System z Server Strategy and Direction

How New Technologies Help You Deliver Smarter Systems

Tom Rosamilia – General Manager,

IBM Power and z Systems

March 8, 2011

Smarter Planet Solutions Increase Demands on IT

1.2 zettabytes (1.2 trillion gigabytes) exist in the "digital universe

- **50%** YTY growth
- **25%** of data is unique; **75%** is a copy

Internet connected devices **growing 42% per year**

32.6 million servers worldwide

- **85%** idle computer capacity
- **15%** of servers run 24/7 without being actively used on a daily basis

servers growing **6x per year**
storage growing **69x per year**
virtual machines growing **42% per year**

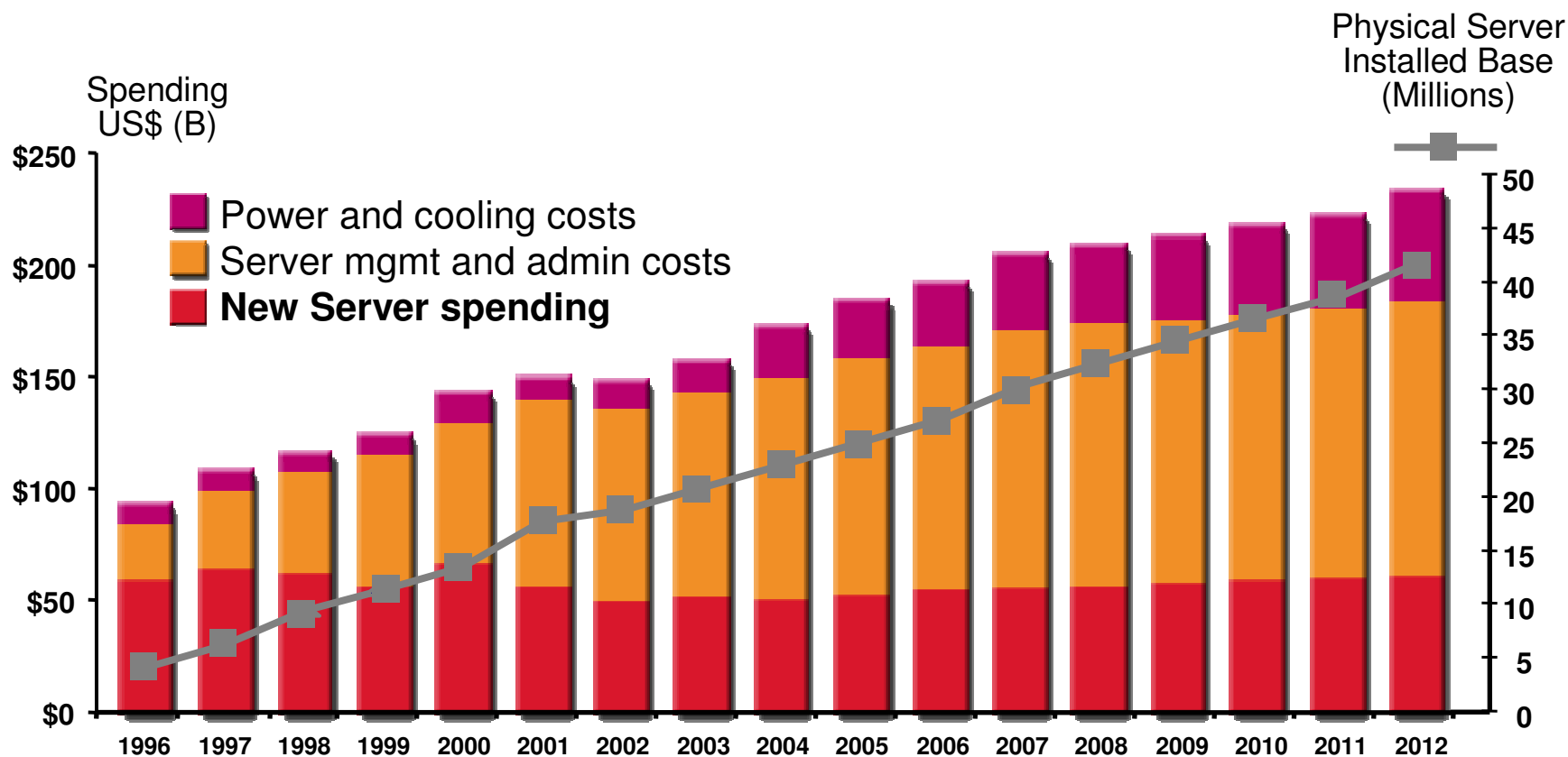Data centers have **doubled** their energy use in the past five years

- **18%** increase in data center energy costs projected

But IT budgets are growing less than 0.8% per year

IT Operating Costs are Out of Control

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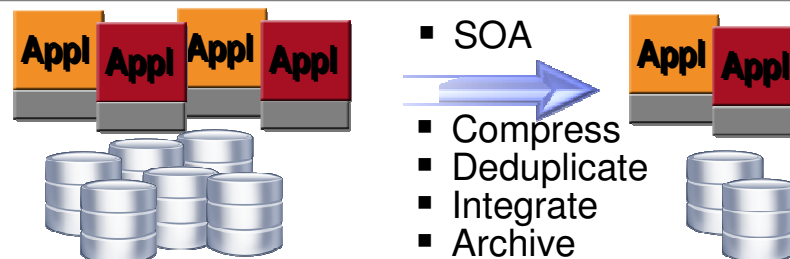Cooling and Management Administration**

