

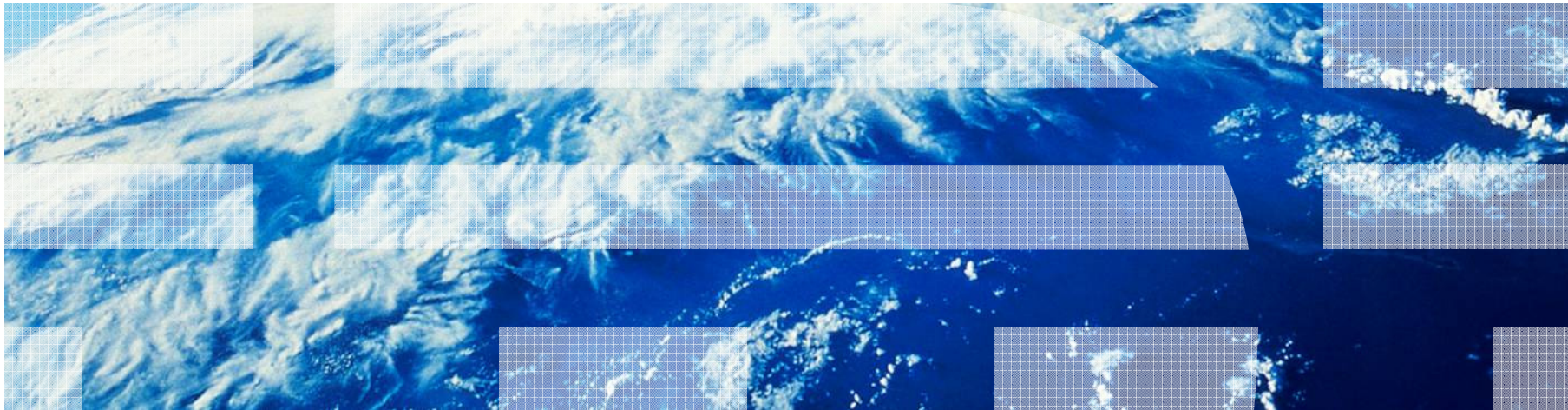
**Cisco EXPO 2011**

**13 September 2011**

**Sami Kuronen**

**Senior Architect, Global SME**

# Cloud Computing and the Network



## What is driving our client's toward the Cloud Computing Model?

### Findings from the 2010 CEO study detailed the need to manage corporate complexity and volatility

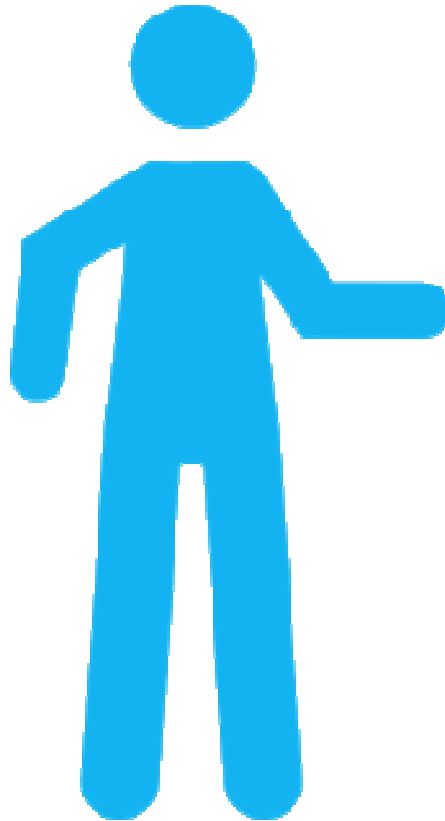
CEOs told us they operate in a world that is substantially more volatile, uncertain and complex. Many shared the view that incremental changes are no longer sufficient in a world that is operating in fundamentally different ways. (Some) primary findings arose from our conversations:

- Today's complexity is only expected to rise and more than half of CEOs doubt their ability to manage it. **Seventy-nine percent of CEOs anticipate even greater complexity ahead.**
- However, **one set of organizations** – we call them “Standouts” – **has turned increased complexity into financial advantage over the past five years.**
- Better performers manage complexity on behalf of their organizations, customers and partners. They do so by **simplifying operations and products and increasing dexterity to change the way they work, access resources and enter markets around the world.** Compared to other CEOs, dexterous leaders expect 20 percent more future revenue to come from new sources<sup>1</sup>

Many companies are turning to cloud to help them address these requirements...

