# How to Provide the Best Quality of Service on Linux for System z Infrastructure

# Agenda

- **Linux on System z -- Ideal Platform for Consolidation**

- **Managing the New Workloads**

- **IBM Tivoli Service Management Center for System z**

- **Suggested Reference Architecture**

- **Why IBM Tivoli**

- **More Information Resources**

# Consolidation Drivers:  Lower TCO, Better Resource Utilization of System z

## Rising Costs of Management and Administration

15 years ago
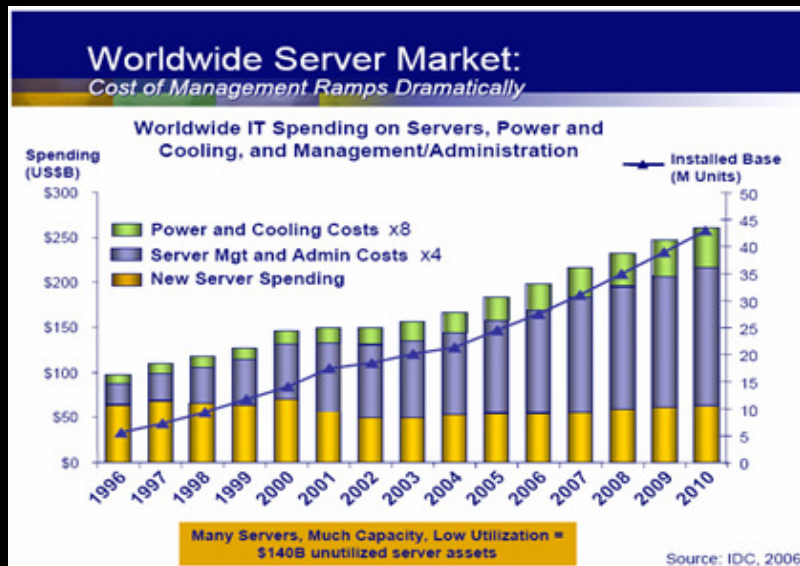
Today

*New hardware and software spending*
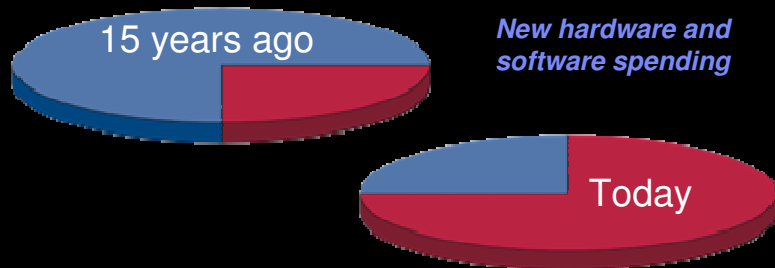
Source: Tony Picardi, IDC
Economist.com: Make it simple. Oct. 28, 2004
From The Economist print edition
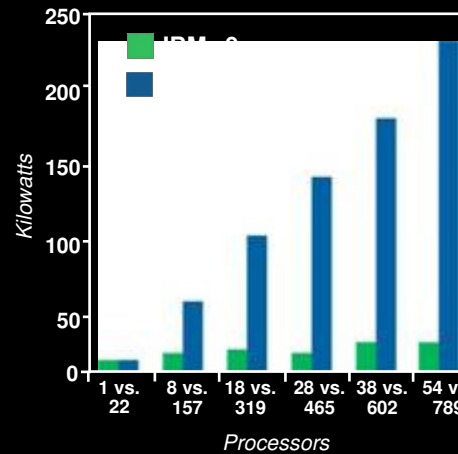
## System z Effectively Manages Growth and Complexity

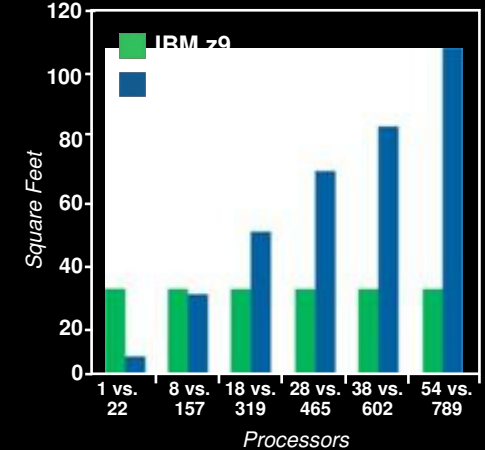Workload

Ops Staff

Gartner

### Worldwide Server Market:
*Cost of Management Ramps Dramatically*

Worldwide IT Spending on Servers, Power and Cooling, and Management/Administration

