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Introduction to Cloud Computing

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The world's infrastructure is maxed out…
Something meaningful is happening…

Every human being, company, organization, city, nation, natural system and man-made system is becoming ***interconnected, instrumented and intelligent.***

… the world's infrastructure needs retooling.

Traffic

Network Overload

The world is flatter.

Because it can.

The world is smaller.

Underutilized Ports

Because it must.

Medical Errors

The world is getting smarter.

Because we want it to.

Energy Crisis

Financial Crisis

Cloud Computing – a Disruptive New Paradigm

"Clouds will transform the information technology (IT) industry… profoundly change the way people work and companies operate."

The Economist

- *Provides massively scalable computing resources from anywhere*
- *Simplifies services delivery*
- *Enables rapid innovation of new business models*
- *Dynamic Infrastructure for next generation data centers*

IBM Business Results in Cloud Computing

The IBM TAP business case represents an ideal environment for a private cloud implementation. By implementing virtualization and automated provisioning, the team was able to:

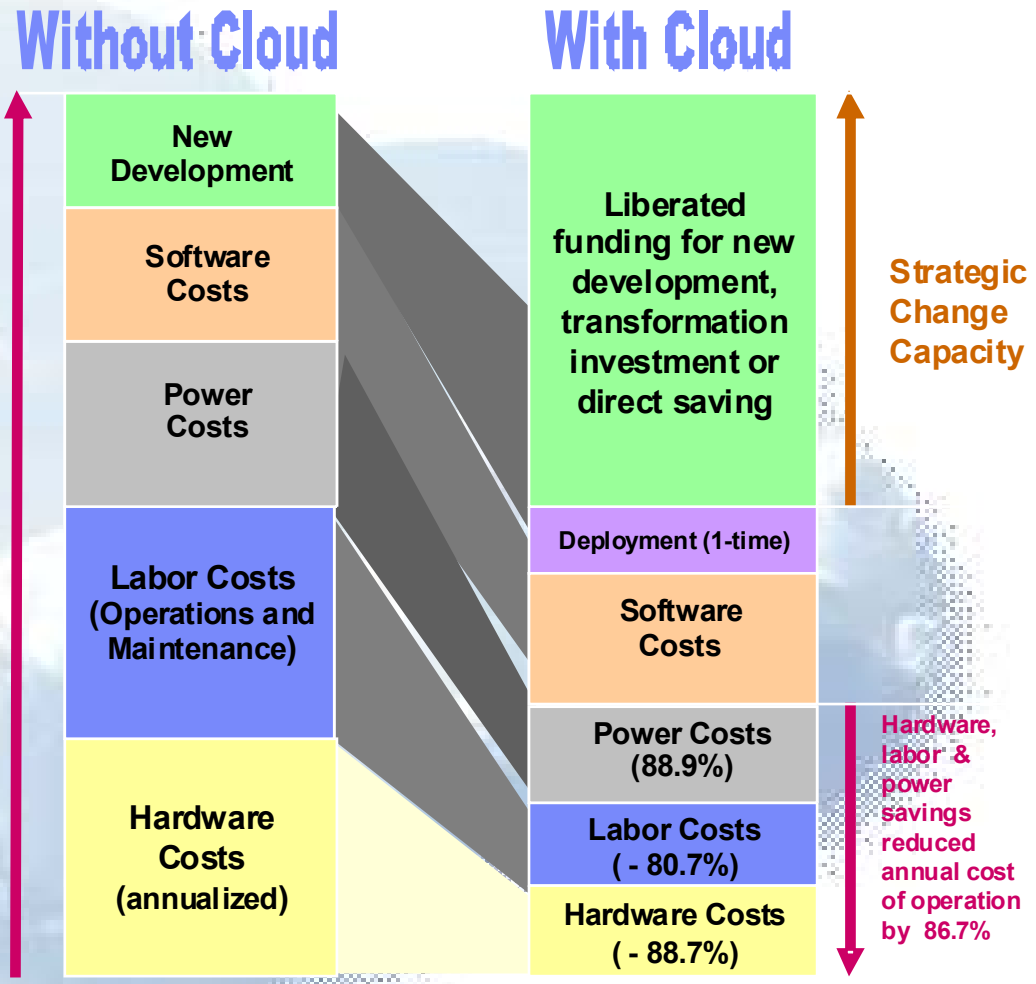
- Reduce from 488 servers to 55
- Reduce from 15 admins to 2
- Reduce Power costs (fewer servers)

Clients who have already adopted virtualization and automated provisioning will see different results.