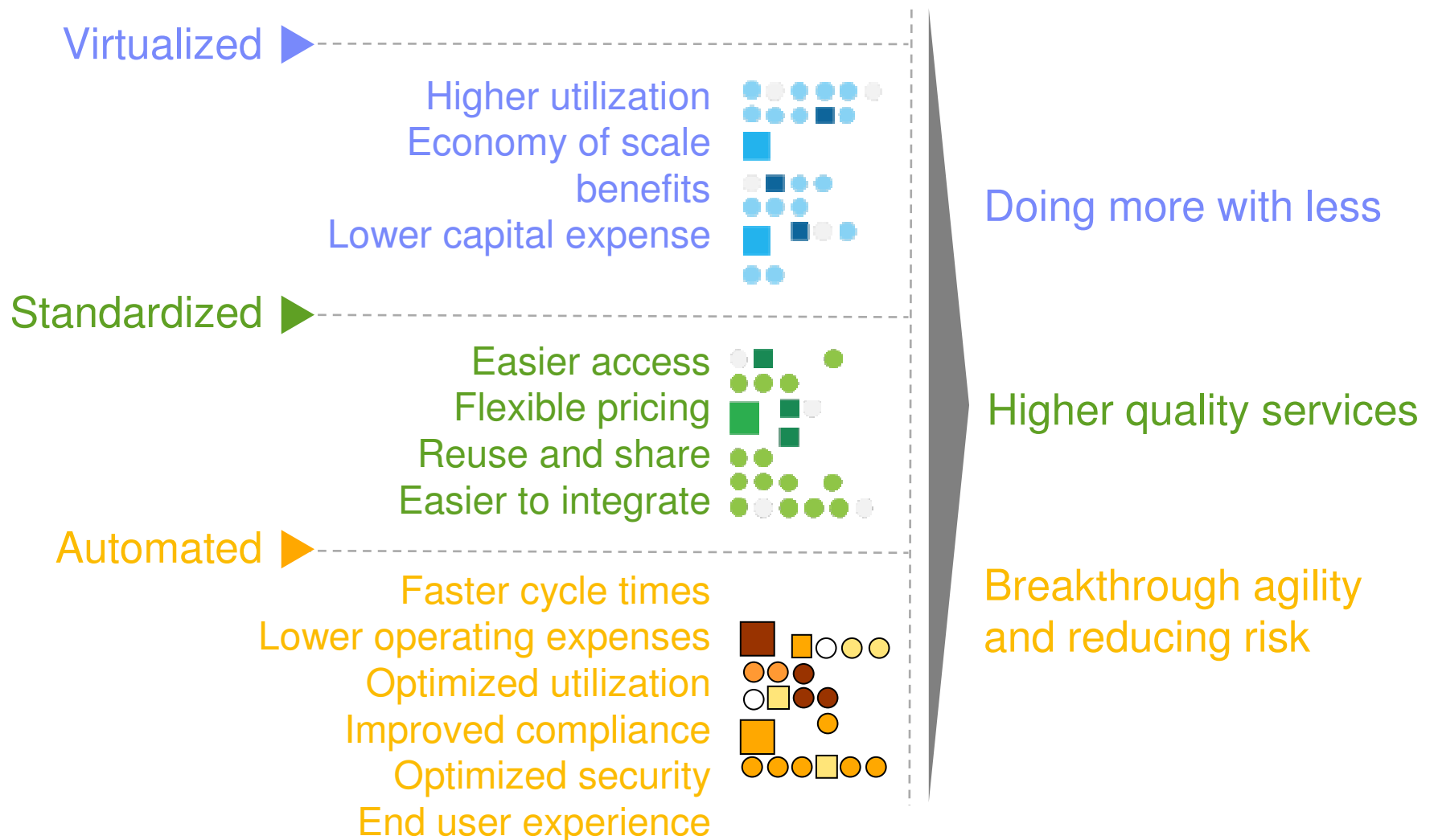
<sup>1</sup> Capitalizing on Complexity, Insights from the Global Chief Executive Officer Study'  
IBM Institute for Business Value, May 2010, GBE03297-USEN-00, p.8 – 9

Cloud is a shift in the consumption and delivery of IT with the goal of simplifying to manage complexity more effectively.

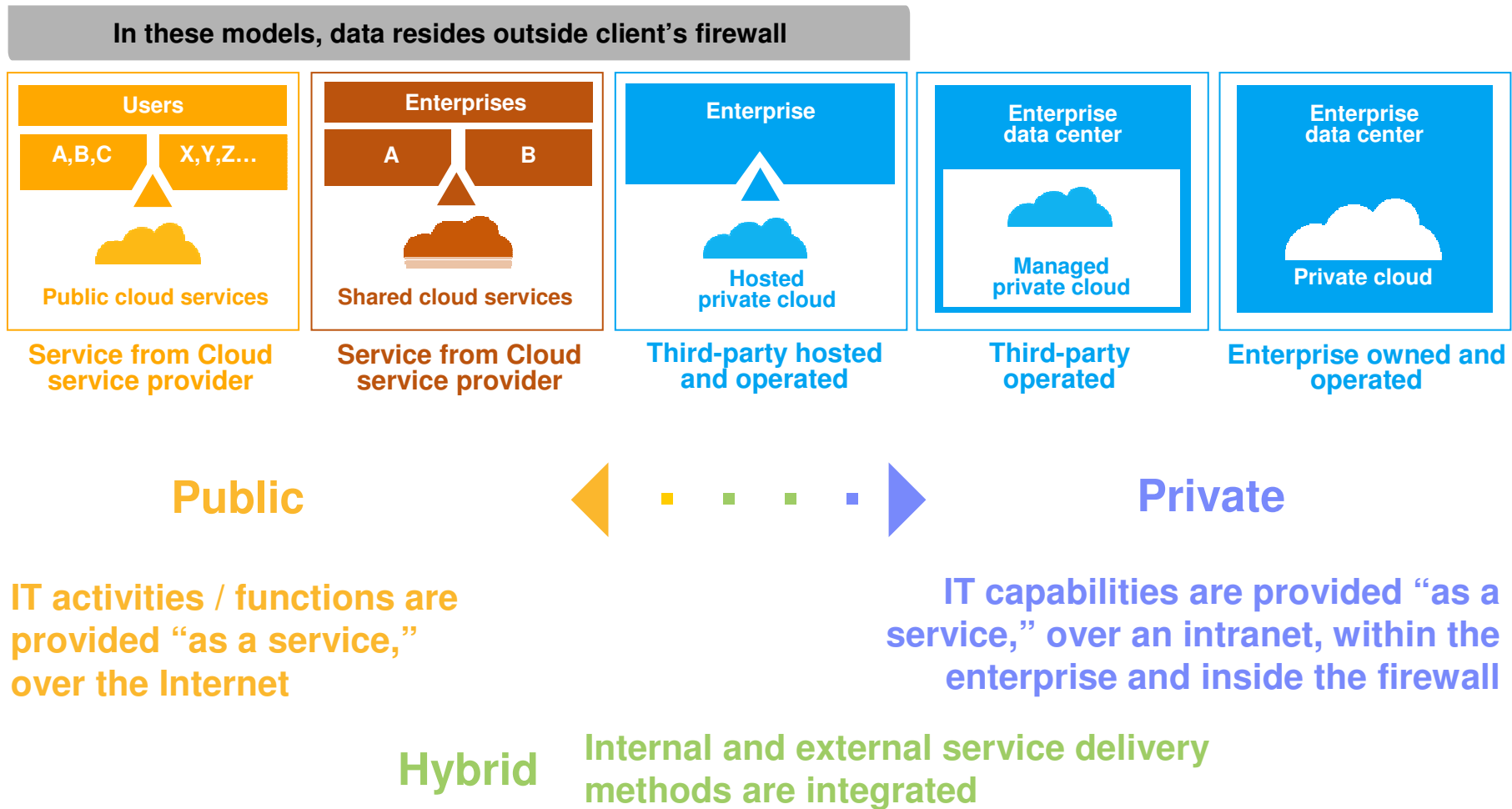


- **Cloud is:**
  - A new consumption and delivery model
- **Cloud addresses:**
  - Cost reduction
  - Scale
  - Utilization
  - Self-service
  - IT agility, flexibility and delivery of value
- **Cloud represents:**
  - The industrialization of delivery for IT supported services
- **Cloud includes:**
  - Delivery models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS) and Business Process as a Service
  - Deployment models: public, shared, private, hybrid

