Achieving Greater Efficiency – Managing IT and Software Assets

**John Kogel
Vice President,
Tivoli Product Management and Development,
IBM Software Group**

Multiple forces
are driving
a transformation
of the data center

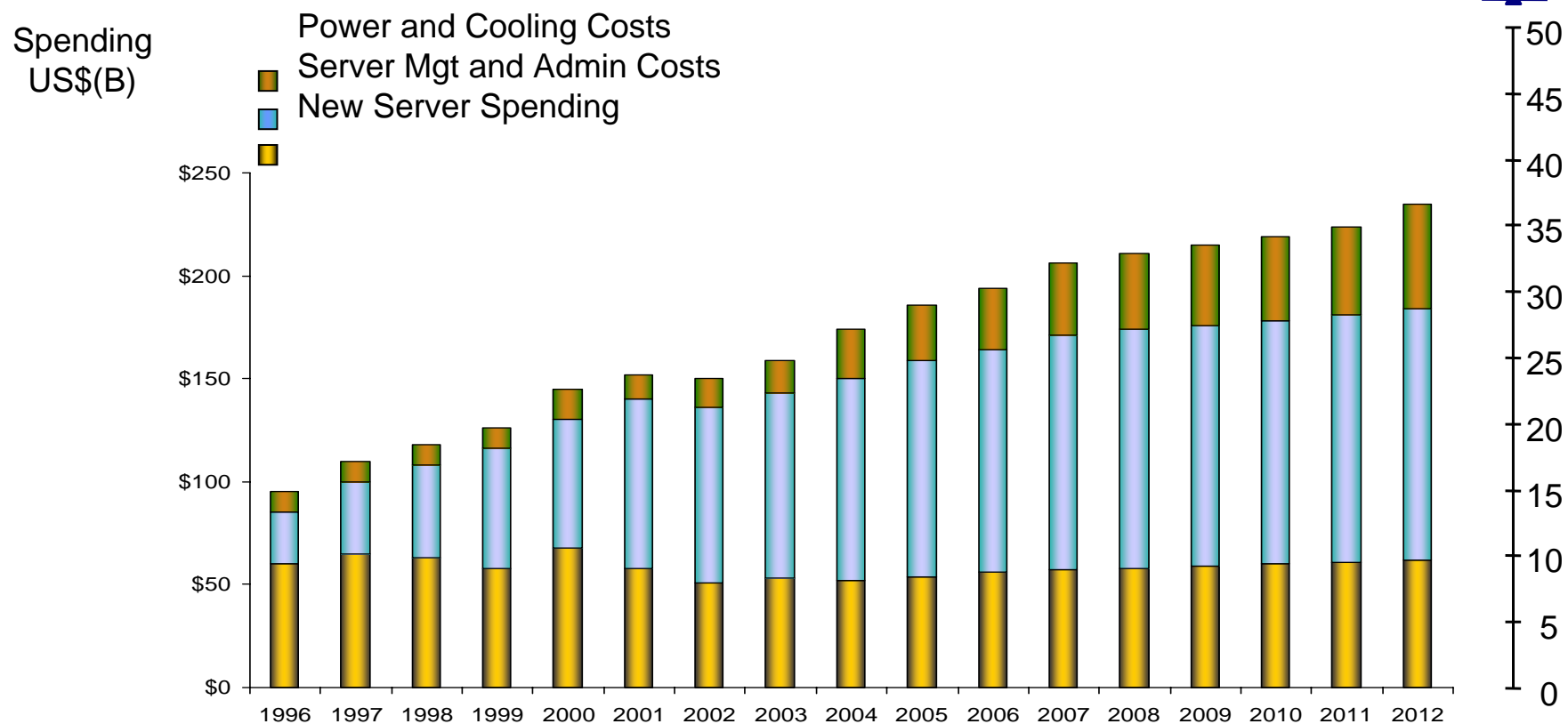**Data Center**

Business and technology change is accelerating

Operational complexity has IT at a break point

Annual Operating Costs Are Out Of Control

Worldwide IT Spending on Servers, Power, Cooling and Management/Administration
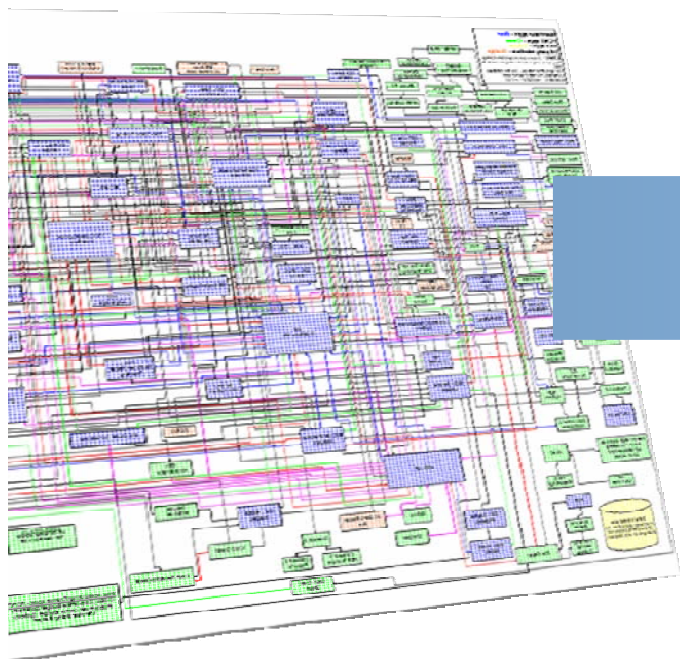
Physical Server Installed Base (Millions)

Requiring a shift in how IT is managed

Managing resources vs. managing services

Old Thinking…

IT manages IT *resources* that
support "the business"

New Thinking…

IT manages *services* that
drive business *results*

Case Study: Multi-channel Retail

Customer

Store or Brand

Shared Service

Supplier

Outsourced
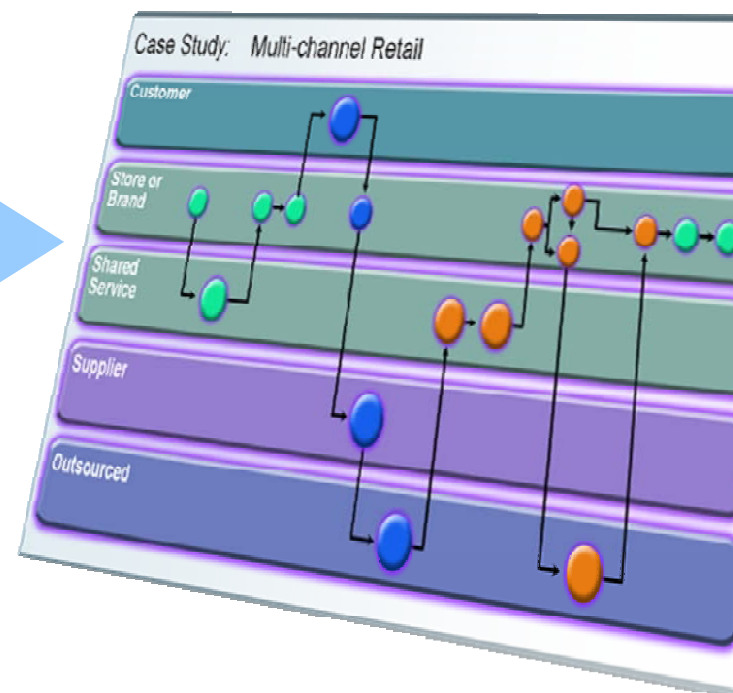
IBM Service Management

VISIBILITY

**See Your Business
Services & Processes**

CONTROL

**Manage Your Risk
& Compliance**

AUTOMATION

**Build Agility into
Your Operations**

IBM Service Management

Supporting clients in all stages of adoption

Simplified

Shared

Dynamic

Drives IT efficiency

- Physical consolidation and optimization
- Virtualization of individual systems
- Systems, network and energy management