Business Case Results

Annual savings: $3.3M (84%) $3.9M to $0.6M

Payback Period: 73 days
Net Present Value (NPV): $7.5M
Internal Rate of Return (IRR): 496%
Return On Investment (ROI): 1039%

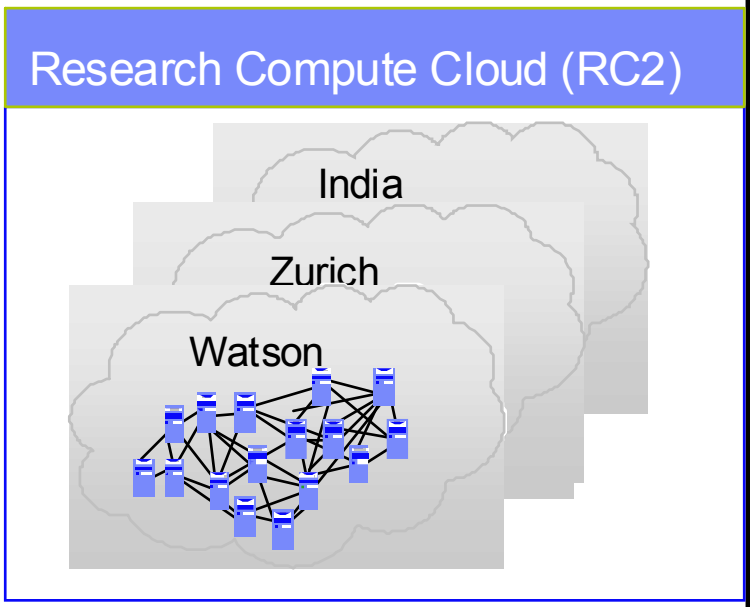


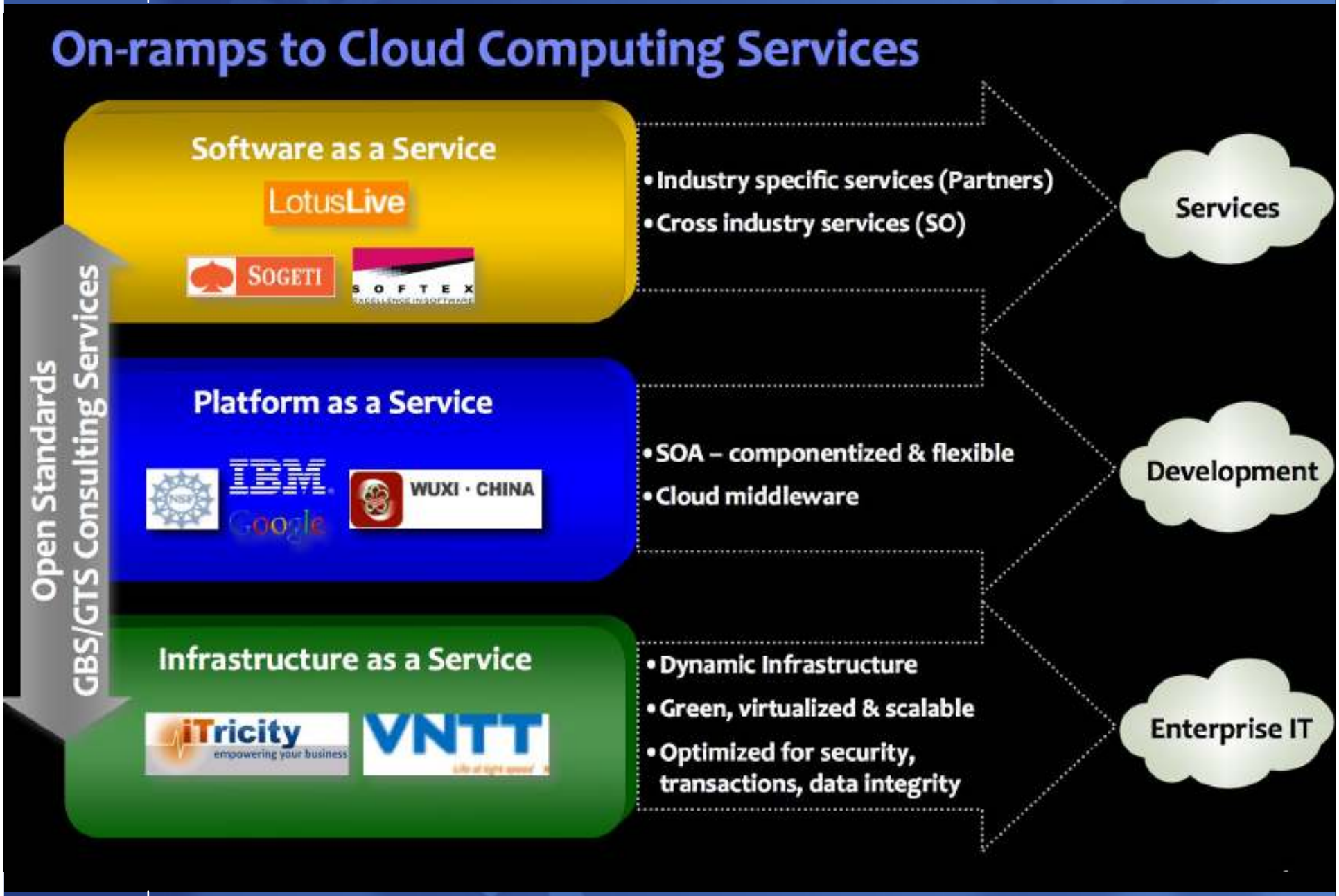
Note: 3-Year Depreciation Period with 10% Discount Rate