# Cloud computing delivers IT and business benefits.

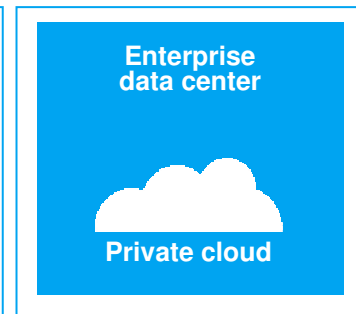
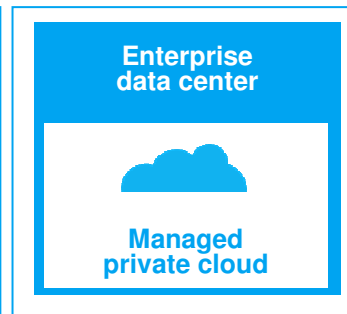
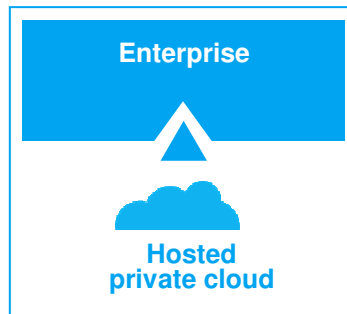
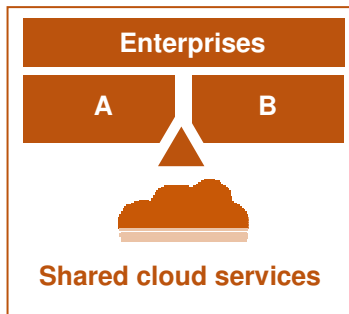
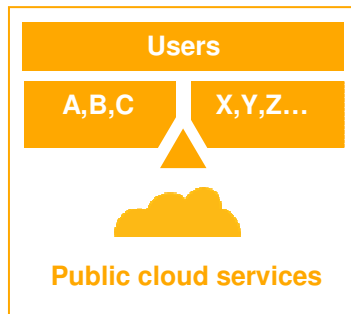


There is a spectrum of deployment options for cloud computing.



# Each cloud delivery model has different characteristics.

**In these models, data resides outside client's firewall**



- Service from cloud service provider
- Standard services
- Individual users
- Shared resources
- Pay as you go
- Access through public Internet

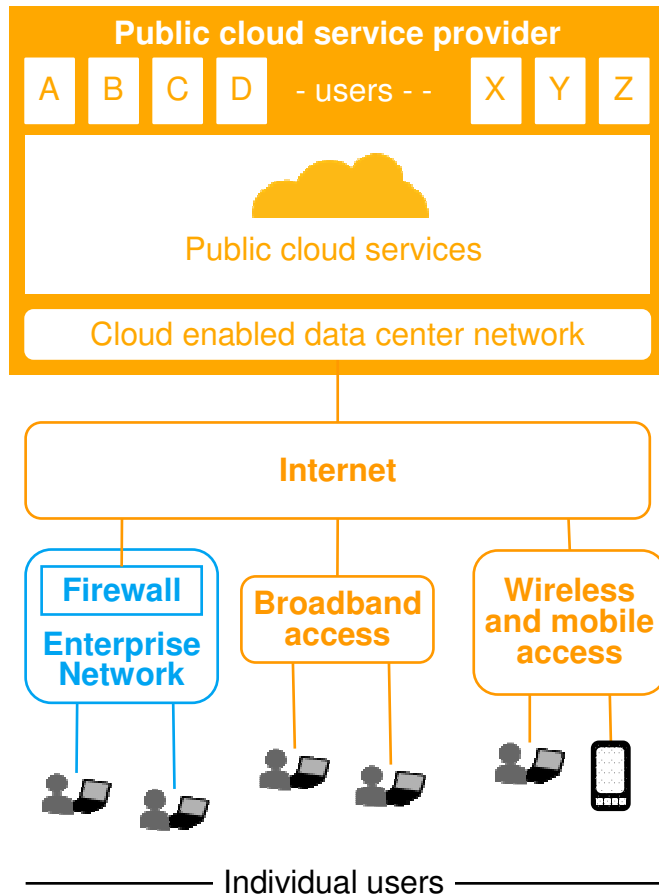
- Service from Cloud service provider
- Standard services
- Enterprise users
- Mix of shared and dedicated resources
- Shared facility and staff
- Utility pricing model
- Virtual private network (VPN) access

- Service provider owned and operated
- Dedicated resources for client
- Access through dedicated connection from network service provider

- Third-party operated
- Enterprise owned
- Implemented on client data center
- Uses enterprise network
- Mission critical
- High compliancy

- Enterprise owned and operated
- Implemented on client data center
- Uses enterprise network
- Mission critical
- High compliancy