Rapid deployment of new infrastructure and services

- Highly virtualized resource pools – "ensembles"
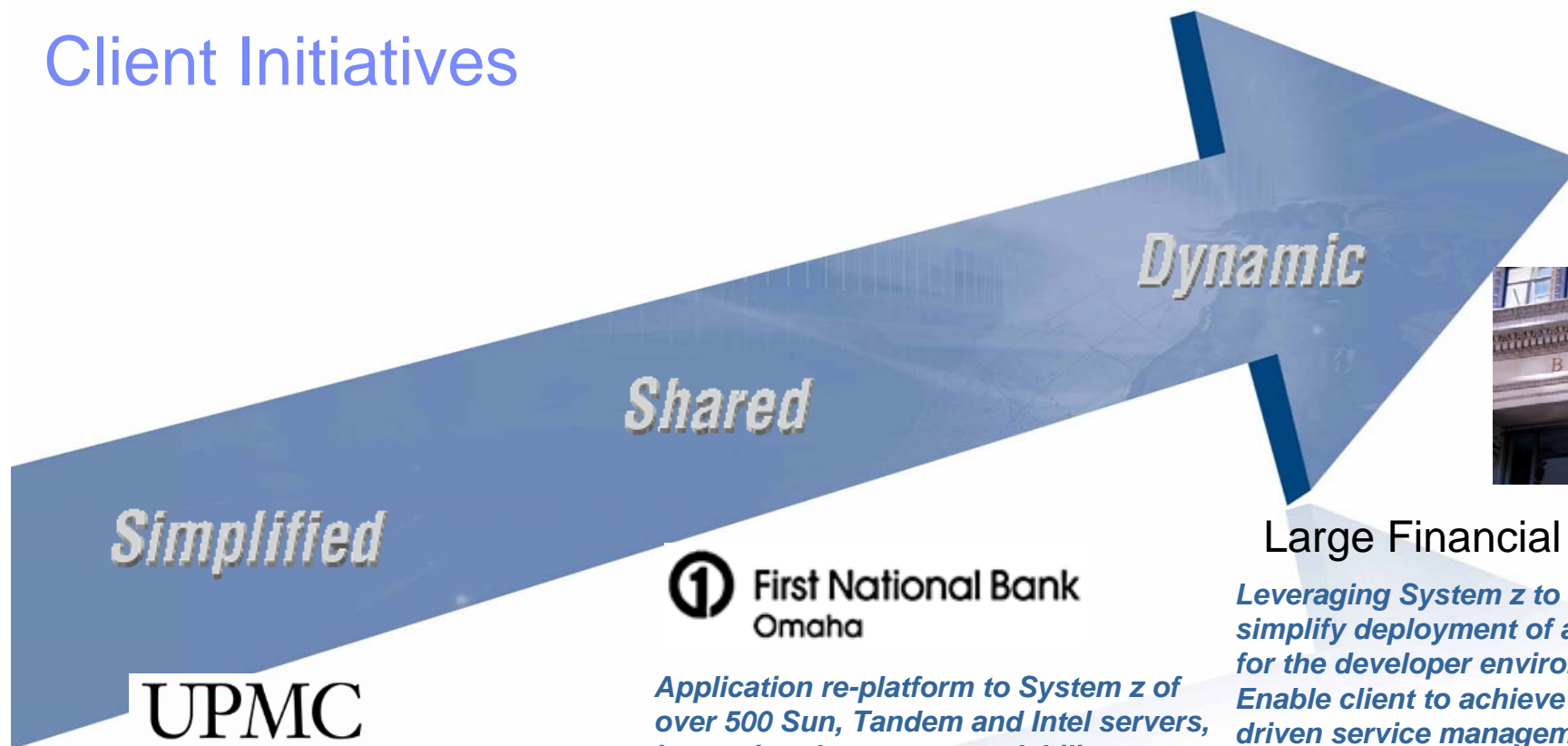- Integrated IT service management
- Green by design

Highly responsive and business goal driven

- Virtualization of IT as a service - "cloud"
- Business-driven service management
- Service oriented delivery of IT

Client Initiatives

Simplified → **Shared** → **Dynamic**

UPMC

For consolidation and virtualization of Unix servers and storage reducing complexity, energy and labor

- Help improve total cost of ownership
- Standardize management processes
- Monitor usage to help reduce energy costs

① First National Bank Omaha

Application re-platform to System z of over 500 Sun, Tandem and Intel servers, improving data center scalability, manageability, reliability, substantial cost and operational

- Align business and IT
- Improve agility
- Automation to help reduce costs

Large Financial Firm

Leveraging System z to simplify deployment of applications for the developer environment. Enable client to achieve a business driven service management model effectively managing demand and supply of IT resources

- Adapt quickly to change
- Deliver IT as a service
- Reduce cost through process maturity

IBM System z – strategic to the transformation

Costs & Service Delivery

Built in elasticity for just-in-time capacity and scalability – 900k+ users & terabytes of data

Virtualized "share everything" environment can enable 100% utilization without degradation

Avoidance of issues related to network latency

Business Resiliency & Security

"Mean time between Failure" – measured in decades vs. months

Fewer points of intrusion

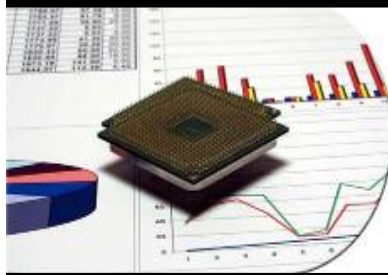Help reduce complexity with centralized management model for secure operations

Energy Efficiency

Energy efficient consuming 80% less than distributed solutions

Less hardware, floor space and energy consumption

Near-linear scalability

Changing application models

Ecosystem supporting open compute standards and source software

Enables transparent multi-tenancy of applications

Provides a hybrid SaaS hosting environment

The mainframe for cloud computing

"It's a mainframe model where things run together but in isolation. The issue is whether the machines will bear up under the load of diverse work or will they grind down and you'll need to provision another machine. You need reliability, security, auditing, privacy, data integrity, automation and full isolation."

- Steve Mills, SWG Sr VP

- Strong TCO
- Energy efficient
- Near-linear scalability
- Capacity management & upgrades on demand
- Delivers a specialized IT environment
- Virtualizes from the silicon to the app
- Enables transparent multi-tenancy of applications
- Improves performance
- Comprehensive industry-leading security
- Enables seamless reliability

The financial benefits of System z are compelling

Recent IBM TCO study performed for a client …

- **Potential for dramatic reductions in software expense**

- **Potential reductions in power and cooling**
  - **No additional Energy Costs on z by activating 1 IFL**
  - **No additional floor space by activating 1 IFL**

- **Potential for dramatic improvement in service and disaster recovery**

- **Increased processor utilization**

- **A true "utility" solution**

…and the savings will improve over time with z.