Source: IDC

Strategies to Reduce Costs and Improve Value

Optimize the Overall IT Environment

Consolidate Hardware Infrastructure

Eliminate Redundant Software and Data

- SOA
- Compress
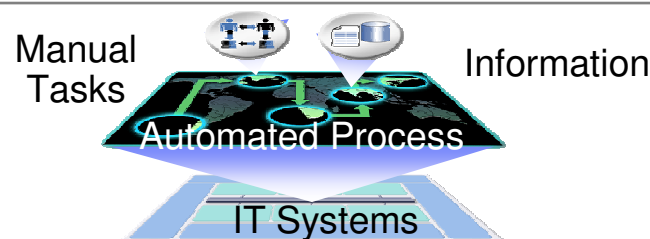- Deduplicate
- Integrate
- Archive

Improve Service Delivery

Integrated Service Management

Visibility   Control   Automation   Cloud Computing

Modernize the Enterprise

Manual Tasks   Information

Automated Process

IT Systems

Now we are entering the next era of computing.
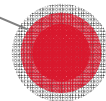
Big data

Cloud

Optimized systems

SMARTER COMPUTING

Strategies to Transform IT to Deliver Breakthrough Economics and Value

Twice the capacity on a flat budget

Applied to deliver new insights and drive innovation

Created by the integration of Big data in Optimized systems, managed as a Cloud

IBM Systems Provide an Ideal Foundation for Smarter Computing

System z	Power Systems	System x	IBM Storage
Freedom by Design	*Performance Redefined*	*Defining the Next Generation of x86 Servers*	*Storage Reinvented*
Achieve up to 55% lower TCO per workload – with hybrid computing	**Power Systems running DB2 as low as 1/3 the cost of Oracle Database***	**Industry leading Intel performance and lower management cost by 50%**	**Reduce power, operating and cooling costs by up to 60%**
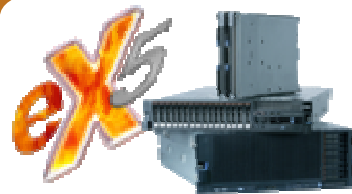
IBM's Integrated, Workload Optimized Systems Accelerate the Path to Smarter Computing

Tightly integrated appliances

- Up in 24 hours or less
- Wire speed processing
- Data security, 5x less time
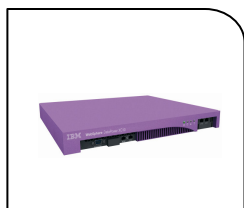
IBM WebSphere DataPower

IBM InfoSphere Guardium

IBM Netezza

Flexible integrated systems

- Deploy systems in days vs. months
- Reduce storage costs by 40%
- Lower energy consumption by 70-90%
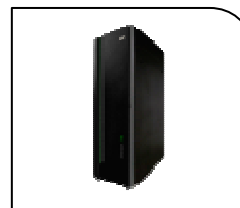
IBM Smart Analytics System

IBM Cloudburst

Source: Based on IBM internal studies

System z is Freedom By Design

INTEGRATE

- Large Scale Consolidation to integrate workloads

- Allianz consolidated 40 distributed workloads with investment pay back in less than 1 year

Allianz (logo)

▼

IBM Smart Analytics System 9600, Solution Edition & ELS

AUTOMATE

- Automate resource provisioning for dynamic user and workload requirements

- Central Bank of Russia reduced workload for technical staff by 85 percent

(Bank of Russia logo — БАНК РОССИИ)

▼

z/VM, Workload Manager, zManager for efficiency

SECURE

- Improve security of critical data

- Conway Freight pickup, delivery, tracking, payment and more are available online based on secure, reliable data managed by IBM System z

Con-way FREIGHT (logo)

▼

EAL5 Design, Cryptographic processing, Tivoli Secure

zEnterprise enables freedom to innovate, freedom to leverage and freedom to save

System z Improves IT Efficiency Across Industries*

44%
lower cost per
credit card transaction

31%
lower IT spend per
consumer loan

25%
lower cost per
mega watt hour produced

24%
lower cost per
hospital bed

20%
lower cost per
airline passenger

26%
lower cost per
new vehicle

25%
lower cost per
retail store

23%
lower cost per
barrel of oil

"… in the long run, the marketplace ***rewards those that make the optimum use of the right computing resources in the right way*** *as evidenced by business performance."*

-- * Dr. Howard Rubin, CEO and Founder Rubin Worldwide

IBM zEnterprise System

A System of Systems that unifies IT for predictable service delivery

IBM zEnterprise 196 (z196)

The Next generation of mainframe technology, more performance, more scale, more efficient

zEnterprise Unified Resource Manager

Centralized management of heterogeneous resources for simplification and resiliency

zEnterprise BladeCenter Extension (zBX)

Integrated IBM POWER7® blades, IBM x86 Blades* and High-performance optimizers and appliances

The Value Begins at the Heart of z196 …

Up to 40% Improvement for traditional z/OS workloads

Up to 60% Improvement for Linux workloads

30% Improvement in CPU intensive workloads via compiler enhancements

60% Total capacity improvement

1 to 80 configurable for client use
IFL, zIIP, zAAP, and ICFs
Up to 3 TB RAIM memory
15 subcapacity settings
Cryptographic enhancements
Optional water cooling and/or HV DC Power
Upgradeable from z10 EC and z9 EC

- Technology and Performance

- Enhanced Availability and Serviceability

- Workload Optimized Simplified Management

- Dynamic Energy optimized

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… and the Value Extends to Heterogeneous Workloads

IBM zEnterprise BladeCenter Extension (zBX)

