



Cloud Computing 101
Dissipating the Fog

2012/Dec/xx

Why the interest in Clouds?



A method to avoid/defer CAPEX/OPEX and possibly accelerating implementation

It all started here - Timeshare

Computers and applications were very expensive Customers either:

- ▶ Loaded their programs, input cards and produced reports, &c. on the equipment provided by the Service Provider (SP)
- ▶ Purchased a partition of a SP application and accessed it via directly-attached devices (eg: EDS Payroll)

What was Provided

- Defined Interfaces →
- Sequence rules →
- Maintenance →
- Visibility →



Expectations

- Service Levels
- Flexibility
- Security
- Resilience
- Compliance/
- Auditability

Snapshot of Clouds Today (this should look familiar)

Computer Complexes and applications can (still) be very expensive - Customers either:

- ▶ Load their programs/datasets onto the SP's environment and access them via the web
- ▶ Purchase rights to use a virtualized SP application via the web

What's Provided

- Defined Interfaces →
- Sequence rules →
- Maintenance →
- Visibility →



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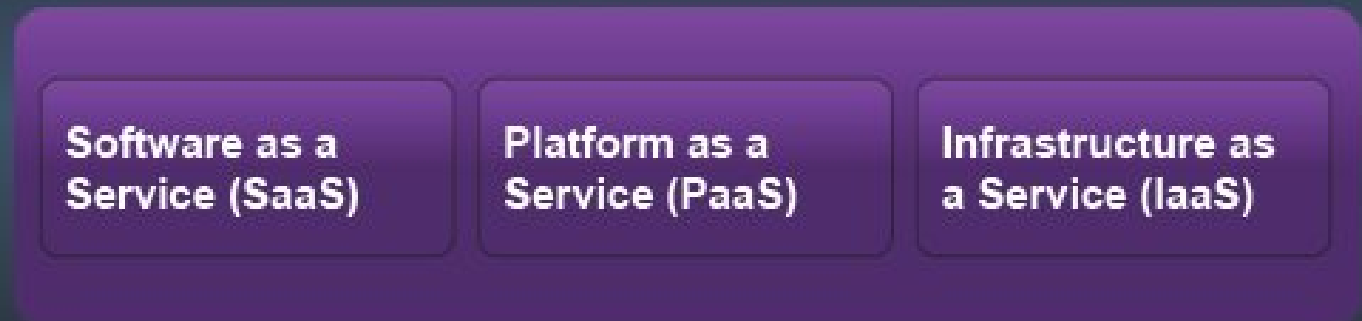
There are different types of clouds NIST Viewpoint