Insurance Company IT Costs

File & Print Servers

5-Year Total IT Cost Analysis

$600-700K Savings with System z

Chart: 5-Year Total IT Cost Analysis (y-axis 0 to 900)

Categories (x-axis): HPQ F&P, z10 EC-IFL, z9EC-IFL

Legend:
- SW M&S
- HW Maint
- Facilities
- Staff
- Replace thru lease
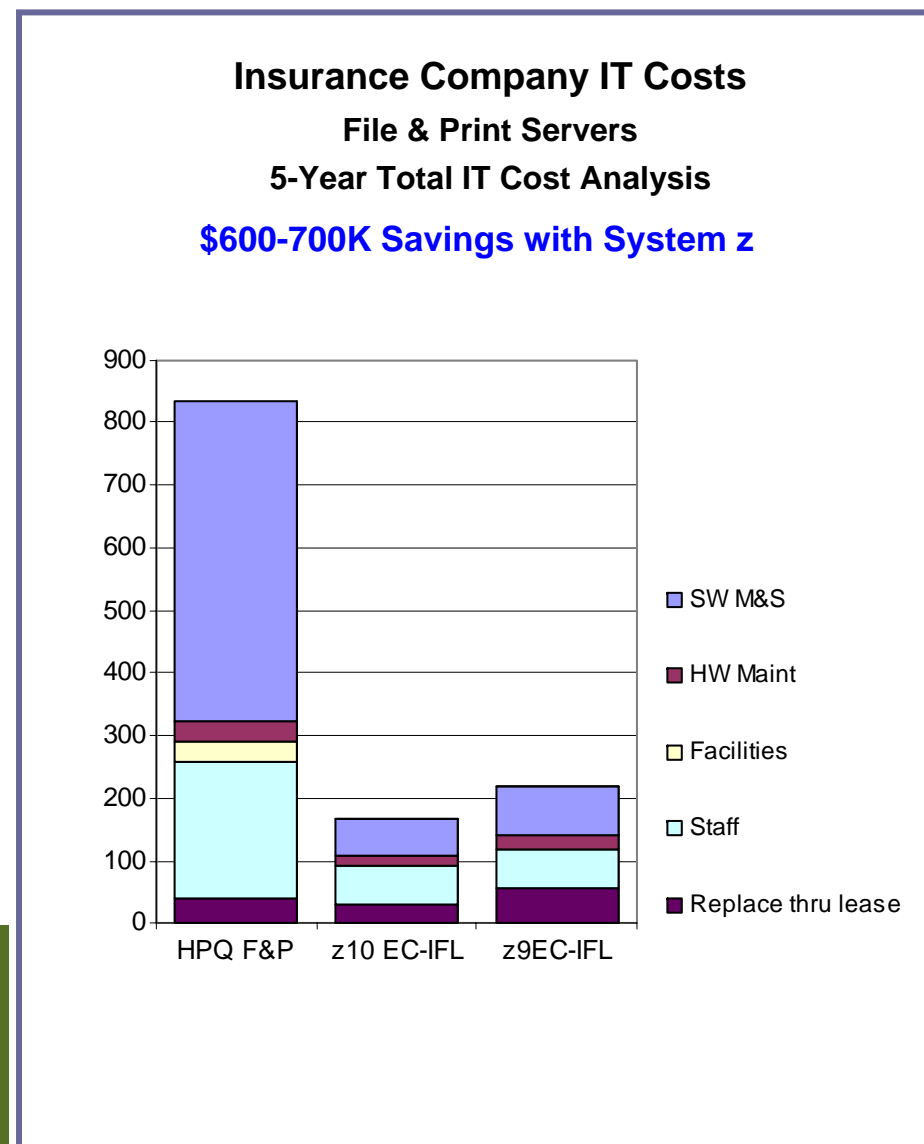
Helping ensure benefits are achieved

Usage and Accounting Manager IBM.

System Costs

Date Range: 1/1/2008 to 12/31/2009

Expenses by Resource

Legend:
- Staff
- Facilities
- HW Maint
- SW M&S

Resource	Charges
HPQ F&P	**166.904**
HW MAINT	6,729
SW M&S	102,077
FACILITIES	6,652
STAFF	43,571
Z10 EC-IFL F&P	
HW MAINT	
SW M&S	11,479
FACILITIES	0
STAFF	12,066
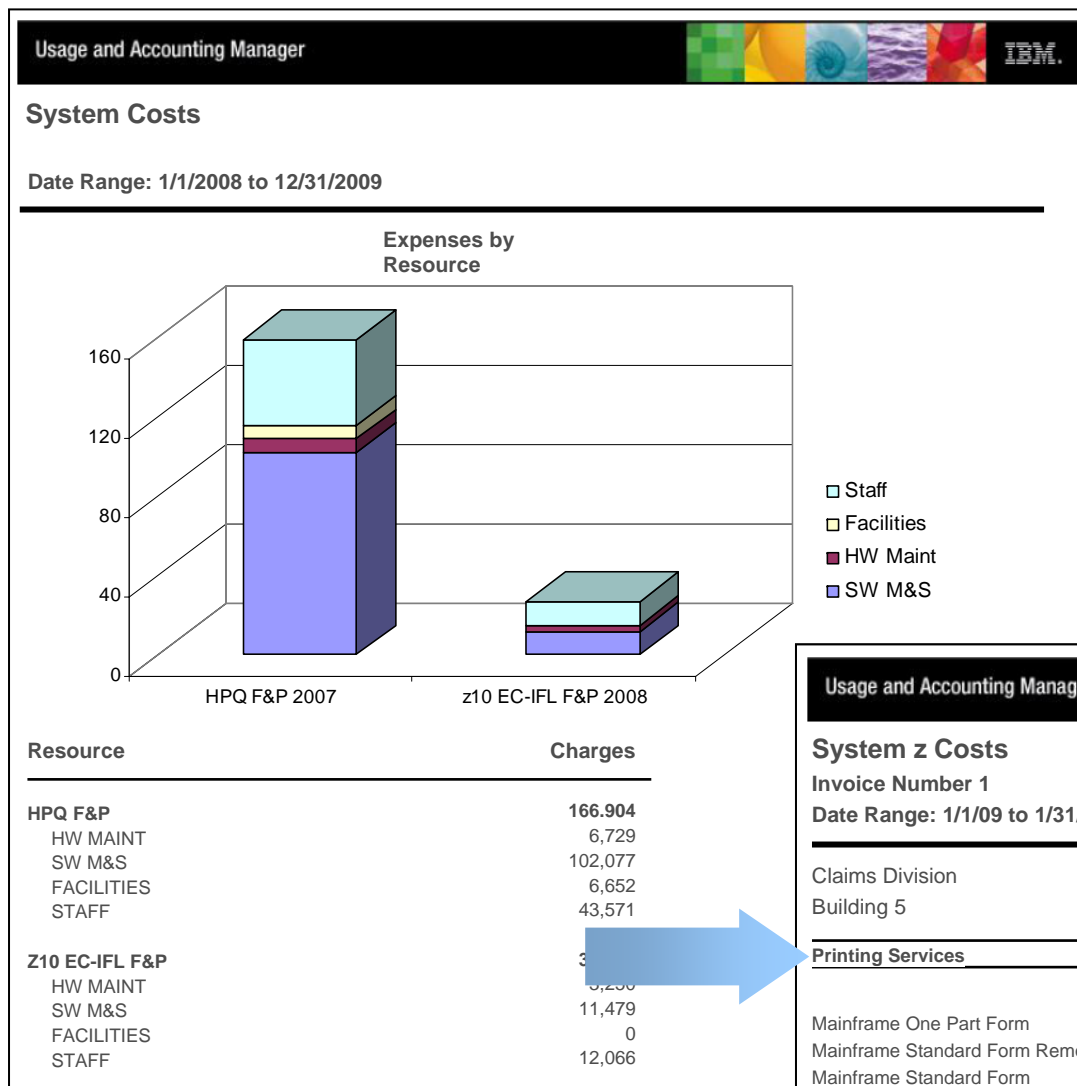
IBM Tivoli®