Spending (US$B)

Installed Base (M Units)

- Power and Cooling Costs x8
- Server Mgt and Admin Costs x4
- New Server Spending

$300
$250
$200
$150
$100
$50
$0

50
45
40
35
30
25
20
15
10
5
0

1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

Many Servers, Much Capacity, Low Utilization = $140B unutilized server assets

Source: IDC, 2006

## System z:  More Performance and Capacity than Linux

### POWER:
### System z vs. Linux on Intel

IBM z9

Kilowatts

250
200
150
100
50
0

1 vs. 22 | 8 vs. 157 | 18 vs. 319 | 28 vs. 465 | 38 vs. 602 | 54 vs. 789

Processors

### SPACE:
### System z vs. Linux on Intel

IBM z9

Square Feet

120
100
80
60
40
20
0

1 vs. 22 | 8 vs. 157 | 18 vs. 319 | 28 vs. 465 | 38 vs. 602 | 54 vs. 789

Processors

# Linux on System z  Provides an Ideal Platform for Key New Workloads – Data, Web / WebApp Servings

- **Data Serving challenge:  Manage massive processing requirements and meet them quickly**

  – System z scalability supports consolidation of diverse workloads onto zSeries servers

  – "Vertical" scaling consolidates workloads of less powerful processors onto a more powerful processor

- **Web Serving/Web App challenge:  Requires many server instances, resulting in complex server environments**

  – z/VM running on a zSeries processor enables "horizontal" server consolidation

  – Capacity is added by obtaining additional servers and integrating them into the network



"With z/VM, the mainframe can support hundreds to thousands of Linux virtual systems on a single mainframe, which can provide excellent total cost of ownership, especially based on software pricing per core."

*-- Gartner  "Open Source in IBM Mainframe"*

# IBM Internal Project to Consolidate Linux Servers Onto Mainframes With IFL's

- IBM expects substantial savings by consolidating 3,917 Linux servers to approximately 30 mainframes

- $82M operational savings per year
  - 86% savings in system admin cost
  - 85% savings in floor space
  - 81% savings in power
  - 57% savings in network
  - 41% savings in software support
  - 19% savings in disk storage maintenance

# Organizations Move New Workloads to Linux on System z to Cut Costs … Then Think About How to Manage Them

**<u>When they decide to move their workloads ...</u>**

1. Scenario 1 - Their current solutions may not allow them to manage from System z -- they may not have a rich portfolio for security

2. Scenario 2 -  They may be new to virtualization and consolidation and may not have tools to manage this environment

3. Scenario 3 -  Apart from consolidation and lower TCO benefits, customers may want to implement a "New Enterprise Data Center"  -- a flexible infrastructure that can help IT align closely  with the business

**Organizations must ensure they have the Visibility, Control and Automation to manage their entire enterprise centrally from System z**

# Scenario 1: IBM Tivoli brings integrated solutions and capabilities to manage workloads on Linux on System z … and the entire enterprise

## End-to-end solutions for managing the enterprise

- End-to-end Operations Management

  - Integrated and automated solutions for service delivery process and processes such as deployment, fulfillment, and change and release management

  - ⭐ *#1 in Worldwide IT Operations Management - Gartner (6th consecutive year)*

  - ⭐ *#1 in System Management Software - IDC*

  - Dynamically allocate workloads to best available virtual resource, and resolve cross-workload and physical resource dependencies

- Highest Availability and disaster recovery

  - Reduce the number and duration of service disruptions

  - Help ensure high availability of critical applications with policy-based healing and automation capabilities

## Highest level of Security with rich set of applications

- Provide integrated, end-to-end security management including identity protection, access control and regulatory compliance



**Scenario 1:**
**Customer's management solutions may not allow them to manage from System z. They may not have a rich portfolio for security.**

# Scenario 2: IBM Tivoli provides the tools to manage virtualized environments and realize the benefits of moving workloads to Linux on System z

- Proactive Monitoring and visualization tools are vital for managing the new environment
  - Need a comprehensive and cohesive view of IT resources; rapidly isolate and analyze problems before service levels are threatened
  - Need advanced real-time visualization of services and processes to monitor, measure availability - performance

- Provide end-to-end automation of system and application availability across applications

- Dynamically manage workloads across the virtualized environments and provide best resource utilization
  - Ranked "All Star First Team" by analyst EMA