IBM Research Computing Cloud

1. **Provides self service "on demand" delivery solution for research computing resources**

2. **Zero touch support for the full life cycle of service delivery**
   - Order creation
   - Approval process
   - E-mail notification
   - Automated provisioning
   - Monitoring



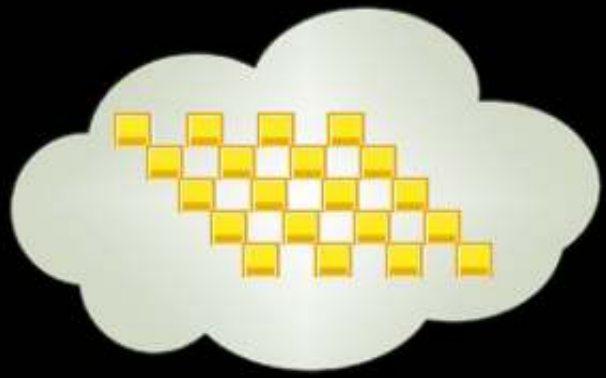


Technology Demo Storyboard

Develop in the cloud

- Integrated, dynamically provisioned and scaled runtime environment
- Repository for source and reusable assets

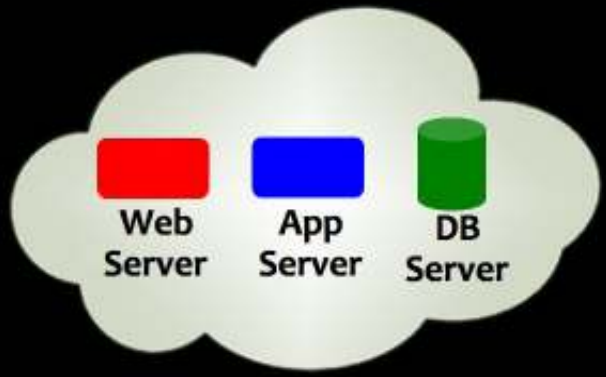
Developers ,
Architects, Testers



Deploy in the cloud

- One click application provisioning
- Deployment optimization
- Collaboration platform for knowledge sharing

Developers,
Early Users,
Operations,
Application Owners,
Business Units



Technology Demo Storyboard

Deliver services from the cloud

- Seamless transition to production environment
- Easily accessed from anywhere

Overflow to another cloud

- Hybrid cloud for Dynamic Infrastructure
- Leverage extra capacity from public clouds
- Single systems management view across clouds

China Cloud Computing Center

Highlights

- First commercial cloud computing center in China
- Built by IBM for municipal government of Wuxi, China
- Eleven parks to be created across China for software development
- Accelerates transformation to a service-led economy

