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The Impact of Cloud and SOA on an IT Organization

From Service Delivery to Business Transformation

September 1, 2009

Presentation Agenda

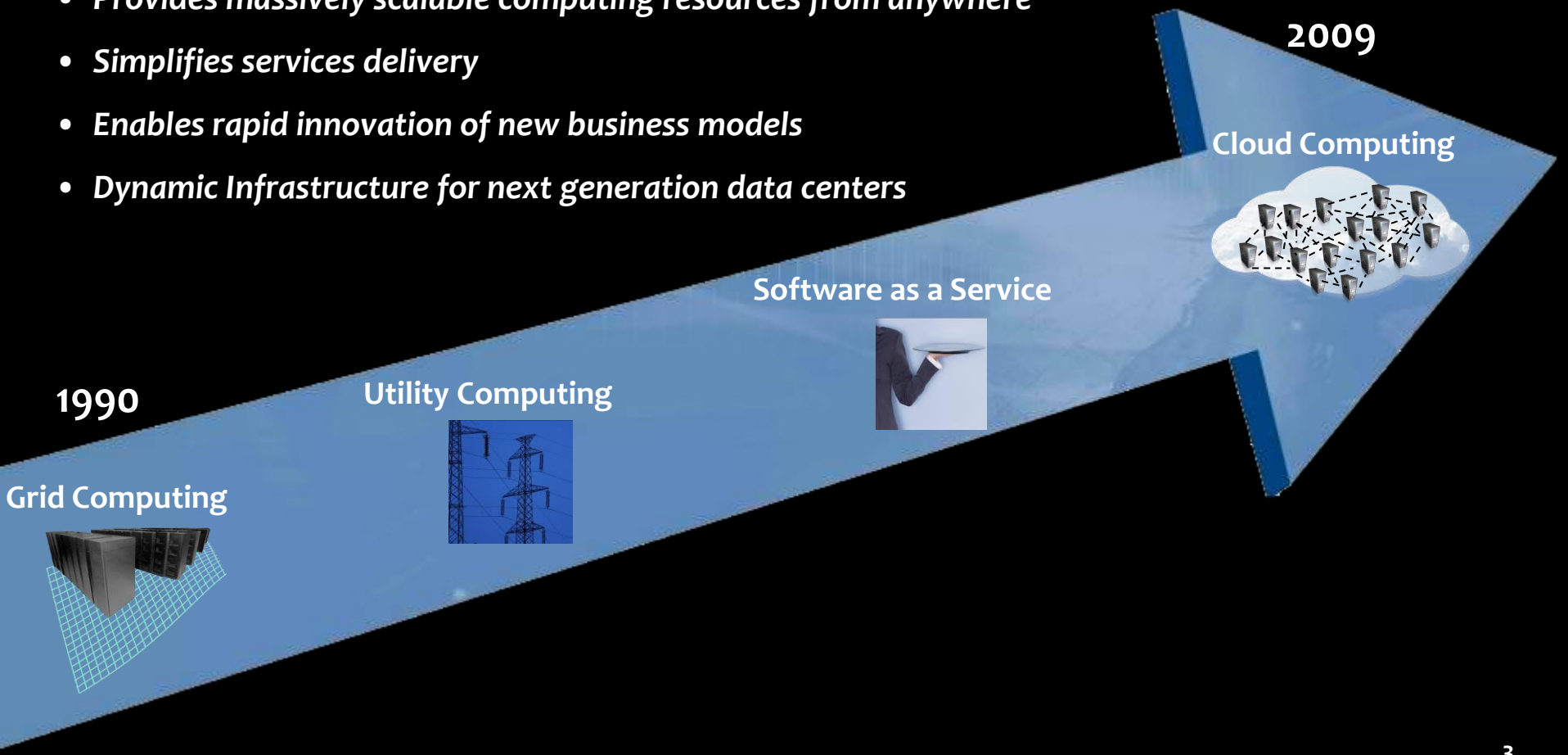
- Virtualization technology studies and approach
  - Benefits and case studies
  - Layers of virtualization
- Cloud Computing overview and case study
  - Definitions and use cases
  - Case study
- SOA Governance challenges
  - SOA and alignment with Virtualization and Cloud
- Time permitting – Cloud TCO study

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*



Dynamic Infrastructure – Benefits Reported from study of 45 implementations of virtualization

89%
improved service

45%
reduced risk

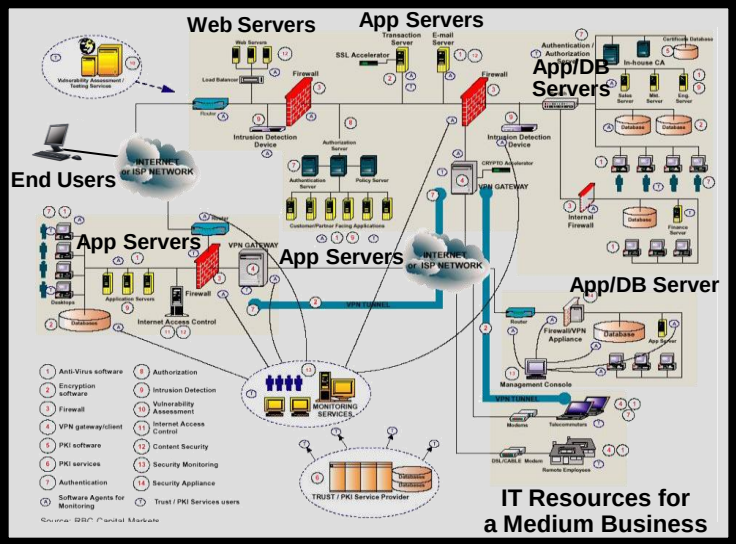
2/3
reduced costs

1/2
Virtualization efforts were driven by business resiliency requirements

1/45
Project was only driven by a desire to virtualize

Allied Irish Banks, Bank of Montreal, Bank of Russia, Bharti Airtel, BP, BP Angola, Centrinet, Cheshire County Council, City of Syracuse Police Dept, Continuous Linked Settlement, Depository Trust & Clearing Corporation, DTE Energy, Ecole Polytechnique Federale de Lausanne, EPELFI Gilfam, Fetranspor, First National Bank of Omaha, Geisinger Health System, Geoscience Australia, Gewandhaus Gruber, Groupe Mutuel, GSMS Incorporated, Guangdong Dapeng LNG Company Limited, Honda Italia Industriale, Implanet, Metabasis Therapeutics, Inc., METRO Group, Montreal Informatica, Nationwide Insurance, North Carolina State University, NYPD, On Line Do Brasil, Oxxio, Pacific Coast Producers, Professional Provident Society, Sainte-Justine Hospital, Storstroms ErhvervsCenter, Swedish Medical Center, Telenor, Terna, The Bank of New York Mellon, The Co-operative, University of Pittsburgh Medical Center, Whirlpool Corporation

Virtualization Provides Significant Simplification



- Rigid configurations
- Fixed resources per server
- Low server utilization
- Wasted energy and floor space
- HW changes impact SW assets
- Servers managed individually