- Track assets to understand how and where they are deployed, and reconcile actual assets

- Accurately assess which IT resources are being utilized, and provide chargeback

**Scenario 2:**
**Customers are new to virtualization and consolidation, and may need a different set of solutions for this new environment**

## Scenario 3: Innovative, Best-of-Breed Tools Help Organizations Implement a "New Enterprise Data Center"

### IBM Tivoli Service Management Center for System z provides …

- Dynamically provision and de-provision servers on demand and ensure full utilization of resources

- Understand the impact of incidents or changes

- Real-time service visibility & intelligence; Plan, test and execute IT Service continuity

- Automate key process steps such as release targeting, testing and deployment

- ⭐ *Highest Rated, OvumSummit ITSM Vendor Report Card*

- ⭐ *Leader, Datamonitor Vendor Comparisons for ITSM and Desktop Management*

- Create a **Cloud Computing environment** – a highly efficient, trusted, energy efficient and virtualized environment for consolidation and high speed processing

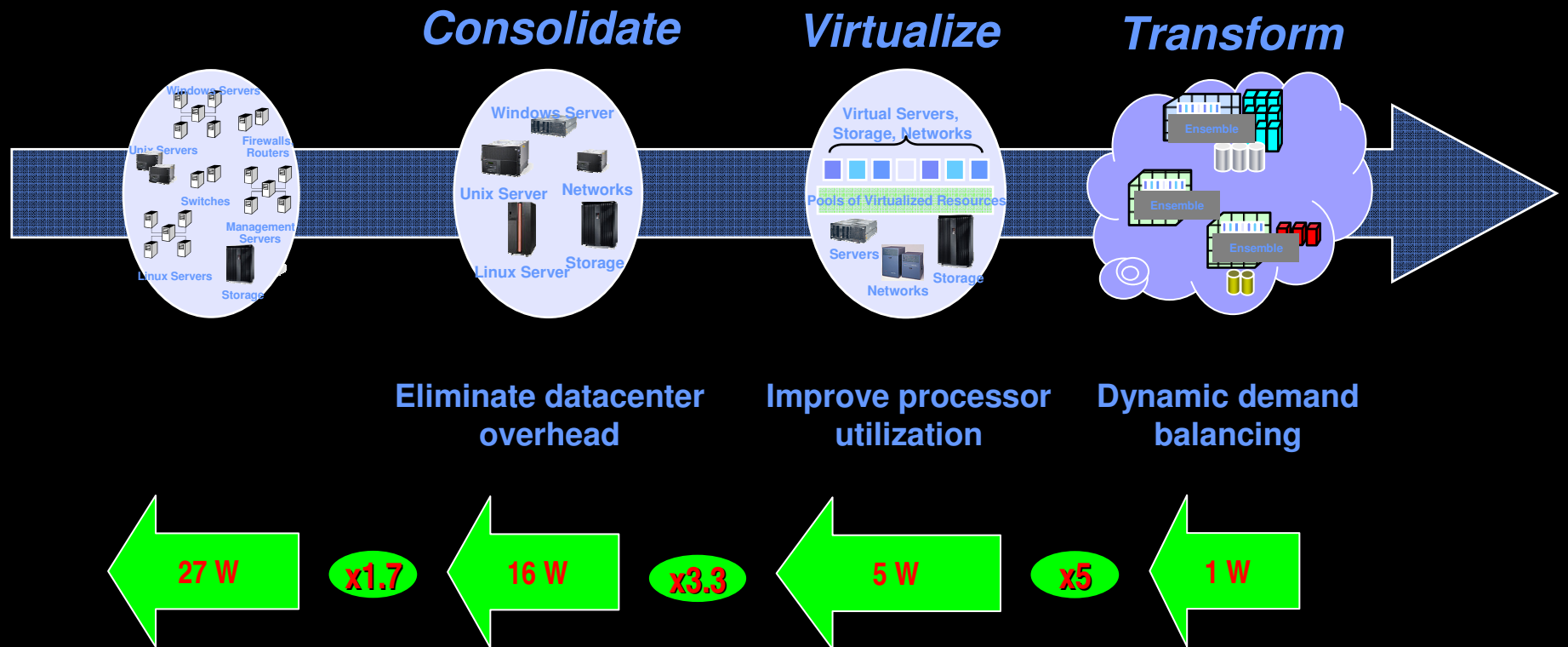*… a compelling new way to deliver service*

**Scenario 3:**
**Apart from consolidation and lower TCO benefits, customers may want to implement a "Dynamic Data Center" -- a flexible infrastructure that can help IT align closely with the business.**