WUXI · CHINA

Offering Features

- Public cloud: Access through internet or secure connection
- Promotes software start-up company growth
- Accelerates development and test cycles through quick resource on-boarding
- Offers virtualized, secure, network isolated environments
- Delivers backup/restore capabilities to protect customer assets

iTricity Cloud Computing Center
"IT as electricity"

iTricity
empowering your business

Highlights

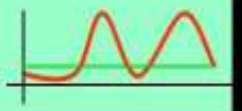
- First commercial cloud center in Benelux
- "Compliant Infrastructures as a Service" for enterprise customers
- Virtually connects to one of the 5 data centers in Benelux region
- Hosts multiple customers and workloads
- Based on Subscription and Usage based billing
- Powered by IBM System x and System p (based on IBM N-series)

Cloud Subscription License (12-36 months)
- *Security management*
- *Availability management*
- *Continuity management*
- *Accessibility*

fixed monthly fee

Usage Based Billing (hour, day, week, month, etc)
- *capacity management*
- *performance management*

- *pay per cloud instance*
- *pay per Gb storage*
- *pay per Mbs*



Offering Features

- Compliant Cloud Computing (Basel-II, SOX, SAS-70, Healthcare)
- Hybrid Clouds with Cloud Bridge which connects existing infrastructure with additional capacity in cloud centers
- Highest Security with ISO 27002 management

IBM Cloud Labs & Customers

Google Academic Initiatives – Enabling Virtual Classrooms

IBM, Google, MIT, Carnegie Mellon, University of Maryland, Berkeley, University of Washington, CSU

Google/IBM Academic Initiative

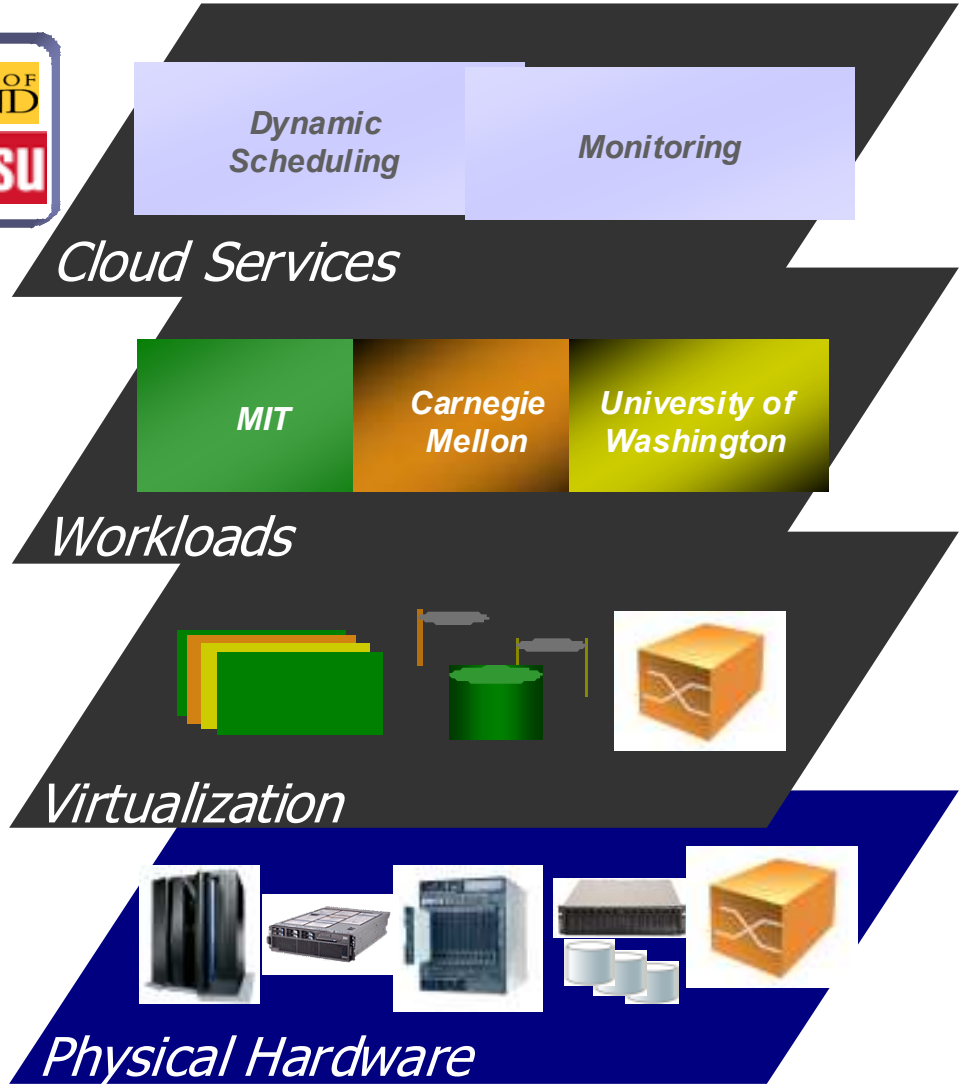
Promote open standards & Hadoop parallel computing model

