Getting Your Arms Around the Cloud

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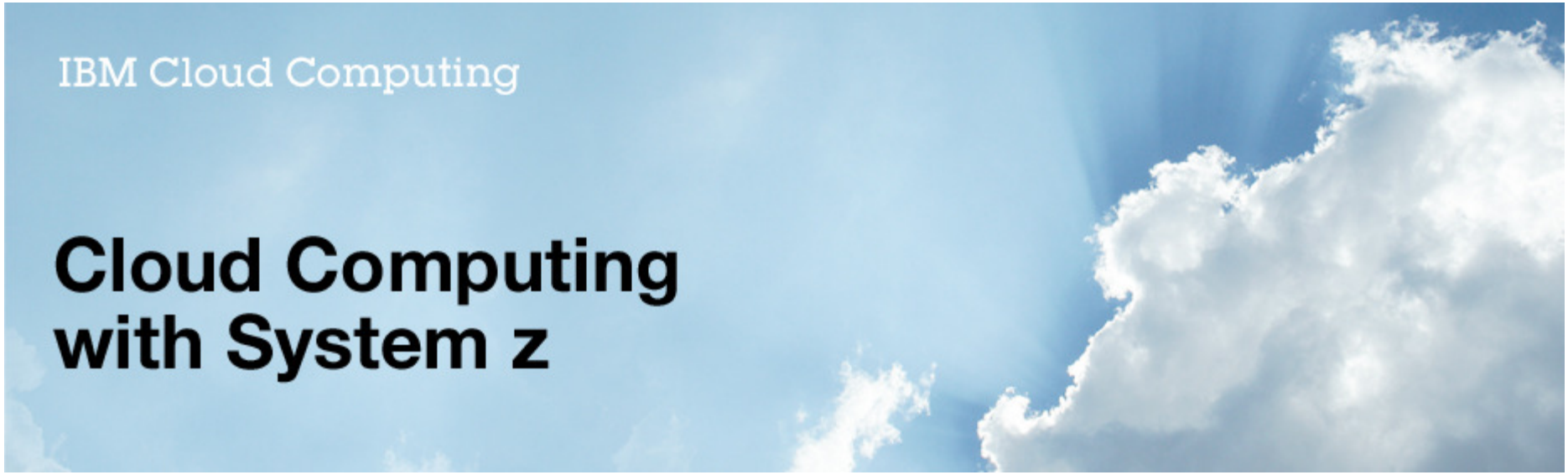
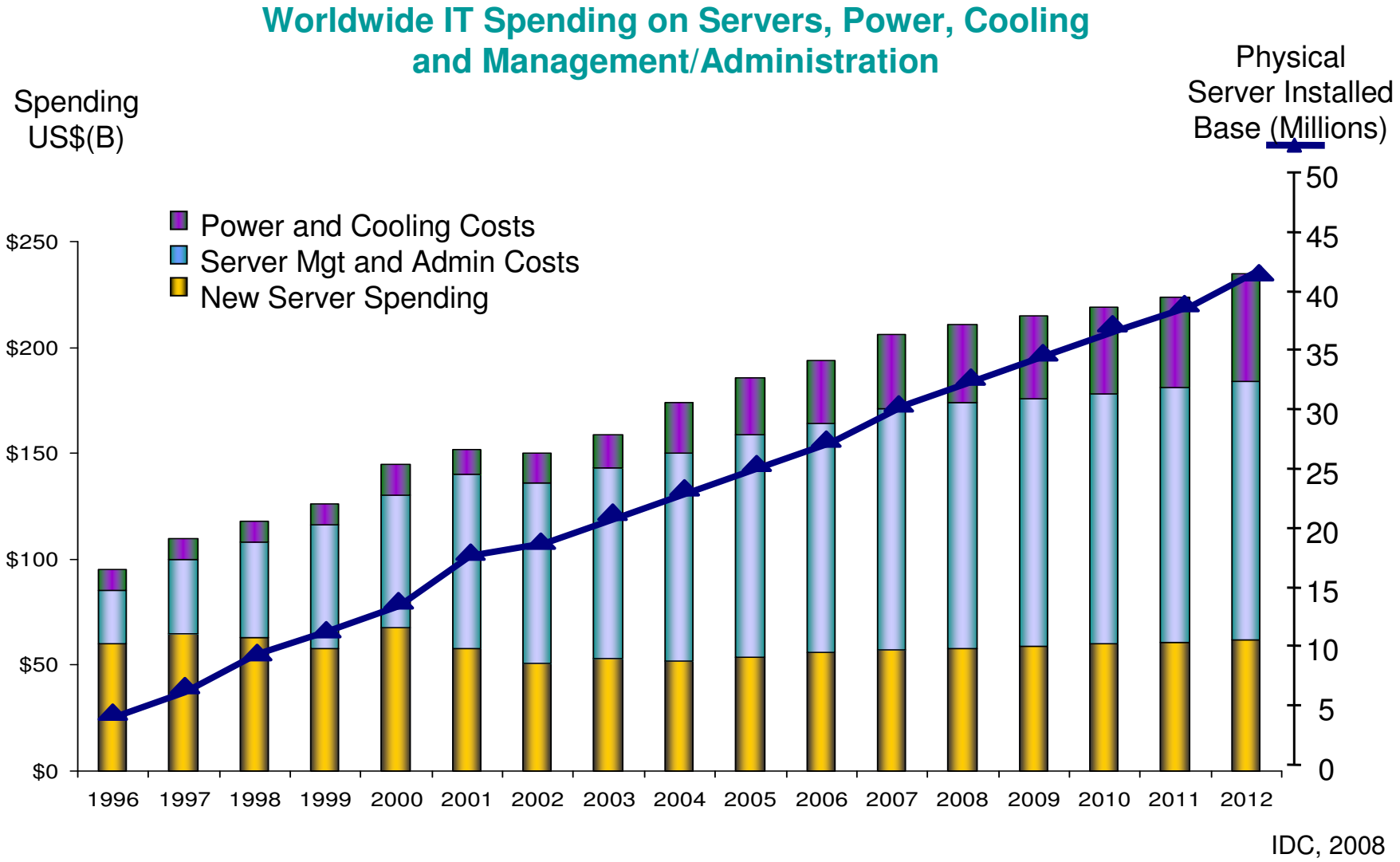
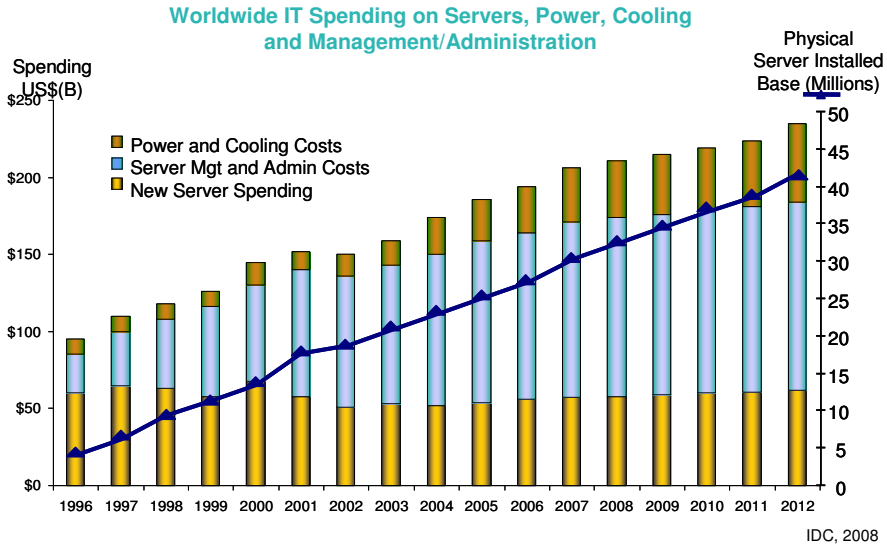


