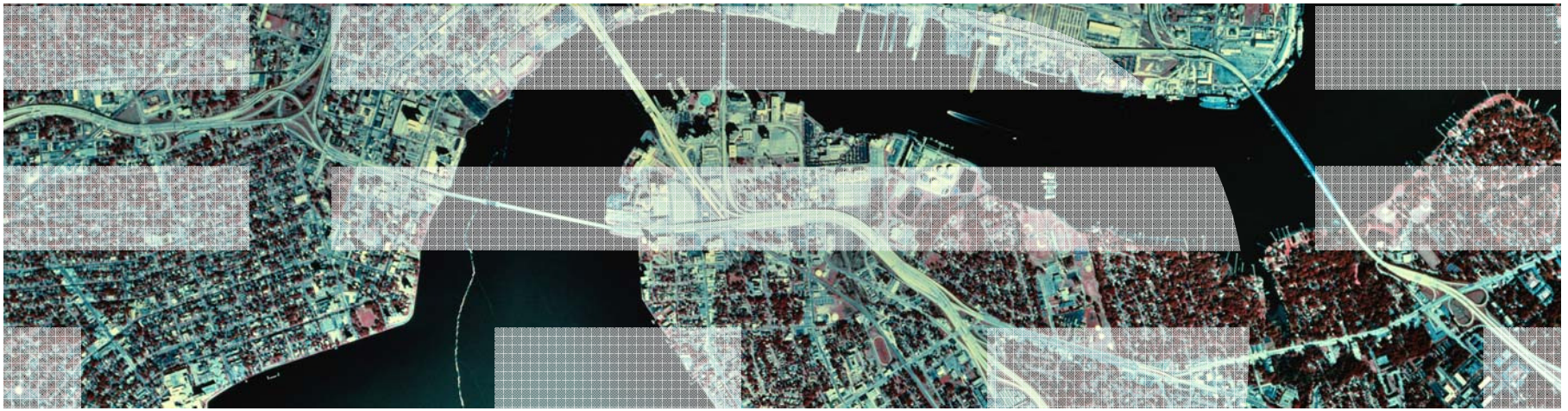
26 May 2010

Thriving in Uncertain Times

Smart Ways to Reduce Costs and Achieve a Competitive Edge

Steve Mills
IBM Senior VP and Group Executive
IBM Software



IT Organizations are Challenged by a Set of Operational Issues

Challenges

Service Delivery

Application Modernization and Deployment:

Costly and Slow

Business Resiliency and Security

Global 24x7 Demand for Information Services:

Always On, Always Secure

Energy Consumption and Cost

Rampant Server Proliferation:

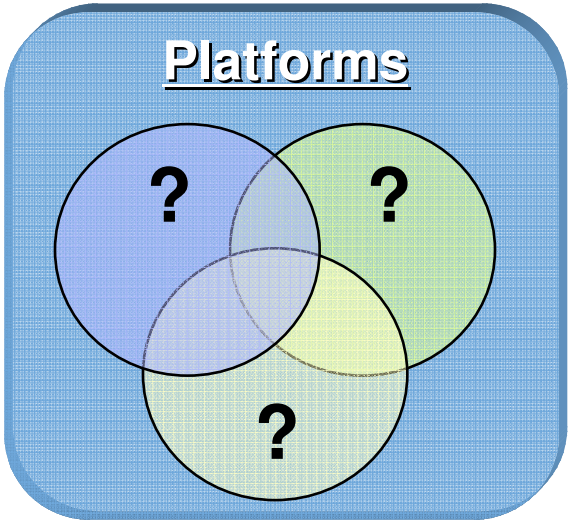
Costly to Own, Manage and Power

Smarter Business Infrastructure

Supporting Multiple Workload Approaches ….

Transaction/data Processing

- Scale
- Flexible workload management
- Fast transaction, I/O speeds
- High quality of service
- Security



Basic Web & Collaboration

- Scale
- High throughput
- Varying quality of service
- Varying levels of security

Business Applications (including web)

- Scale
- High quality of service
- High memory requirements
- Flexible infrastructure
- Security

Business Analytics

- Scale
- Compute intensive
- High I/O bandwidth
- High memory requirements
- Varying levels of security

Static Simulation / Modelling

- Compute intensive
- High memory requirements
- Lower QoS

Matching best platform for workload is crucial

Workload Fundamentals

- **Major workload variables include:**
  - Instruction set requirements
  - CPU intensity
  - Application working set and memory requirements
  - I/O intensity
- **Very high CPU and instruction set intensity optimizes around fastest possible integer and/or floating point capability**
  - Power or Intel
- **Significant transaction load and high I/O and large amounts of accessible data optimizes around systems with large numbers of dedicated I/O processors and optimized caching**
  - Z or Power

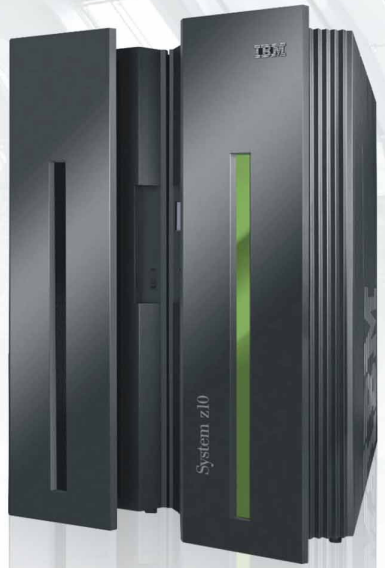
    but …. businesses will often fragment applications and data to accommodate sub optimal system characteristics on platform preferences
- **Lightweight applications / limited transaction load / modest data**
  - Z or Power or Intel
  - Easiest workloads to consolidate on the fewest number of boxes
  - Optimizes around high level of system partitioning and virtualization

TCA and TCO Fundamentals

- **Server cost is the smallest element for running typical commercial workloads**
  - Over a 3, 4, or 5 year life, labor cost and energy cost are both higher than server cost
- **The greater the number of individual boxes, the greater the cost**
  - Each box must be managed – set up / operation / security / upgrade, etc.
  - Each box has to be fed by data
  - Each box requires telecommunications connections – routers / switches
  - Each box requires its cables and the cables of all of the connected boxes
- **Scale up versus scale out is no longer a primary issue**
  - All systems … Z, P, Intel … support scale up and scale out
  - Z and P offer massive scale out inside the box
  - Cost is optimized through reducing the number of elements that surround a server
- **Few businesses do granular cost accounting of their per server, per system or per application**
  - Costs are often aggregated, then allocated
  - Most companies do not know their true cost of ownership
  - Historical charge back techniques almost always over allocate to large shared systems … the mainframe

Significant Advantages to Best Fit Optimization

- **Light transaction workloads with light I/O**
  - 33% lower cost on Intel versus zLinux
- **Heavy transaction workloads**
  - 62% lower cost on POWER7 versus Intel
- **Workloads with heavy I/O**
  - 27% lower cost on zLinux versus Intel