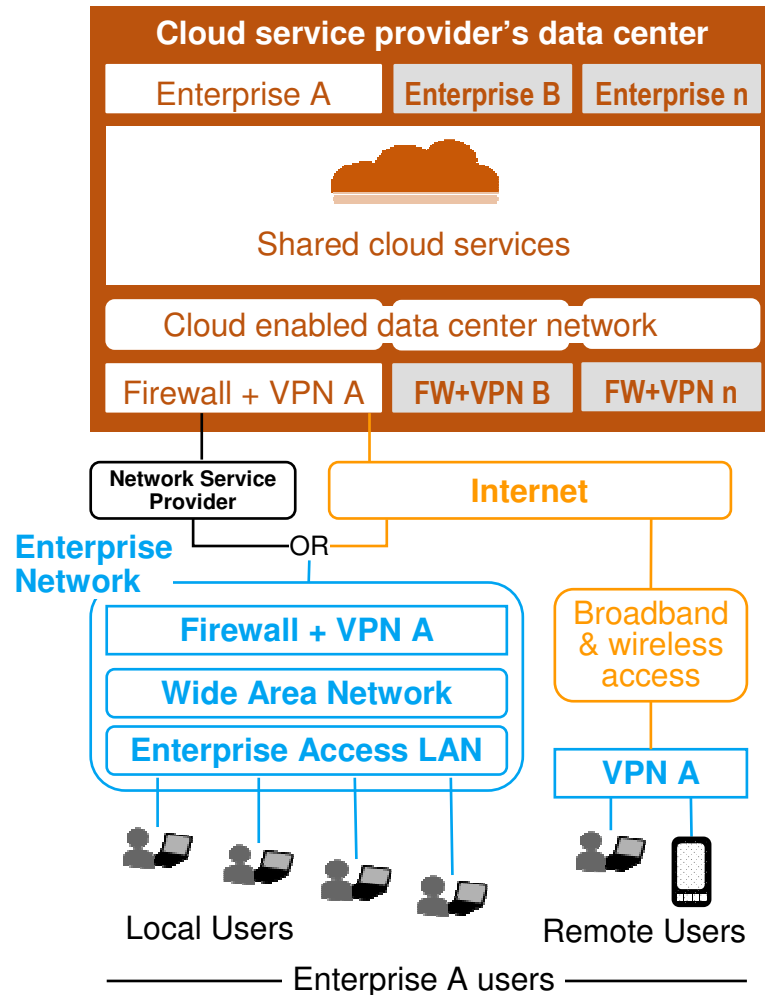
**Public cloud** services rely on the public Internet with uncontrollable reliability, performance and security.



### Network Implications

- Relies on the public Internet for availability and performance
- Uses a wide range of connectivity options and technologies for cloud access
- Impacts enterprise security boundaries and privacy policy enforcement
- Depends on cloud service providers for additional security and scalability measures within their data centers
- Deals with multiple Internet Service Providers (ISPs) and billing models challenges

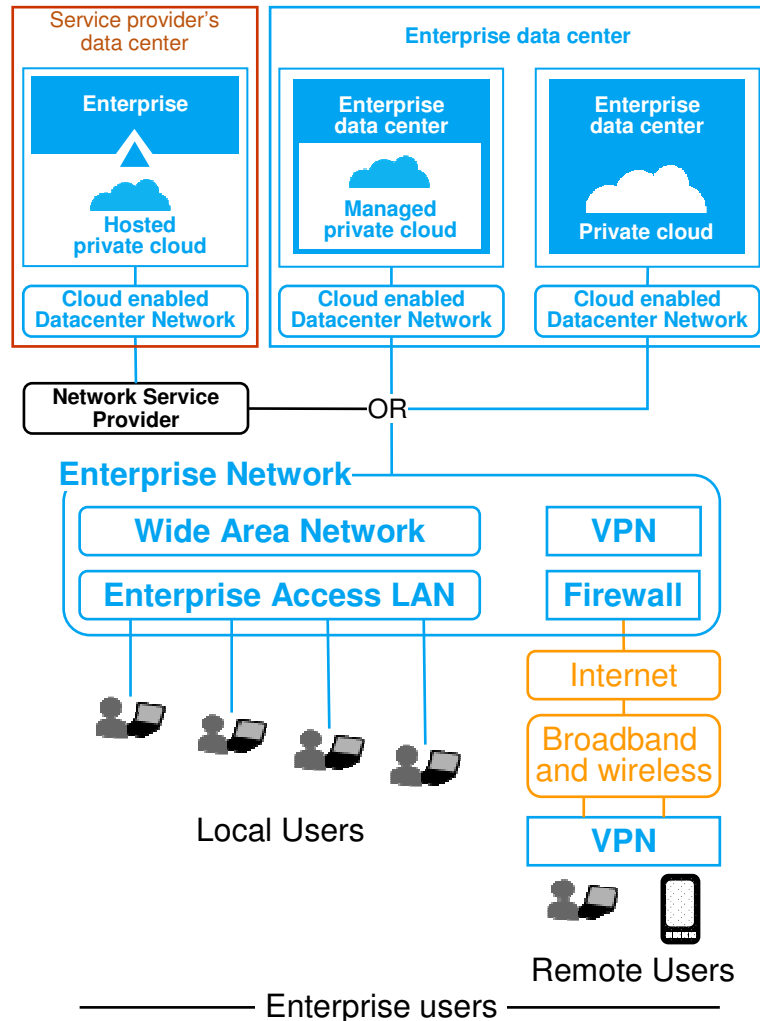
**Shared cloud** service providers deliver over the public Internet, but can improve security using virtual private networks and dedicated network service provider connections.



## Network Implications

- Relies on the public Internet and/or extranets for delivery
- Requires additional security measures for enterprise extranets
- Need to consider end-to-end network scalability, provision, and management capabilities accordingly
- Understand potential financial impacts when dealing with multiple ISPs and network service providers

**Private cloud** models have similar networking environments, where services are delivered through intranets or dedicated network connections through network service providers.