Optimizers
- **IBM Smart Analytics Optimizer**
- **DP[1]**

Select IBM Blades
- **BladeCenter PS701 Express**
- **System x[1]**

- **Integrated IBM Certified Components**

- **System z support**

- **Expanding OS support for z196**

- **Simplified management**

One to four – 42u racks – capacity for 112 blades
No MIPS/MSU rating
Configured for high availability
Integrated 10Gbe data network
Optional rear door heat exchanger

… managed by the
zEnterprise Unified Resource Manager

POWER7™
BUILT ON
Power™

AIX®

Linux

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zEnterprise extends Service Management for Improved Governance

Service Management

| APP | APP | APP | APP | APP | APP |

MIDDLEWARE

MULTIPLE OPERATING SYSTEMS
e.g., z/OS, z/TPF, z/VSE, z/VM,
Linux on System z | AIX | Linux on System x [1]

Platform Management

VIRTUALIZATION – PR/SM, z/VM, PowerVM, System x Hypervisor

FIRMWARE

Hardware Management

| System z | POWER7 | IBM x86[1] | IBM Optimizers |

Unified Resource Manager

zEnterprise
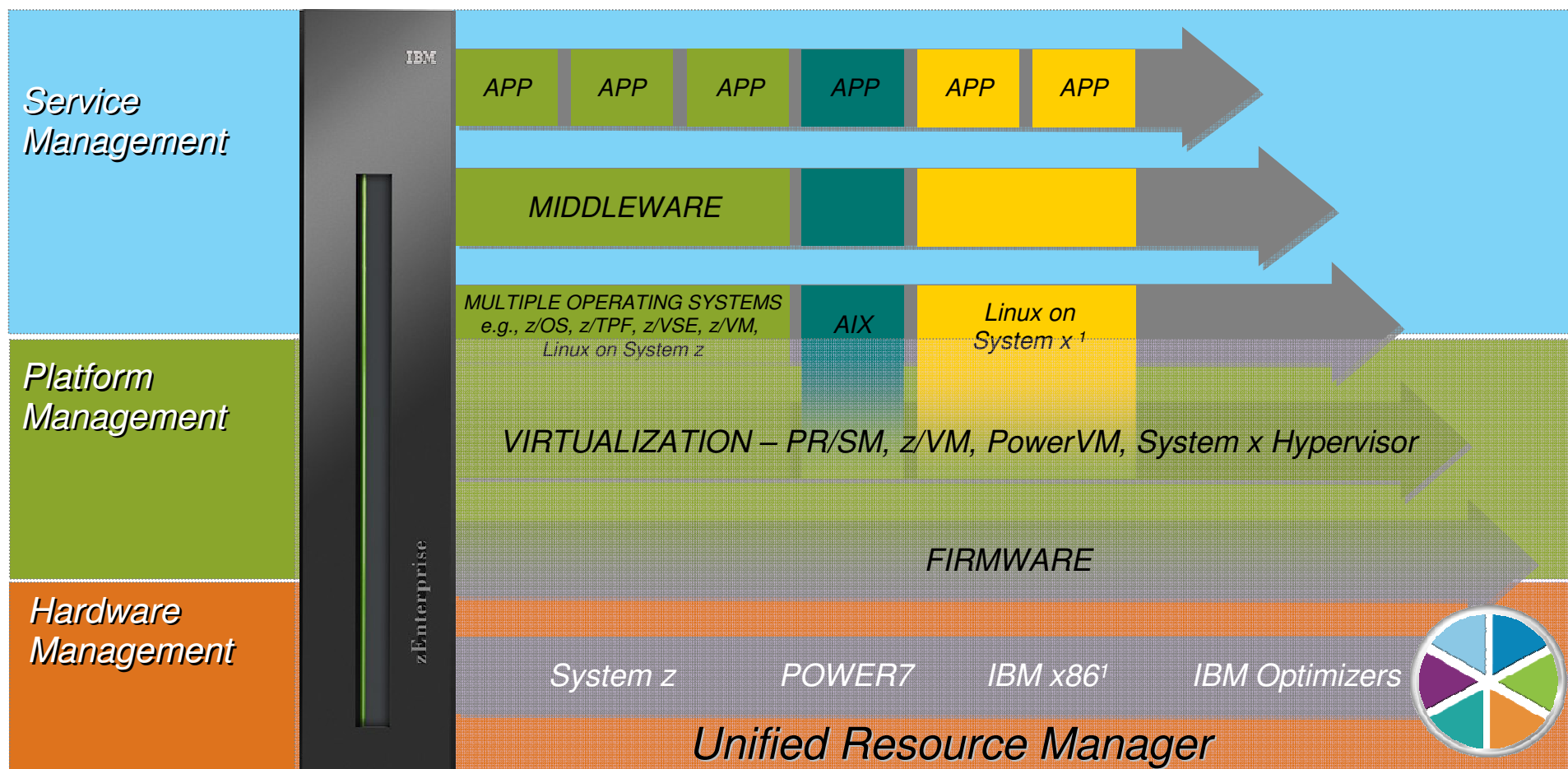
Focused, collaborative innovation
A "complete systems" approach

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1 All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represents goals and objectives only.

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IBM Smart Analytics Optimizer
Capitalizing on breakthrough technologies to accelerate business analytics

What is it?

The IBM Smart Analytics Optimizer is a workload optimized, appliance-like add-on that enables the integration of business insights into operational processes to drive winning strategies. It accelerates select queries, with unprecedented response times.

How is it different?

- **Performance:** Unprecedented response times to enable 'train of thought' analyses frequently blocked by poor query performance.