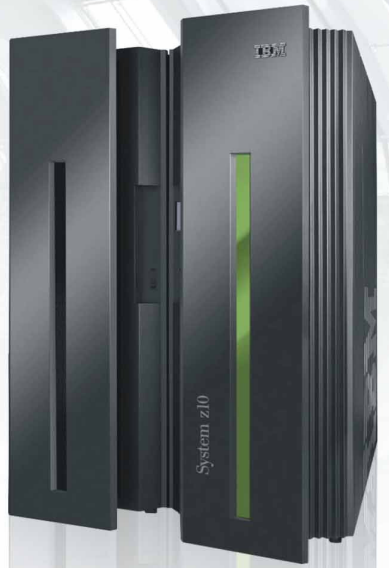


- ***Consolidating each workload to the optimum platform achieves lowest possible total run-time costs***

The Value of Mainframe Computing

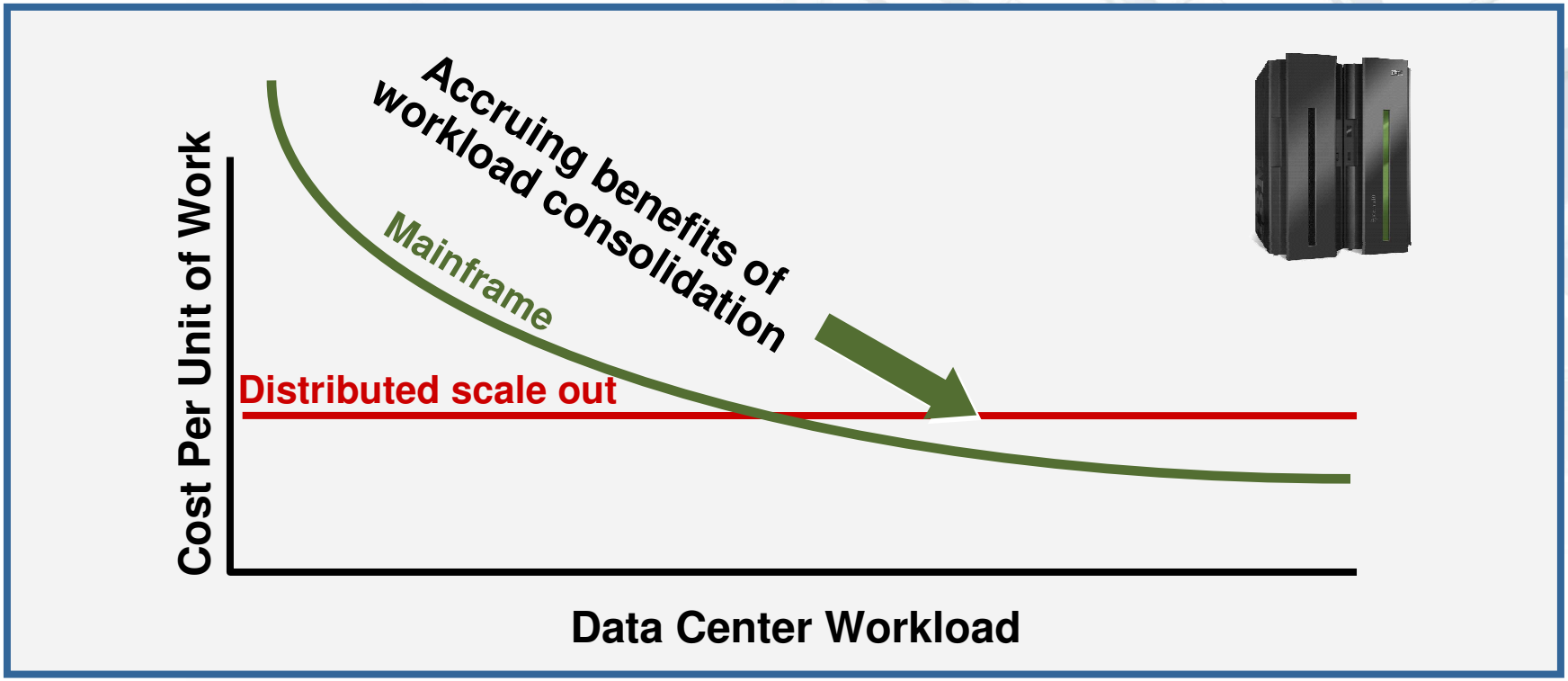
Mainframe Computing Delivers Value for Core Commercial Workloads

- Designed for high availability and responsiveness
- Maximum throughout per unit cost
- Tight centralized control for
  - Security
  - Stability / Change Management
  - Backup / Recovery
  - Auditability
  - Resource / Cost Management and Accounting
- Simplified and low cost operations and administration