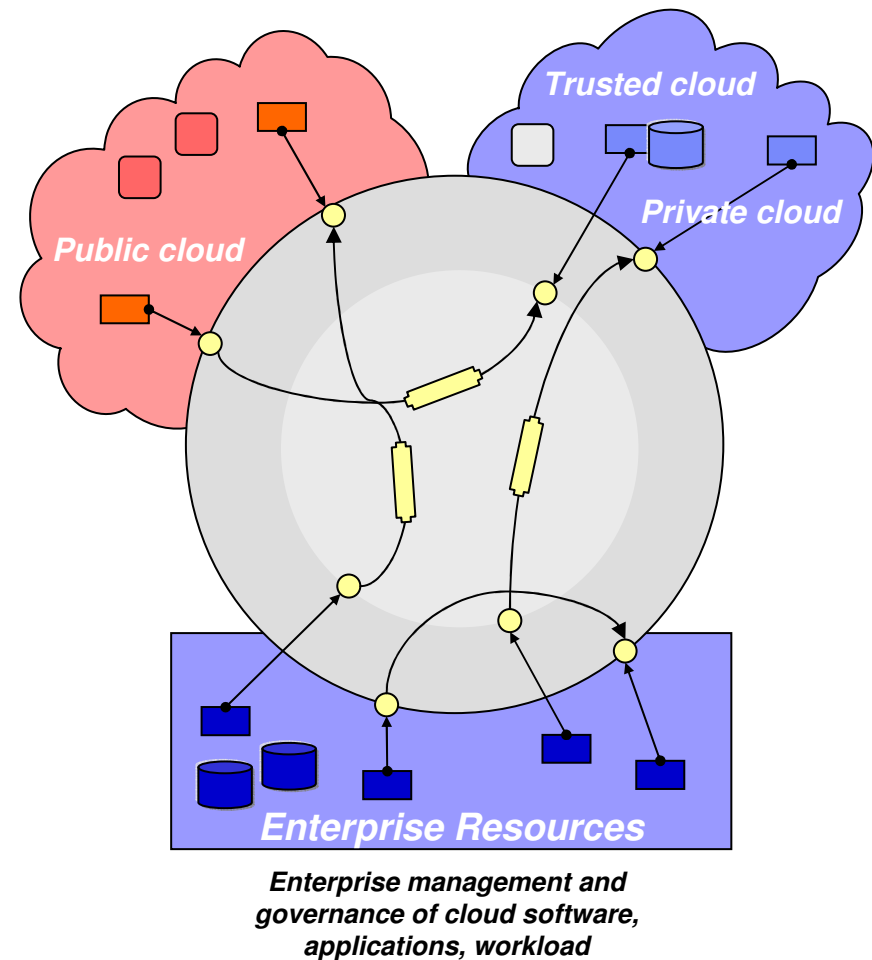


## Network Implications

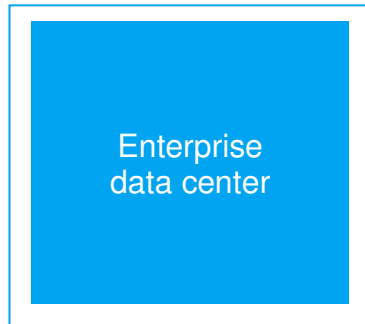
- Depends on application profiles, services provided, and financial impacts
- Delivers dynamic provisioning, security, availability, and performance
- Requires integrated cloud services and management solutions
- Involves multiple network management systems for hosted private cloud
- Requires additional networks to connect between the cloud service provider and enterprise data centers and users for hosted private cloud

As enterprises come to rely on **hybrid cloud** environments, management, security and integration disciplines will need to evolve as well.

- **Management of workloads running off-premise on clouds**
  - Management of software applications and services (monitoring, events, availability, performance)
  - Service request management (governance of service provisioning)
  - Dashboard for service visibility
- **Security for hybrids**
  - Control security and resilience of services (identity management, compliance, isolation)
- **Integration (connectivity) of hybrid applications and information**
  - On-premise to off-premise business application connectivity and governance
  - Information exchange across the enterprise and clouds

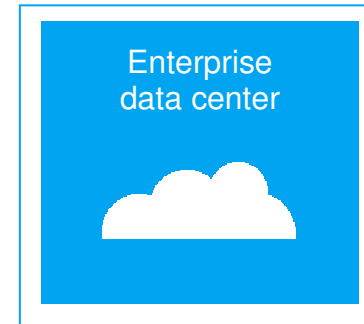


# Private cloud options require a new set of network design attributes.



## Traditional Network Design

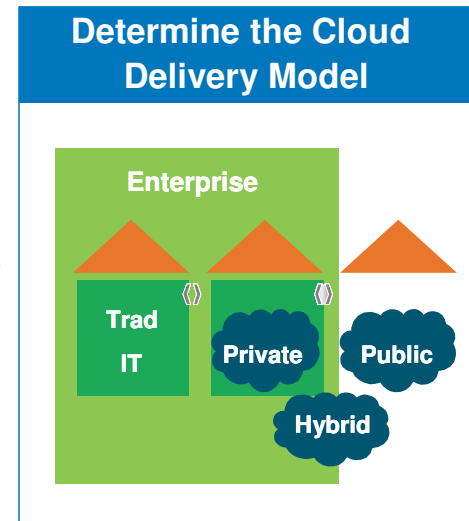
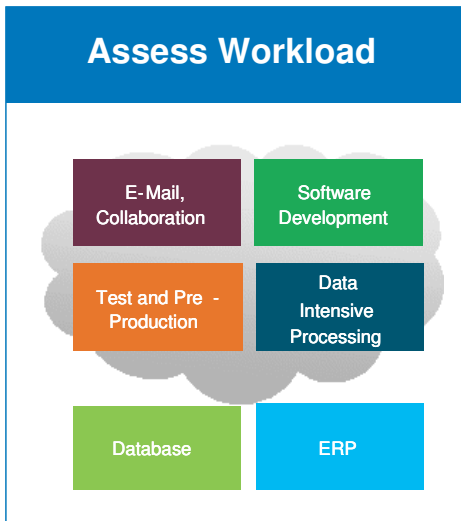
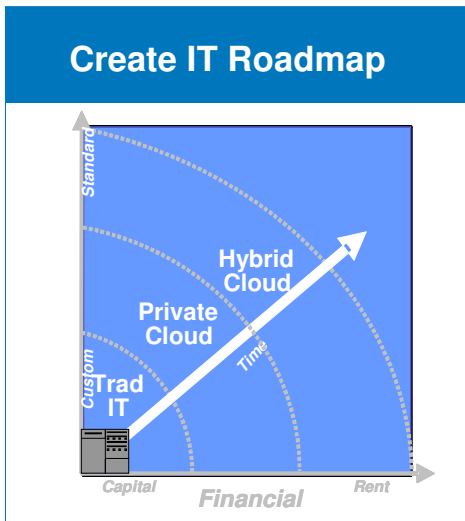
- Optimized for availability
- Slow to adapt
- Costly
- Rigid, inflexible
- Infrastructure silos
- Dedicated
- Device sprawl
- Location dependence



## Cloud Network Design

- Optimized for flexibility
- New approach to availability
- Cost more important
- Variable, metered
- Integrated infrastructure
- Shared
- Consolidation/Virtualization
- Location independence

We follow a 6-step approach to building a cloud environment. We use the same approach to build the supporting networks.