Virtual Environment

- Virtual resources are easier to deploy, grow, move, …
- Virtual resources, configurations, and workloads are decoupled and insulated from physical environment

Virtual Servers | Virtual Storage | Virtual Networks | Virtual Clients

Virtualization Layer

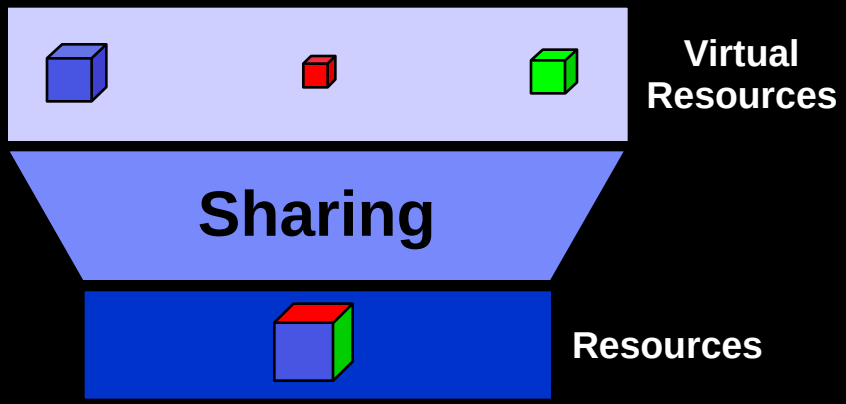
Decouples Virtual and Physical Environments

Physical Environment

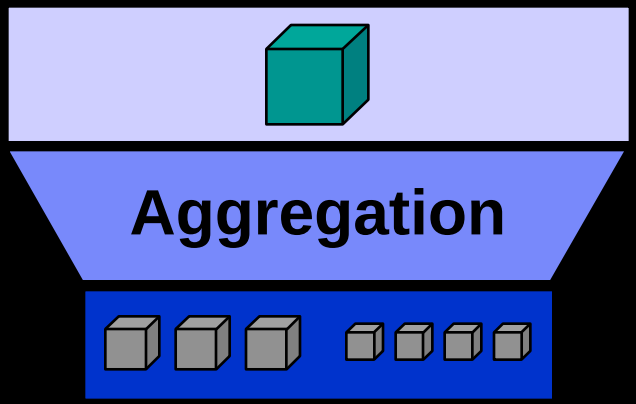
- Physical resource changes can be made without impact to running IT workloads
- Improved HW utilization and energy efficiency

Blades | SMP Servers | Storage Servers and Storage | Network Hardware

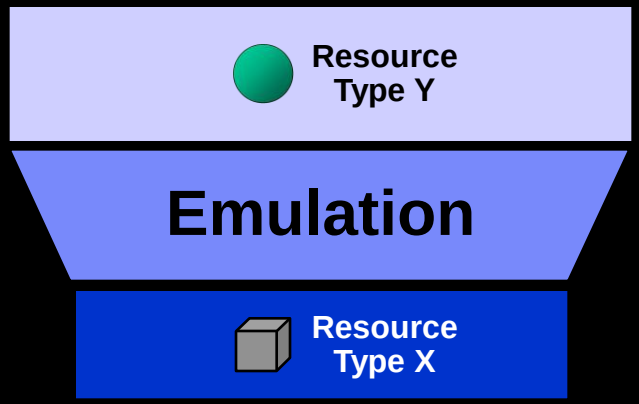
Virtualization Functions and Benefits



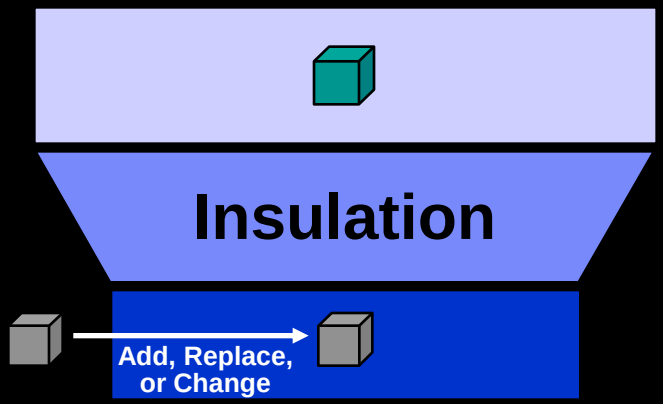
Examples: LPARs, VMs, virtual disks, VLANs
Benefits: Resource utilization, workload manageability, flexibility, isolation



Examples: Virtual disks, IP routing to clones
Benefits: Management simplification, investment protection, scalability



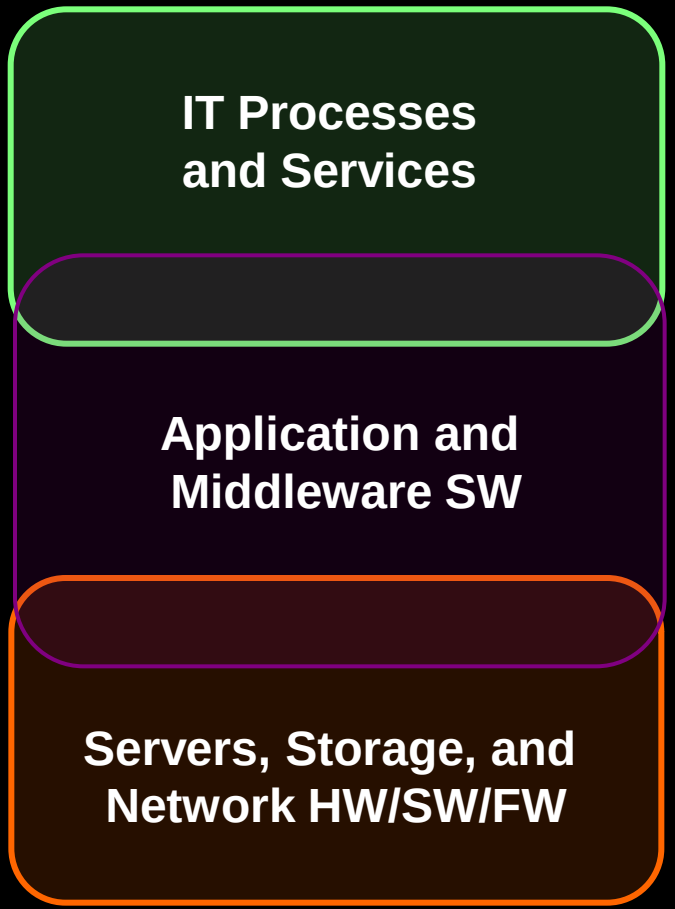
Examples: Arch. emulators, iSCSI, virtual tape
Benefits: Compatibility, software investment protection, interoperability, flexibility



Examples: Spare CPU subst., CUoD, SAN-VC
Benefits: Continuous availability, flexibility, software investment protection