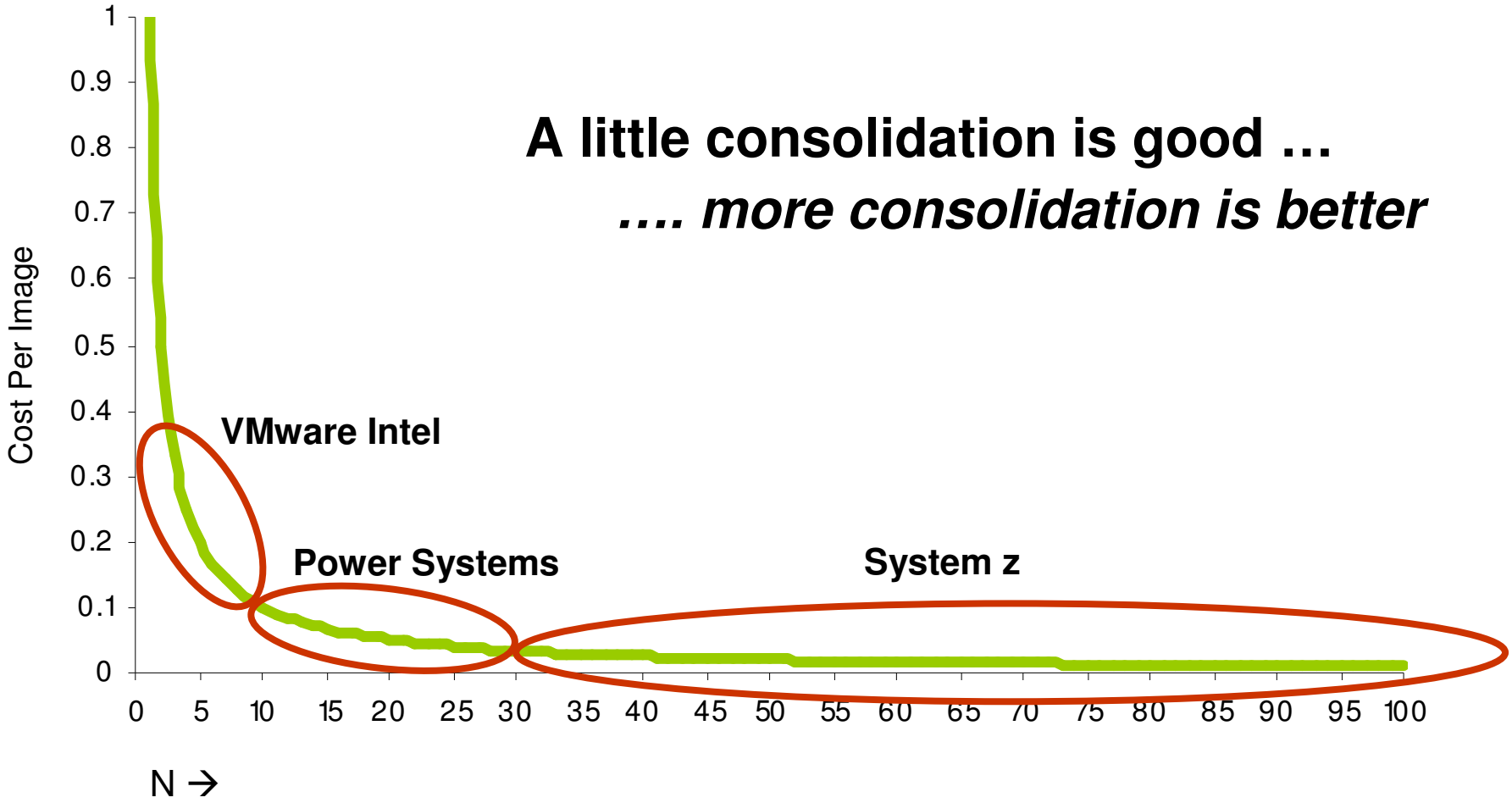


Mainframe Cost per Unit of Work Goes Down ….

…. as Workload Increases



Observed Consolidation Ratios



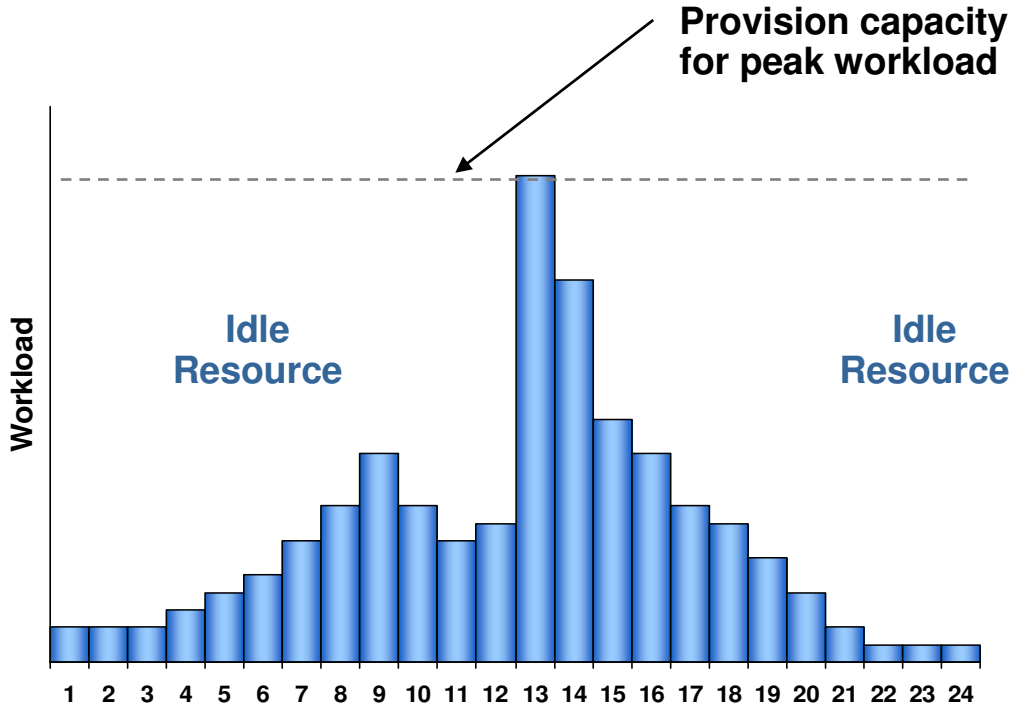
Utilization of Distributed Servers and Storage

Typical utilization of:

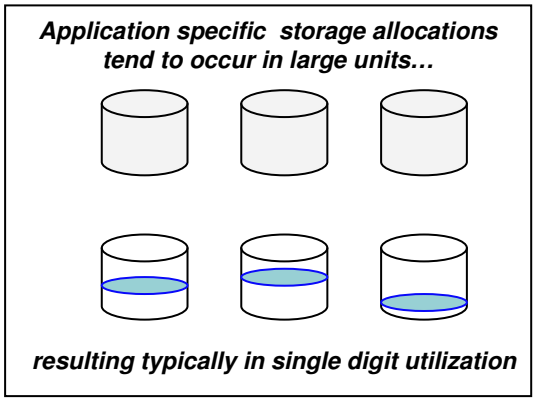
Windows Servers	5-10%
UNIX Servers	10-20%
System z Servers	85-100%

Server dedicated to one application

The cost of storage is typically three times more in distributed environments



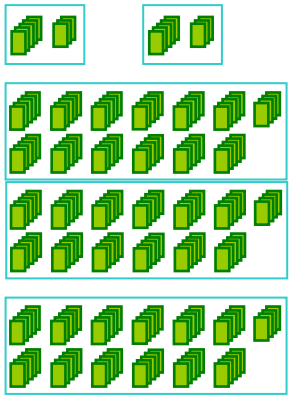
- **Storage Allocation**
  - Application-specific resulting in over-allocations
  - Fine grained storage allocation mechanisms characteristic of mainframe storage are uncommon in distributed environments.
- **Storage Utilization**
  - Single digit utilization for distributed environments is not uncommon
  - Storage utilization of 80% + is typical for mainframe
- **Storage Management**
  - Data disaster recovery, synchronization, and transfer requirements add complexity and cost



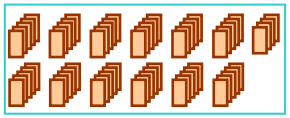
Compare the Processors Needed to Achieve 2,200 Transactions per Second

Online Injector: 1 x HP RX7620

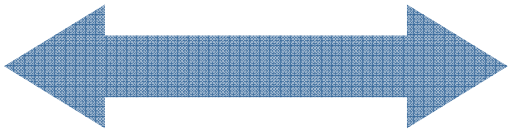
Temenos T24 Servers:
2 x HP RX7620
3 x HP 9000 Superdome



Oracle 10g: 1 x HP 9000 Superdome



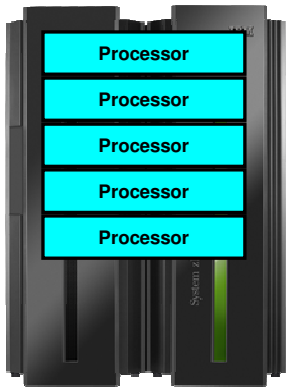
5 processors
(3,906 MIPS)



280 processors
(457,762 Performance Units)

$26.0M
TCA (3yr)