Cloud Taxonomy

Essential Characteristics



Service Models

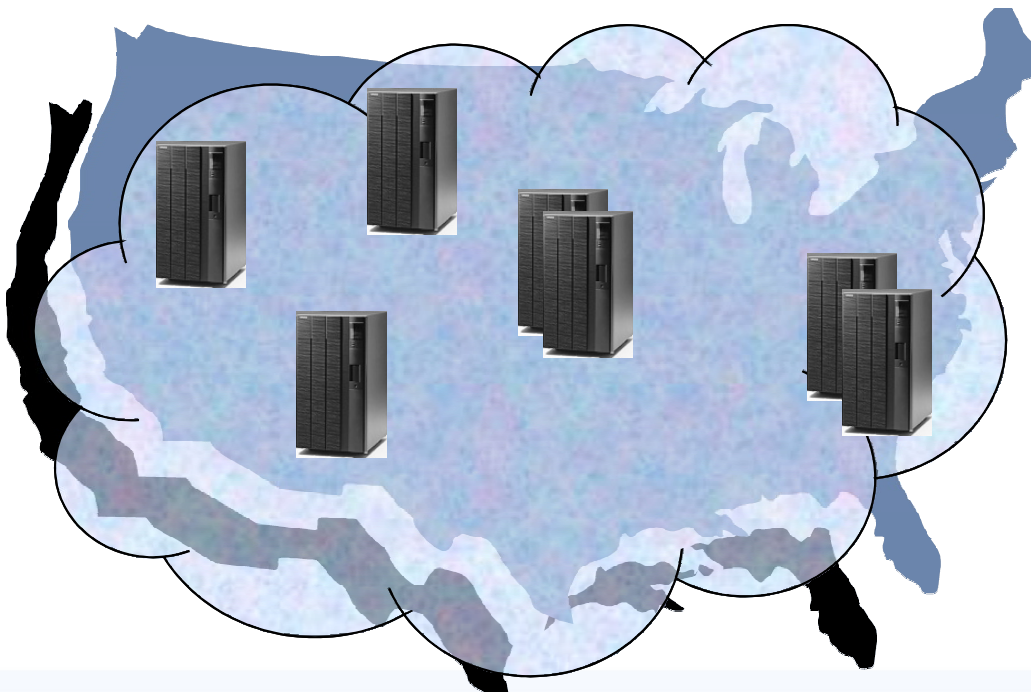


Deployment Models



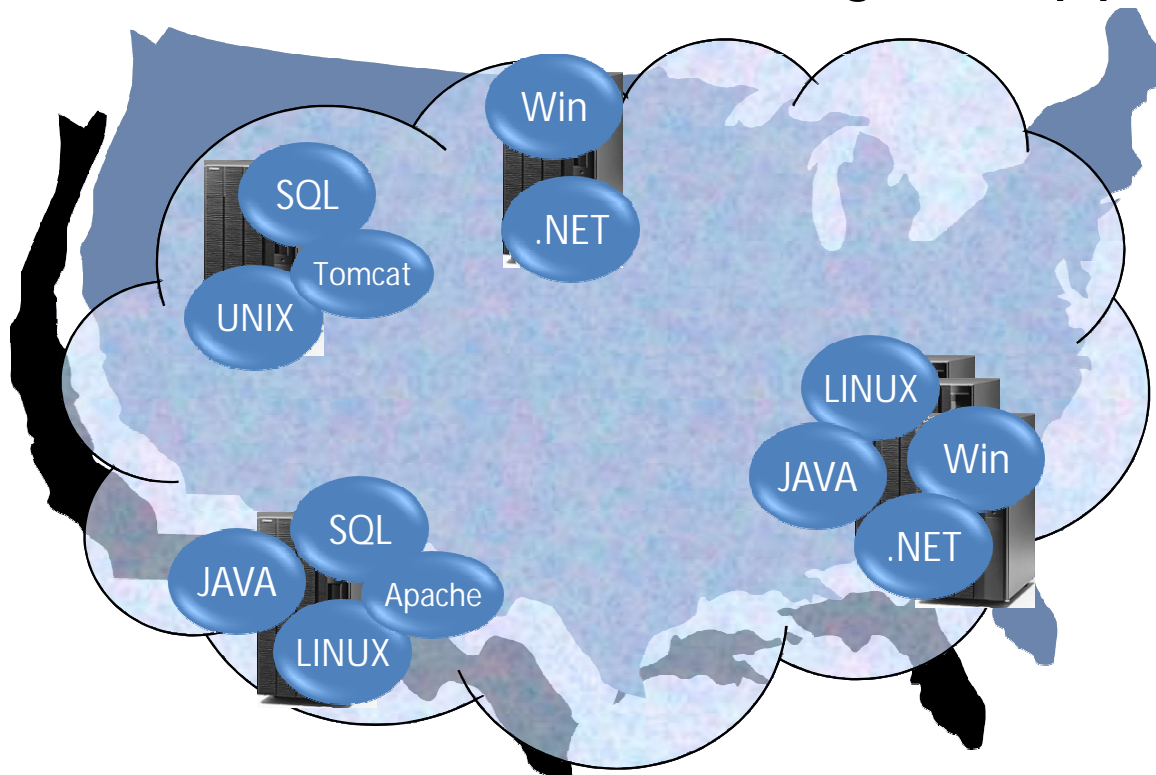
Types of services models: Infrastructure as a Service (IaaS)

- Virtualized hardware data storage, networking and bandwidth i.e. Server, Storage, Routers, Switches etc.
 - ❑ Data as a Service (DaaS) is a *subset* of IaaS restricted to only providing data storage/representation
 - ❑ Computing as a Service (CaaS)
- Examples: Amazon, Rackspace and IBM BlueCloud



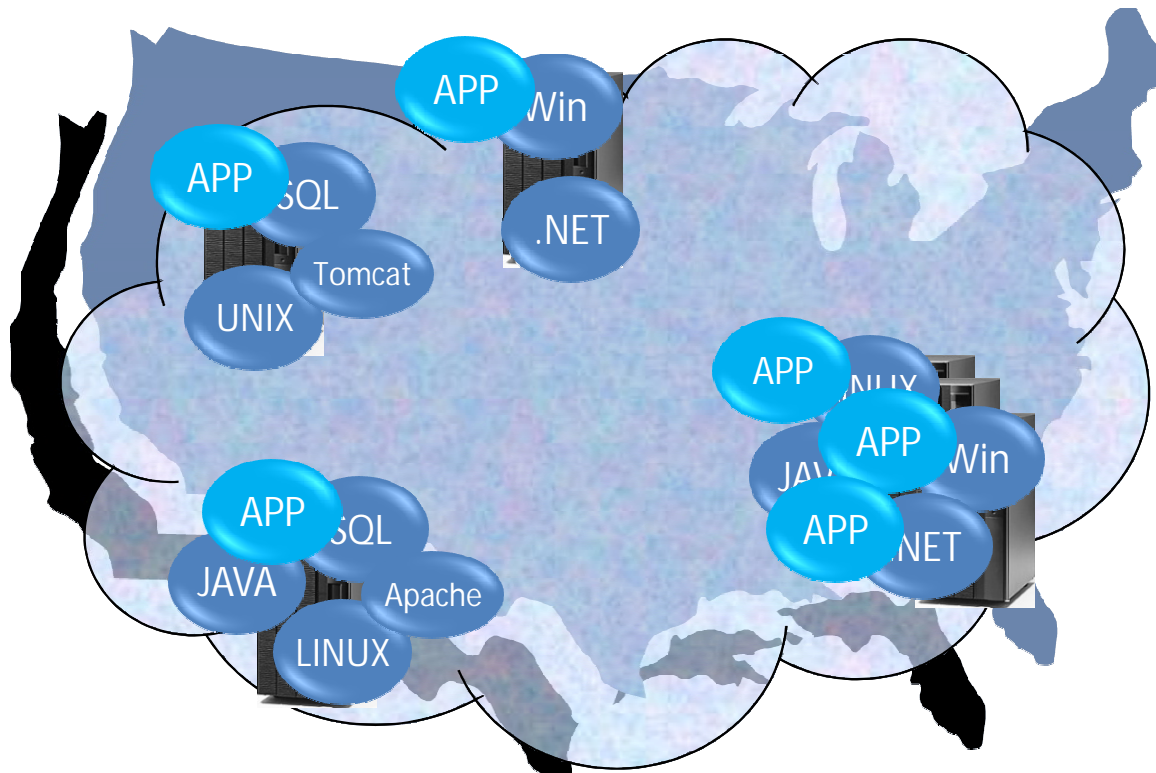
Types of service models: Platform as a Service (PaaS)

- Application Building Block (ABB): Virtualized hardware + Operating System + Application support stack (eg: .NET, SQL, VS.NET, JAVA-VM, Apache, TomCat)
- Microsoft Azure and Google's AppEngine