Annual Operating Costs Are Out Of Control



Businesses face challenges today

- Lost business opportunity because IT too slow to react. Lack of agility
- Long deployment timelines for new systems (weeks/months+)
- Many people involved in the process, high cost & complexity
- Many steps are manual and prone to error
- Huge up front investment for new infrastructure
- Server sprawl
- Low utilization
- Costly compliance, auditing, and security patching



What Is The Solution?

- Reinvent the data center to build a more dynamic infrastructure
  - Take Cost Out
    - Virtualization and consolidation
  - Reduce Energy Consumption
    - Green Data Center
  - Simplified Administration - Request Driven Provisioning
    - Automatic self service

Provide private cloud services to the enterprise

Cloud computing is about enabling the end user to help themselves

A user experience and a business model

- Standardized offerings
- Rapidly provisioned
- Flexibly priced
- Ease of access

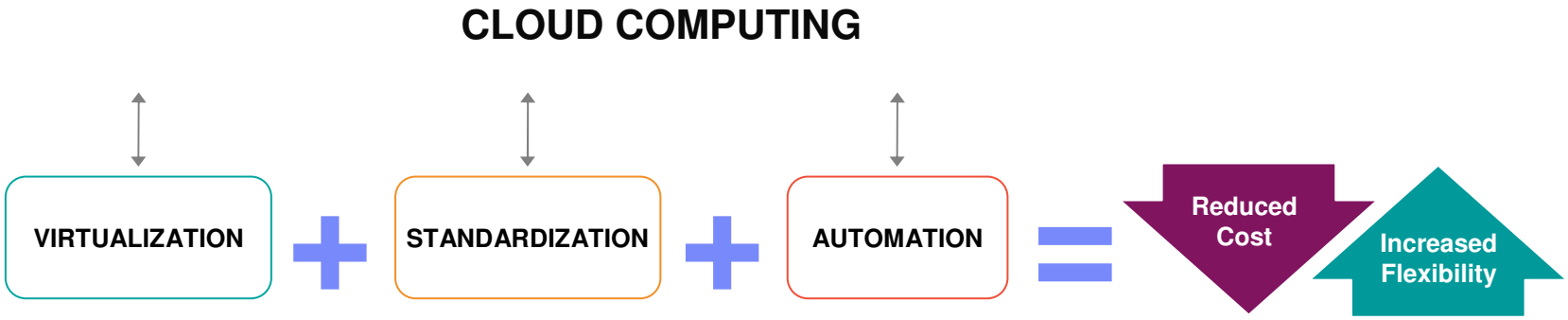
An infrastructure management and services delivery method

- Virtualized resources
- Managed as a single large resource
- Delivering services with elastic scaling

Similar to Banking ATMs and Retail Point of Sale, Cloud is Driven by:

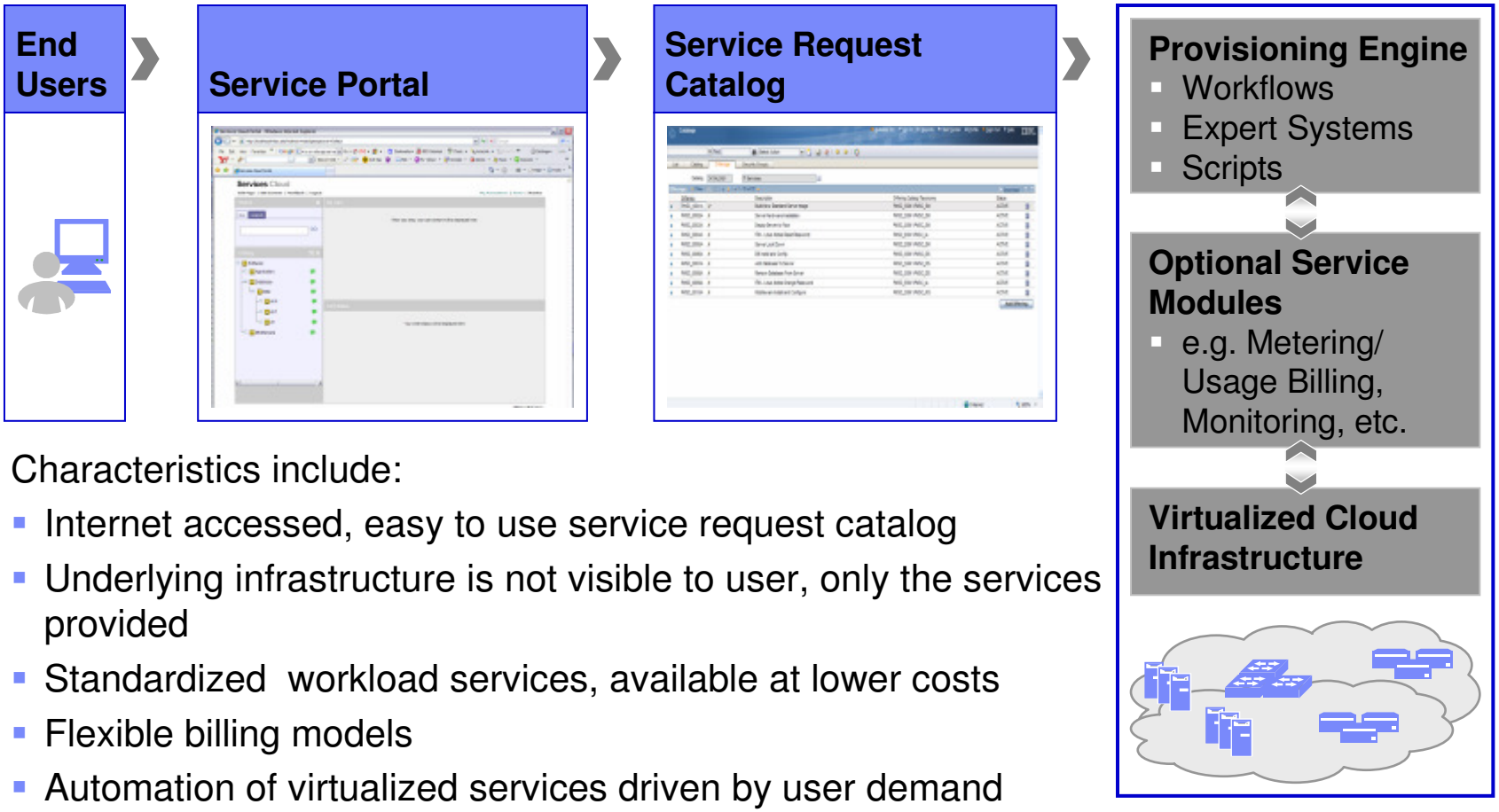
- Self-Service *(consumer behavior)*
- Economies of scale
- Technology advancement

An effective cloud computing deployment is highly optimized to achieve more with less….



…leveraging virtualization, standardization and automation to free up operational budget for new investment.

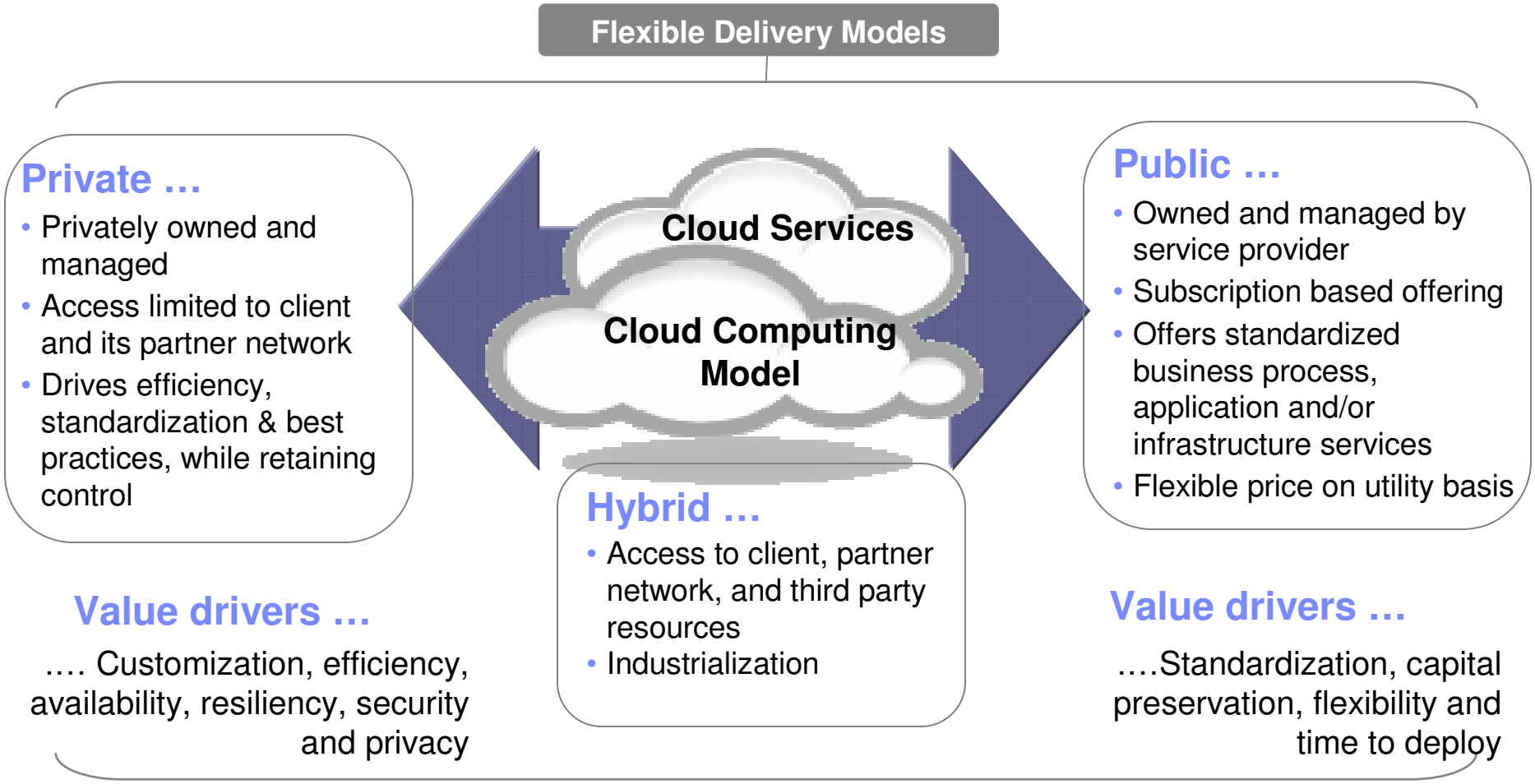
How does cloud computing work?