# Infrastructure: From Consolidation to the Cloud

**Consolidate**   **Virtualize**   **Transform**

**Windows Servers**
**Unix Servers**   **Firewalls Routers**
**Switches**
**Management Servers**
**Linux Servers**
**Storage**

**Windows Server**
**Unix Server**   **Networks**
**Linux Server**   **Storage**

**Virtual Servers, Storage, Networks**
**Pools of Virtualized Resources**
**Servers**
**Networks**   **Storage**

**Ensemble**
**Ensemble**
**Ensemble**

**Eliminate datacenter overhead**   **Improve processor utilization**   **Dynamic demand balancing**

27 W   x1.7   16 W   x3.3   5 W   x5   1 W

# IBM Tivoli Solutions Address Data Serving and Web Serving Management Needs Caused by Consolidation

**Data Serving Challenge:**

**Manage massive processing requirements and meet them quickly**

- Manage incidents, analyze and prioritize risks

- Get visibility into system health and quickly resolve issues

- Dynamically manage workloads across virtualized resources, resolve priorities and provide service assurance with critical path analysis

- Improve system availability and productivity

**Web Serving Challenge:**

**Requires many server instances, resulting in complex server environments**

- Discover application dependencies, see the configuration details, store them in central place and manage changes to the environment

- Manage incidents and analyze and prioritize risk based on SLAs

- Manage your assets and provide chargeback based on their usage

- Maintain high availability with single point of control and HA/DR automation

## IBM Tivoli's Service Management Center for System z:
Providing organizations with the Visibility, Control and Automation to use System z as the hub for managing their entire enterprise

- Implements service management with System z as the core platform for managing services that often span diverse operating systems and platforms

    – Not a product, but a portfolio of integrated solutions, organized into management domains

- Provides unified means for z practitioners to have enhanced visibility, control and automation of the services delivered to their customers

- Manages a System z virtualized environment and the high utilizations of consolidated workloads to reduce your environment complexity and overall energy consumption

- Exploits the operational advantages of System z to deliver and expand enterprise services managed as a utility

# Service Management Center for System z Provides a Rich Set of Solutions for Managing z Linux Environment

**New on z!**

IBM Tivoli Service Management Center for System z

**Best Practices and Services**

Process Mgt

Service Mgt Platform

Operational Mgt

**Optimized Infrastructure**

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

| | | |
|---|---|---|
| **IBM Tivoli Application Dependency Discovery Manager (TADDM)** | **IBM Tivoli Change and Configuration Management Database (CCMDB)** | **IBM Tivoli Service Request Manager** |

| | | | |
|---|---|---|---|
| **IBM Tivoli Netview for z/OS, OMEGAMON, IBM Tivoli Composite Application Manager** | **IBM Tivoli System Automation & IBM Tivoli Workload Automation** | **IBM Tivoli Accounting & Usage Manager**  **TDS z/OS** | **IBM Tivoli Identify Manager, IBM Tivoli Access Manager and zSecure**  **RACF, SIEM** |

# Management Considerations during a System z Consolidation Project

**During analysis phase to determine what workload is appropriate to consolidate, also consider**

I. <u>What</u> is needed to manage consolidated environment

II. <u>Where</u> the management solution runs

III. <u>Incremental</u> approach leverages existing investments

IV. <u>Common</u> service management process automation infrastructure

# Manage the new System z Consolidated Environment

- Visualize, control and automate the consolidated operating environment

- Improve availability with performance monitoring and automation

- Realize the total cost of ownership ( TCO) advantages of consolidating

- Design for operational advantages up-front

- Leverage existing skills and centralized management

- Optimize the use of physical hardware with correlation to virtual resources

**New consolidated System z environment**
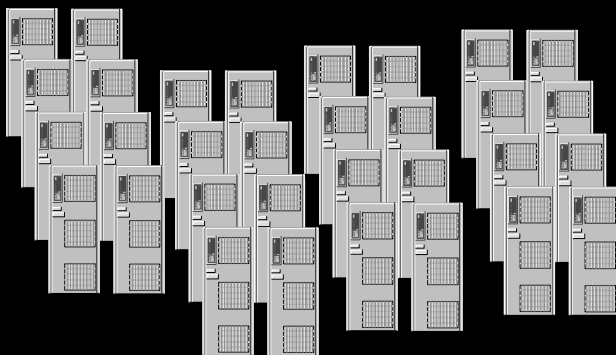
System z Consolidation
(10:1 - 20:1 reduction in physical servers) *