- **Integration:** Connects to DB2 through deep integration providing transparency to all applications.

- **Self-managed workloads**: Queries are executed in the most efficient way.

- **Transparency:** Applications connected to DB2, are entirely unaware of IBM Smart Analytics Optimizer.

- **Simplified administration:** Appliance-like hands-free operations, eliminating many database tuning tasks.

Faster insights for enabling new opportunities

WebSphere DataPower XI50 for zEnterprise (XI50z)

What is it?

The IBM WebSphere DataPower appliance integrated in the zEnterprise System, can help simplify, govern, and enhance the security of XML, Web and IT services by providing connectivity, gateway functions, data transformation, protocol bridging and intelligent load distribution.

HMC

zBX

XI50z

How is it Different?

- **Security**: VLAN support provides enforced isolation of network traffic with secure private networks. And Integration with RACF security

- **Tightly Integrated:** Integration into Sysplex Distributor for improved workload distribution and controls across all z operational images

- **Improved support:** Monitoring of hardware with "call home" for current/ expected problems and support by System z Service Support Representative

- **System z packaging:** Increased quality with pre-testing of blade and zBX. Upgrade history available to ease growth. Guided placement of blades to optimize.

- **Operational controls:** Monitoring rolled into System z environments from single console. Time synchronization with System z. Consistent change management with Unified Resource Manager

Providing fast and flexible application integration
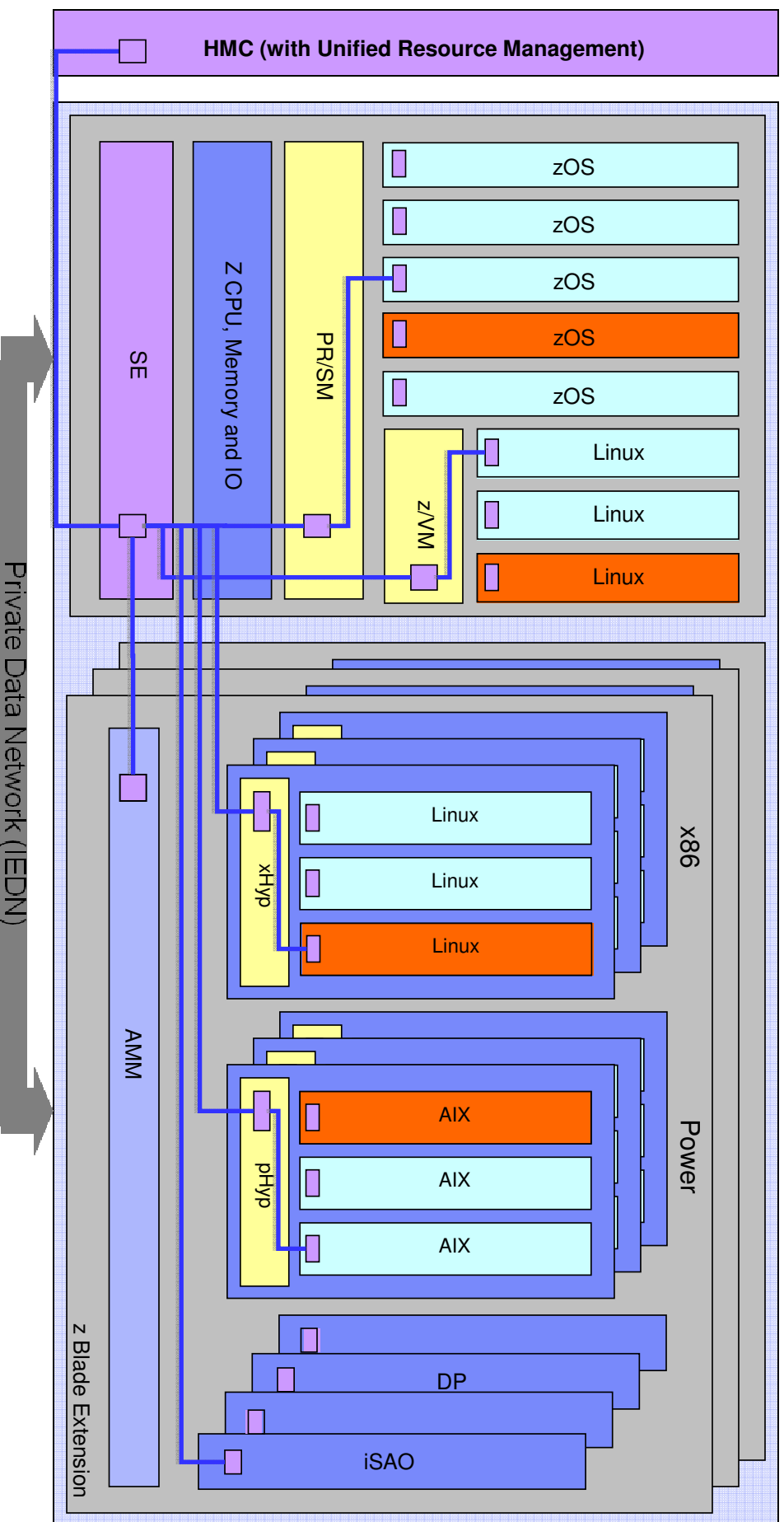
Putting zEnterprise System to the Task

Service Management and Reporting (Deployment, Performance, Availability, Security, Energy)

HMC (with Unified Resource Management)

Private Data Network (IEDN)