TCS BaNCS and DB2
1x z10 2097-705



$18.9M
TCA (3yr)

117 Performance Units per MIP

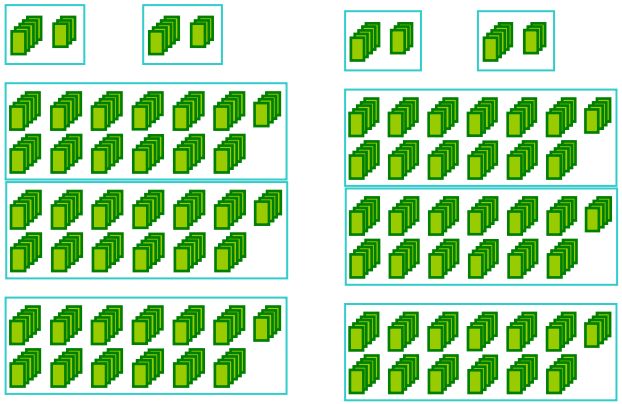
HP Integrity rx7620 - (10U) 1.5GHz 6MB (8ch/8co)

HP 9000 Superdomes - 32W 1GHz 32MB (32ch/64co)

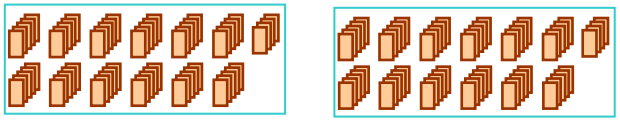
Compare the Processors Needed to Achieve 2,200 Transactions per Second (with Dev/QA)

Online Injector: 2 x HP RX7620

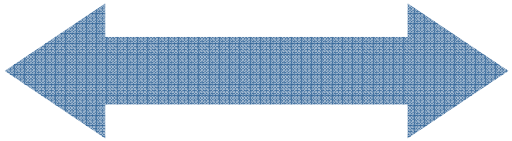
Temenos T24 Servers:
4 x HP RX7620
6 x HP 9000 Superdome



Oracle 10g: 2 x HP 9000 Superdome



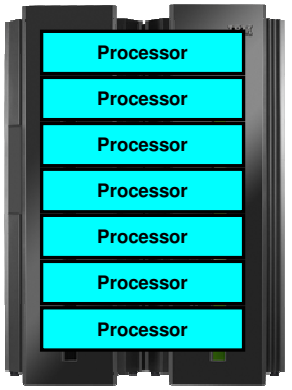
7 processors
(4,906 MIPS)



560 processors
(915,524 Performance Units)

$59.2M
TCA (3yr)

TCS BaNCS and DB2
1x z10 2097-707



$22.7M
TCA (3yr)

187 Performance Units per MIP

NOTE: Double Distributed Servers, add 1000 MIPS to System z for Dev/QA

HP Integrity rx7620 - (10U) 1.5GHz 6MB (8ch/8co)

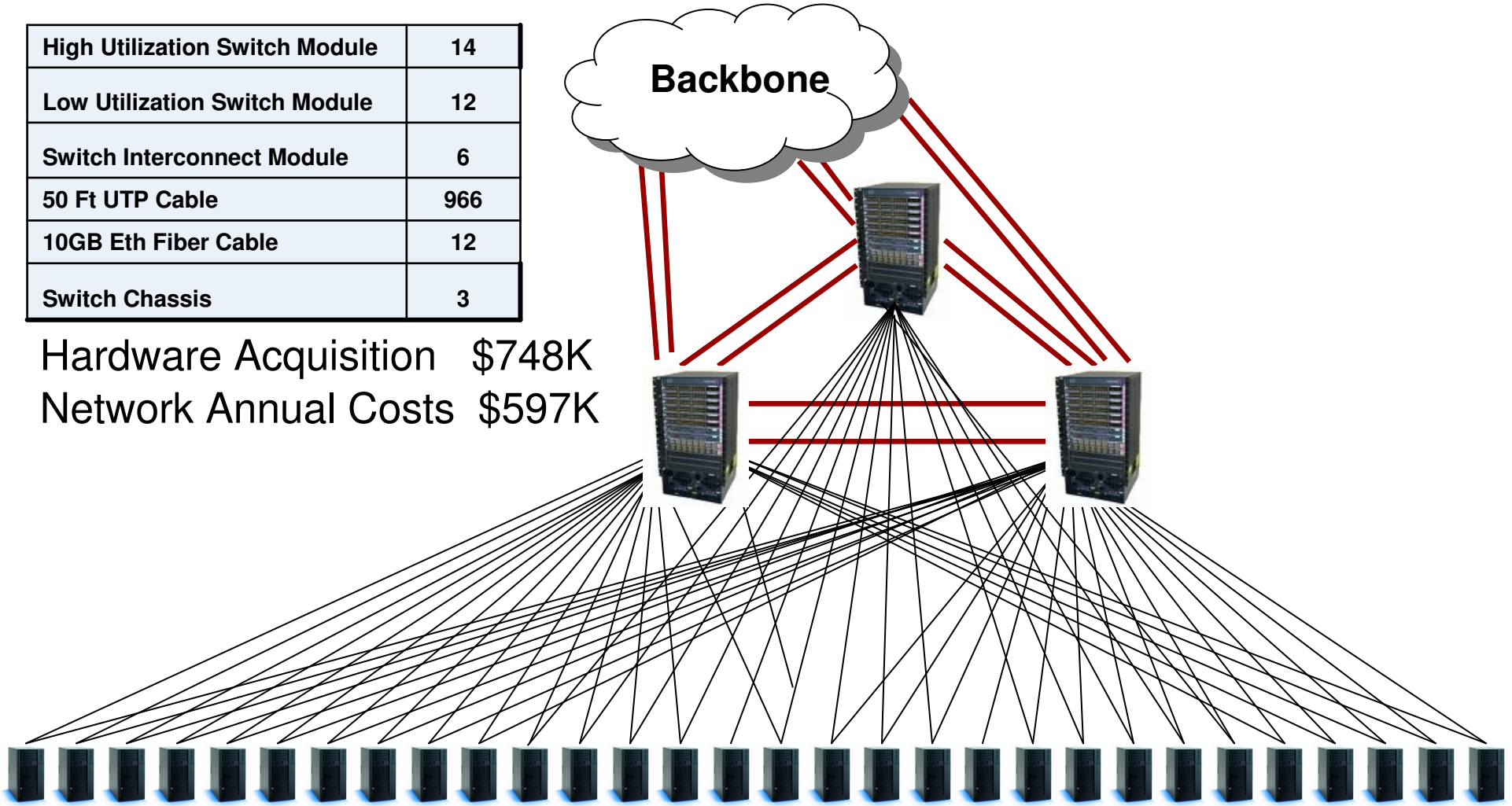
HP 9000 Superdomes - 32W 1GHz 32MB (32ch/64co)

Case Study: Network Costs – Before Consolidation (483 Servers to 2 System z's)

High Utilization Switch Module	14
Low Utilization Switch Module	12
Switch Interconnect Module	6
50 Ft UTP Cable	966
10GB Eth Fiber Cable	12
Switch Chassis	3