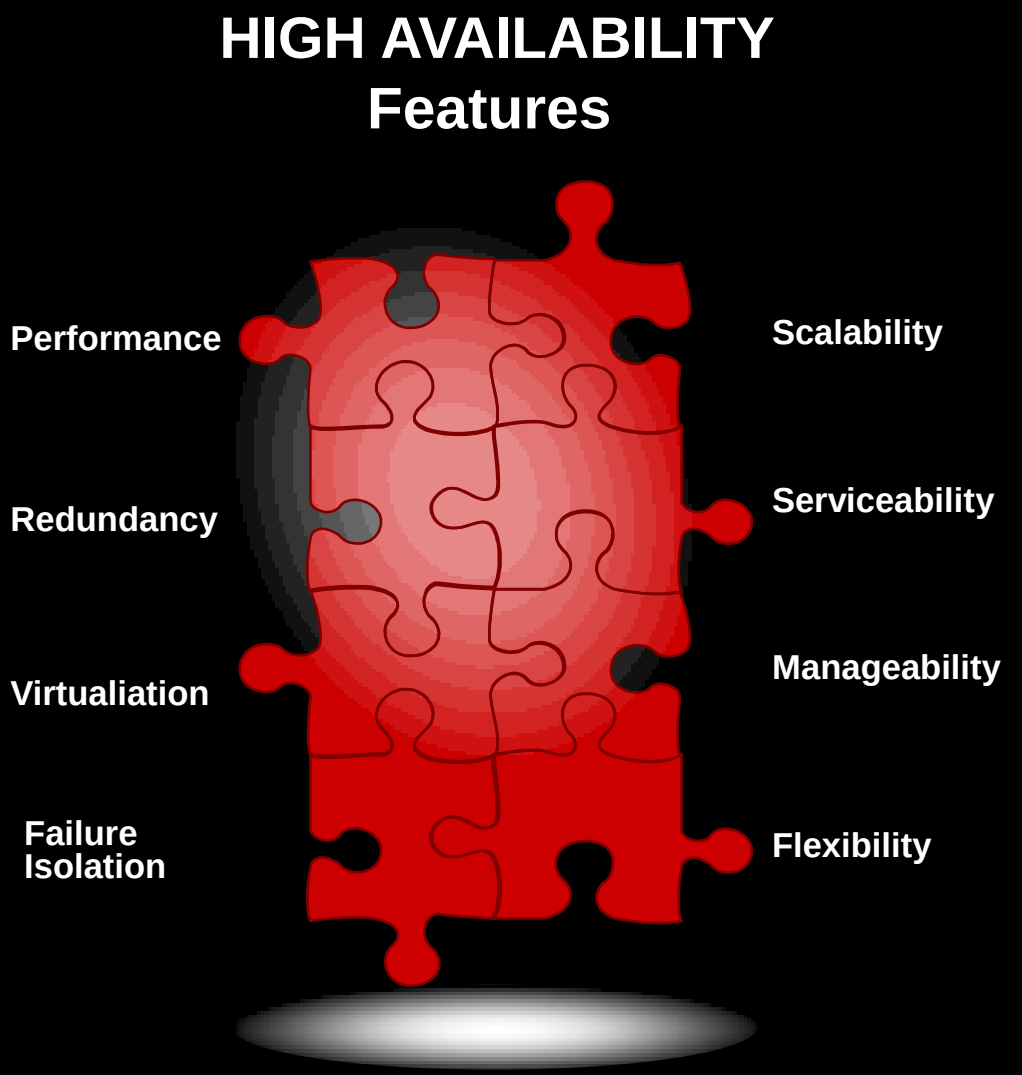
Virtualization Strategy for Layered Hypervisors

Resilience: the ability to be ready – to take advantage of good changes and bounce back from bad changes



Technologies that Matter for Virtualization

- Hot-swap SATA Drives
- Hot-swap fans in 1U servers
- On board diagnostics
- Hot-spare / mirrored memory
- Blade chassis redundancy



Reduce cost with increased performance

2005

9 x346 Servers

Single-Core processor

2009

1 x3650 M2 Server

Quad-Core processor

50% lower annual energy costs[1]

8.8x more performance per server[2]

89% floor space reduction

(1) IBM Engineering Research Study, Feb'09
(2) Based on Intel performance data, 2009

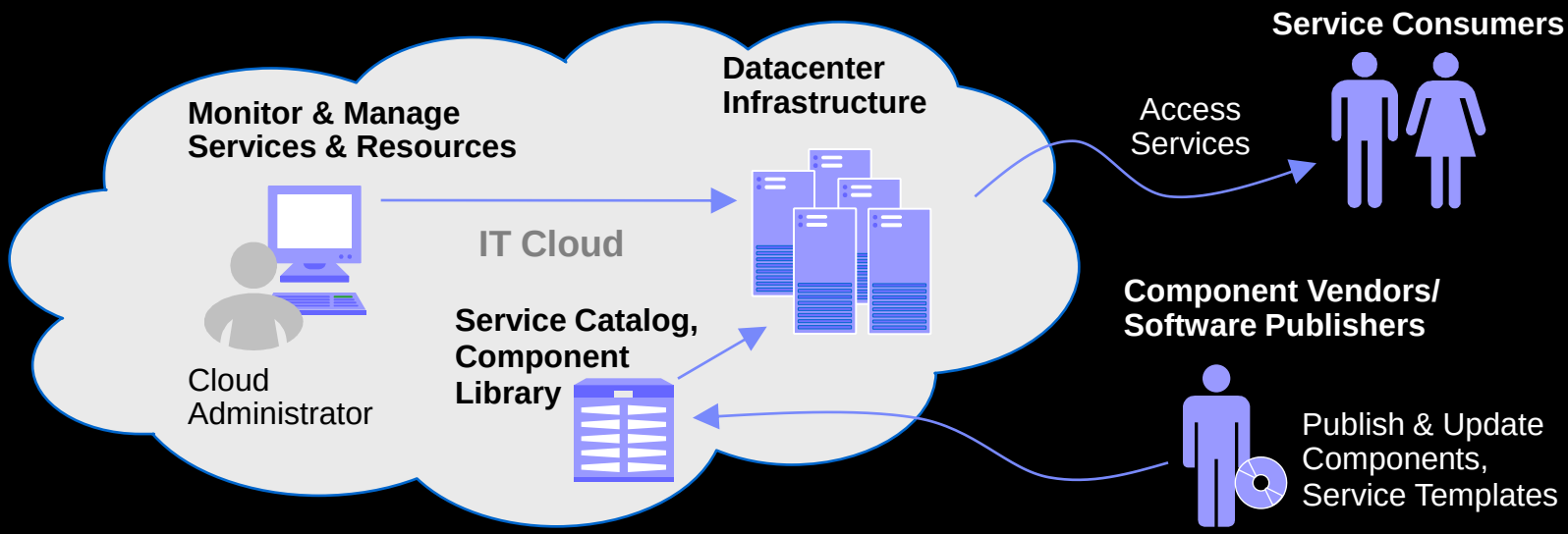
What is Cloud Computing?