Jointly provide compute platform of the future

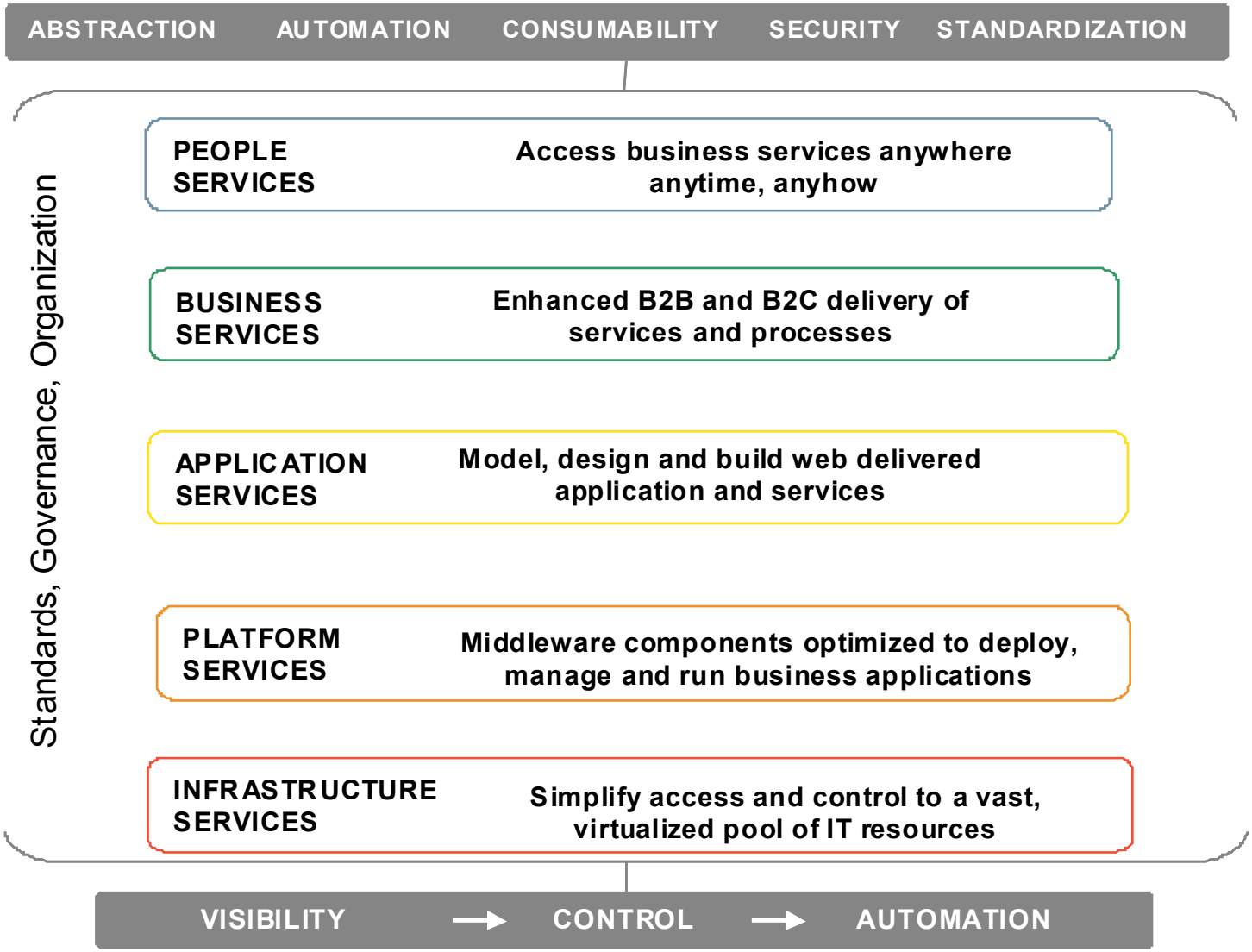
Benefits

Trains students with next generation computing skills

Optimizes emerging Internet scale workloads such as search, video, audio, 3D Internet, machine learning, mobile computing