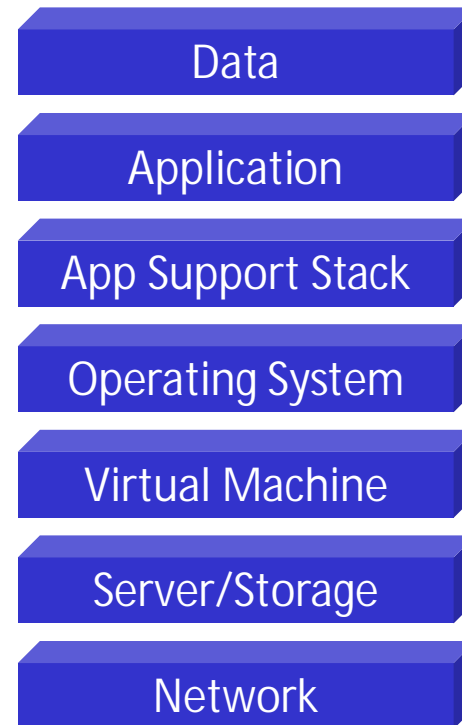
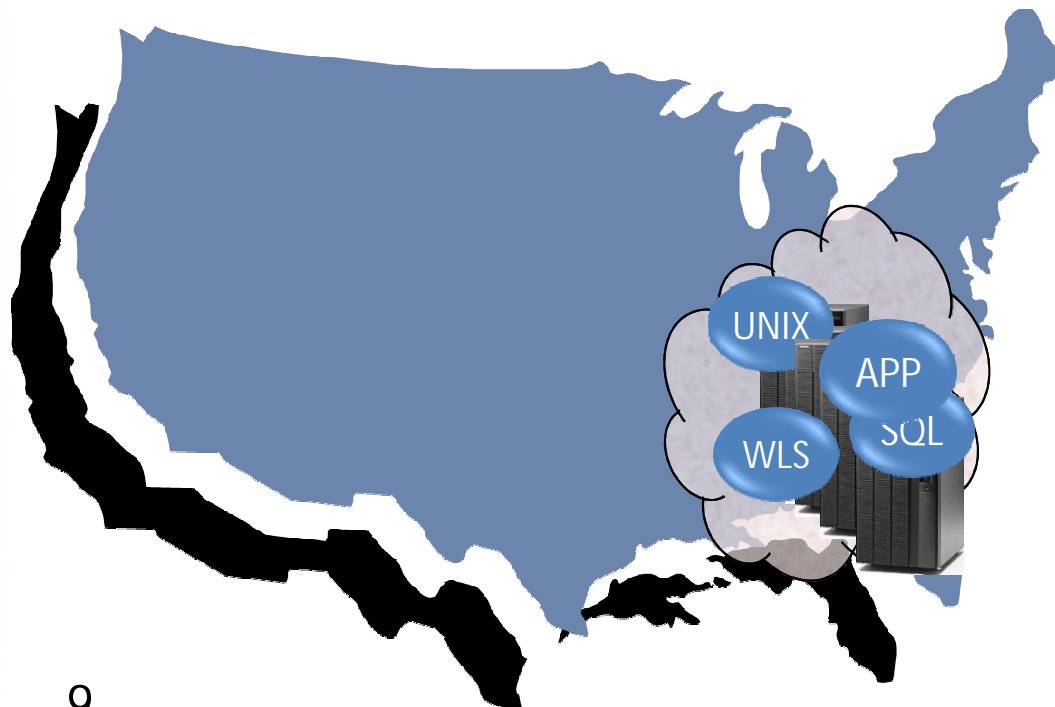


Types of service models: Software as a Service (SaaS)

- Virtualized operating environment (ABB) + application
 - ❑ Cybersecurity as a Service (yes its also called SaaS)
- Examples: VPMi, Salesforce, BillQuick