A user experience and a business model

- Cloud computing is an emerging style of IT delivery in which applications, data, and IT resources are **rapidly provisioned** and provided as **standardized offerings** to users over the web in a **flexible pricing model.**

An infrastructure management and services delivery methodology

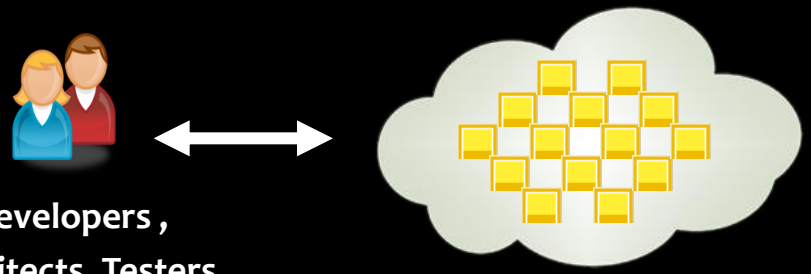
- Cloud computing is a way of **managing** large numbers of highly **virtualized resources** such that, from a management perspective, they resemble a single large resource. This can then be used to deliver services with **elastic scaling**.



Typical Scenario for Cloud use in the Enterprise

Development environment

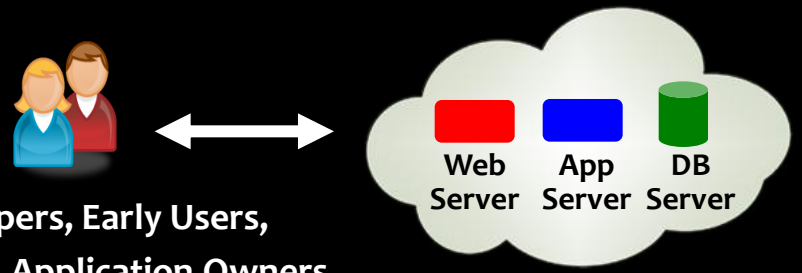
- Acquisition at a project level
- Availability of components
- Set-up of environment



Developers ,
Architects, Testers

Deployment and Testing

- Multiple dedicated test environments
- Multiple versions of software
- Reacquisition at end of projects



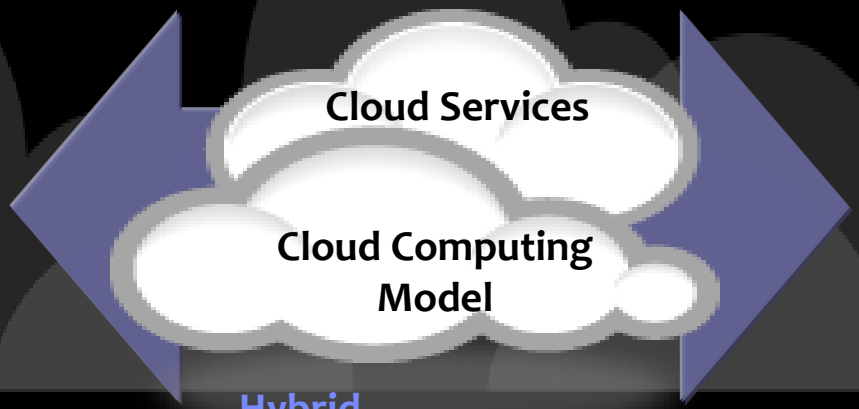
Developers, Early Users,
Operations, Application Owners,
Business Units

New consumption and delivery models drive new sourcing options and business flexibility

Flexible Delivery Models

Public …

- Service provider owned and managed.
- Access by subscription.
- Delivers select set of standardized business process, application and/or infrastructure services on a flexible price per use basis.



Private …

- Privately owned and managed.
- Access limited to client and its partner network.
- Drives efficiency, standardization and best practices while retaining greater customization and control

Hybrid …

- Access to client, partner network, and third party resources

…. Standardization, capital preservation, flexibility and time to deploy

…. Customization, efficiency, availability, resiliency, security and privacy

…service sourcing and service value

Service Oriented Architecture

- Development and deployment checkpoints non-existent
- Massive service redundancy
- Mutiple sectors each developing services as needed
  - Redundant service development

- Typical Causes leading to isolated development and lack of governance
  - Requirements are not well documented with frequent requirement changes
  - Requirements captured in context of existing application
    - No business or enterprise Focus
  - Lack of re-usable Business Processes
    - Existing processes from one tool cannot be used by other tool
  - Different software development lifecycles used without a selection process (e.g. Agile and Waterfall)
  - Collaboration between in house and external development is limited
  - Process compliance reporting challenges with manual maintenance of spreadsheets – 10-20% overhead on project managers and project leads

A Service Oriented Architecture complements Cloud …

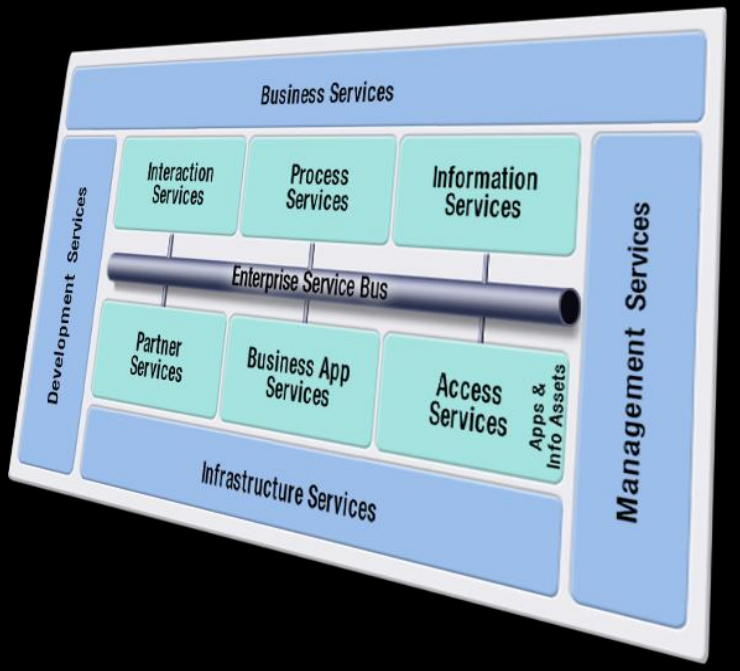
Both require similar capabilities:

- Architectural and organizational models
- Optimization, Innovation and Value Delivery
- Flexibility and Agility
- Secure, reuse and sharing of 'services'
- Separation of Concerns (Requestors, Providers, Creators, Brokers, etc.)
- Improved Administration

Virtualization at all layers of the architecture

SOA provides flexibility, reuse, separation of concerns, etc.