Usage & Accounting Manager

Decision Support for z/OS

Enabling IT operations to establish appropriate allocation methodologies to measure and manage IT cost and provide granular reporting and invoicing capabilities

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Usage and Accounting Manager IBM.

System z Costs
Invoice Number 1
Date Range: 1/1/09 to 1/31/09

Claims Division
Building 5

Printing Services

|	Units	Rate	Charge
Mainframe One Part Form	1,512	0.55	831.60
Mainframe Standard Form Remote	52	0.55	28.60
Mainframe Standard Form	2,251	0.55	1,238.05
Mainframe Print			**2,098.25**

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

Linux on System z z10-EC
  8 IFL cores @ 4.4 GHz
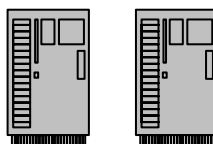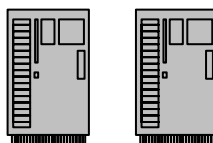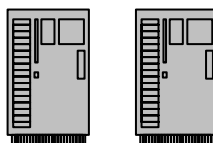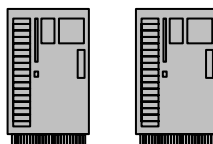
Workload on each one
  5% utilization
  40 ms response time
  4.5 tps
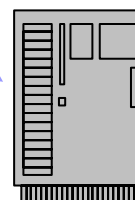
Intel server x3950
  8 cores @ 3.5 GHz

Consolidate VM
images on two
different platforms

Each VM image
  4 virtual cores
  1 GB virtual memory

Response Time Comparison
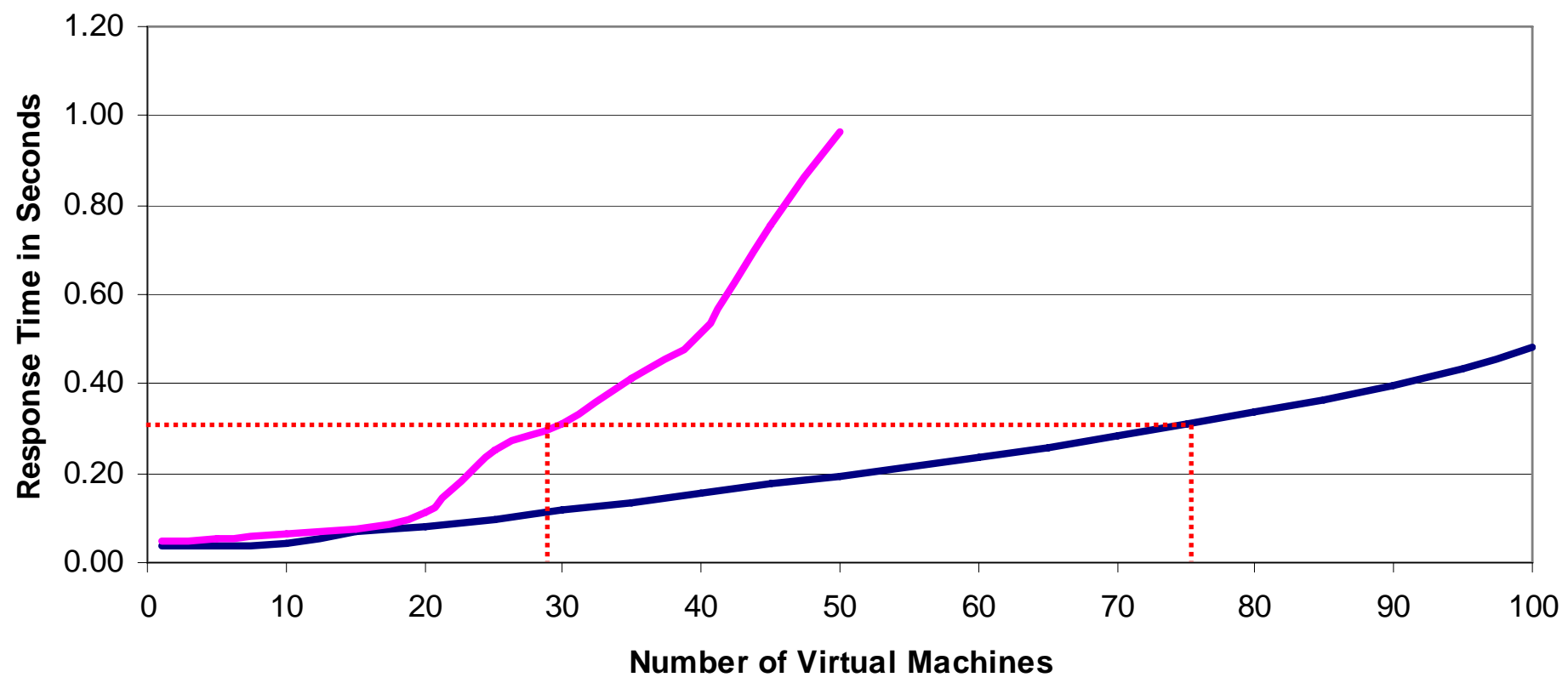
Throughput Comparison