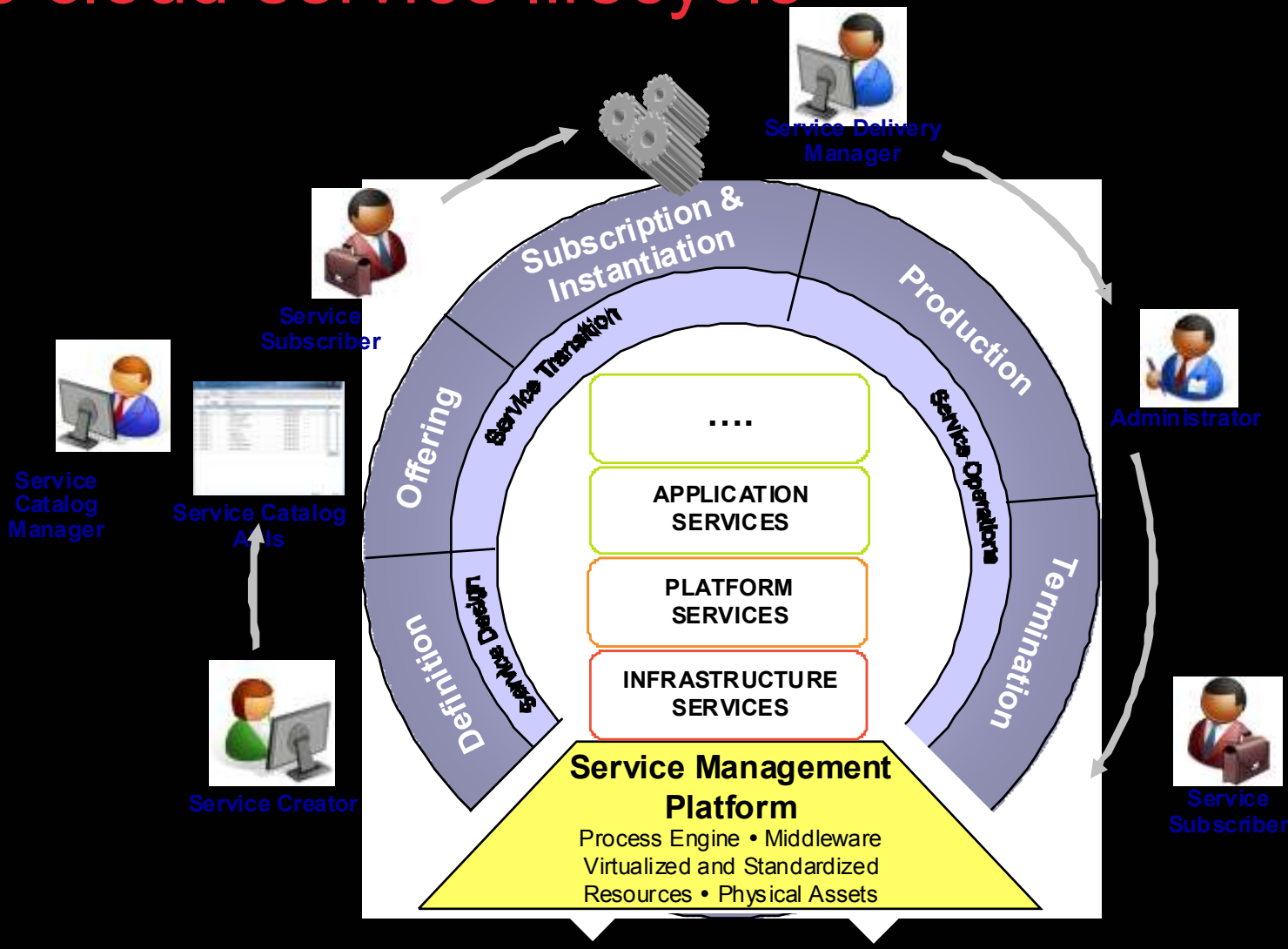


Cloud Computing Services

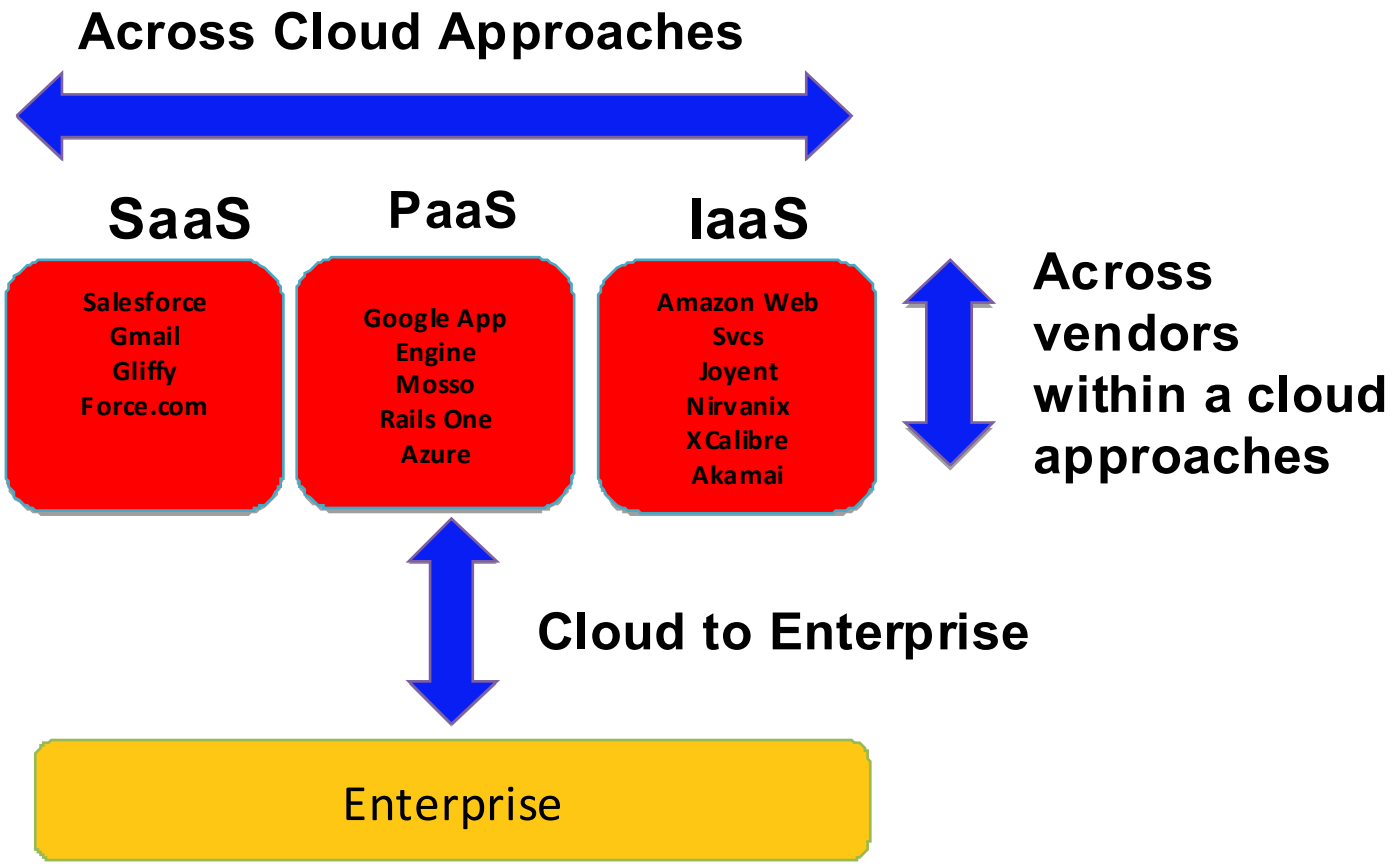


…to deliver smarter business outcomes with agility and speed

The cloud service lifecycle



Cloud Standards



- *Standards are evolving along with the emerging nature of the market*
- *Vendors are beginning to focus on interoperability as well as innovation*
- *Support for ecosystems of Cloud Services*

Security in Cloud Computing

Authentication and role-based access control
- Federated Identity including single sign-on