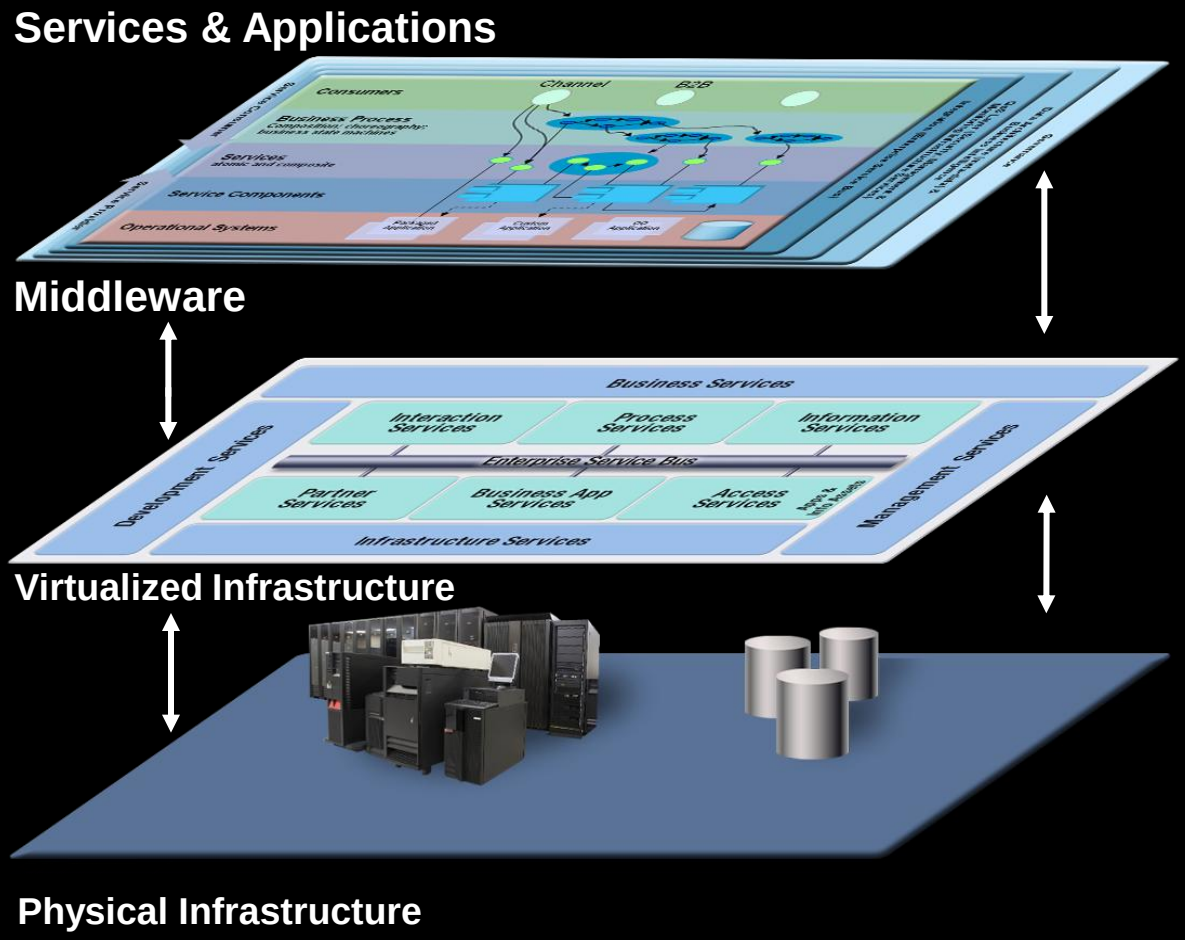
Exploit a dynamic and elastic environment to enable innovation and to get optimum use from resources



… and provides layers of abstraction that enable Cloud delivery.

SOA Characteristics

- Applications reused in new dynamic ways
- Services combined from multiple sources
- Rapid deployment
- Services route to any available resource
- Distributed access



SOA Governance – Client Challenges

- Development and deployment checkpoints non-existent
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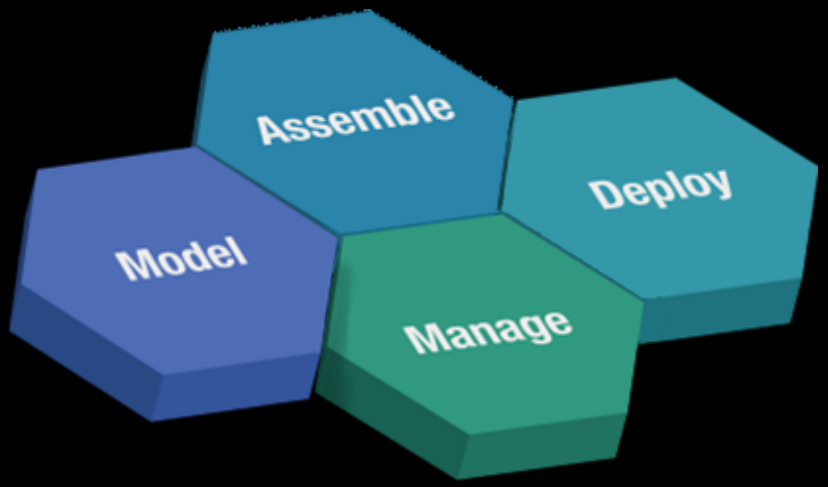
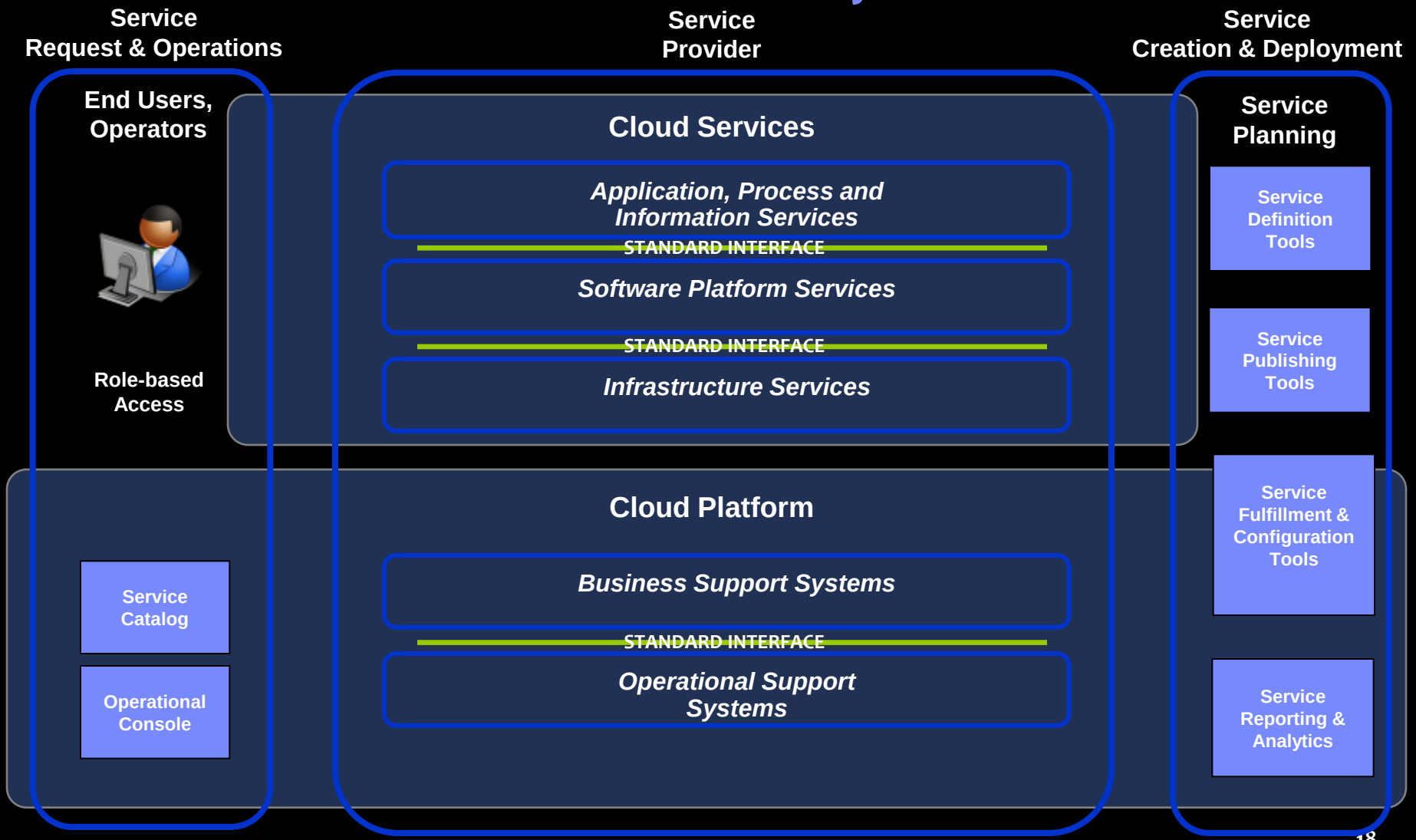
SOA Governance Approach to Client Challenges