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

Throughput Comparison

z/VM x86 Hypervisor
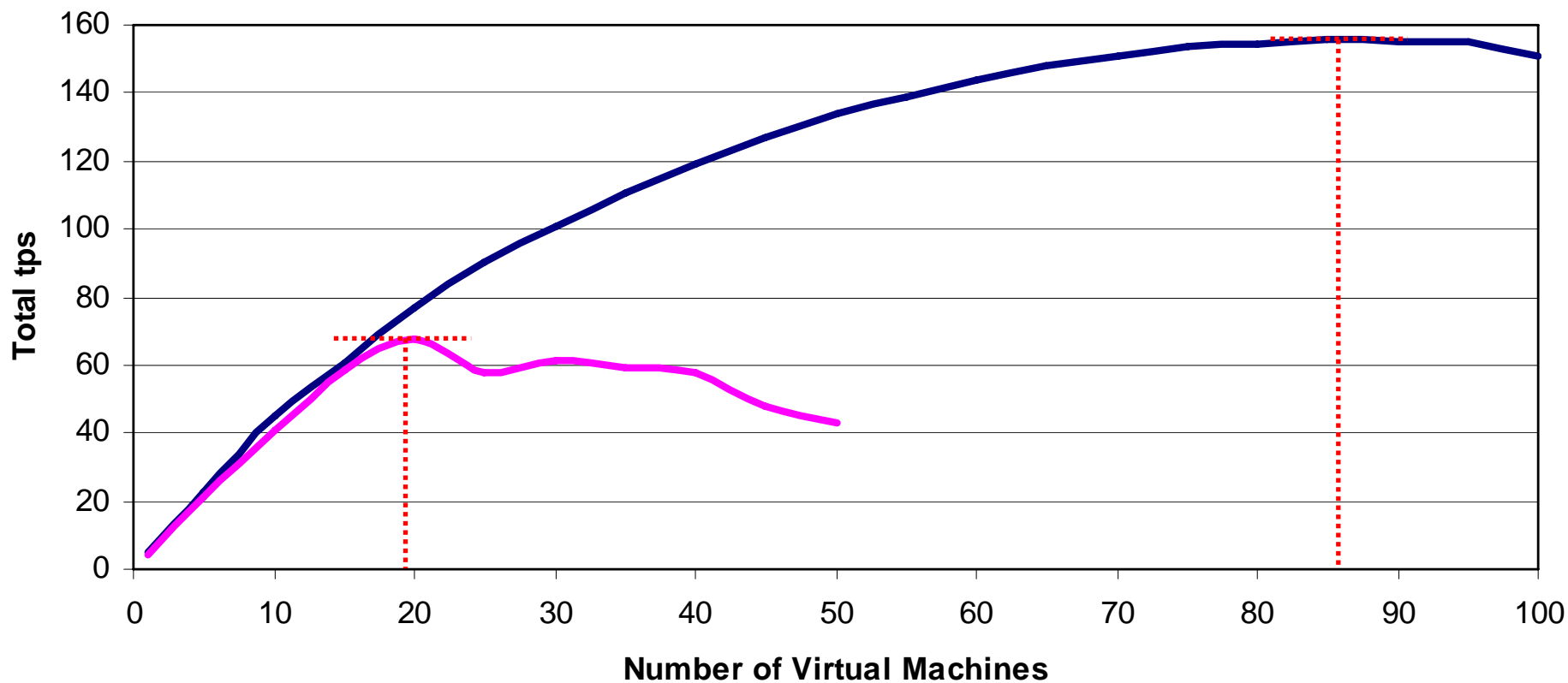
Utilization Comparison

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

Utilization Comparison

—— z/VM —— x86 Hypervisor

Y-axis: **Total CPU Utilization %** (0, 20, 40, 60, 80, 100, 120)

X-axis: **Number of Virtual Machines** (0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100)

IBM expects System z to be the end-to-end service management hub to enable a dynamic data center – Competitors do not !

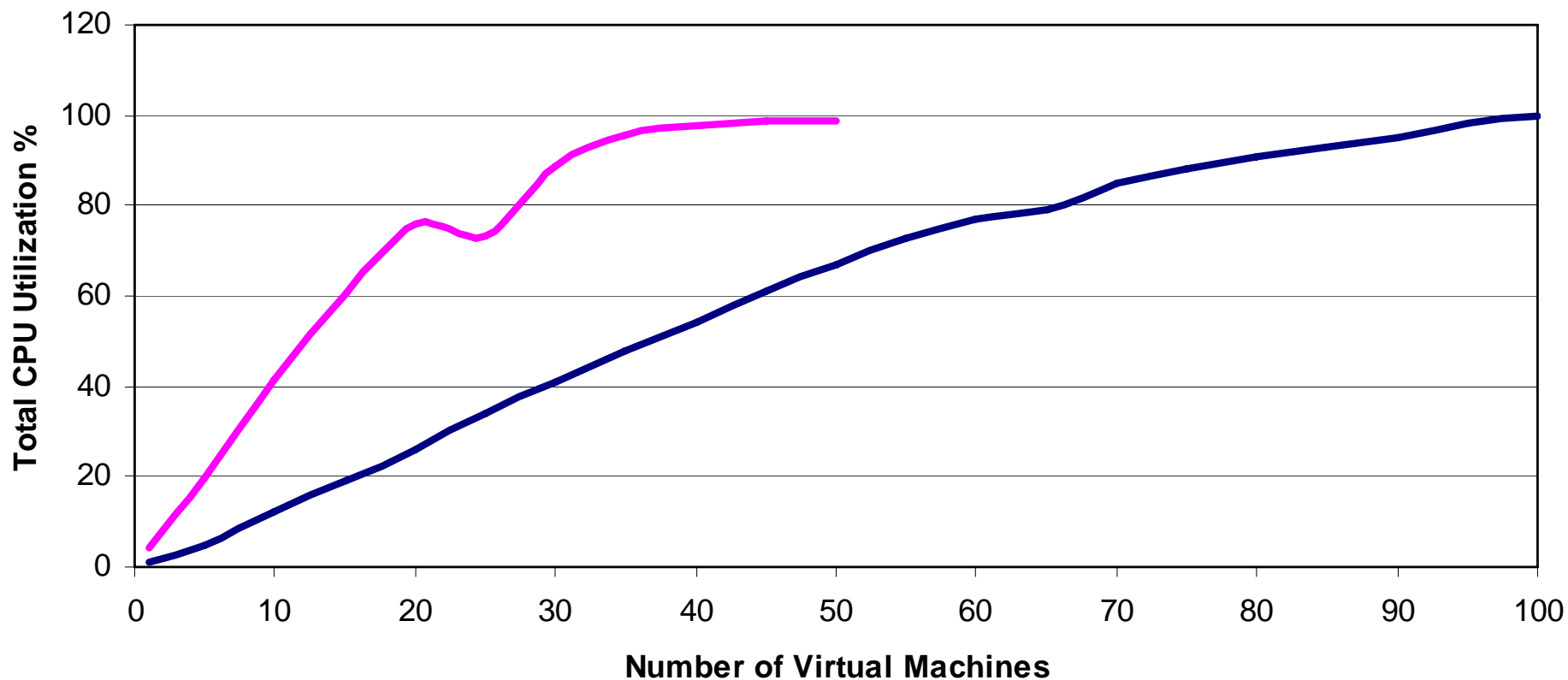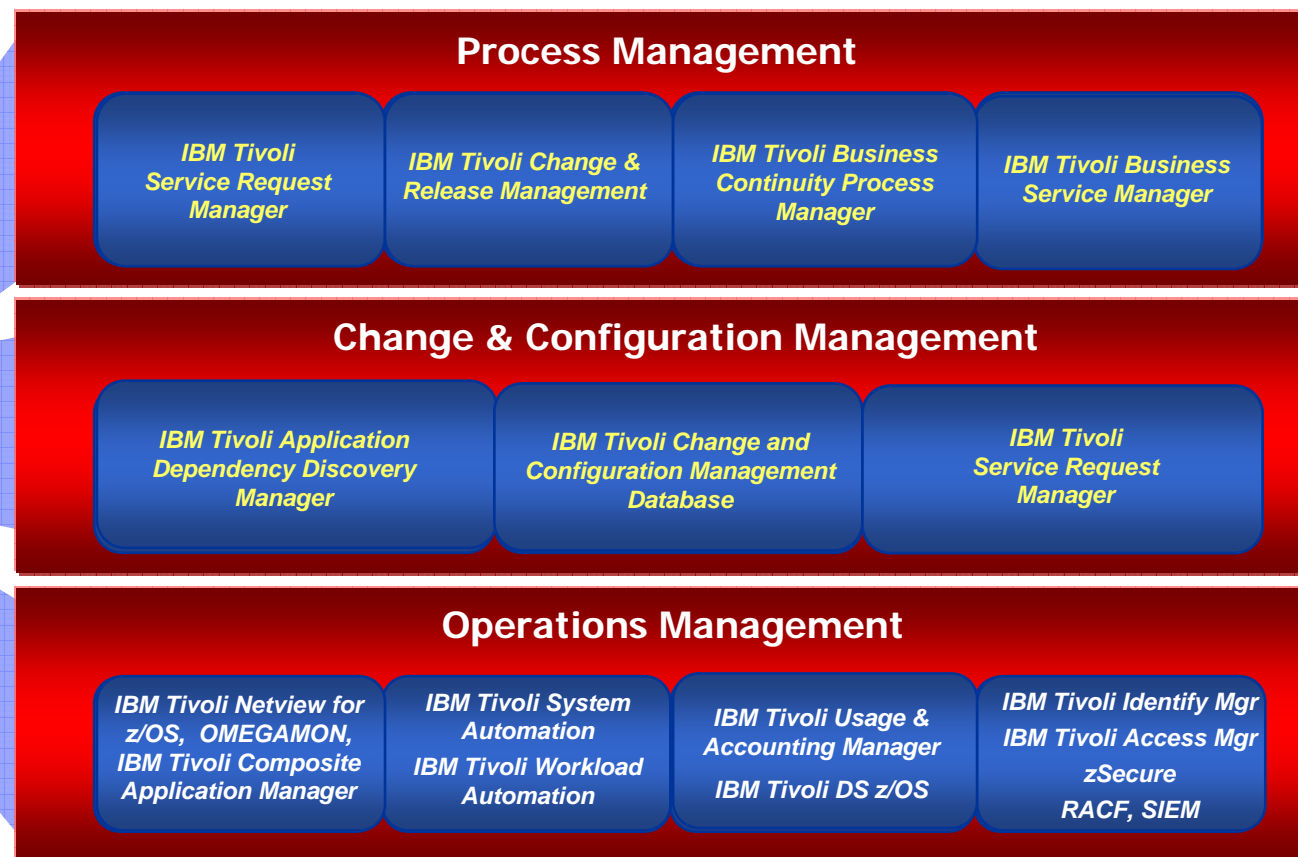| AREA	DISCIPLINE	KEY CAPABILITY	ONLY IBM
Operational Management	Performance Monitoring	Consolidated end-to-end business service and IT operations management user interface	✓
	Workload Automation	Workload balancing for virtualized environments and automated critical path management to optimize throughput for critical services	✓
	Availability Management	High availability solutions for Linux on System z and cross-platform high availability and disaster recovery capabilities	✓
	Financial Management	Linux on z and z/OS usage and accounting tracking and reporting	✓
	Enterprise Asset Management	Integrated enterprise and IT asset management	✓
	Security Management	Single point of control for user security access, control, auditing and compliance across the enterprise	✓
Change & Configuration Management	Discovery & Relationship Mapping	Automated System z dependency mapping and discovery of server resources and application relationships to manage change	✓
	Configuration Management	Comprehensive federated database that provides a single topology for the enterprise – both distributed and System z	✓
Process Management	Incident & Problem Management	Service desk integration with enterprise asset management	✓
	Change & Release Management	Visibility into the impact of implementation tasks to identify potential conflicts with the change window across the enterprise	✓
	Business Continuity Management	Ability to plan, design and test for enterprise-wide disaster recovery with integration to the operational management solutions	✓
	Business Service Management	Event management integration with IBM and 3rd party event monitors	✓