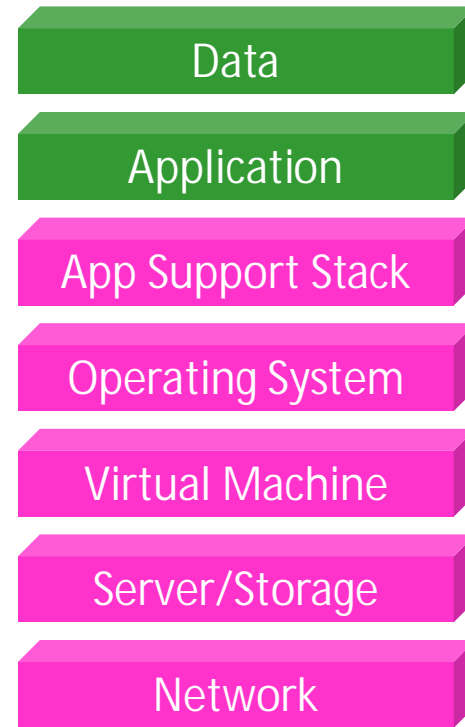
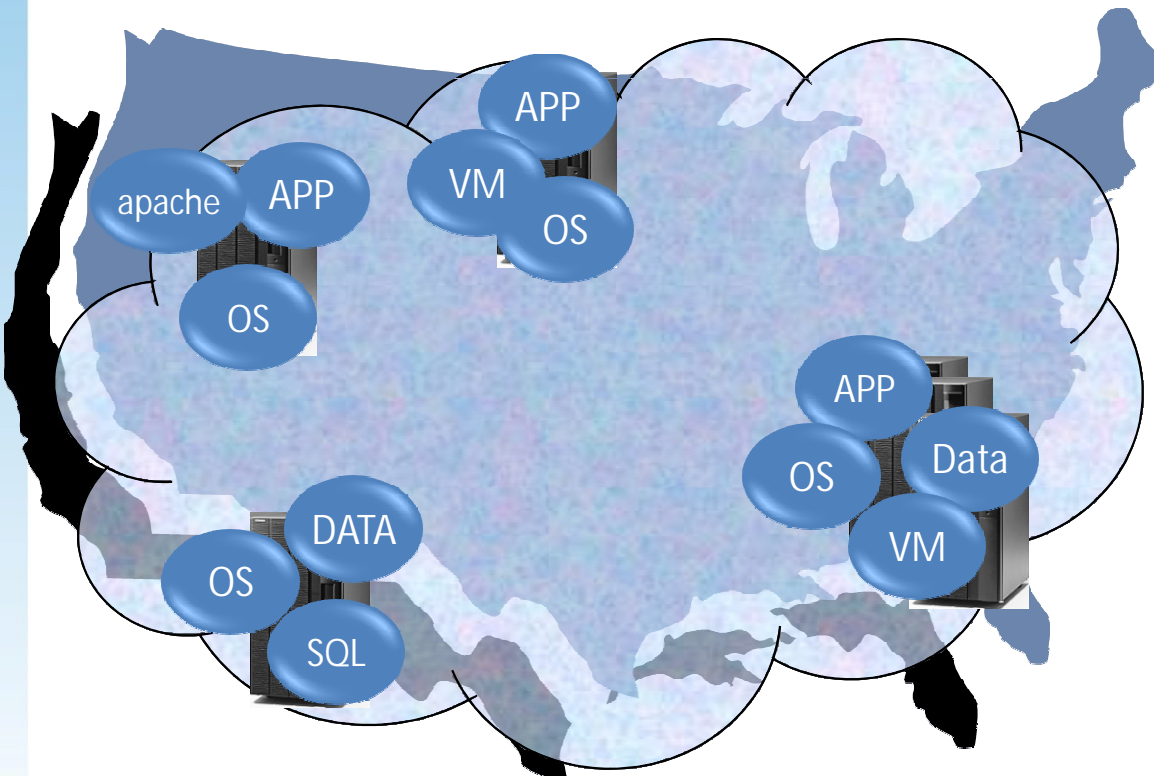
Virtualized and contained within one organization



 IT Control

Deployment models: Community (PaaS example)

- Supporting solution block is shared resource
 - Time Share / Service Provider



IT Control



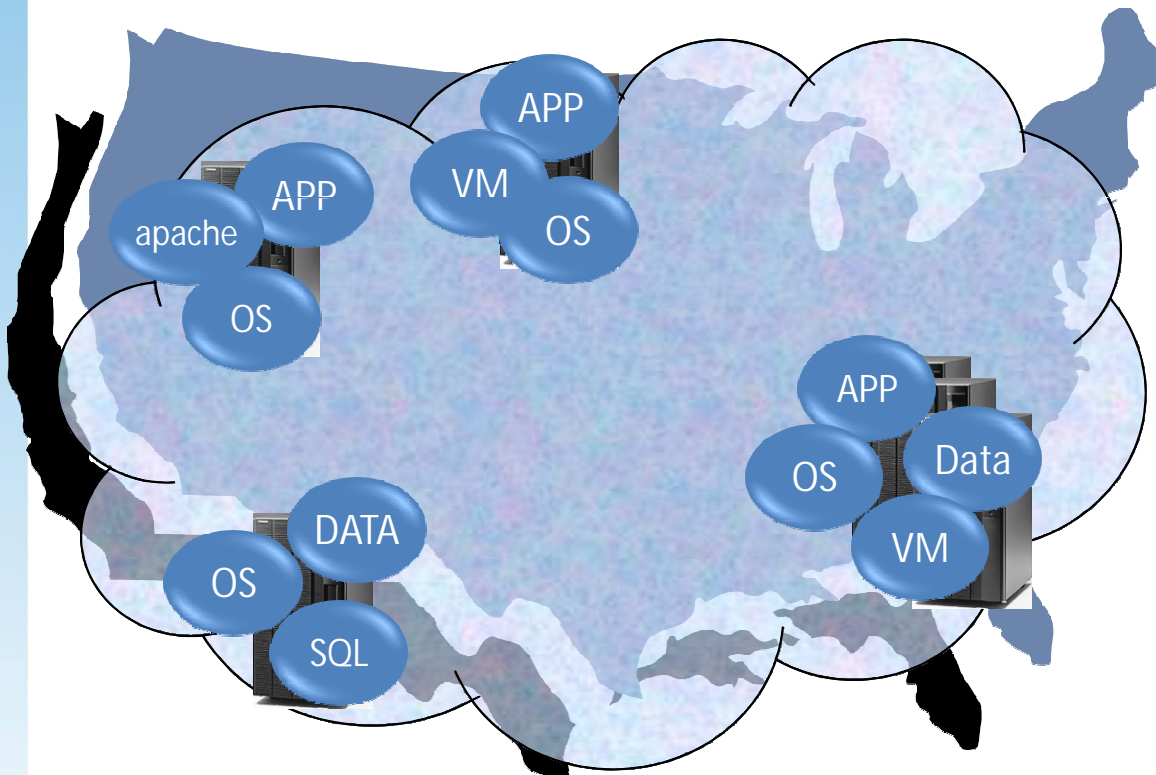
Cloud SP
Control



Shared Control

Deployment models: Public (SaaS example)