- Promote consistent service life cycle management methodology across all sectors
- Need Processes to manage various stages of service life cycle such as:
  - Portfolio Rationalization
  - Creation a New Service
  - Implementation of Service
  - Certification
  - Deployment
  - Publishing of Service
  - Subscription to a Service
  - Creation of New Service Version
  - Retirement of Service

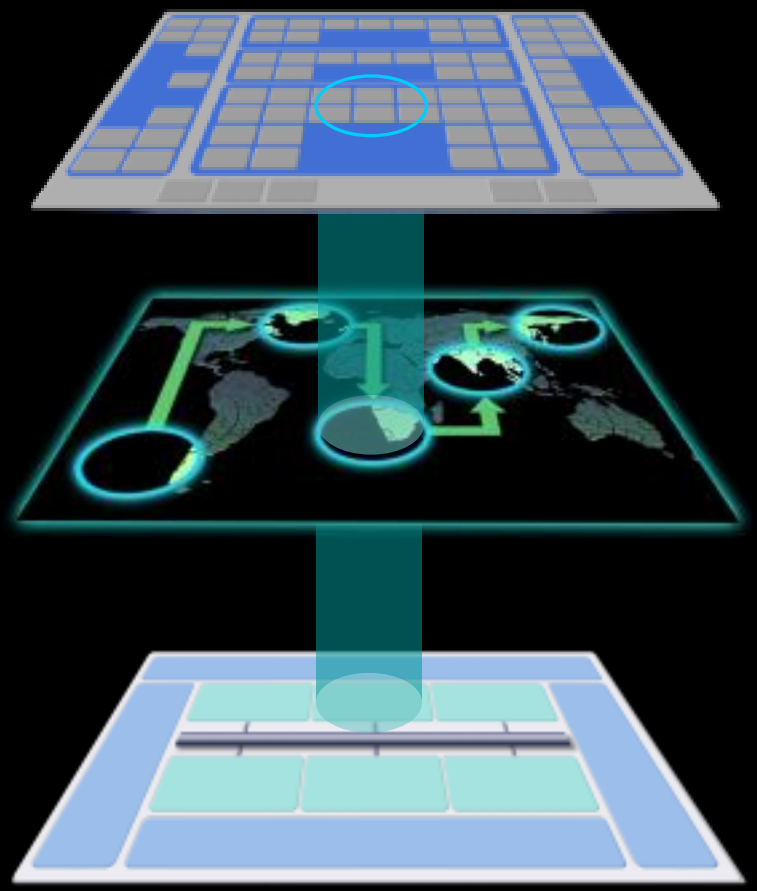


When deploying services on cloud architectural model that includes standards based interfaces is key …



… as well as identifying workloads with affinity for Cloud.

- Risk and migration cost may be too high today
  - Database
  - Transaction processing
  - ERP workloads
  - Highly regulated workloads
- Can be standardized for cloud
  - Web infrastructure applications
  - Collaboration infrastructure
  - Development and test
  - High Performance Computing
- Made possible by cloud
  - High volume, low cost analytics
  - Collaborative Business Networks
  - Industry scale “smart” applications



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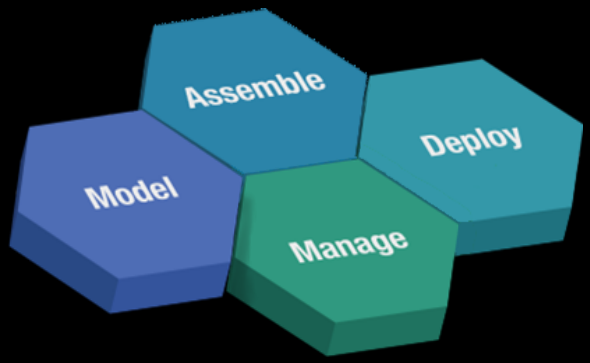
SOA Governance + Cloud Approach to Client Challenges

- Focus on the right workloads for Cloud
- For those projects, also use Cloud for shared implementation environments that can be deployed, and removed, as needed on the Cloud for some key steps in the SOA Governance processes
  - Creation a New Service
  - Implementation of Service
  - Certification
  - Deployment
  - Publishing of Service
  - Creation of New Service Version



- Hands-on live environment is better than review on paper
- Should also provide a collaborative environment on the same network so all stakeholders can communicate

Financial Services Company using Cloud

Goal:

- Automate clustered deployment of SOA / BPM processing rollouts to:

1. Accelerate time to market
2. Reduce cost

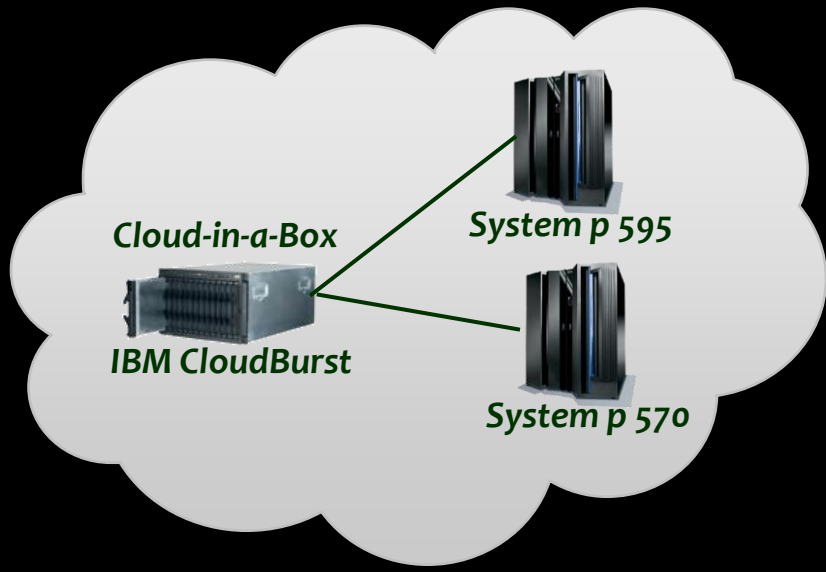
Pain Points:

- 2 weeks to setup a single test configuration of an SOA process (there are 200 processes to automate)
- 6 – 8 weeks to deploy images across 5 environments
- Multiple teams involved in each build: Systems Management, Runtime, Application, Database and Operating System teams.