### Define Business Value

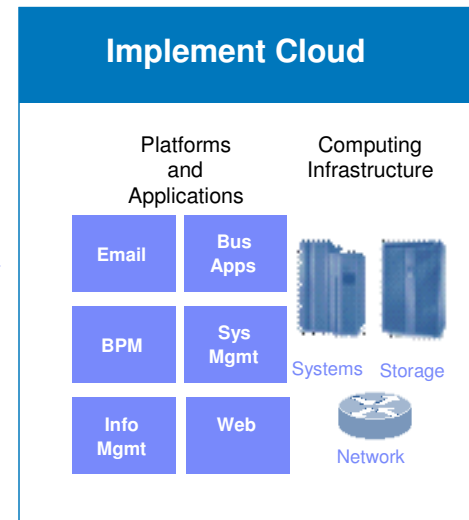
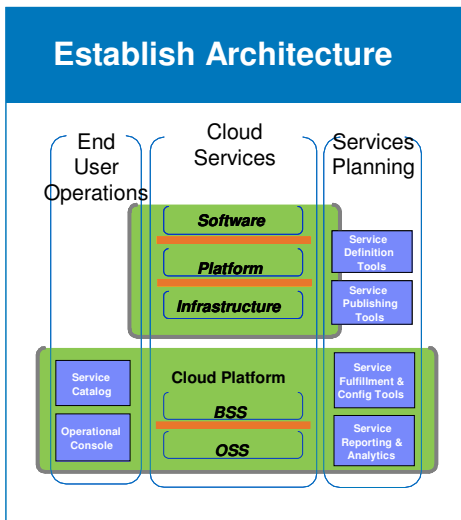
KPI/Metric	KPI - Baseline	KPI - Target	% Change
Reduced IT infrastructure costs			
Improved operational costs			
Improved business process efficiency			
Improved customer service and satisfaction			

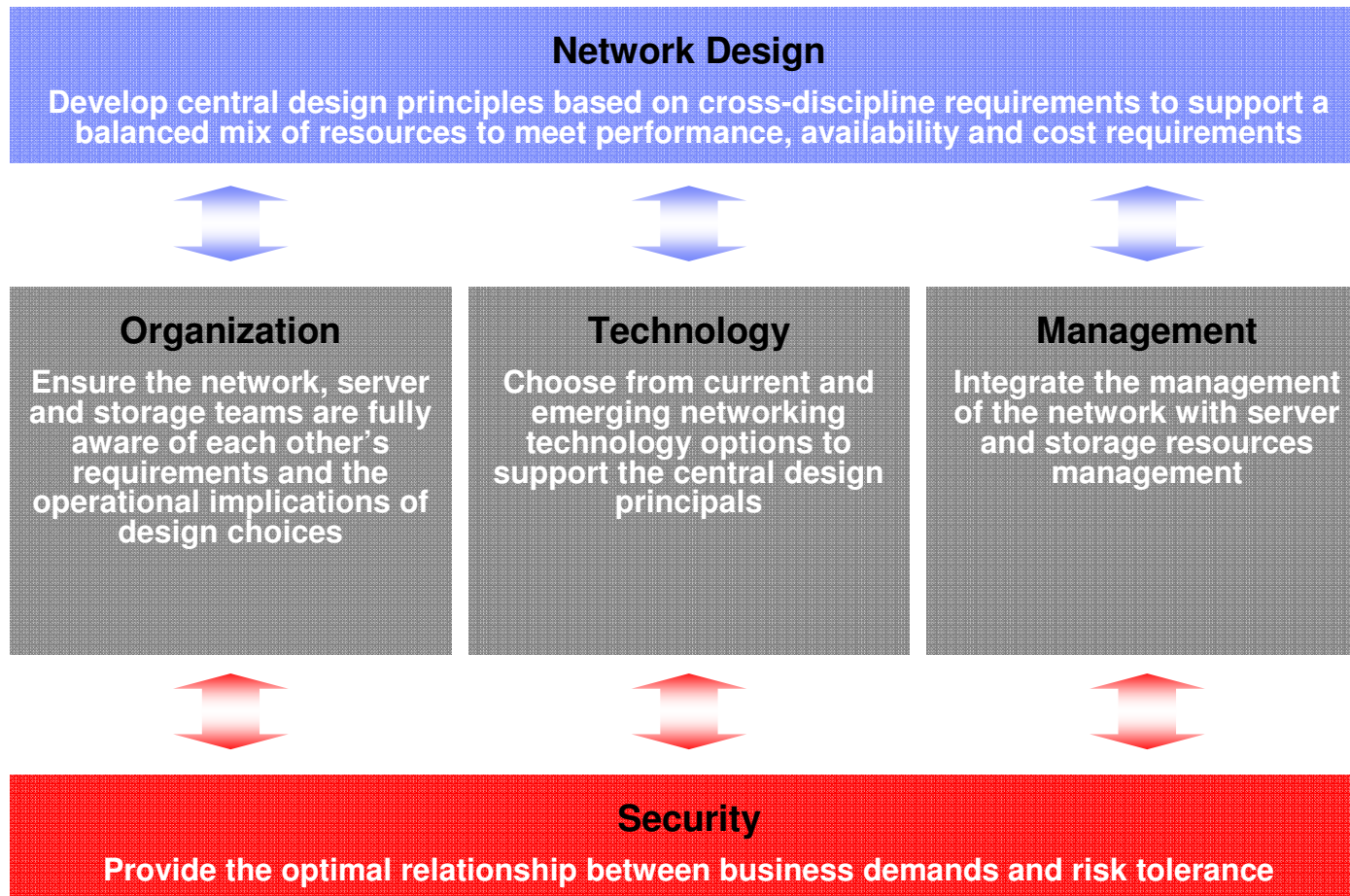
	Annual Growth %	Baseline Yr 0	Target Yr 1	Target Yr 2	Target Yr 3
<b>Hardware</b>					
# of dedicated servers currently supporting project requirements					
Average annual server cost					
<b>Staff</b>					
# of admins required to support dedicated servers & software					
Average annual fully loaded employee labor rate					
<b>Provisioning of Applications and Services</b>					
# of service provisioning requests per year					
Average provisioning time per request (hrs)					
Average length of reservation (days, weeks, months)					