✓ **Simplifier**
✓ **Faster**
✓ **Cheaper**

App Workload

Runtime (OS, middleware)

Virtualization

Physical Hardware

**\* Analysis required to determine workload appropriate for consolidation.**

# Flexible Approach to Where to Run Management

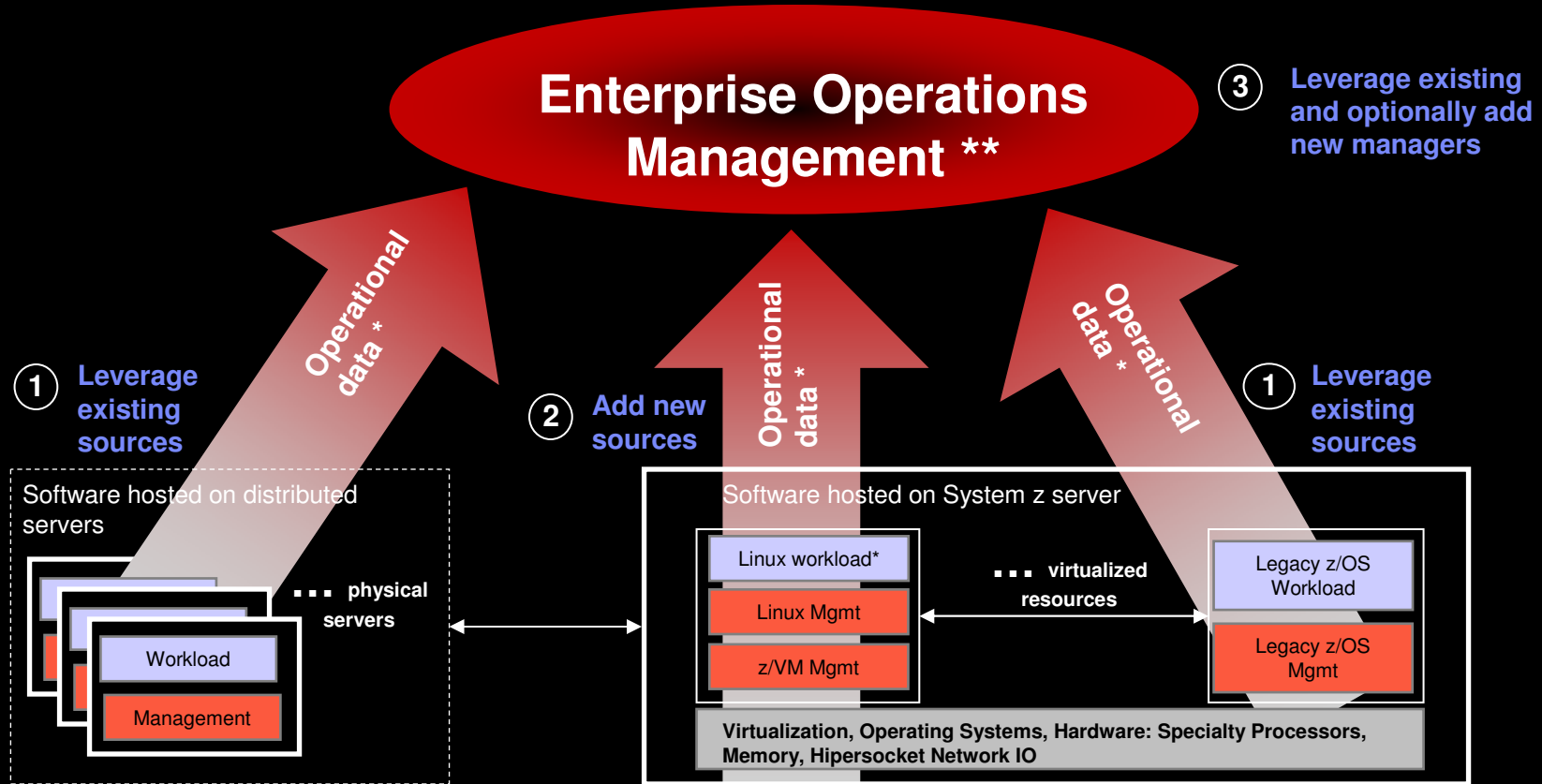- **Traditional service management implementation:**