- Data is secured and control shared



Data

Application

App Support Stack

Operating System

Virtual Machine

Server/Storage

Network

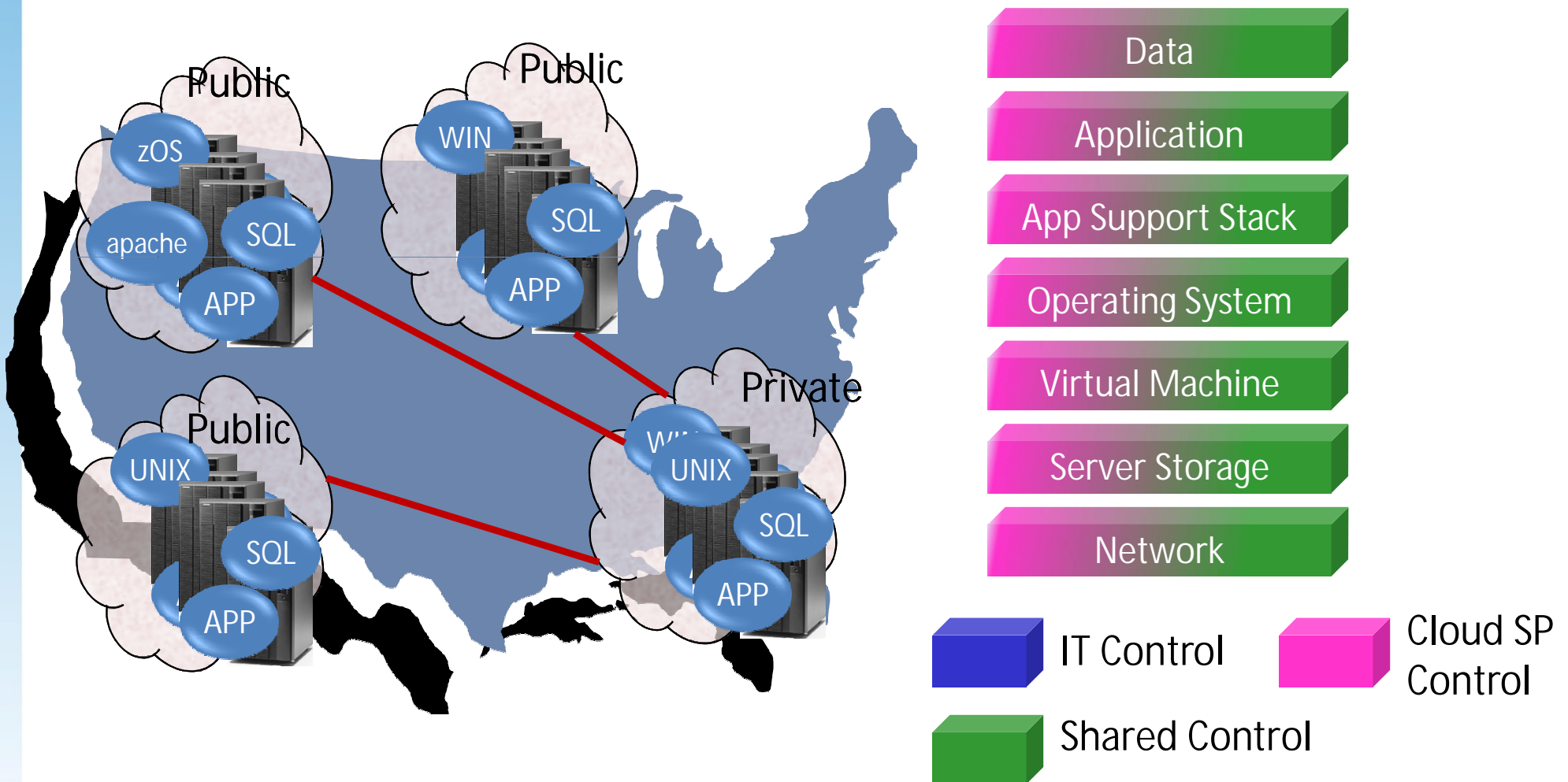
IT Control

Cloud SP Control