Characteristics include:

- Internet accessed, easy to use service request catalog
- Underlying infrastructure is not visible to user, only the services provided
- Standardized workload services, available at lower costs
- Flexible billing models
- Automation of virtualized services driven by user demand
- Seemingly endless resources

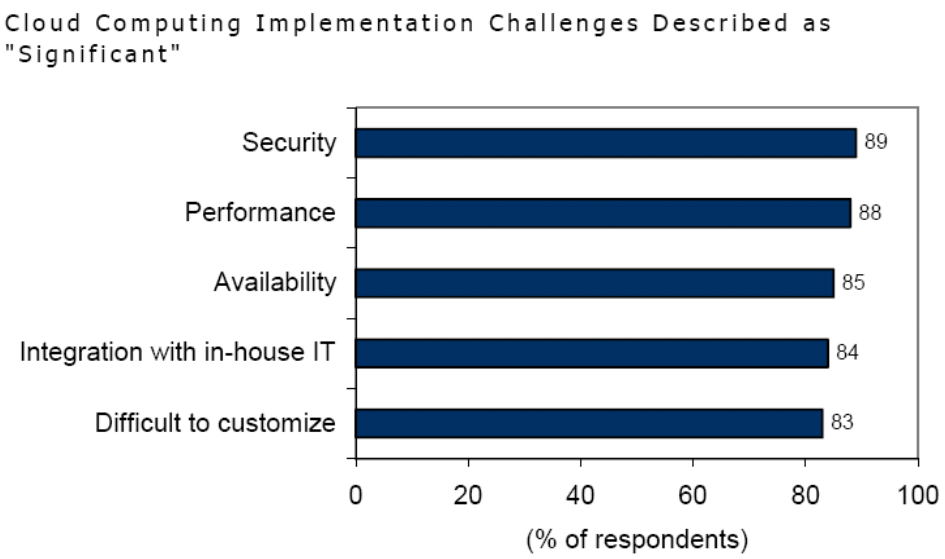
There are multiple delivery models for cloud



System z and private cloud computing

The right answer for the large enterprise

Enterprises must overcome obstacles to adopt cloud computing …



Note: Multiple responses were allowed.

Source: IDC's Enterprise Panel, 2008

…and System z can help.

Virtual – a "share all" approach to system resources for efficiency

Secure - a multi-tenant design point with EAL 5 certification

Available - 24x7x365 operations with zero data loss recovery

Efficient - consuming 80% less energy than distributed solutions

Scale - ability to meet massive demands from users and data

Cloud computing is based on operational efficiency

System z brings differentiated value to the cloud

Economies of scale achieved with less resources, moving parts, and money, while delivering more compute capacity from system resources

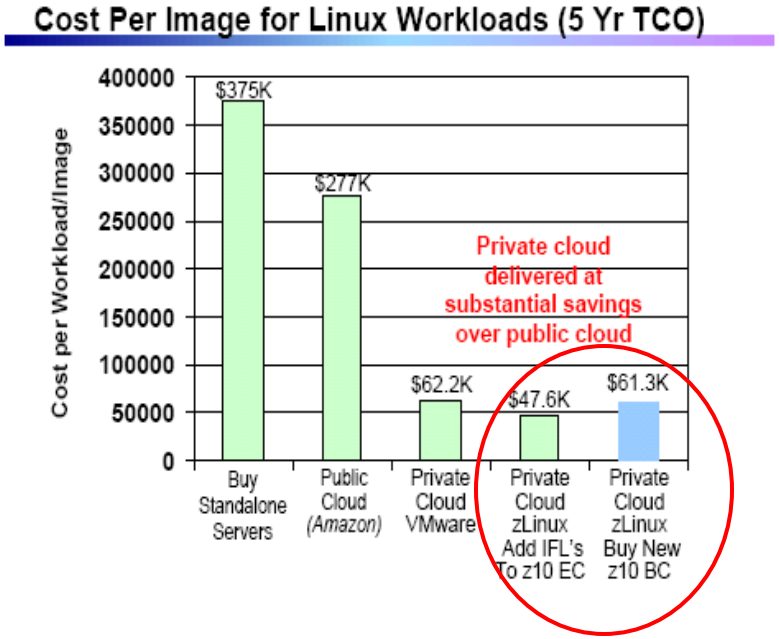
Dramatic Simplification through Virtualization

IBM's Project Big Green System z consolidation results in 60-75% gross cost savings (5 yr TCO)

Unit	Distributed	System z Linux	% Reduction
Software Licenses	**26,700**	**1,800**	**93%**
Ports	**31,300**	**960**	**97%**
Cables	**19,500**	**700**	**96%**
Physical Network Connections	**15,700**	**7,000**	**55%**