IBM Tivoli Service Management Center for System z

Integrated solutions to manage your enterprise end-to-end

IBM Tivoli Service Management for System z

Process Management

IBM Tivoli Service Request Manager	IBM Tivoli Change & Release Management	IBM Tivoli Business Continuity Process Manager	IBM Tivoli Business Service Manager

Change & Configuration Management

IBM Tivoli Application Dependency Discovery Manager	IBM Tivoli Change and Configuration Management Database	IBM Tivoli Service Request Manager

Operations Management

IBM Tivoli Netview for z/OS, OMEGAMON, IBM Tivoli Composite Application Manager	IBM Tivoli System Automation, IBM Tivoli Workload Automation	IBM Tivoli Usage & Accounting Manager, IBM Tivoli DS z/OS	IBM Tivoli Identify Mgr, IBM Tivoli Access Mgr, zSecure, RACF, SIEM

Investing in System z to support data center transformation

Linux on System z Management

- Linux on System z is growing at 49% per year and 17% of all mainframe processors have a Linux on system z partition.
- Only IBM delivered an enterprise ITSM infrastructure, including system and workload automation as well as provisioning and deployment solutions for Linux on System z

Asset & Financial Management

- The acquisition and integration of MRO and CIMS Labs has positioned IBM as the sole provider of zOS and Linux on z usage accounting and software license compliance management

Green Data Center

- IBM's Project Big Green dedicating $1 billion aimed at reducing IT Data Center power consumption over the next three to five years.
- Tivoli Monitoring for Energy Management is the only product that provides visualization on energy usage and thermal conditions across Linux on z and Distributed

SOA Management

- IBM invested in a comprehensive SOA service lifecycle management solution running on System z, critical for cloud computing. Tivoli provides operational visibility into SOA applications and Network appliances with tight integration to Security and Identity management that is un-match by competition

End-to-End Security Management

- IBM is spending $1.5 billion on security research and integration for our security offerings.
- This investment enable end-to-end security and compliance management across multiple platforms with broadest security capabilities on System z in the market.

Recognizing the benefits and capturing the value

Swiss Re

Implemented end-to-end service management solution that monitors mainframe and distributed environments, and automatically identifies and fixes performance issues

Sparkasse

Implemented service management for the entire production workload based on IBM Tivoli Workload Scheduler - end-to-end from System z. Drives 4 million z/OS workloads and 35,000 distributed workloads from a single graphical user interface

IBM Tivoli

Service Management Center for System z

Casas Bahia centralized operations on System z, leveraging Tivoli monitoring solutions, to support rapid growth and reduce IT costs

COLACEM
Qualità del fare

Colecem is leveraging Tivoli monitoring and automation solutions to manage SAP running Linux on System z

Fifth Third Bank

"With IBM's help, Fifth Third is working toward having an 'on-demand' infrastructure that gives us the flexibility to move resources, on-the-fly, to where we need them." - Jim Scott

IBM Tivoli Service Management Center for System z

Meeting today's challenges and positioning clients for tomorrow

- **Unique advantages that address many of today's operational challenges**

  - Hub for managing services that span heterogeneous operating systems and platforms

  - Integrated IBM Tivoli z/OS and Linux on System z management solutions

  - Utilize virtualization and ability to consolidate workloads

  - Unified means for z practitioners to have enhanced visibility, control and automation

- **Enabling a dynamic and highly efficient service delivery model**

  - Manage a service landscape running on System z from bare metal up to the application as if it were homogeneous