Isolation Management
- Server, Storage and Network

Security for Image Management
- Security Metadata, Access Control, Authorization

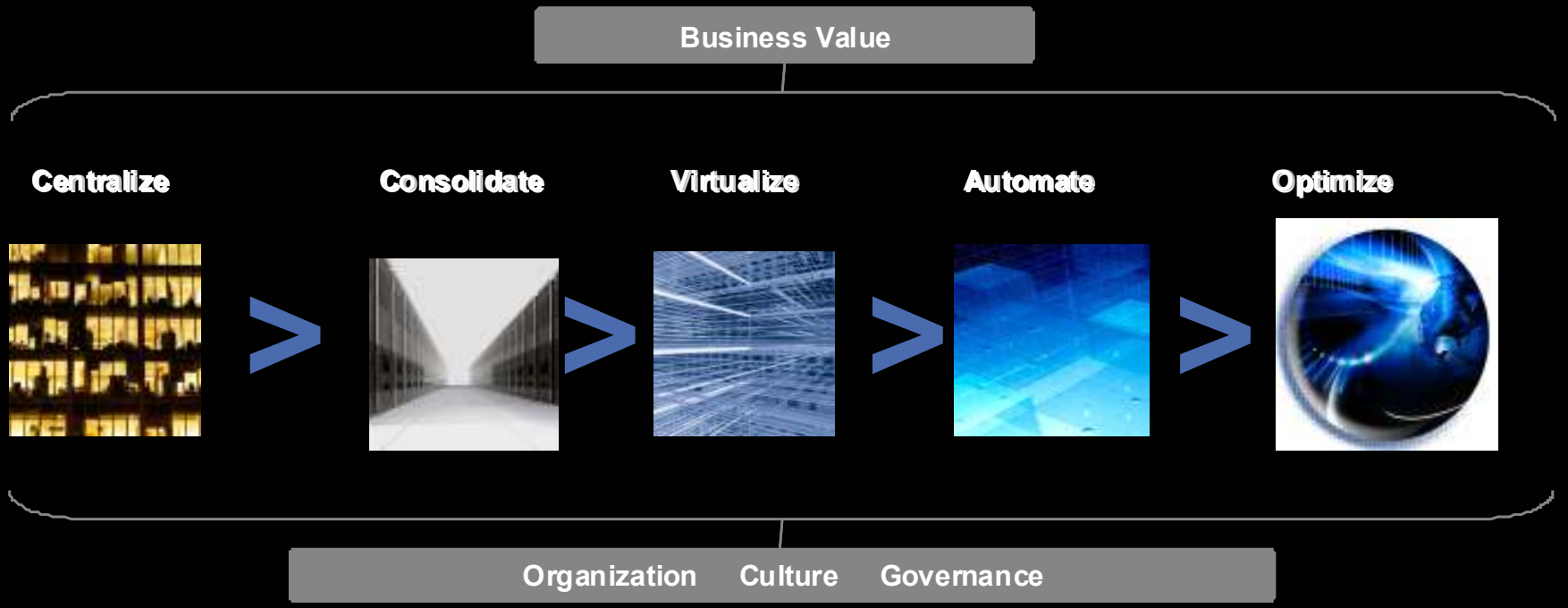
Integrity management
- Virtual Image integrity

Risk and Compliance
- Auditing and Configuration Management
- Enterprise-level Regulatory Compliance

Policy Management

Threat Management

The journey to cloud…



….requires an integrated and orchestrated approach.

IBM Cloud Computing Offerings

A portfolio of leadership products and services for optimizing with cloud computing that continues to grow to support customers with cloud building and cloud delivered offerings.

Cloud Consulting

- Infrastructure strategy & planning for cloud computing
- Business cloud consulting services
- IT optimization services

Cloud Implementation

- Service Management for Cloud Computing
- Tivoli Service Automation Management (TSAM)
- Self-enablement Portal
- Virtual Infrastructure Access
- Scale out File Services
- IBM design & implementation for test environments
- IBM security solutions for cloud computing
- Virtual workplace continuity

Cloud Delivered

- IBM LotusLive
- Computing on Demand
- IBM Information Protection Services

  - *Remote data protection service*

  - *Managed data protection for desktops and laptops*

IBM Cloud Labs Mission

Drive IBM's leadership in cloud computing and act as core engine for all cloud activities

- **Evangelize IBM's Cloud initiative through a worldwide team of experts**
- **Drive first-of-a-kind customer proofs of concept and implementations**
- **Engage in core solution enhancements and development activities**
  - Private Clouds
  - Public Clouds
  - Industry Standards
- **Roll out new IBM offerings worldwide**

For more information please visit
http://www.ibm.com/cloud

Thank you!