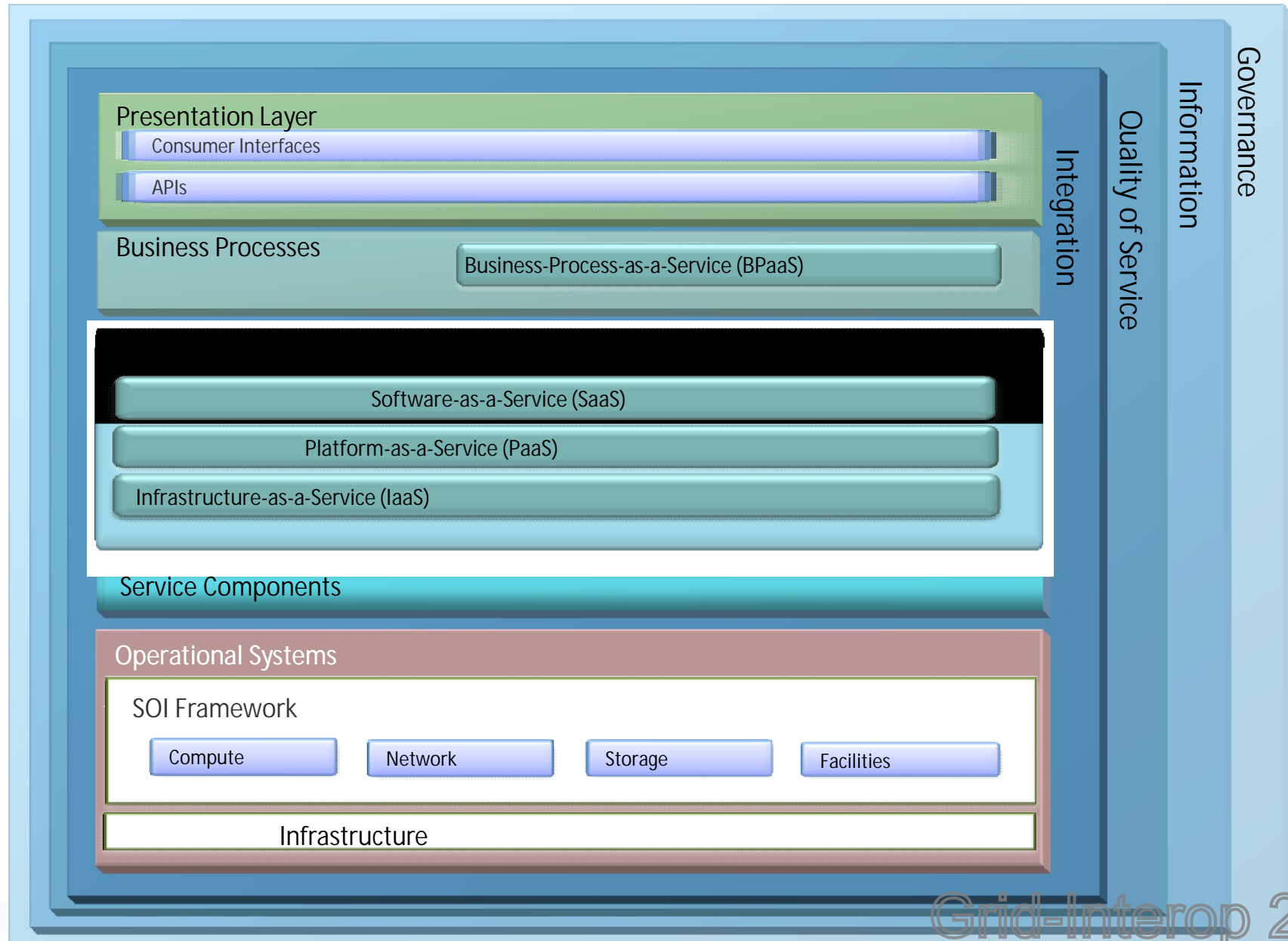
Shared Control

Deployment models: Hybrid (SaaS example)

- Mix of in-house controlled and public shared

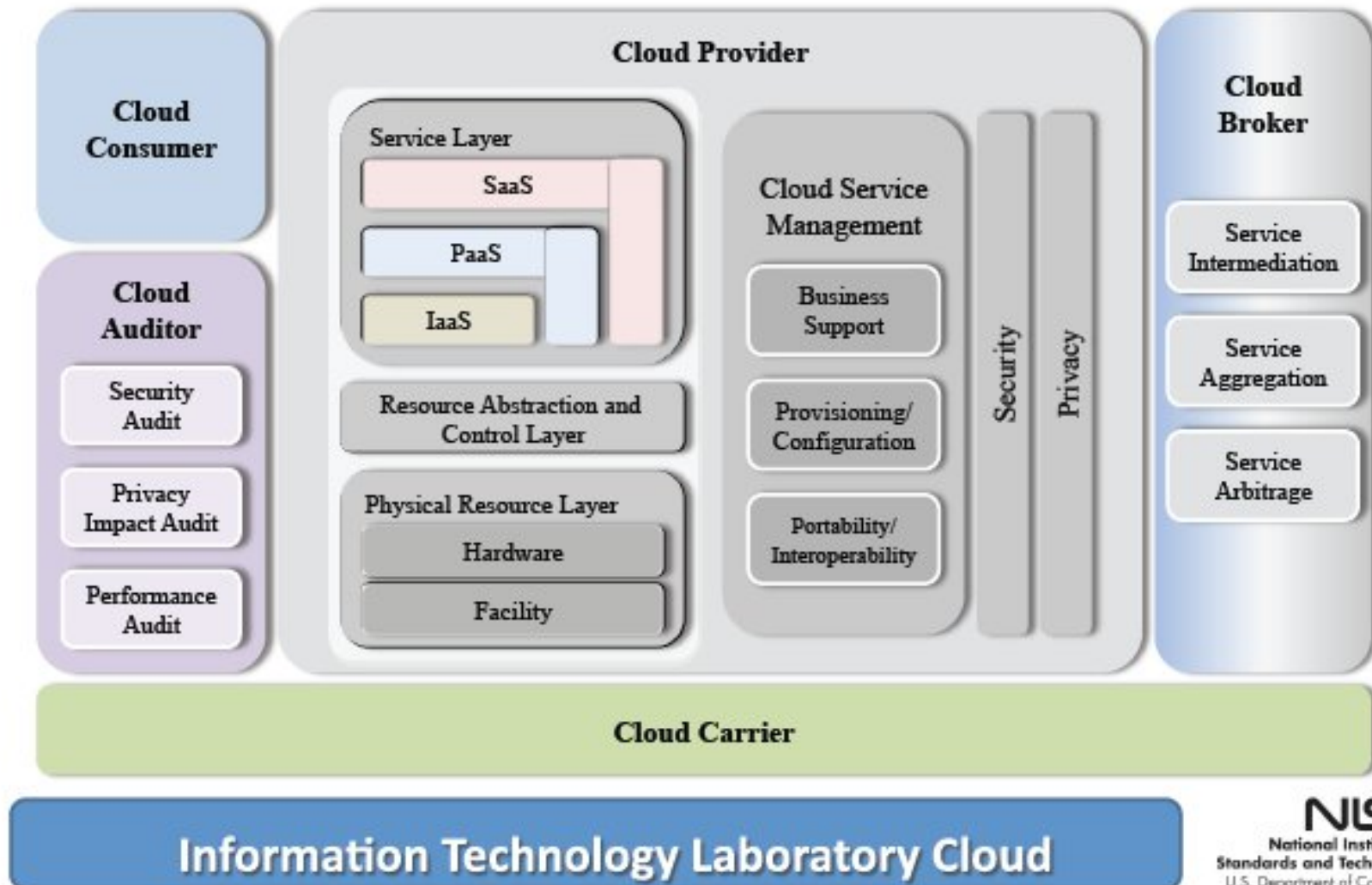


Cloud ABBs (Open Group)