  - Dynamic provisioning, configuration and de-provisioning complete application landscapes

  - Exploits the multi-OS environment and elasticity of the platform to support the delivery of SaaS and a cloud user experience
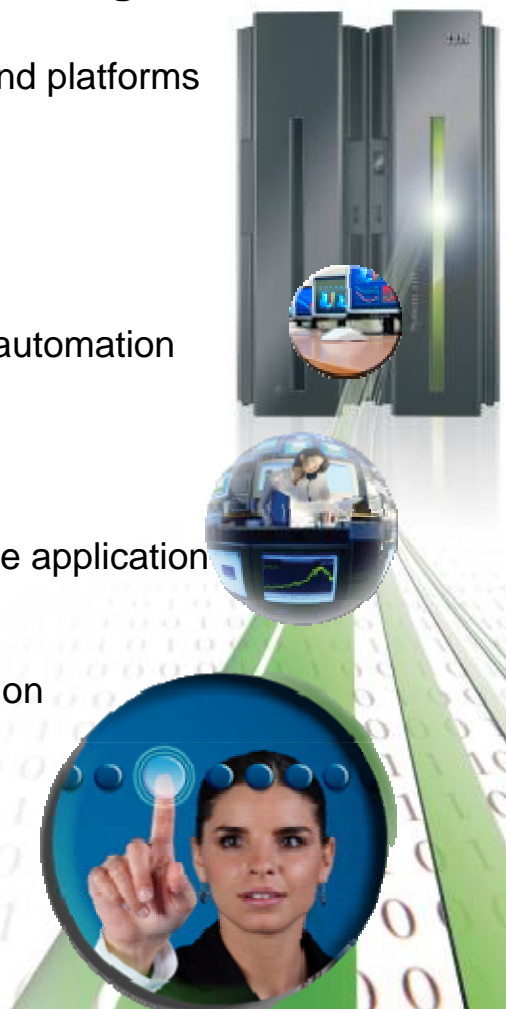
Service Lifecycle Management
A core discipline for delivering a cloud-user experience

- **IBM Service Management Center for System z is a foundation for providing Service Lifecycle Management functionality**

  - IT resources and their complexity is abstracted from the user under the service concepts (encapsulate, hide and abstract)

  - Focus on what the services provide as opposed to how the services are implemented, hosted, or managed

  - IT resources/services are delivered with high quality and driven by quality levels

- **System z platforms provides operational advantages and efficiencies for delivering service lifecycle management value**

  - IT efficiency and resiliency of business services can be delivered from a platform that is highly available, secure and fault tolerant

  - IT infrastructure and the above IT Operating Environment layers consolidation and simplification is driven from System z

Architectural Model for Cloud Computing

Service
Request & Operations

Service
Provider

Service
Creation

End Users,
Operators

Role-based
Access

Cloud Services

*Application/Business, Process,
Assembly and Information Services*

Software Platform Services

Infrastructure Services

Standards Based Interfaces

Cloud Management Platform

Business Support Systems(BSS)

*Service Delivery Platform
"Operational Support Systems (OSS)"*

Service Planning

Service
Definition
Tools

Service
Publishing
Tools

Service
Reporting &
Analytics

Service
Catalog

Operational
Console

Cloud Scenario

Enterprise Pre-production Scenario

Private Test cloud: Testers request basic infrastructure resources for a defined period of time. These resources are used in testing a new version of the online retail application

Request

Deploy

Manage

Tivoli

Provisioning

OMEGAMON

OMEGAMON

OMEGAMON
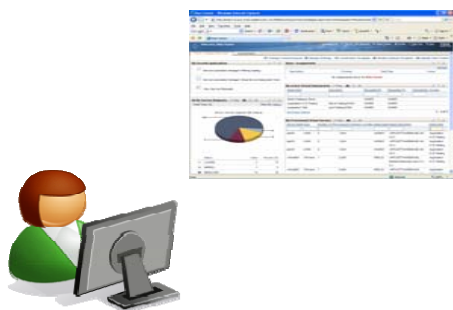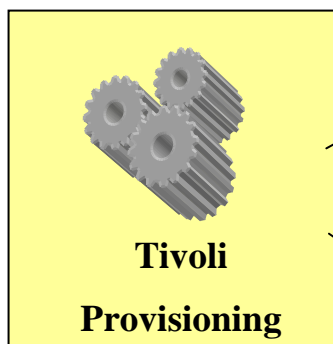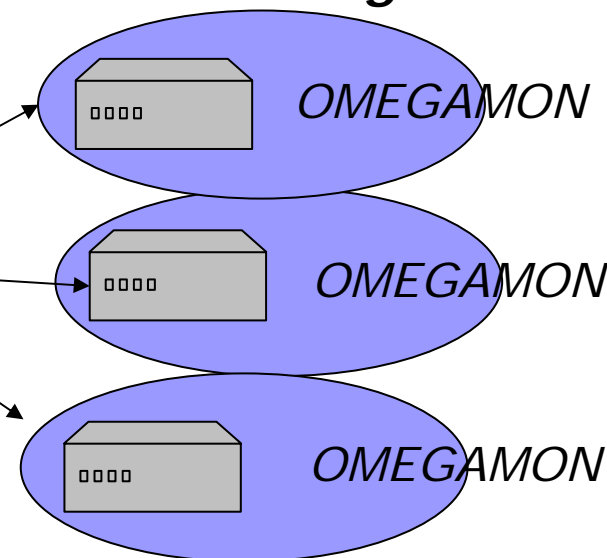
A Tester uses the service catalog to request 3 Linux on System z virtual machines for two weeks

The request begins the automation process which deploys the requested virtual machines, and installs specified software stacks onto the VMs
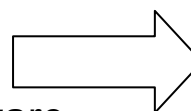
Monitoring agents are deployed on the virtual machines. Real-time utilization statistics are used to determine necessary modifications to the service

Cloud Scenario

Enterprise Production Scenario

Private Application cloud: A Sports Retail Company uses cloud computing internally to save on capital expenses, IT operational expenses, and increase time to market.

Request

Deploy

Manage

Tivoli Provisioning

Resource and application monitoring

Usage and accounting

Resource and application monitoring
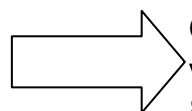
Usage and accounting
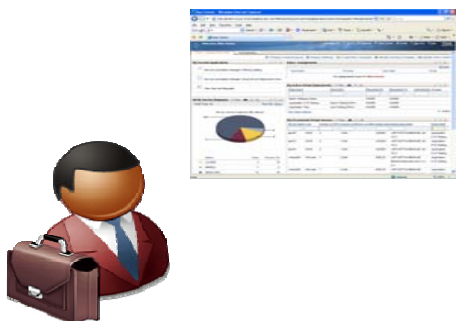
A Marketing Manager uses the service catalog to request an image of the online CycleWorld retail application. The new instance will be used to accommodate the expected surge in sales due to the Tour de France.
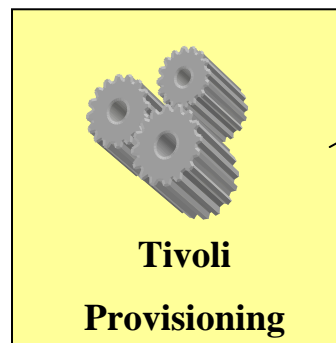
The request begins the automation process which first notifies the appropriate IT service delivery manager for approval. After his approval, automated workflows deploy the application image from the image repository.
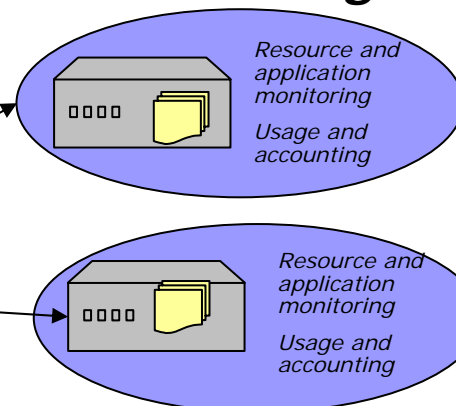
Utilizing monitoring and event management, application performance has reached defined thresholds. Another image is deployed to meet the higher than expected customer demand.

