrastructure

- Customers allocated VRF, customer VLANs within VRF
- VMs are assigned to a Customer assigned VLANs
- Management VLANs for CMP, automation, remote access
- Back-end VLANs for tools & management.
- Firewalls provide separation between the backend tools & management VLANs.



# Self-Service Portal

## Manage users teams and assign authorization roles

- Create, modify teams
- Create, modify users
- Assign roles

## Manage service requests

- View Service Request
- Manage service request approvals

Capgemini Private Cloud Services  
Welcome Capgemini User About Help Logout

Home > Request a New Service > Virtual Server Management

Backup and Restore Server Image

Modify Project

Cancel Project  
Use this task to cancel a project. All of its virtual servers will be de-provisioned and would no longer will be available. Any saved images will also be deleted.

Create Project from Saved Image  
Provision one virtual server from a saved image to a new project.

Manage Users and Teams

Modify Server

Create Express Project with VMware Servers  
Provision one or more VMware virtual machines containing a software image.

Create Project with VMware Servers  
Provision one or more VMware virtual machines containing a software image.

My Requests  
Resolved (19) Failed (1) Total (20)

Recent Activity  
Create Project with VMware Servers EvanSWTest2 Resolved  
Create Express Project with VMware Servers dbsize\_013 Resolved  
Create Express Project with VMware Servers dbsize\_012 Resolved  
Create Express Project with VMware Servers dbsize\_011 Resolved  
Create Express Project with VMware Servers dbsize\_010 Resolved

My Projects  
Decommissioned (73) Operational (17) Total (90)

Recent Activity  
CustAExpUK Decommissioned  
EP4 Decommissioned  
NewExpUK05from Saved Decommissioned  
EvanSWTest2 Decommissioned  
Evan\_Windows\_SP\_TEST Decommissioned

Upcoming Projects  
No upcoming projects

## Service requests and virtual server creation

- Request project and create virtual servers
- Add virtual servers to projects

## Manage Projects & Servers Control virtual machines:

- Start, Stop, Restart and Save/Restore servers
- Modify virtual server resource allocation
- Request decommission of virtual servers and projects



# Self Service Portal: Request Project and Server Creation

Create Express Project with VMware Servers

Provision one or more VMware virtual machines

Resource Group used to Reserve Resources  
Express VMware US Sys

\*Image to be Deployed

Select	Name	CPUs	Memory	Storage
<input checked="" type="radio"/>	Express US SLES	1	1 GB	8 GB
<input type="radio"/>	RHEL54_x64_ExpressUS_Small	1	2 GB	8 GB
<input type="radio"/>	RHEL54_x64_ExpressUS_Medium	2	4 GB	8 GB
<input type="radio"/>	RHEL54_x64_ExpressUS_Large	4	8 GB	8 GB
<input type="radio"/>	W2K8R2_x64_ExpressUS_Small	1	2 GB	20 GB

Select software to install

Available Software

Selected Software

Resources

To adjust the settings of the requested resources, press the setting button. After making the necessary adjustment, press the setting button to save the configuration.

Servers	CPU	Memory	Disk	Network
Virtual 1 Physical 0.1	Main 1 GB Swap 0 GB	Local 8 GB	Cust A Web EXP	