SE

Z CPU, Memory and IO

PR/SM

zOS
zOS
zOS
zOS
zOS

zVM

Linux
Linux
Linux

z Blade Extension

AMM

xHyp

Linux
Linux
Linux

x86

pHyp

AIX
AIX
AIX

Power

DP

iSAO

The IBM zEnterprise System
Lowering the cost of <u>distributed</u> workloads through optimal platform selection
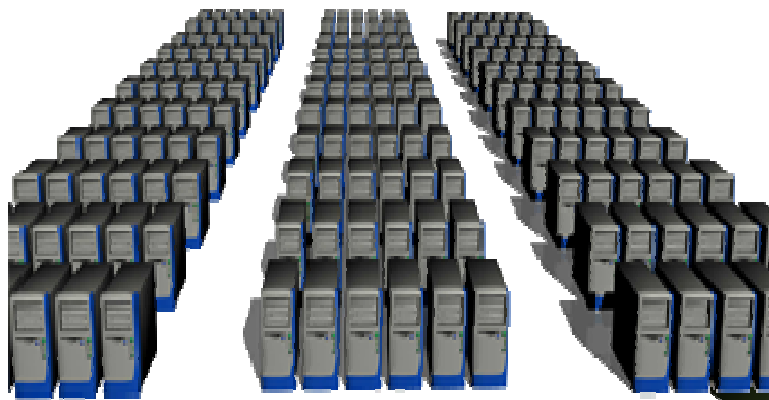
Current data center:

Distributed workloads on a variety of Intel servers, connected to a System z

Optimize distributed work on zEnterprise with Linux on System z, POWER7 blades and Intel blades with Unified Resource Manager

Lower cost of acquisition by up to **56%***

Reduce cost of ownership by up to **55%***

Reduce network complexity by up to **98%***

* Based on IBM analysis of a large Financial Services company Datacenter. See details on ibm.com/systems/zenterprise

System z – Integrated Workloads
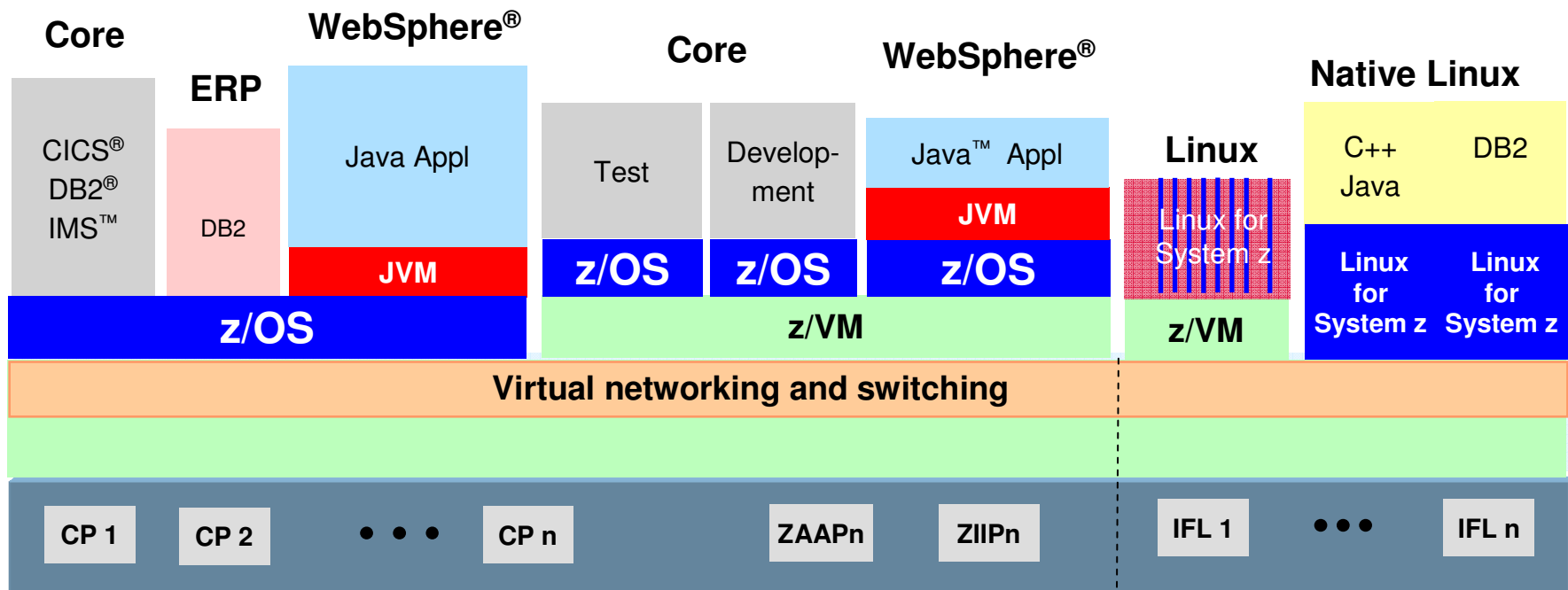
- **Massive, robust consolidation platform**
- **Virtualization is built in**
- **100's to 1000's of virtual servers on z/VM**
- **Intelligent and autonomic management of diverse workloads and system resources**

zEnterprise Enables Critical Computing for Many Industries

Banking	Insurance	Retail	Healthcare	Public Sector
Core Banking	Claims Processing	On-line Catalog	Patient Care Systems	Electronic Tax
Wholesale Banking – Payments	Policy Sales & Management (e.g. Life, Annuity, Auto)	Supply Chain Management	On– line Claims Submission & Payments	Web based Social Security
Customer Care & Insight	Internet Rate Quotes	Customer Analysis		

Telcel: Manages Massive Growth

- Mexico's largest provider of wireless telephony services

- Massive jump in year-on-year post-paid transaction volume

- Consolidated distributed systems to zEnterprise System and upgraded processing engines

- Implemented disaster recovery system

telcel

Needs data center to grow with business

- Business strategy change to meet customer demand

- Ability to manage growth and extend to hybrid environment

Senegal: Transforms Import/Export Process

- Forms the government budget, stimulates the economy and controls finances.