Hardware Acquisition $748K

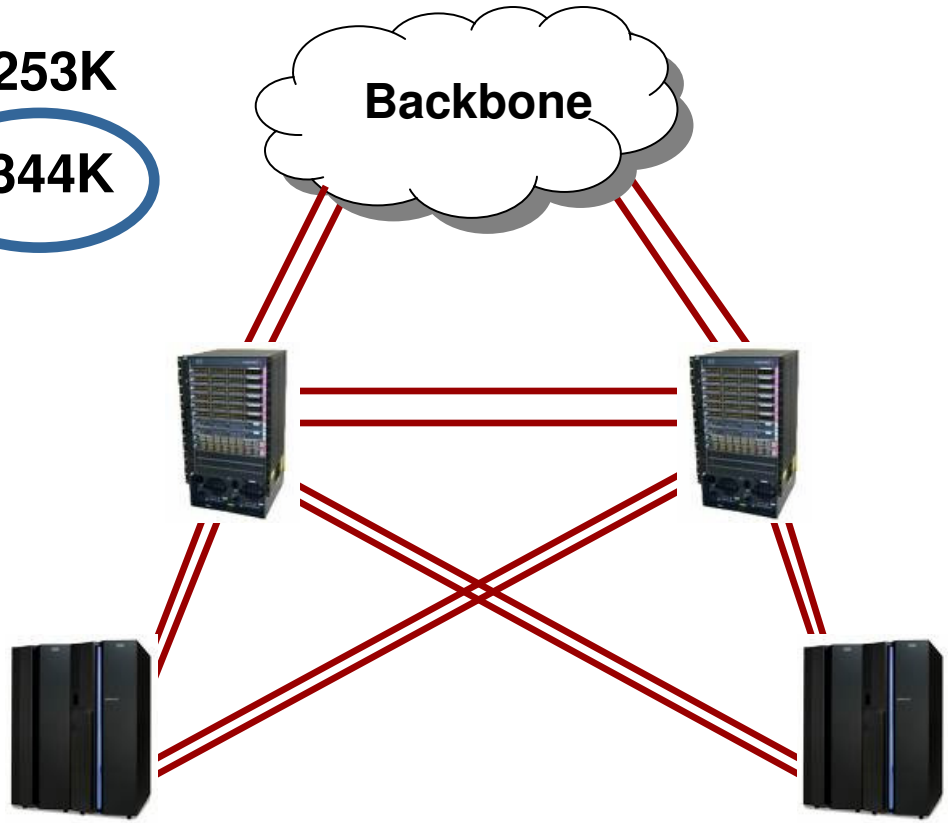
Network Annual Costs $597K



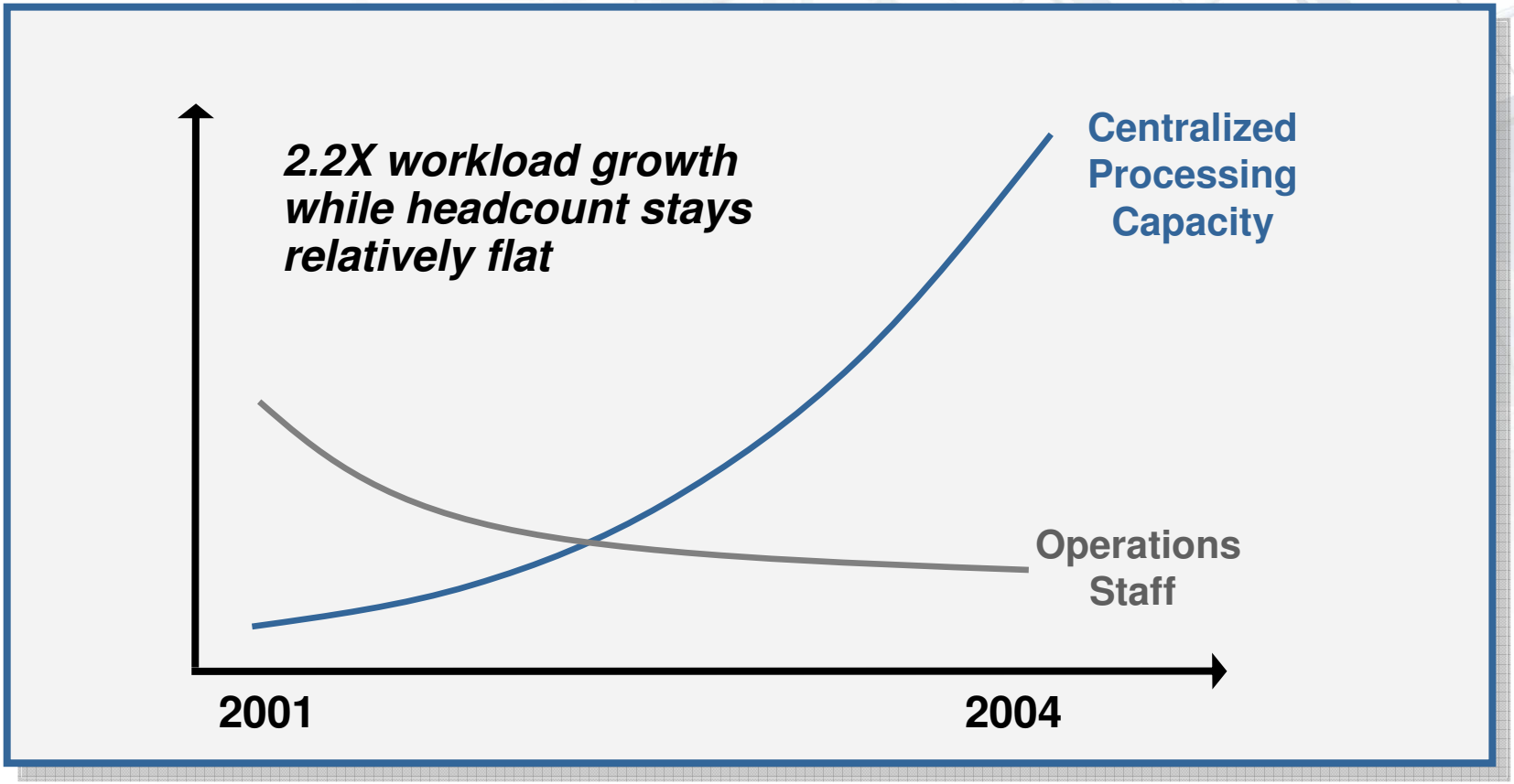
*Shows **30** of the **483** Servers*

Case Study: Network Costs – After Consolidation (483 Servers to 2 System z's)

- **New Hardware Acquisition** **$0**
  (reuse some of old network hardware)
- **"After" Network Annual Cost** **$253K**
- **Network Annual Cost Savings** **$344K**



Consolidation and Structured Practices are the Reasons for Improved Productivity



Customer Survey – How Many People to Manage Servers?