1  
20 available

OK Cancel

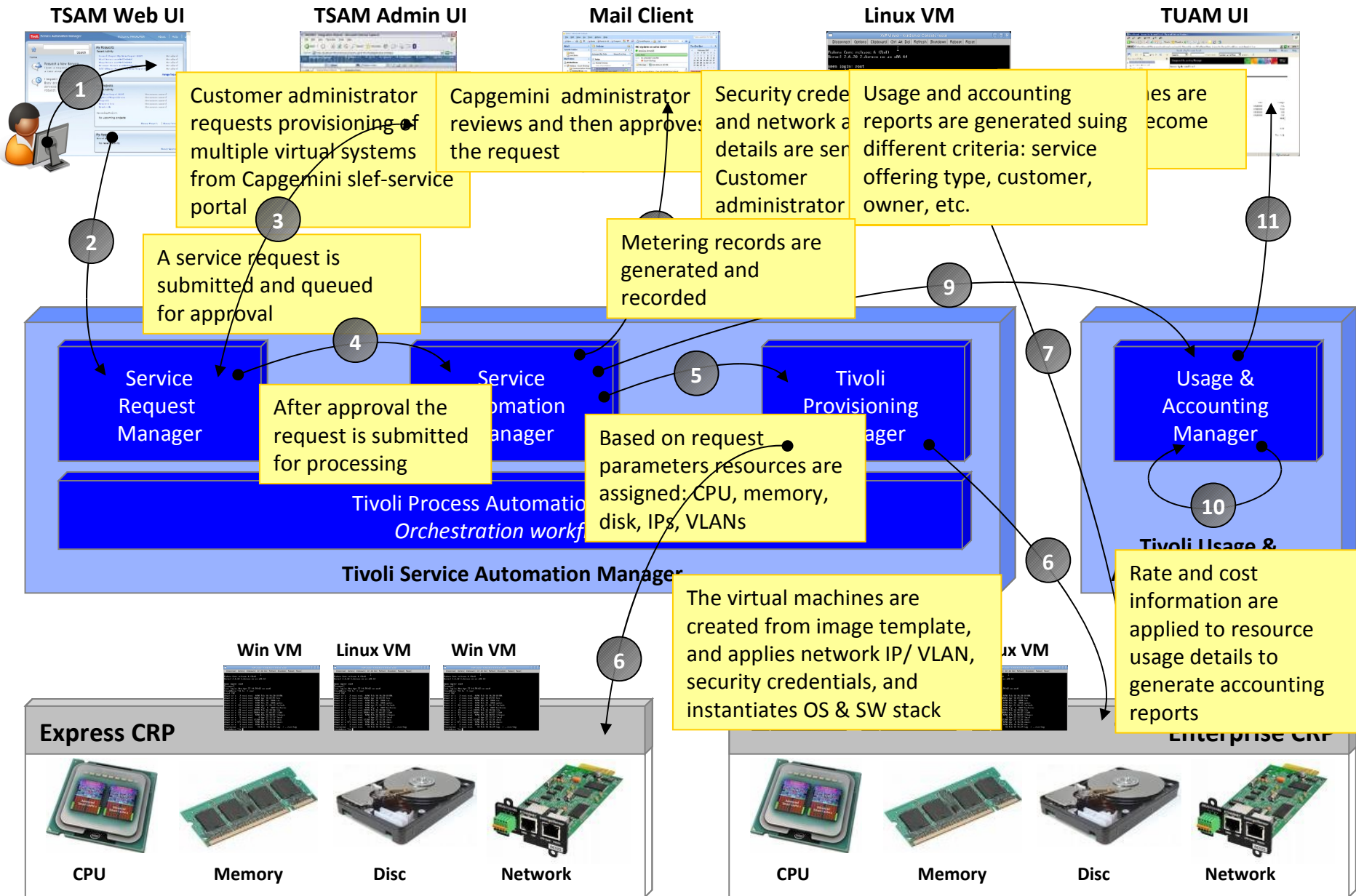
Selection of target resource pool  
Target data center and service type (express vs enterprise)

Selection from image catalog the OS type and size

Option to select additional software packages to be deployed and configured

Selection of the target customer network domain where to deploy the virtual systems  
Mapped to customer specific VLANs

Selection of number of virtual system to instantiate and customization of disk size



What were the key challenges to overcome?

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## Key Challenges

- **Secure Multi-tenancy**
  - Integration with the existing network & management infrastructure.
  - Seamless integration with customer network.
  - Implementing flexible automation for network multi-tenancy.
  - Mapping customers/resource pools/zones to VLANs.
  - Self service portal to provide full separation of authorization and responsibilities between different customer administrators and service provider administrators.
- **Implementing on a Global Scale**
  - Single Global CMP, highly available, with regional failover.
  - Multiple regional Client Resource Pools.
  - Leverage Capgemini's network.
  - Deployed in highly secure, access controlled data centres.



## Key Challenges

- Delivery of **different type of service offerings**
  - Self service vs. fully managed service offerings.
  - Resource pools with different qualities of service with different availability, monitoring, support policies.
  - Expanded roles & responsibilities for customer & team separation.
  - Enable delegation of responsibility to service provider administrators for fully managed service offerings.



- Metering of **service usage**
  - Allocation based metering using oob TSAM / TUAM capabilities.
  - Extending the allocation metering for IaaS storage & image storage.
  - Provide full flexibility for supporting different pricing schemas.

What were the key lessons learned during the project?

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# Key Lessons Learned

- **Cloud computing** doesn't change everything
  - Evolutionary in implementation, revolutionary in technology!
  - Normal IT project methodologies apply (mostly).
  - Leverage processes & skills you already have.
  - Don't throw everything out, because a small part is new!
  - Ironically, everything that holds up "traditional" projects will hold up your first Cloud project.