- Limited IT access across the country 30 border checkpoints

- Increased system performance 70 percent; reduced power consumption 20 percent; cut operating costs 30 percent

Needs upgraded process to ensure work is done accurately and efficiently

- Geographically dispersed systems

- Customs officers have access to real-time information to ensure improved management of customs processes

Ministère de l'Economie et des Finances

République du Sénégal

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New Companies are Migrating to the Mainframe

61 New Accounts in 2010

- **40%** growth markets
- **60%** major markets
- **50%** running Linux
- **Majority installed Business Class technology**
- **Across all industries**

Russia's Comepay: New Infrastructure in Emerging Economy

- Operates 24/7 self-service payment kiosks for internet, digital TV, mobile phones and utilities – 200 kiosks in 11 regions of Russia

- Business expansion strategy will result in three-fold increase in transactions, from 10,000 to 30,000 per second

- Consolidating OLTP, OLAP, customer portal, bookkeeping database and other services on Linux on mainframe

Needs flexibility to adjust workloads without downtime

- Large amount of unstructured data

- Reduce IT costs to pay for itself in just over a year

Payment Solution Providers: The New Generation of Processing on System z

- An industry leader specializing in business consulting, smart-card solutions, e-payment networks and the integration of financial transaction processing systems

- Rapid growth required the payment switch platform to transform into a more robust and reliable environment

- Migrating from an Oracle on Intel platform to a highly secure System-z based solution

Needs high-transaction payment switch

- Ability to accept millions of transactions each day
- Provides ideal environment for cloud services

Fit-for-Purpose Private Cloud on zEnterprise
Dramatic Reduction in Costs

**Cost per Workload
(US$)**

$191K

**72% lower
overall TCO**

$78.6K

■ Public cloud

$70.5K

■ Private cloud with
zEnterprise

$42K

$11.6K

$4.5K

Light Intel
Workloads

Heavy UNIX
Workloads

Workloads with
Heavy I/O
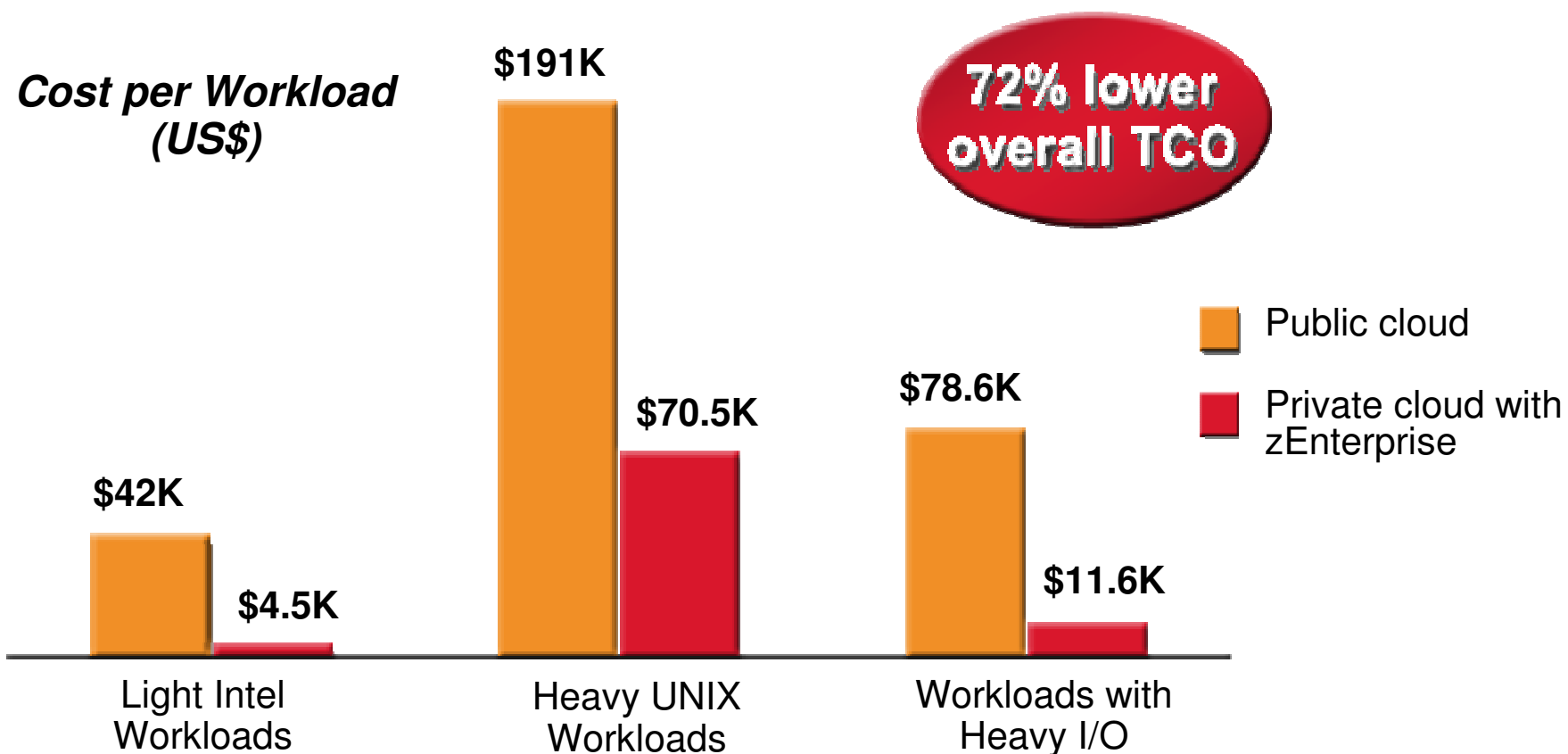
Cloud Solution Manages 6M Merchant Locations