TCO Reductions with Cloud Computing

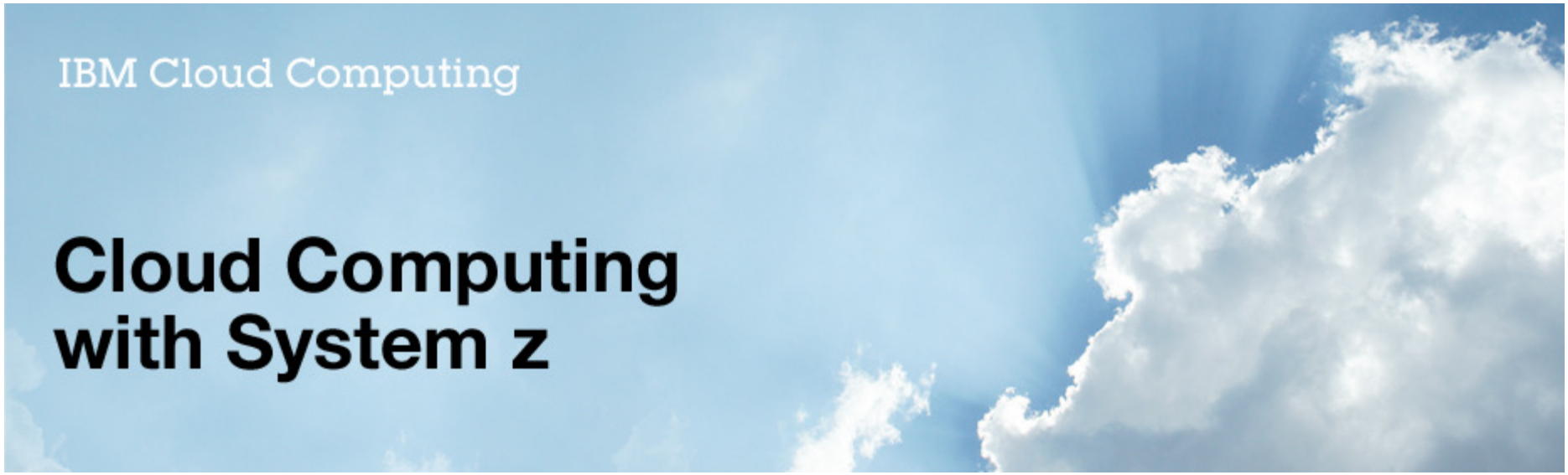
IBM found cost comparisons for 100 virtual Linux servers to be cheaper with Private Clouds on z



Do more work with your cloud - use System z

▪ Near-linear scalability	up to 900,000+ concurrent users; TBs of data
▪ "Mean Time Between Failure"	measured in decades versus months
▪ ¼ network equipment costs	virtual and physical connectivity
▪ 1/25th floor space	400 sq. ft. versus 10,000 sq. ft
▪ 1/20 energy requirement	$32/day versus $600/day
▪ 1/5 the administration	< 5 people versus > 25 people
▪ Highest average resource utilization	Up to 100% versus < 15%
▪ Capacity Management & upgrades	On demand; in hours, not weeks/months
▪ Security intrusion points	Reduced by z architecture and # of access pts.
▪ Higher concurrent workload	hundreds of applications versus few

Case Study

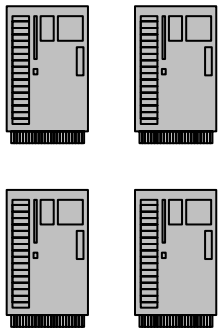


A Benchmark Comparison

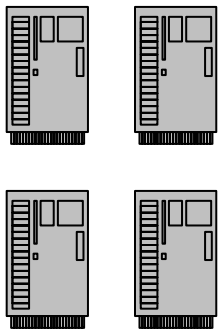
We ran a benchmark to compare how many images can be consolidated in practice

Friendly Bank online banking benchmark
(WebSphere Application Server)

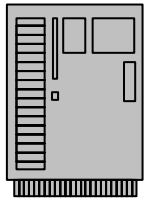
Intel servers x366
4 cores @ 3.66 GHz
12 GB memory



Workload on each one
5% utilization
40 ms response time
4.5 tps



Linux on System z z10-EC
8 IFL cores @ 4.4 GHz
64 GB physical memory



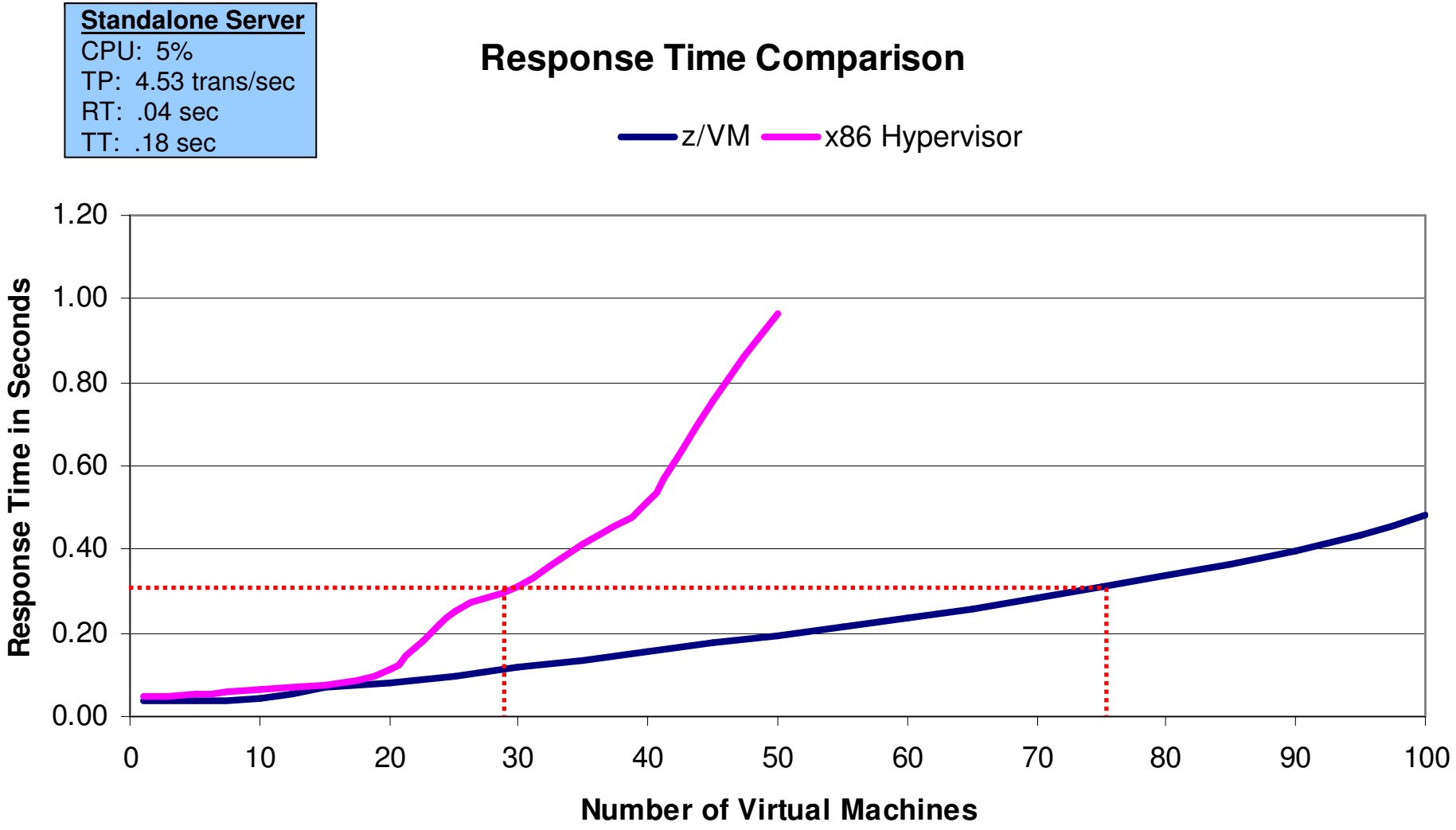
Intel server x3950
8 cores @ 3.5 GHz
64 GB physical memory