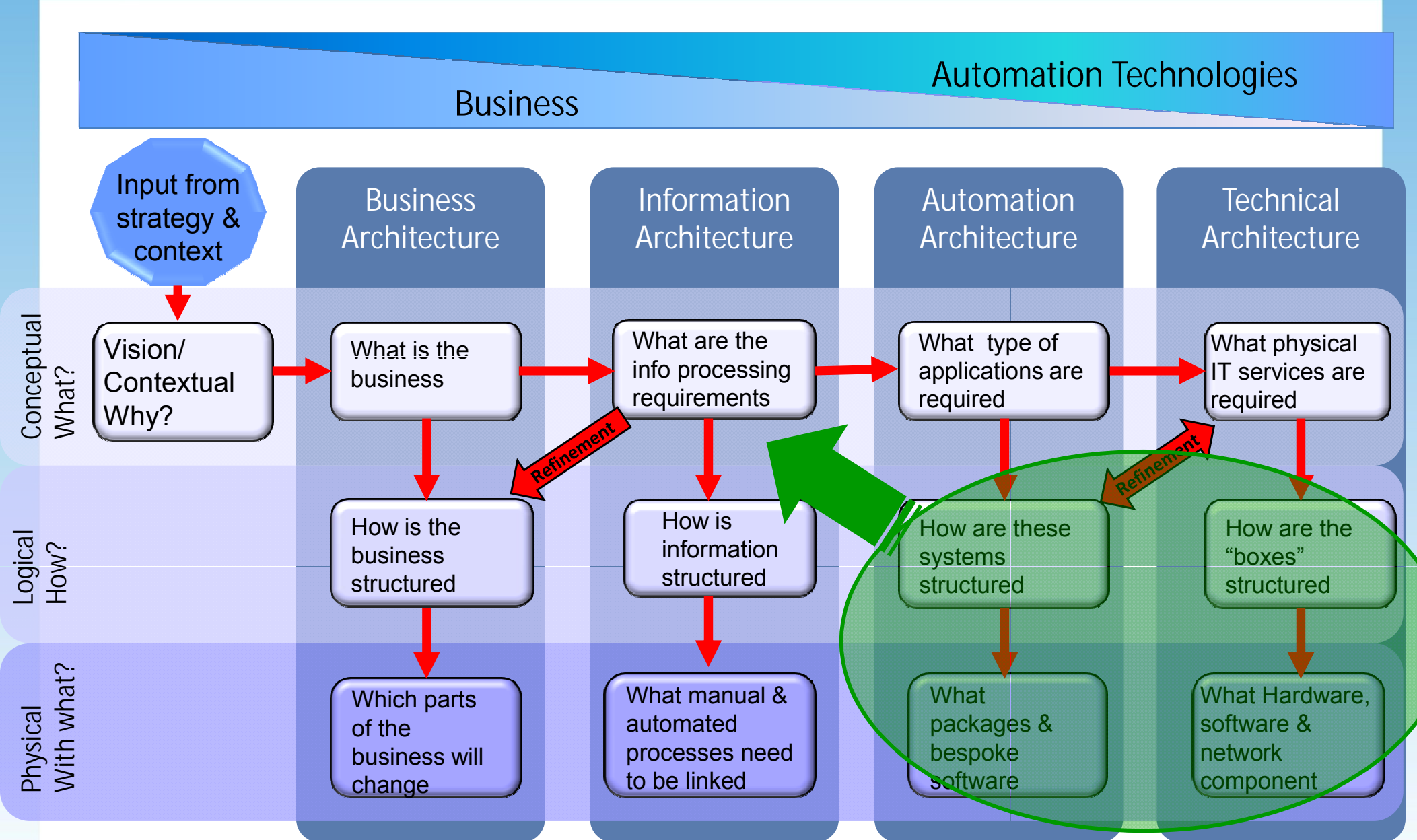


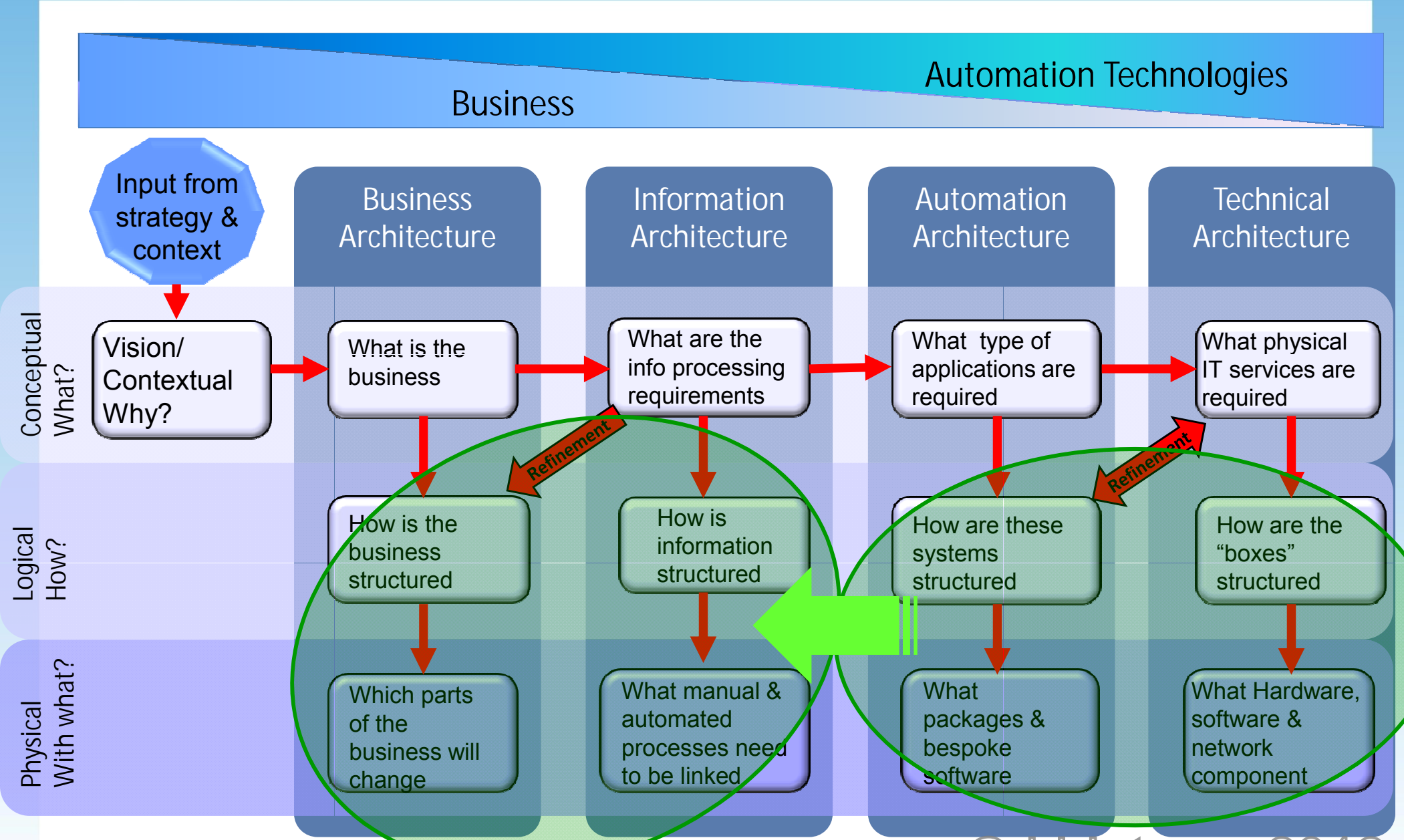
NIST View of XaaS (everything as a Service)

The NIST Cloud Computing Reference Architecture



Impact of Clouds on an Organization EA Perspective – IaaS & PaaS





* outsourcing a function

Service Provider key items

Accessibility

- Interface standards
- Usage roles (sequence)
- Compatibility

Service levels

- Broad access & Latency
- Scalability (rapid elasticity)
- Backup, disaster continuance/recovery

Security

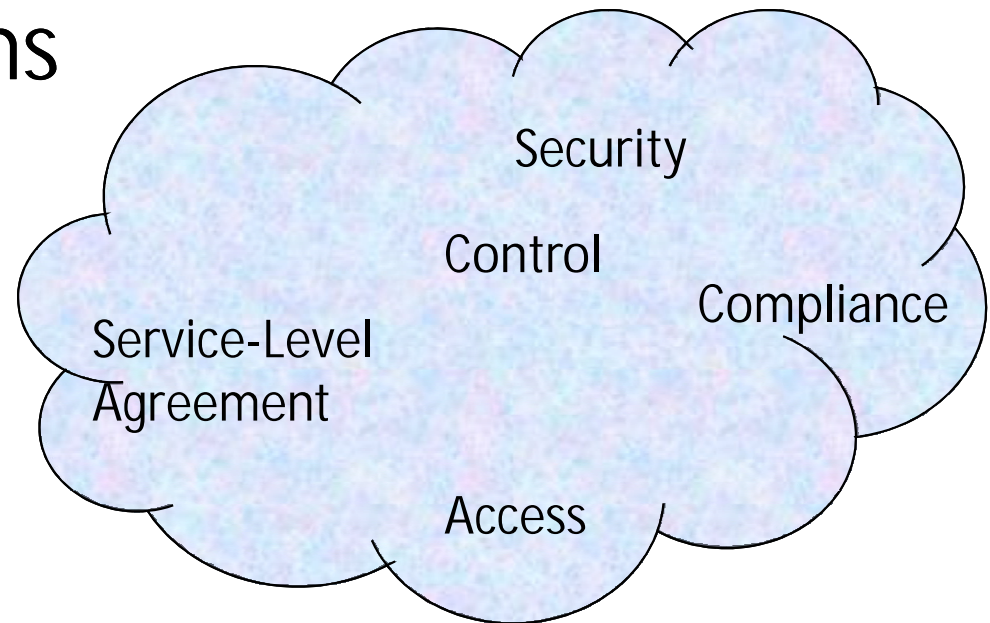
- Secured access and storage
- Privacy

Regulatory and client compliance requirements

Control

- Visibility and shared control over contracted virtual environment

- Accurate billing



Why this isn't pervasive – TRUST

Which of the following do you believe about cloud computing (including SaaS)?

- a) The benefits of cloud computing outweigh the risks - 20%
- b) The risks of cloud computing outweigh the benefits - 41%
- c) The risk and benefits of cloud computing are appropriately balanced - 39%

2011 ISACA Risk/Reward Barometer

Which of the following best describes your enterprise's 2011 cloud computing plan?

- a) We limit cloud computing to low-risk, non-mission-critical IT services - 25%
- b) We use cloud computing for mission-critical IT services - 14%
- c) We do not currently use cloud computing for any IT services - 21%

2011 ISACA Risk/Reward Barometer

Why this isn't pervasive

Technical Issues

- Communications Latency
- Ability of Cloud resources to respond in near real-time to dramatic workload increases
- Inconsistent Cloud response times due to external demand (other Cloud users)

Business Issues

- Cloud provider stability – if we bet portions of our business process on their procedures will they be around for the long haul
- Visibility into security procedures (eg: privacy, archiving, access)
- Changes to existing business procedures (organizational structure) and security procedures

Emotional Issues

- Knowing its not completely in your control
- Not trusting your or the Cloud provider's security and disaster-continuance measures

Questions