- Makes payment transactions for merchants, financial institutions and its customers

- Needed to share resources and business data to process 60 billion transactions

- zEnterprise-based cloud solution with IBM software, services and financing
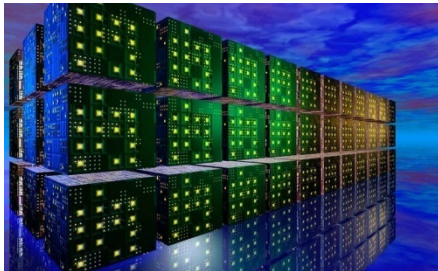
Needs simplified management

- Manage data from more than 6 million merchant locations

- Process transactions up to 70 percent faster

The Most Efficient Platform for Large-Scale Consolidation
Linux on zEnterprise
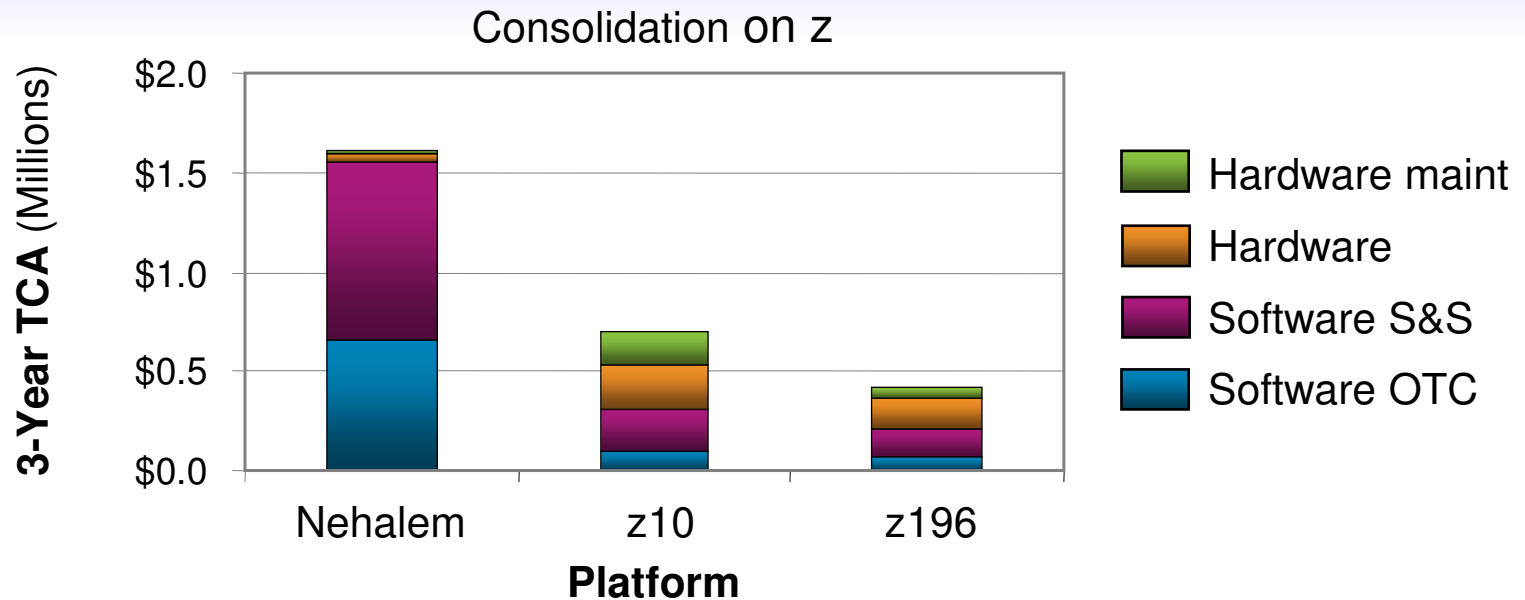
- Lower acquisition costs of hardware and software vs. distributed servers*

- Less than **$1.00/day** per virtual server (TCA)*

- Reduce floor space by up to **90%** compared to distributed servers*

- Reduce energy consumption by up to **80%** compared to distributed servers*

Example: **Consolidate 40 Oracle server cores to 2 Linux engines on zEnterprise**

Consolidation on z

Chart: 3-Year TCA (Millions) vs Platform

Y-axis: $0.0, $0.5, $1.0, $1.5, $2.0

X-axis platforms: Nehalem, z10, z196

Legend:
- Hardware maint (green)
- Hardware (orange)
- Software S&S (magenta)
- Software OTC (blue)

Why are Clients Consolidating to System z?