# NT Servers	# People	Ratio (s/p)
1123	68	16.5
228	20	14.4
671	51	13.1
700	65	11.5
154	18	8.5
431	61	7.1
1460	304	4.8
293	79	3.7
132	54	2.0

# UNIX Servers	# People	Ratio (s/p)
706	99	7.1
273	52	5.2
69	15	4.6
187	56	3.3
170	51	3.3
85	28	3.0
82	32	2.6
349	134	2.6
117	50	2.3
52	52	1.0

Mainframe administration productivity surveys range 167-625 MIPS per headcount (500 is typical), so…

Source: IBM Scorpion Customer Studies NOTE: Figures for total administration cost

Understand the Cost Components

Annual Operations Cost Per Server

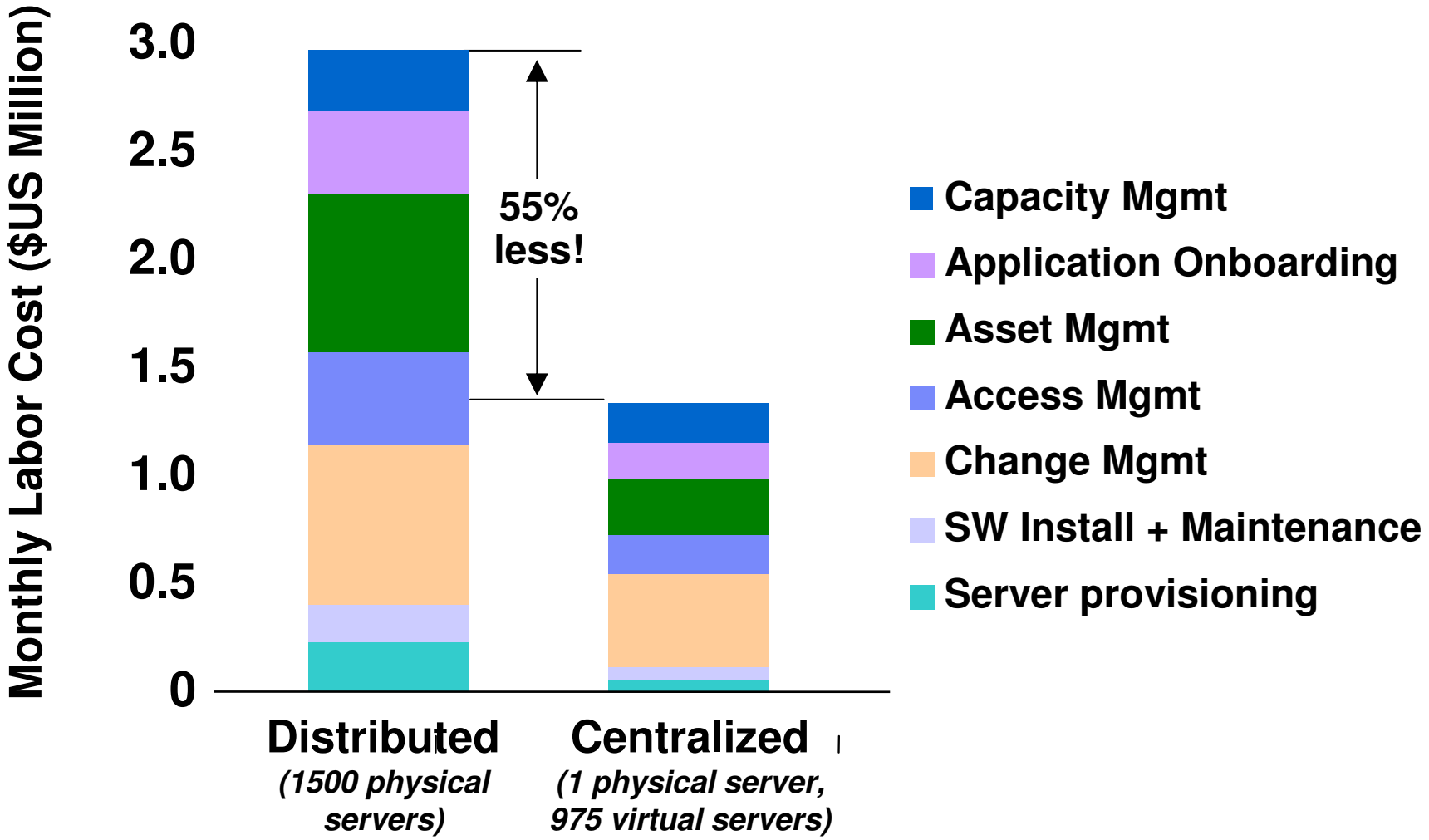
(Averaged over 3917 Distributed Servers)

Power	**$731**
Floor Space	**$987**
Annual Server Maintenance	**$777**
Annual connectivity Maintenance	**$213**
Annual Disk Maintenance	**$203**
Annual Software support	**$10,153**
Annual Enterprise Network	**$1,024**
Annual Sysadmin	**$20,359**
Total Annual Costs	**$34,447**

The largest cost component was labor for administration
7.8 servers per headcount @ $159,800/yr/headcount

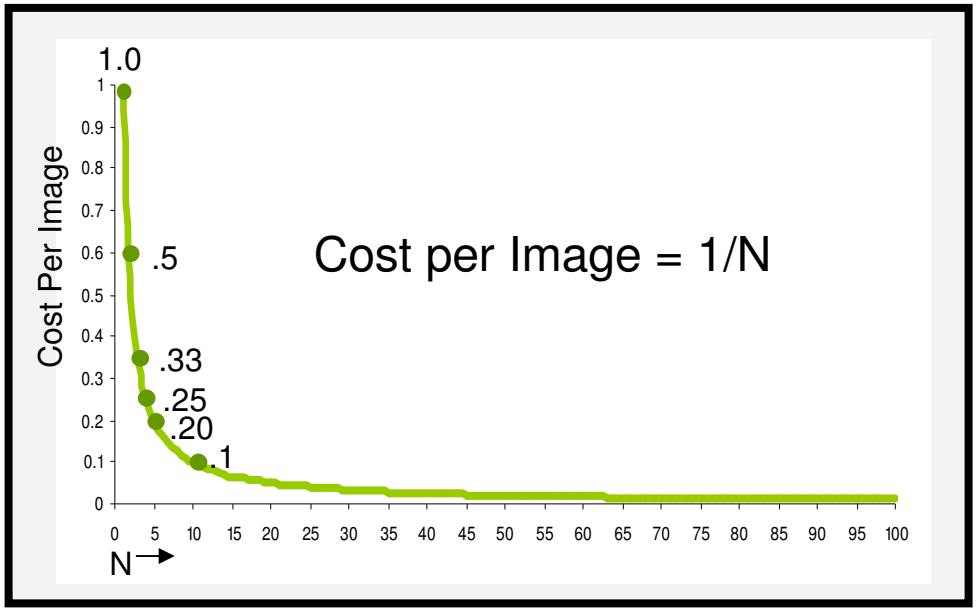
Source: IBM internal study

Case Study: Financial Services Firm Estimates Monthly Labor Savings of 55% with Centralized Approach