| | | |
|---|---|---|
| **Operations and Production Mgt**<br>**Security Mgt**<br>**Financial Mgt** | Integration | **Process Automation**<br>**Service Automation**<br>**Operations and Production Mgt**<br>**Security Mgt**<br>**Financial Mgt** |
| **Hosted on System z** | | **Hosted on Distributed Systems** |
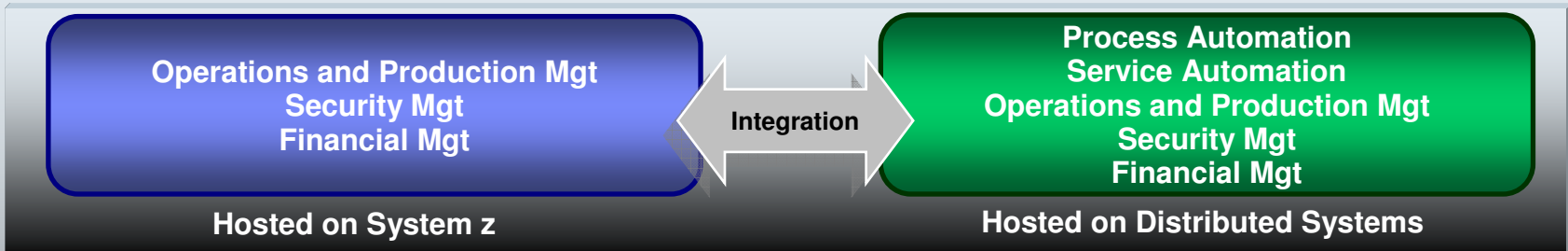
- **Consolidated IBM Service Management Enterprise Hub implementation:**

| | |
|---|---|
| **Process Automation**<br>**Service Automation**<br>**Operations and Production Mgt**<br>**Security Mgt**<br>**Financial Mgt** | |
| **System z** | **Distributed Systems** |

✓ Management solution can be consolidated to run on System z

- Flexibility allows for same TCO benefits of consolidating applications
- Management for Enterprise can be "managed from" System z

✓ Legacy z/OS management provide basis for centralized management and common infrastructure

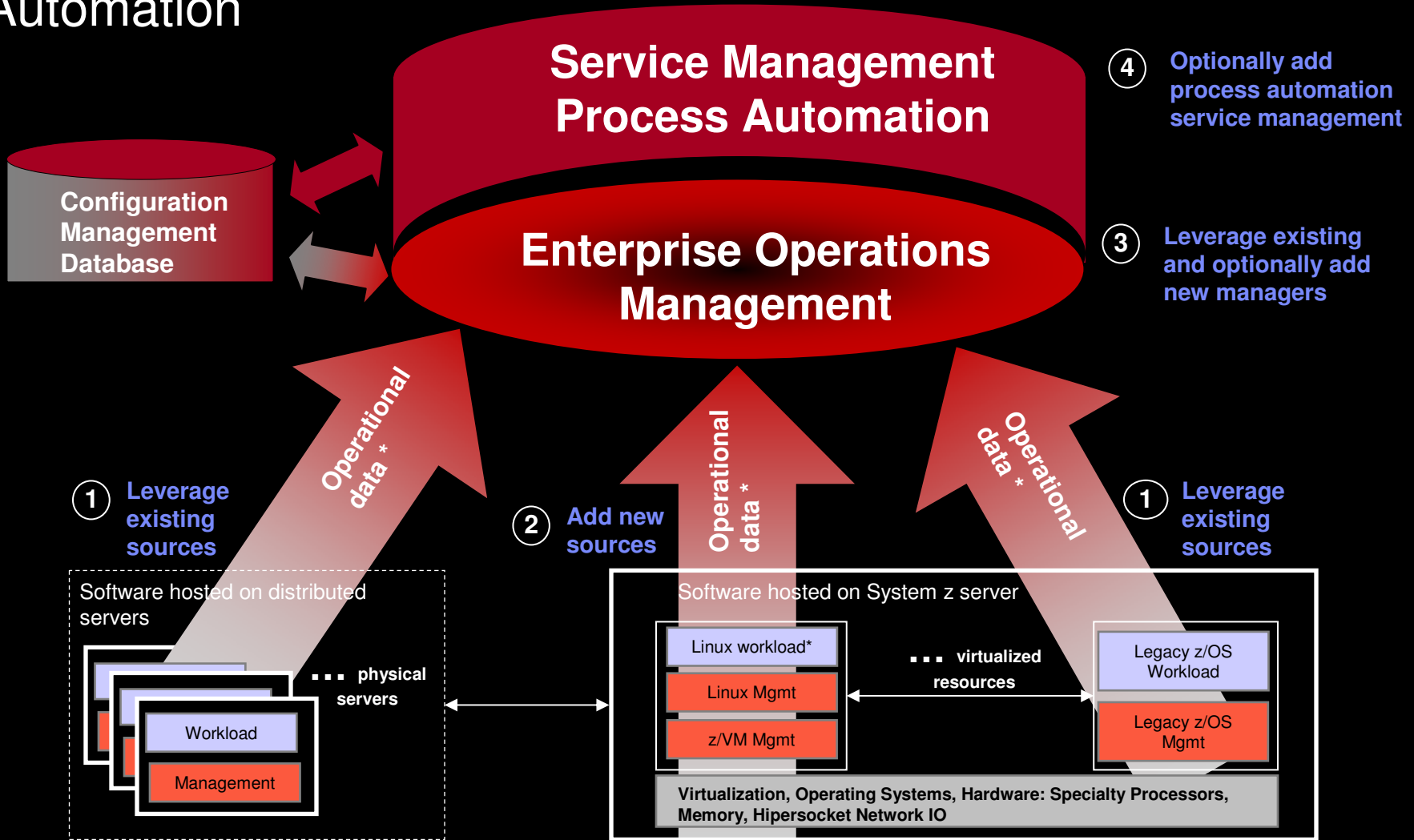# Incremental  Approach Leverages  Existing Investments