Key Benefits with Cloud

- Accelerates business transformation
- 10x reduction in deployment time → 3 **hour deployments**
- Optimized resource utilization & improved turnaround time for project development and deployment

"Previously, we had to spend a lot of time supporting projects and whist we're doing that, projects are suffering… (Now), we can provision the environment overnight."



WEBSPHERE PROCESS SERVER 6.0 (CLUSTER)	WEBSPHERE APPLICATION SERVER 6.0 (CLUSTER)
WEBSPHERE MQ 6.0.2.2 (HACMP)	IBM HTTP SERVER 6.0 (LOAD BALANCED)
ITCAM for SOA 6.1	WEBSPHERE EDGE SERVER 6.0
DB2 7.2 (HACMP)	WEBSPHERE MESSAGE BROKER 6.1 (HACMP)

Where's the challenge and why aren't we all doing SOA on Cloud today?

1. Loss of control
   - Spend more time on designing containers, sandboxes
2. Data center automation is a new skill base
   - Spend more time on designing containers, sandboxes
3. Multi-tenant security concerns
   - Security is often improved if virtual secure networks are used, which isolate systems completely on to their own network
4. Complexity of new technology
   - Resource pools can lead to radical simplification
5. Reliability of shared systems
   - See hardware vendor studies

What are some better reasons to adopt incrementally

1. End to end service level agreements are hard to write
   - These will need to be understood and enforced by the underlying infrastructure
2. Support processes need to be updated
   - Systems supporting multiple business processes have multiple customer contracts – this is true of both Cloud and SOA
   - Completely public cloud, or SaaS, providers in handling problem resolution across organizations
3. Network traffic needs careful planning
   - The standardized network is a key enabler, but the network design was likely not built for the additional load

Summary

- SOA and Cloud adoption require similar organizational capabilities:
  - Improved Administration through architectural and organizational models
  - Focus on optimization, innovation and value delivery
  - Secure, reuse and sharing of 'services'
  - Separation of Concerns (Requestors, Providers, Creators, Brokers, etc.)
- SOA and Cloud are targeting similar value propositions
  - Applications and resources can be reused in new dynamic ways
  - Services combined from multiple sources
  - Rapid deployment
  - Services route to any available resource
  - Distributed access
- Focus on workloads that can be standardized for cloud
  - Web infrastructure applications
  - Collaboration infrastructure
  - Development and test
  - High Performance Computing
- Use a cloud environment to test your service and process changes live

For more information, please visit:
ibm.com/cloud

Or contact:
hately@za.ibm.com

Cloud Computing Total Cost of Ownership study

TCO methodology approach

- Determine TCO over 5yr period
- Running 100 Linux images
- Deployed on 4 different platforms
- 24 x 7 Operation

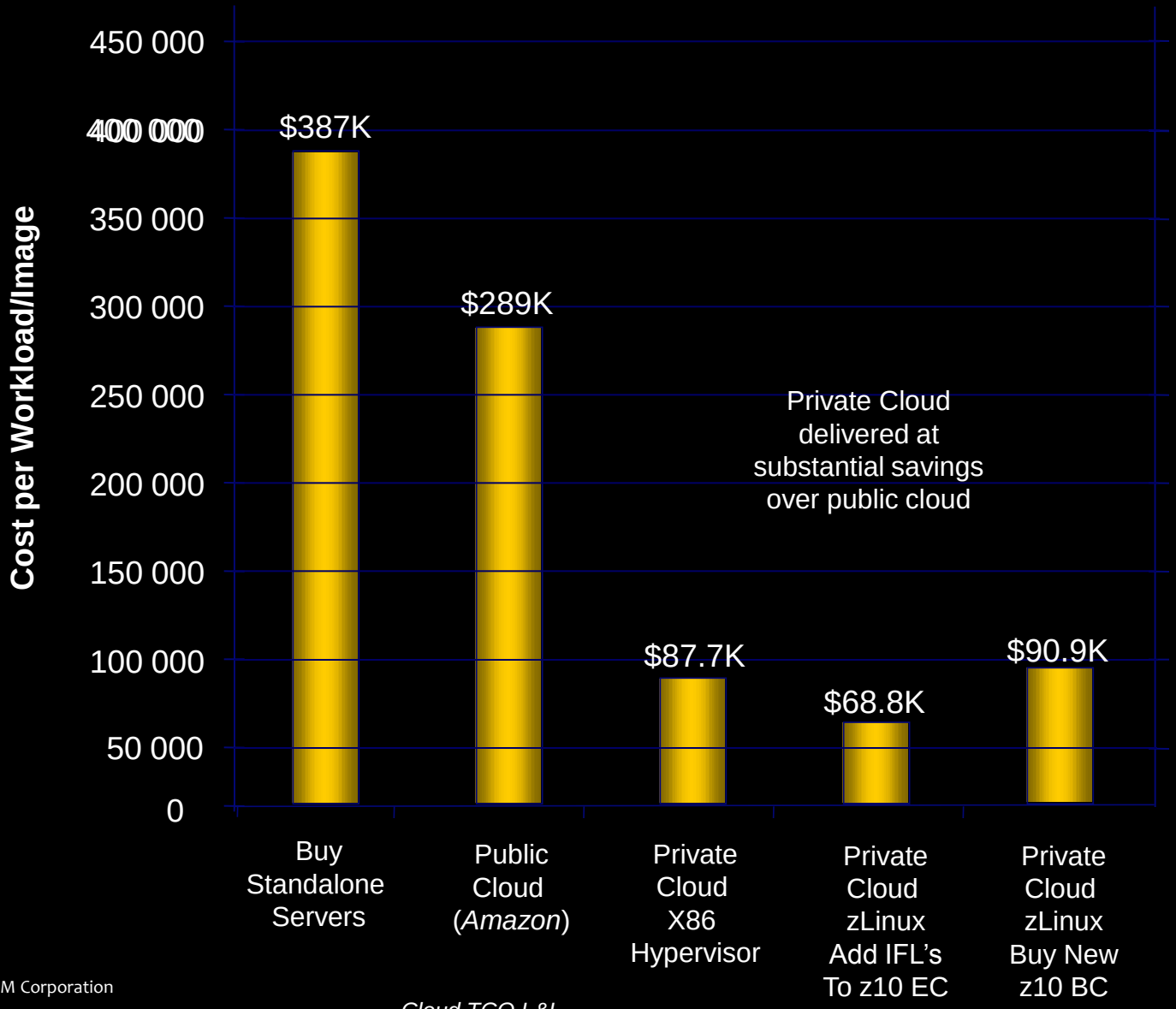
Workload

- Core Banking Application (Java Based)
- Built on IBM WebSphere Application Server
- Connected to IBM DB2 Enterprise Database
- Running on Linux
- Monitored by IBM Tivoli Composite Application Manager