How Does Consolidation Reduce Cost

- Costs shared by all “N” consolidated images
  - Hardware
  - Software
  - Power
  - Floor Space
  - Local Network Connectivity
- Costs ***not*** shared by consolidated images
  - Migration cost per image
  - Off premise network cost
  - Labor cost per image



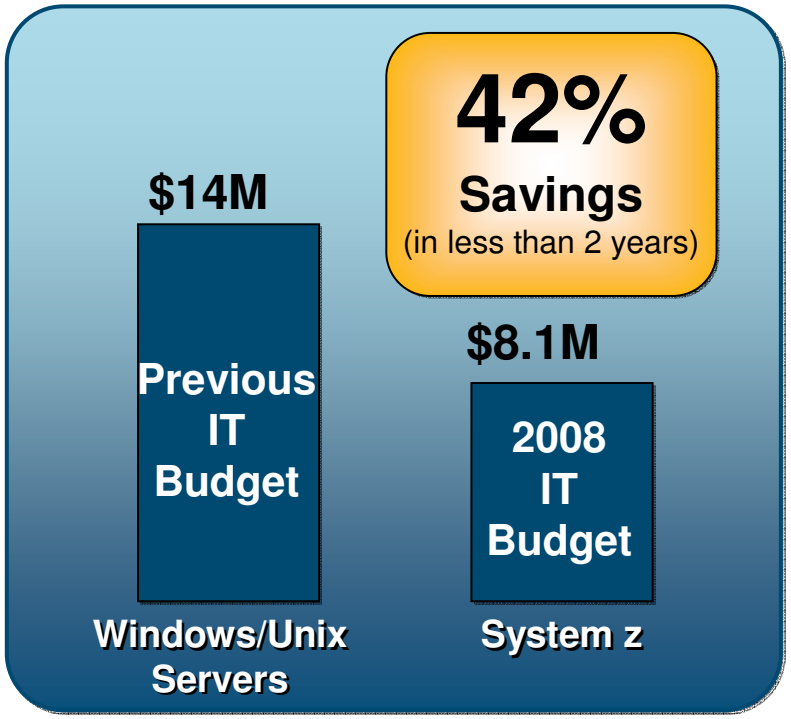
Fixed cost per image

Fixed cost per image, but typically less than unconsolidated labor cost

The more workloads you can consolidate, the lower the cost per image

Optimize Deployment of Applications and Data

Deploying SAP Database and Application Servers



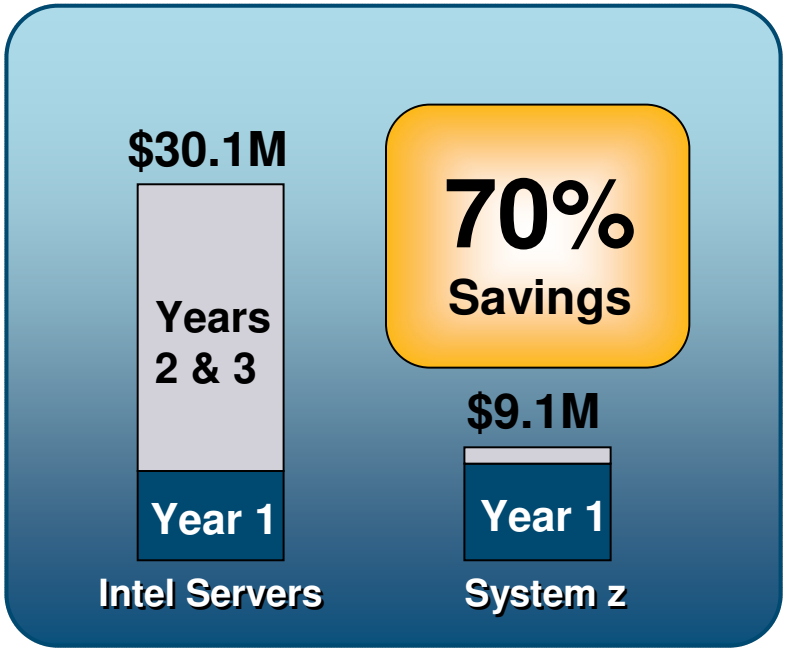
Top three reasons for savings

- **Software and hardware licensing costs dramatically reduced**
- **Software and hardware maintenance costs are significantly down**
- **Networking costs plunged, while infrastructure was drastically simplified**

BALDOR **$1.8 billion Electric motors manufacturer**

Consolidate Applications and Data

Drive Down Costs of Hardware, Software and Management



Top three reasons for savings

- Consolidated 292 Oracle servers to one System z
- System administration costs 90% less on System z
- Subscription and support licenses were over 95% less on System z

A regional North American government organization

Additional benefits

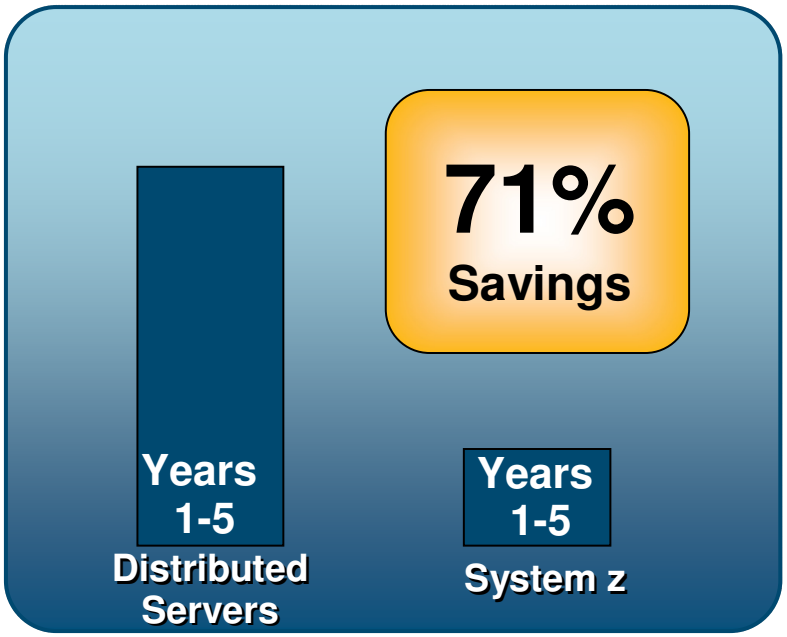
Increased administrator productivity

Faster provisioning speed

Simpler Infrastructure

Optimize Deployment of Applications and Data

Deploying a Portal Application



A large technology organization

Top three reasons for savings

- 93% reduction in software licenses: 26,700 down to 1,800
- Greatly reduce labor costs due to less administration
- Hardware costs are dramatically less

Additional benefits

- A fraction of prior physical network connections
- Far fewer ports
- Dramatically less cabling

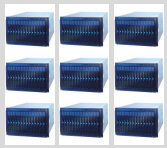
Four Smart Ways to Quickly Reduce Costs

Based on insights from working with hundreds of customers, here are four approaches to reducing costs