Consolidate VM images on two different platforms

Each VM image
4 virtual cores
1 GB virtual memory

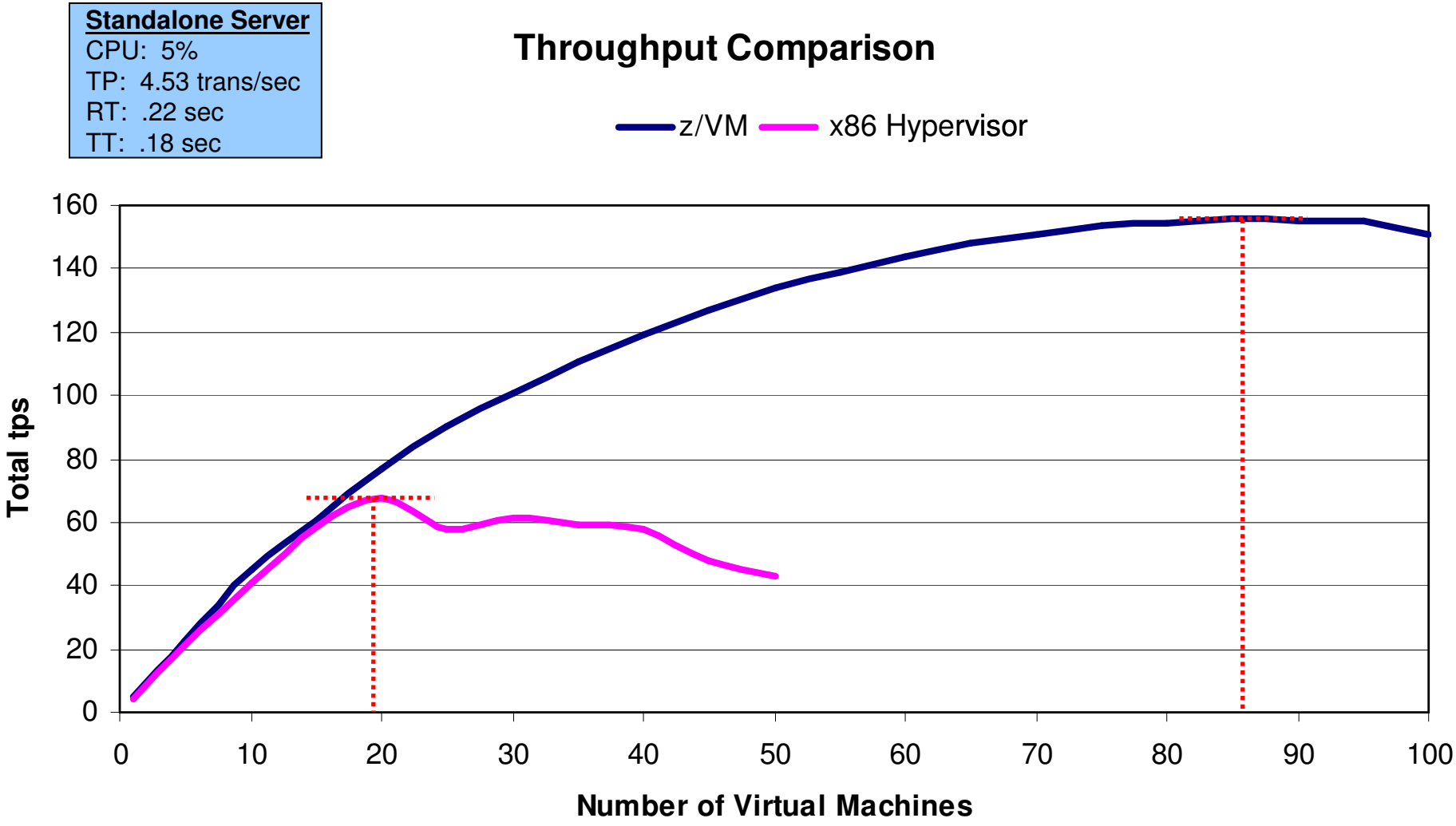
Response Time Comparison

Standalone Server
CPU: 5%
TP: 4.53 trans/sec
RT: .04 sec
TT: .18 sec



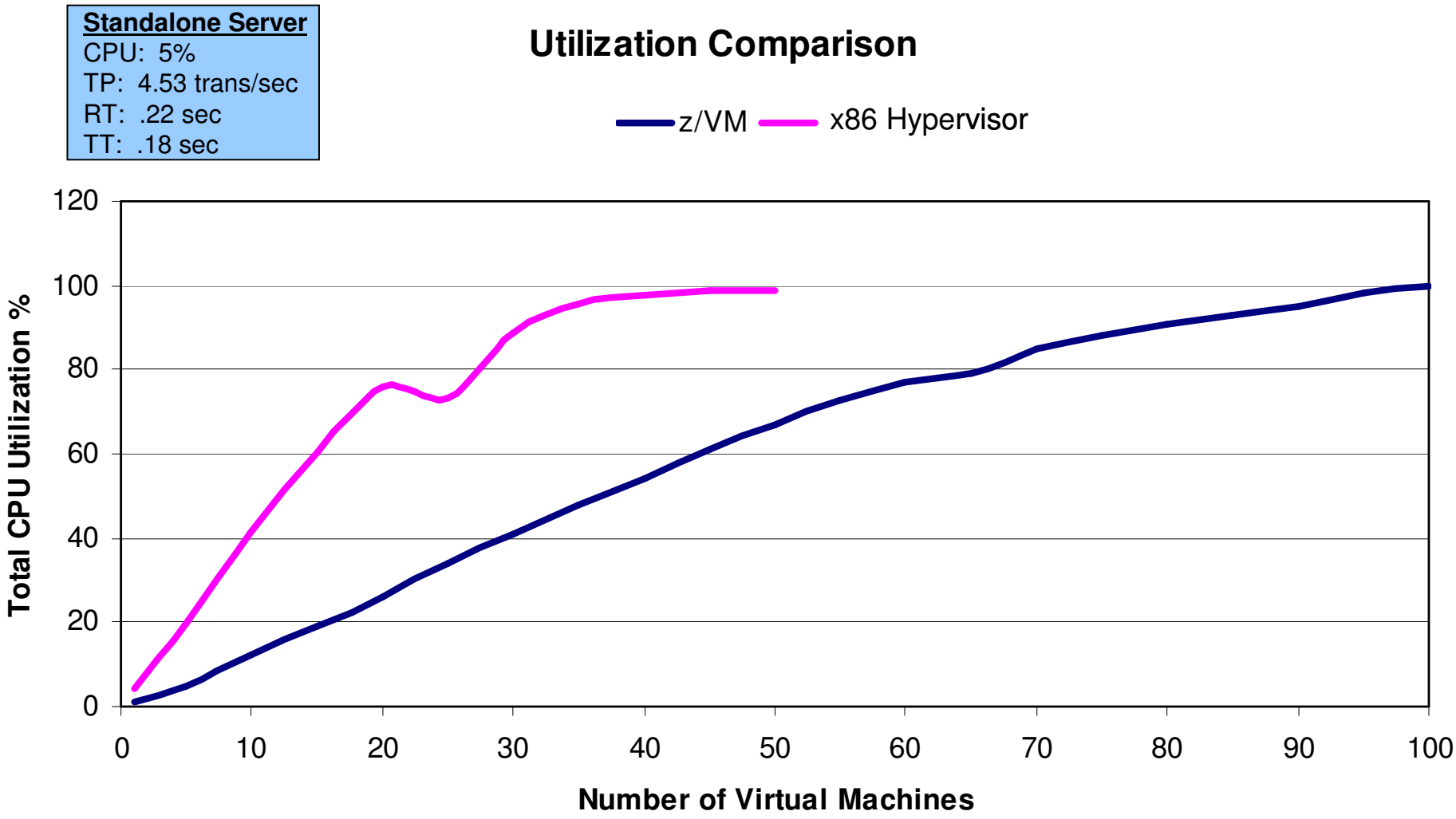
Throughput Comparison

Standalone Server
CPU: 5%
TP: 4.53 trans/sec
RT: .22 sec
TT: .18 sec



Utilization Comparison

Standalone Server
CPU: 5%
TP: 4.53 trans/sec
RT: .22 sec
TT: .18 sec



Service management in the enterprise

Enabling quality service delivery and business innovation

Visibility:
See your Business

Respond faster and make better decisions

Control:
Manage your Business

Manage risk and compliance

Automation:
Improve your Business

Lower costs and build agility

Introduction to Solution Editions

[August 14, 2009]

System z Solution Edition Series announced by IBM

(Telecomworldwire Via Acquire Media NewsEdge) IBM (NYSE:IBM) announced on Friday the System z Solution Edition Series - seven integrated hardware, software and services packages.

A solution edition is an aggressive pricing / packaging concept for targeted workloads/use cases on System z.

- Delivers tangible savings in hardware, software, and services
- Leverages the strengths of System z to deploy key workloads, including WebSphere, business intelligence/data warehousing, application development, ACI, SAP, security and **cloud computing**

Learn more about solution editions: http://www.ibm.com/systems/z/solutions/editions/

Solution Edition for Cloud Computing

A service automation and management framework for System z

	Creates…	That delivers …
Solution Edition for Cloud Computing	An infrastructure solution for cloud computing built on Tivoli & System z	The framework to migrate workloads for rapid adoption of cloud computing benefits

IBM software

Tivoli. software

Visibility

Control

Automation

IBM hardware

Centralize, Virtualize & Simplify

IBM Services

- Create an awareness of cloud computing deployment opportunities within the enterprise
- Educate the corporation on cloud computing use cases and management scenarios

- Implement the service automation and management tooling to support cloud workloads