Estimated ROI	0	1	2	3
Timeline (years)				
Cashflow				
NPV				
ROI				
IRR				
Payback Period (days)				

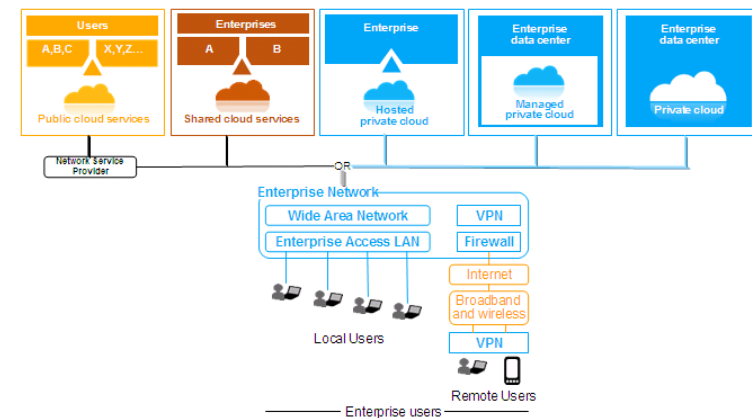


For success in cloud computing, network design decisions must be made in concert with the server and storage disciplines.

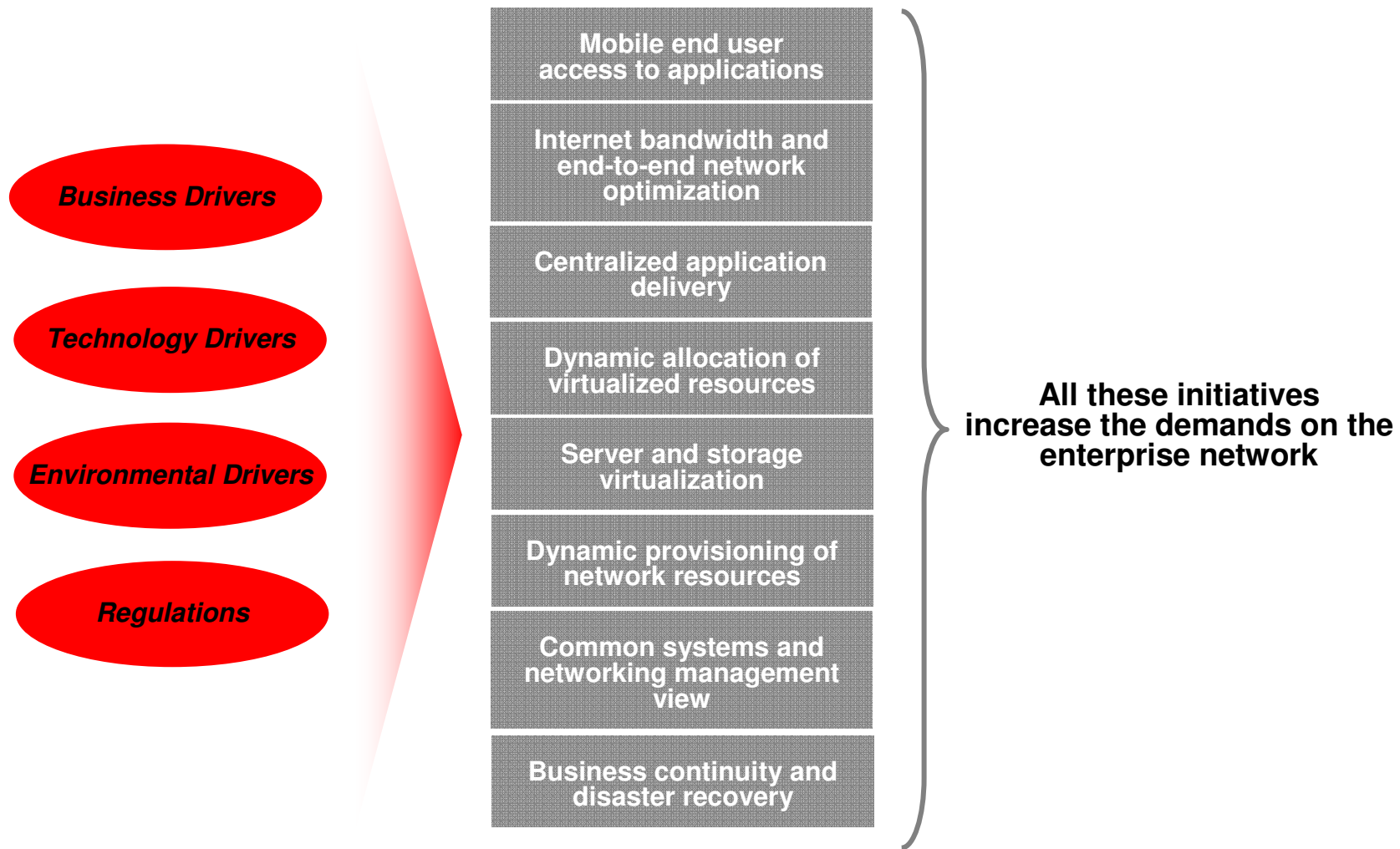


# The network must evolve quickly to support the new requirements and cloud delivery models.

- **Business drivers**
  - Improve service responsiveness, availability, business resiliency, availability, security,...
  - Reduce Cost (CAPEX and OPEX)
- **Regulation**
  - PCI
  - HIPAA
  - Sarbanes Oxley
- **Environmental drivers**
  - Cost and availability of power
  - Cost of cooling
- **Technology drivers**
  - New endpoints (mobile) and applications (video)
  - Expansion of layer 2 domain to support server virtualization and workload mobility
  - Access to public cloud infrastructures
  - Converged fabrics and trend towards physically flat data center



The design drivers must be taken into account in the overall IT designs and initiatives. The importance of networks is increasing.