**Enterprise Operations Management \*\***

③ Leverage existing and optionally add new managers

① Leverage existing sources

② Add new sources

① Leverage existing sources

*Operational data \**

*Operational data \**

*Operational data \**

Software hosted on distributed servers

■ ■ ■ physical servers

Workload

Management

Software hosted on System z server

Linux workload\*

■ ■ ■ virtualized resources

Linux Mgmt

z/VM Mgmt

Legacy z/OS Workload

Legacy z/OS Mgmt

**Virtualization, Operating Systems, Hardware: Specialty Processors, Memory, Hipersocket Network IO**

## Flexible approach to incrementally adding management

- ✓ Multiple starting points
- ✓ Leverage both IBM and 3rd party management tooling

**\* Operational data includes events, discovery, key performance indicators, availability, compliance, usage accounting, etc.**

**\*\* Centralized Operations Enterprise Managers perform remote analysis across many resources for reporting, event viewing, topology, inventory, dashboards etc.**

# Common Infrastructure Enables Service Management Process Automation

**Service Management Process Automation**

④ **Optionally add process automation service management**

**Enterprise Operations Management**

③ **Leverage existing and optionally add new managers**

**Configuration Management Database**

*Operational data ***

*Operational data ***

*Operational data ***

① **Leverage existing sources**

② **Add new sources**

① **Leverage existing sources**

Software hosted on distributed servers

**. . . physical servers**

Workload

Management

Software hosted on System z server

Linux workload*

**. . . virtualized resources**

Legacy z/OS Workload

Linux Mgmt

Legacy z/OS Mgmt

z/VM Mgmt

**Virtualization, Operating Systems, Hardware: Specialty Processors, Memory, Hipersocket Network IO**

**\* Operational data includes events, discovery, key performance indicators, availability, compliance, usage accounting, etc.**

**\*\* Centralized Operations Enterprise Managers perform remote analysis across many resources for reporting, event viewing, topology, inventory, dashboards etc.**

# Why IBM Tivoli ?

We offer the most comprehensive solutions for Linux on System z to help organizations realize lower TCO while providing superior levels of service

## Service Management Center for System z delivers:

- The best end-to-end event-management solutions

- A very broad and rich set of process-management tools

- A reliable, repeatable, resilient incident-management tools

- The capacity and flexibility to dynamically address business process change and increase efficiency
  - Example: Provision/de-provision servers on-demand while ensuring maximum asset utilization

- Ability to map the application and resource dependencies, monitor the resource usage, and provide chargeback

- The option to take incremental steps when managing new workloads by leveraging existing mainframe solutions

- Significant time and resource savings to manage the consolidated mainframe environment versus a distributed one

- The highest level of end-to-end security, access control, identity protection and compliance.