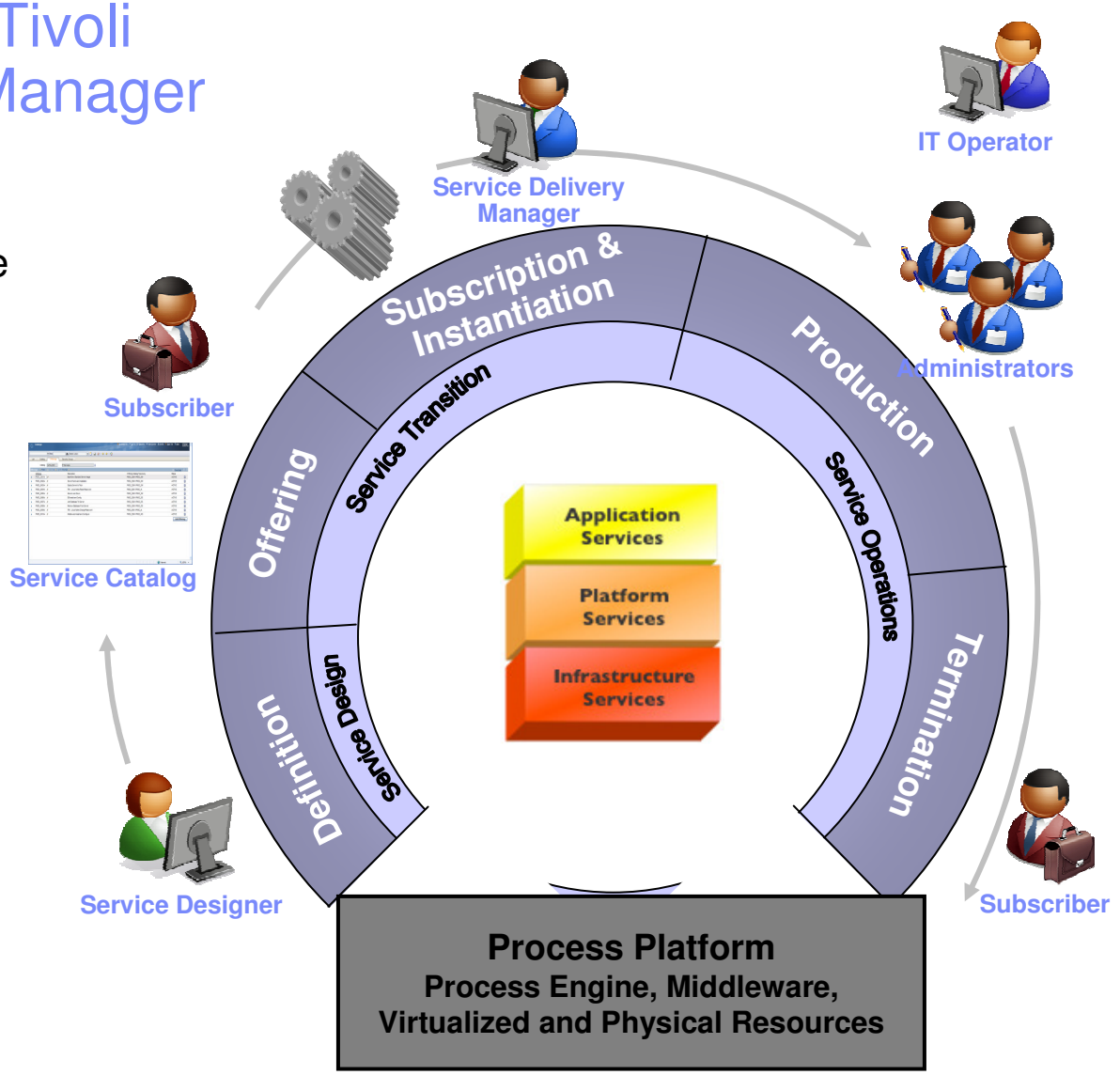
Supporting cloud with Tivoli Services Automation Manager

Approach:

- Expose IT services to service consumers
- Managed roll-out of cloud services

Capabilities:

- Leverages existing management of virtualized infrastructure
- Definition of service
- Specialized interfaces for service consumers
- Service catalog publishing
- Integrated service request management
- Reservation management
- Application on-boarding



A deeper view into the Solution Edition for Cloud Computing

Bill of Materials

- eyeOS †
- Tivoli Services Automation Manager
- TSAM WAS component
- Tivoli OMEGAMON
- z/VM;
- Linux†
- System z10 or IFLs
- Memory
- Storage

† procured by customer

IBM Services

- Direct client to eyeOS image
- Planning workshop for cloud environment (pre-install)
- Install and configure Tivoli products / components
- Testing scenario development and execution for service automation and management
- Configure the system for the customer (LPAR creation, security configuration, etc.)
- Install / prepare the base z/VM & Linux environment

Cloud computing can help businesses become more agile

Companies are looking for a cloud solution to:

- Speed reaction to deliver a new IT service
- Reduce steps and complexity in the provisioning process
- More effectively impact the ratio of system administrators to servers
- Reduce the impact of human error in the enterprise
- Provide elasticity to meet min, mean, or peak workloads
- Standardize the different configurations used in the enterprise
- Reduce the costs in the enterprise

Helping customers realize the value of cloud computing
The Solution Edition for Cloud Computing

Value Proposition for this offering:

- Lowers operating expense by:
  - Automating processes around deploying, optimizing and terminating components of the service
  - Reducing the resources (people, energy, data floor space) needed to run cloud workloads
- Introduces automated service consumer capabilities to simplify lifecycle management of service based workloads
- Provides a framework for standardizing workloads that are inefficient and highly variable today
- Makes mainframe assets readily available and simply consumable

IBM Solution Edition for Cloud Computing

A framework for delivering cloud computing solutions on System z

Delivers a service automation management infrastructure for cloud computing on System z

- Quicker time to value - IBM services creates the private cloud framework on System z at the customer location and provides user training
- Easier implementation - cloud computing management software from Tivoli for automating and maintaining workloads in a cloud
- Greater efficiency - System z with z/VM &Linux provide the foundation to centralize, standardize & virtualize cloud computing workloads

Benefits:

- **Faster ROI**
- **Self service access to mainframe assets**
- **Reduced operations and labor expenses**
- **Internet scale**
- **Rapid provisioning of workloads**
- **Enterprise qualities of service for cloud workloads**

In the spotlight

"We are using System z to deliver cloud computing and hosting services while advancing our innovative business models.
Doug Bourgeois - Director, National Business Center

Learn more: *http://www.ibm.com/systems/z/solutions/editions/cloud/index.html*

Thank you!