1. Consolidate applications and data
2. Optimize deployment of applications and data
3. Reuse applications and data
4. Properly account for your costs

Properly Account for Your Costs

"False Economics": Over-allocation of Costs to System z

	Intel/UNIX Servers	Mainframes
		
Direct Costs Hardware, software, admin	$ Correct allocation	$ Correct allocation
Shared Costs Power, facilities, network, mgmt overhead, etc.	Incorrect, zero allocated	$ Correct allocation
	All of Intel/UNIX incurred costs are moved to mainframe	+$

Getting to "True Economics"

Core problem

- Difficult to assign shared costs to platforms
- Shared costs lumped in with mainframe costs
- Thus, mainframe costs tend to be overstated
- Platform decisions are made that waste cash

Pragmatic quick-return remedy

- Meter basic usage
- Identify largest cost distortions
- Incorporate information in decision making

System z Strategy

Continue capitalizing on traditional system z strengths

- Transaction processing, batch processing, messaging, quality of service, data serving

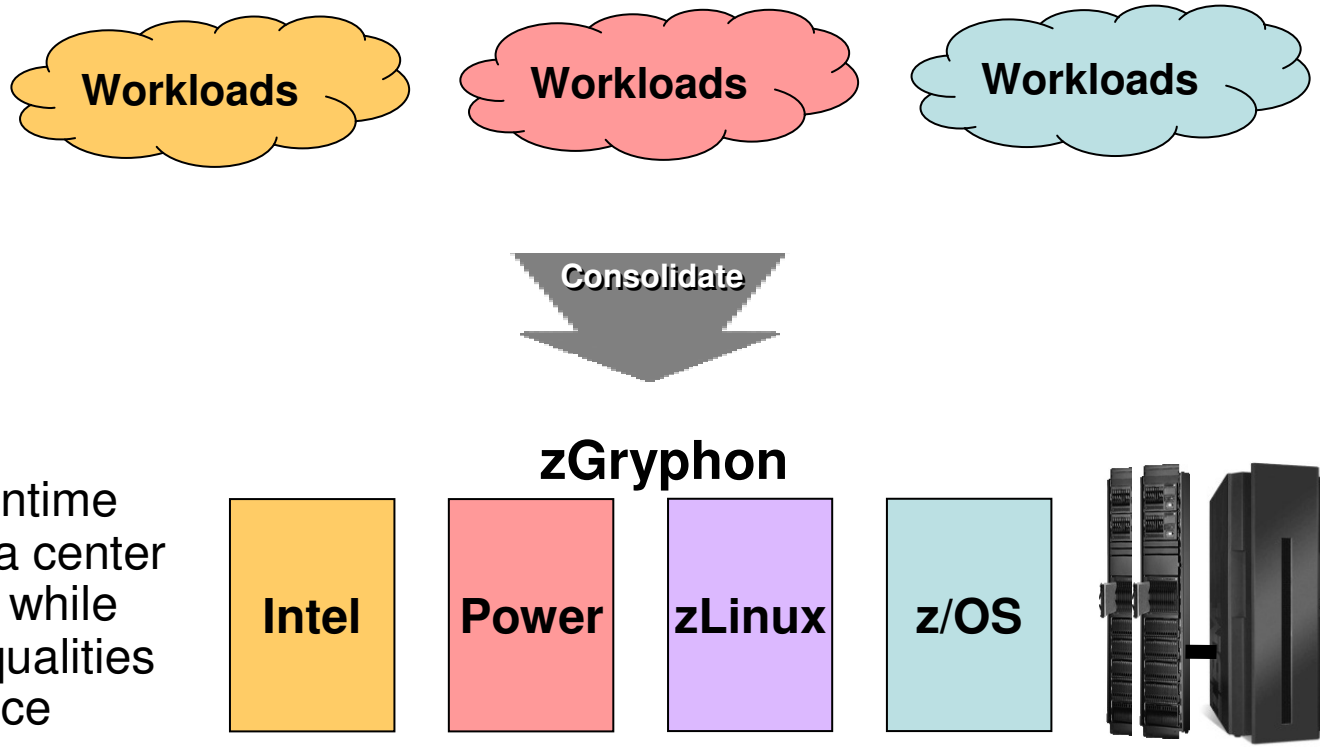
Continue extending advantages of System z for new and mixed workloads

- Systematic re-engineering of the software stack for SOA
- Deliver extensive data management services
- Leverage the wave of workload consolidation by extending its lead in virtualization capabilities
- Simplify platform further, providing even greater cost advantages
  - New faces of z
  - More end-to-end management capability from a z center point of control
  - Simplified labor intensive tasks
  - Request-driven provisioning

Continue expanding the System z ecosystem

- Attracting new System z customers and ISV application workloads
- Making System z relevant to the new IT generation

zGryphon Fit for Purpose Proposition



Optimal runtime costs for data center workloads while preserving qualities of service

Fast processing threads on a blade scale with normal I/O capability

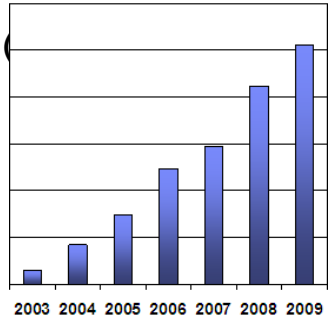
Large scale shared processor pools and high I/O on reliable platform

Sysplex scale for transactions and high I/O with highest quality of service

System z – Thriving Environment for Today's and Traditional Applications

System z Linux: fastest growing server platform

- **Installed Linux MIPS growth of 43% CAGR (2004-2009)**
- **Shipped IFL MIPS increased 65% (**
- **70% of the top 100 System z clients are running zLinux**
- **Linux is 16% of the System z customer install base (MIPS)**



Thousands of ISVs investing in System z platform

- **Over 3,150 LINUX applications are supported on System z; 550 new in 2009**
- **Over 1,650 ISVs building applications for System z; 175 new in 2009**
- **Over 2,100 applications enabled on latest version of z/OS**

NORKOM TECHNOLOGIES

SAP

TEMENOS
The Banking Software Company

Worldwide adoption of mainframe curriculum

Students educated:
- Over 50,000 worldwide, 5,000 more students in China by 2010

University adoption:
- Over 600 schools enrolled globally
- 90% growth in 2 years; 2,000% since 2003; continued flow of schools adding curricula
- 50%+ outside of US

Summary

- We are delivering a New Generation of z software and hardware
- SOA and System z together, extend and leverage decades of massive business investments
- The z ecosystem now enables leap frogging to the Next Generation of Applications
- System z is being re-architected for Enterprise Data Serving
- It's all about the economies of scale and how System z capabilities and 'Quality of Service' makes a difference




System z: Free Offer to help you to reduce costs

Cost and risk analysis: mainframe vs. alternatives

- Tailored to individual customer needs
- Project preparation done within IBM
- Minimal client time investment: 1 day of on-site information gathering
- Quick results: Analysis and findings summary complete in 2 weeks
- Final analysis presentation