System z10
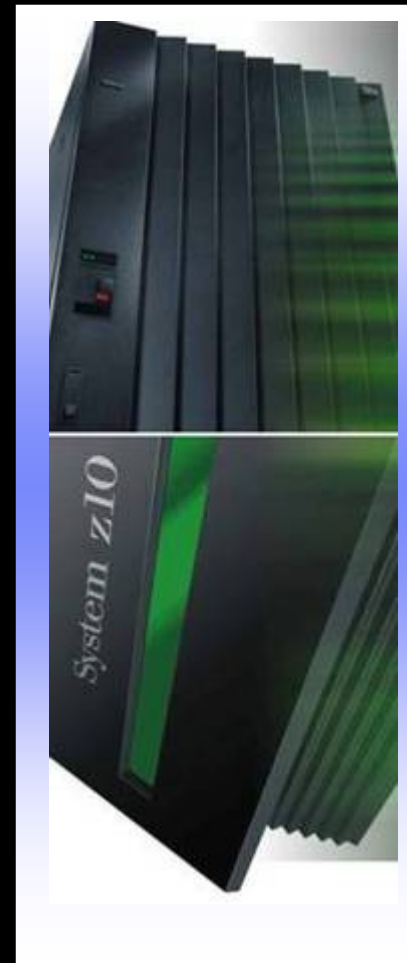
# Casas Bahia: Maximizing Marketing _and_ Cutting IT Costs

## Client Needs:

- Implement a sales reporting system to analyze trends and gauge success of specific marketing campaigns
- Consolidate application development on an enterprisewide platform to handle rapid growth while reducing IT costs

## Solution:

- Centralize operations on two IBM zSeries 990 mainframes
- Establish a unified change management process using IBM Rational ClearCase and ClearQuest software
- Optimize system performance with Tivoli OMEGAMON XE family of products, Tivoli NetView, Tivoli Business Systems Manager, Tivoli Monitoring, Tivoli Enterprise Console

## Client Benefits:

- Improved reporting and development capabilities, while simplifying systems management and reducing IT costs
- Increased Infrastructure availability
- Lowered total cost of ownership for IT environment

*Industry: Retail*

*Profile: One of the largest household goods retailers in Brazil, Casas Bahia operates 500 stores targeting consumers in lower-income brackets. The retailer came to IBM for help in achieving its goal of increasing its customer base from 10 million to 14 million.*

# First National Bank of Omaha: z Linux Leads to Consolidation, Virtualization and Major Improvements

**Client Needs:**

- Simplify large, complex IT infrastructure with more than 600 servers
- Control maintenance costs and 30% annual staff growth
- Improve average 12% server and 14% storage utilization rates
- Manage continual capacity growth to handle peak transaction volumes

**Solution:**

- Implemented IBM WebSphere products for banking running on IBM System z with z/VM and Linux virtual servers

**Client Benefits:**

- **Realized ratio of 18:1 on physical server consolidation by using virtualization, decreasing maintenance costs**
  - Consolidated 560 Intel-based servers to 70 BladeCenter servers
  - Decreased systems staff from 30 to 8 to manage entire infrastructure
- **Capacity Upgrade On Demand provides more mainframe computing resources when extra capacity required**

*Industry: Banking*

*Profile: First National Bank of Omaha is a multi-state holding company founded more than 130 years ago. It serves more than 6.6 million customers throughout the U.S. and has more than 50 location throughout the West and Midwest.*

# Olio Carli: Standardizing on z Linux Solves Address Dilemma, Cuts Costs and Increases Efficiency

**Client Needs:**

- Standardize addresses in growing customer database populated by Web, telephone and written materials

- Correct and update existing records, ensure standardization of new addresses

- Reduce costs from incorrect international shipments

**Solution:**

- Implement Java-based address standardization product, added to customer's mainframe by installing Linux on System z.

**Client Benefits:**

- Sub-second address standardization transactions

- Disparate functions consolidated on enhanced mainframe environment, reducing floor space, power and cooling costs

- Enhanced mainframe environment provides capacity for transaction loads, assures reliable network connections, reduces software licensing costs, and more.



*Industry: Retail*

*Profile: Established in 1911, Olio Carli is a leading manufacturer of olive oil in Italy and recently expanded distribution to France, Germany, Austria and the U.K.  It's website is accessible in four languages and is a benchmark for e-commerce in Italy*

# For More on Service Management Center for System z

Service Management Center for System z Press Release
http://www-03.ibm.com/press/us/en/pressrelease/23596.wss
- Learn more about IBM Service Management Center for System z
http://www.ibm.com/software/tivoli/features/zsmc/

**Tivoli User Community**
An active and lively community for Clients, Business Partners, and IT professionals.
**Free membership** provides you with valuable resources, tools and networking
capability. Log on to  www.tivoli-ug.org or visit the ped in the IBM Pulse Expo

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# THANK YOU