IT is able to utilize usage and accounting tools to report IT costs to the marketing department.

Service Lifecycle Management supported by TSAM

Deploy Service
- **Request Driven Provisioning including Management Agents and Best Practices**
- **Application / Service On Boarding**
- **Self-service**

Subscribe to Service
- **Request a service**
- **"Sign" Contract**

Manage Operation of Service
- **Visualize all aggregated information about situations and affected services**
- **Control operations and changes**
- **Event handling**
- **Automate activities to execute changes**
- **Include charge-back**

Offer Service
- **Register Services and Resources**
- **Add to Service Catalog**

Best Practices Templates

Subscription

Deployment

Offering

Production

Definition

Termination

People

Plans, Goals

Process

IBM Service Management

IT infrastructure
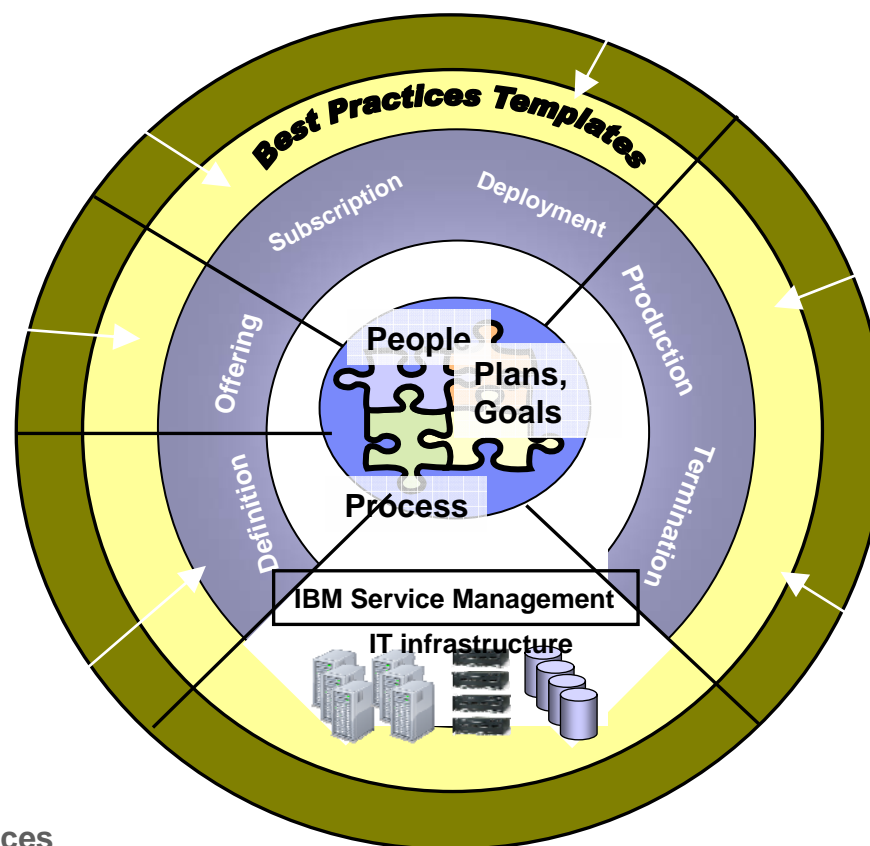
Define Service
- **Scope of Service**
- **SLAs**
- **Topologies, Best Practices Management Templates**

Terminate Service
- **Controlled Clean-up**

Tivoli Services Automation Manager

Scenario: Test Center with complex request fulfillment process + reservation

Fulfillment Flow

John, Test Center Manager
Requests Capacity for specific test through a service GUI

Specifies Parameters:
- **Project Name, Owner**
- **# of Servers, #CPUs, Mem,**
- **Type of VM***
- **SW stack (*or Image*)**
- **Start and Stop Date and Time**

Pass Parameters

Marion, Data Center Admin
Approves request

Additional user customized processes supported

Pass Parameters

Tivoli Service Automation Manager
- Selects resource from pool (CMDB)
- Executes Management Plans to install image

System Ready

John, Test Center Manager
Receives ready to use Test System
Gives testers access

Tivoli Provisioning Manager
- Deploy system

SW Stack

zLinux/zOS

zVM

Grant Access

Run Tests

Anne, Bob, Linda, Testers
Use Test System to run tests

Adds CPUs

Tivoli Service Automation Manager
- Selects resources from pool
- Executes Management Plans to add CPUs

Pass Parameters

Specifies Parameters:
- **Project Name, Owner**
- **# add'l CPUs,**

John, Test Center Manager
Requests more CPU

Run add'l Tests

Two more testers are assigned to project
Add'l tests required, more capacity needed

* Stack can be PowerVM, VMware based as well

The Journey Begins With …

Questions

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The costs of IT Operations

IT Operational Budget by Line Item: All Sectors

Line Item	Percent of IT Budget
Mainframes	1.6%
High-End Servers	1.5%
Midrange Servers	2.8%
Low-End Servers	2.8%
Storage Systems	1.8%
PCs, Workstations, Laptops	4.2%
Printers	0.8%
Network Infrastructure	3.4%
Telecom/Datacom Carriers	8.6%
Operating Systems/Utilities	2.9%
Application Software	10.6%
Business Continuity/DRP	1.2%
Security	1.3%
Personnel	44.6%
Recruiting	0.3%
Training	1.0%
Facilities	1.7%
Consumable Supplies	1.2%
Outsourcing/Outside Svcs	6.6%
Other	1.0%

Source: Computer Economics, 2007   Figure 2-14

IT Staff Ratios: All Sectors

Staff	Percent of IT Staff
IT Managers	10.9%
Project Managers	3.4%
Bus. Analysts/Cust. Relations	5.9%
App. Programmers	24.5%
System Programmers/Admin	8.7%
Computer Ops/Prod. Ctl	3.5%
Help Desk	8.5%
Desktop Support	8.4%
Network Admin/Support	8.7%
Database Admin/Support	4.2%
QA/Testing	1.8%
Security	2.2%
Training/Documentation	1.1%
IT Process & Standards	0.8%
IT Finance & Procurement	1.1%
Web/E-Commerce Staff	2.5%
Clerical	2.0%
Other	2.0%

Source: Computer Economics, 2007   Figure 2-34

Personnel represents the largest percentage of operational costs in the enterprise