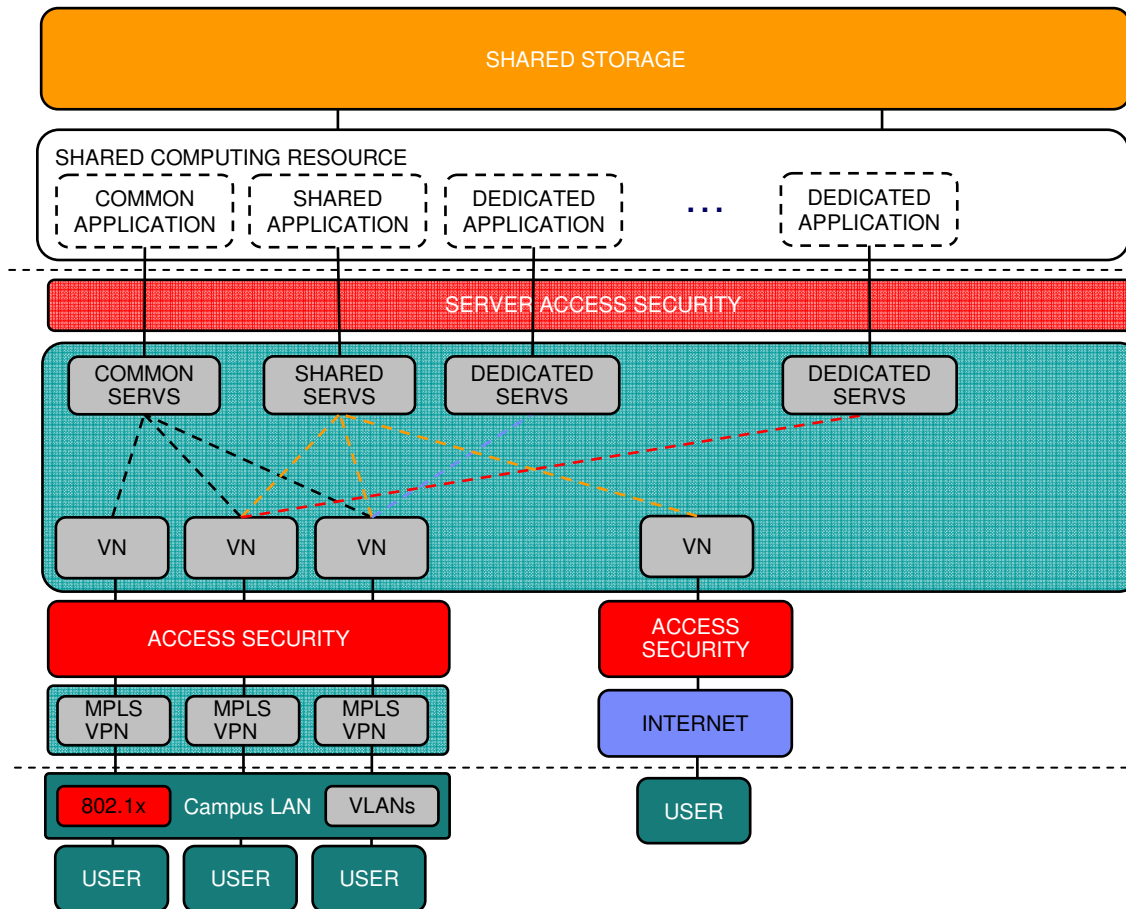
When making transformation, understanding the existing infrastructure is important. The new cloud must be able to support the existing workloads.

- Server types
  - E.g. System x, BladeCenters, System z, System p
  - Other vendors?
- Server locations
  - Where are the servers located physically?
- Server port speeds and quantities per data center
- Type of virtualization (hypervisor) employed
- VM mobility groupings and range
  - How do the VMs move between physical servers (hosts)?
- External connectivity
  - WANs and Internet access
- User infrastructure
  - Locations, network types, PC types etc.
- Storage
  - Transport technology and locations.
  - Hypervisor dependency and VM mobility requirements

Before detailed planning and actualizing these solutions, group of applications' technical aspects should be assessed and documented.

- Application data flows
  - How do applications communicate and interact with each other?
  - Who uses the applications?
- Application specific security policies
  - Who is allowed to use the applications?
- Performance requirements
  - E.g. capacity, performance, availability, loss, latency, and jitter.
  - Specific requirements for sensitive applications, such as video and voice.
- Application storage requirements
  - Including capacity, performance, and availability.
- Other dependencies
  - E.g. application integrations with business partners.
  - Network services (for example, DNS, load balancers, databases etc.).

# And to summarize and simplify this all...what are we ultimately trying to solve?



1

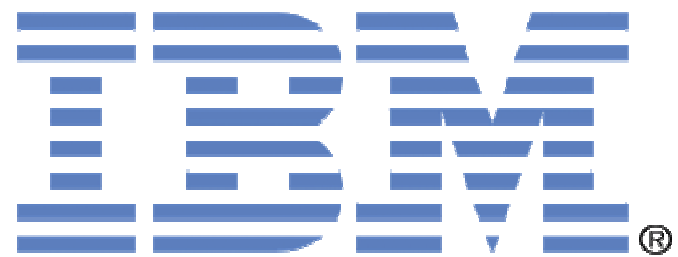
Provide consolidated and virtualized computing and storage resources for applications inside the customer's data center and/or access computing resources or applications via cloud.

2

Provide secure and flexible network based on defined community groups using highly virtualized and shared networking platform and security resources to increase network utilization, improve performance, and overall costs.

3

Provide secure yet flexible network access to specific services based on defined community groups (employees, partners, suppliers, customers, guests).



Thank You!