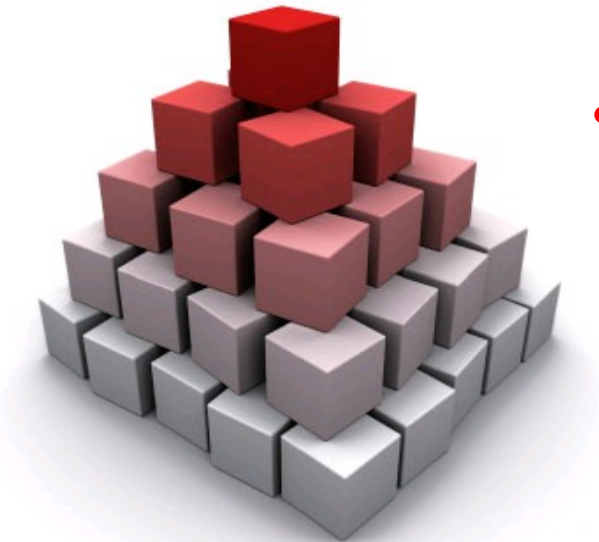
- **New aspects** of Cloud do need to be carefully planned.

- (Cloud) Service definition, quality of service, evolution of the service, service catalog, and service life cycle need to be well defined and designed.
- Clarity in use-cases, service catalog and non-functional requirements fundamental to success.



# Key Lessons Learned

- **Networks** are the **enabler** as well as the **inhibitor** !
  - Access to the Cloud services requires secure front-end user access and back-end Cloud management for a viable Cloud solution.
  - Most enterprise networks are designed for separation & security, and actively prevent back-end access to network zones across business-units, countries and regions.
  - Early verification of network viability for Cloud services delivery is vital, especially when Cloud span beyond the data centre.



- Building a **modular & scalable** architecture
  - Growth and scale becomes the key architectural principle.
  - Modular – not locking into a single hypervisor
  - Architecture designed to be horizontally and vertically scalable.



# Key Lessons Learned

- Build to the **lowest common denominator**
  - Simplification will accelerate deployment and adoption.
  - Grow the service offering complexity with experience and demand.
  - Don't try to solve too many problems at once.
- **Plan early** on how to **operate** your Cloud
  - Build a multi-discipline team embedded in a single group, to compliment the traditional delivery processes. (Hypervisor, storage, compute, service management skills)
  - New Cloud processes will be required in addition to traditional service management processes.
  - These should focus upon the service life cycle from creation, instantiation, operation and termination.



# Smarter Computing enables integrated, automated, and secured Service Delivery

Efficient and innovative IT for improved economics



## Integrated



Improved Integrated Service Management deployed across IT and business infrastructures:

- End to end service management stack for IaaS / PaaS delivery.
- Faster time to value with pre-integrated solutions, eg. ISDM.

## Automated



Automated service delivery and processes across the full lifecycle of requests and incidents:

- Self-service request driven delivery of services in minutes.

## Secured



Increased visibility across complex environments and effective control to meet security and compliance objectives:

- Multi-tenant isolation of workloads



# Thank you and Questions?

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Room 119,  
Conference Center, Level 1

#### Hands-on Lab Schedule

Sun. 10:30 a.m. – 5:00 p.m.  
Mon. 10:30 a.m. – 6:00 p.m.  
Tue. 10:30 a.m. – 6:00 p.m.  
Wed. 8:00 a.m. – 6:00 p.m.  
Thur. 8:30 a.m. – 3:00 p.m.

### Technical Product Certification

Technical product certification lays the groundwork to help you become a world-class resource to your clients, colleagues, and company.

Rooms 301 and 302,  
Conference Center, Level 3

#### Certification Schedule

Mon. 10:30 a.m. – 6:00 p.m.  
Tues. 10:30 a.m. – 6:00 p.m.  
Wed. 8:00 a.m. – 6:00 p.m.

### Post -Conference Education

#### Two-Day Tivoli Workshops

Rooms 101-110,  
Conference Center, Level 1

Thur. 8:00 a.m. – 5:00 p.m.  
Fri. 8:00 a.m. – 5:00 p.m.

#### One-Day Asset Management Workshops

Rooms 121-123,  
Conference Center, Level 1

Thur. 8:30 a.m. – 3:30 p.m.

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IBM and Partner exhibits, theater presentations, Meet the Experts, Client Hospitality Lounge, User Group Networking, Business Partner Cafe and Client Reference Lounge

#### Expo Hours

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Mon. 12:00 p.m. – 7:00 p.m.  
Tue. 12:00 p.m. – 6:00 p.m.  
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Receptions will be held  
Sunday and Monday nights.



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