TCO Components included

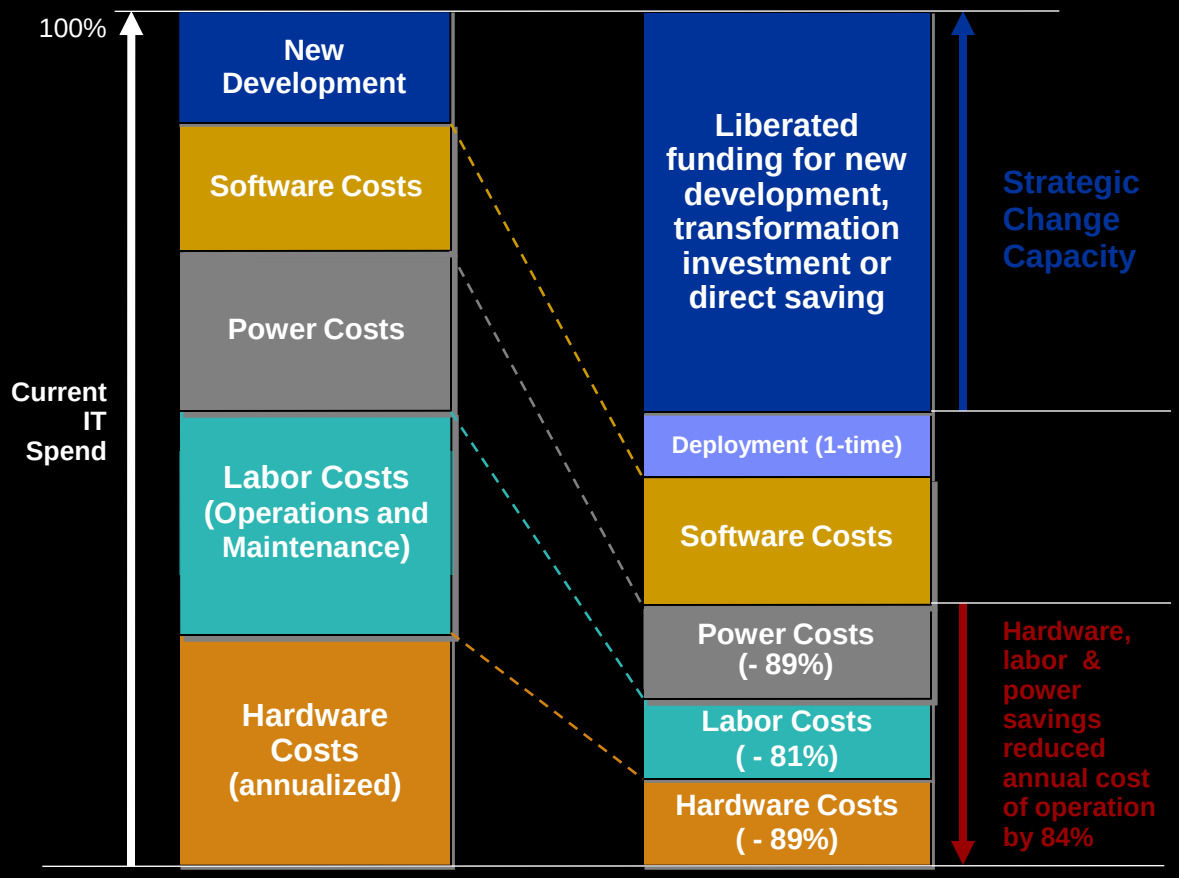
- Hardware
- Software
- Maintenance
- Facilities (power / cooling)
- Administration

Cost per Image for Linux Workloads



Cloud TCO L&L

IBM Technical Adoption Program (TAP)—ROI Analysis



Reduced Capital Expenditure

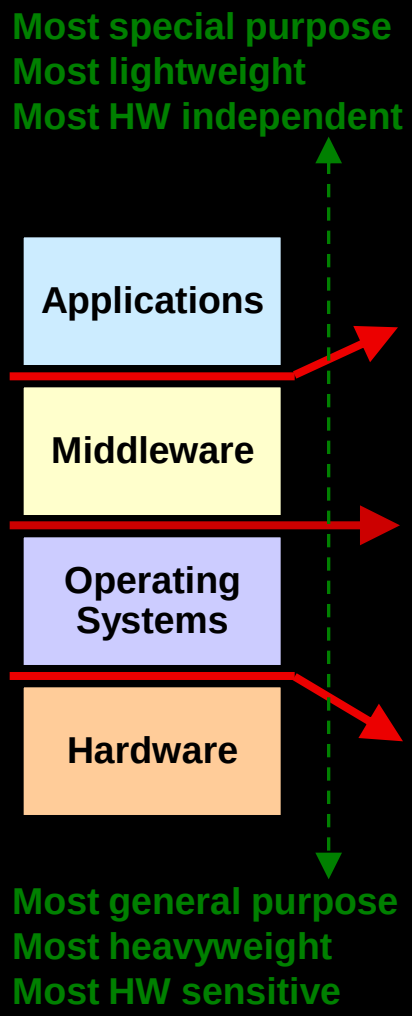
Reduced Operations Expenditure

Additional Benefits
Reduced risk, less idle time, more efficient use of energy, acceleration of innovation projects, enhanced customer service

Business Case Results:
Annual savings: $3.3M (84%)
from $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%

Benefits and Issues at the different layers



Virtual Resources	Benefits	Issues
Virtual runtimes **(application containers)**	Virtual runtimes can be OS independent Virtual file systems can span multiple host systems	Container management All apps must like same middleware release Isolation at middleware level only
Virtual operating systems **(application containers)**	Fewer OS kernels Extremely fine granularity Improved efficiency via single shared OS	Container management All apps must like same OS release OS service affects all apps Isolation at OS level only
Virtual servers **(virtual machines / LPARs)** Virtual I/O Virtual networks Virtual devices **(CPUs, memory, I/O adapters, …)**	Increased hardware utilization => less HW cost, power used, and floor space Agility / flexibility Fine granularity High efficiency	Avail. & security depends upon hypervisor design and integration Doesn't reduce # of OS images to be managed Introduces licensing and usage accounting issues

IBM Cloud Solution Overview

- Easy to access, easy to use Service Request Catalog.
- Hides underlying complex infrastructure from user and shifts focus to services provided.
- Enables the ability to provide standardized and lower cost services.
- Facilitates a granular level of services metering and billing.
- Workload standardization eases complexity.