Workloads run on Linux on System z
(Base: Running Linux on the Mainframe)

Workload	4Q10 (n=35)	4Q09 (n=37)
OLTP	57%	49%
Web Serving	54%	57%
Application Development	51%	68%
Systems Management	49%	43%
Batch	43%	54%
Networking	43%	43%
Security	37%	38%
Data Warehousing	37%	24%
File & Print	31%	46%
Data Analysis	29%	27%
Proxy Caching	14%	16%
CRM	14%	11%
Email	9%	19%
Workgroup	9%	16%
ERP	9%	16%
Scientific/Engineering	6%	11%
Streaming Media	3%	5%
Other workload type	20%	24%
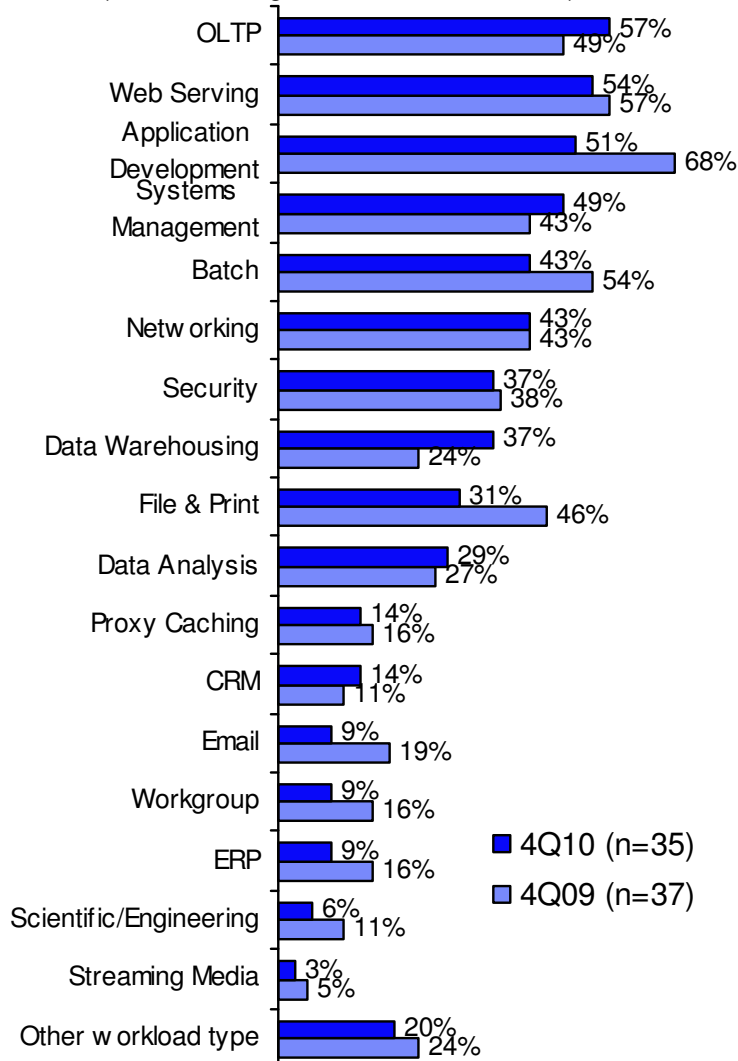
Surveys indicate IBM System z customers use Linux for:

- Web Serving
- Systems Management
- OLTP
- Application Development

"Best Fit" Workloads for Linux on System z:

Business connectors: WebSphere MQSeries, DB2 Connect, CICS Transaction Gateway, IMS Connect for Java

Business critical applications: e.g. SAP

Development of WebSphere and Java applications

WebSphere Application Server (WAS)

Email & collaboration: Domino, Web 2.0

Network Infrastructure: FTP, NFS, DNS, etc. and Comm Server and Communications Controller for Linux, CommuniGate Pro (VoIP)

Data services: Cognos, Oracle, Informix, Information Builders WebFOCUS

Applications requiring top end disaster recovery model

Virtualization and Security Services

Source: IBM Market Intelligence

Bank of New Zealand: Consolidates and Goes Green

- Services individuals, farmers and businesses with their financial pursuits

- At-capacity data center that needed to grow, reduce emissions and costs and become more open

- Consolidated 200 Sun servers into just one mainframe running Linux

bnz

Needs carbon neutral data center

- Maximize space while keeping costs down.

- Reduces datacenter footprint by 30%, reduces heat output by 33%, carbon footprint by 39%, and expects a 20% ROI

TD Ameritrade: Modernizes to Linux on System z

- Provides online brokerage services to self-directed investors

- Consolidate and modernize a crumbling infrastructure

- Move production and disaster recovery data centers

Needs reliable, scalable and secure data center

- Remove 6,000 old servers and install 2,000 new, including four System z mainframes running Linux

- Implemented real-time incident and asset management

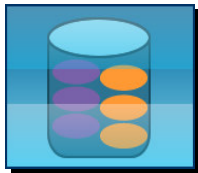- Increased online capacity four times

Enterprise Modernization
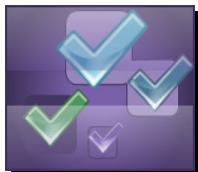
Web Services

Business Process Management

Rules

Enterprise Service Bus

Events

CICS TS 4.1

IBM Services
Help get the most for your business from the zEnterprise System

## Assess and design an IT architecture to optimize for business advantage

- Develop a business case and high level transition plan

- Fit-for-purpose analysis

- Deliver a roadmap for an adaptable and efficient infrastructure that integrates IT and business strategy and priorities

Build and run a smarter system with services for zEnterprise

- Migrate effectively and efficiently to zEnterprise environment.

- Create a more cost-effective and manageable computing environment with server optimization, integration, and implementation services

- Enhance and simplify cross-platform high availability

- Effectively run and manage zEnterprise with maintenance and technical support services

Marketplace Momentum

System z Install Base

Total Installed Capacity

YE03-YE10
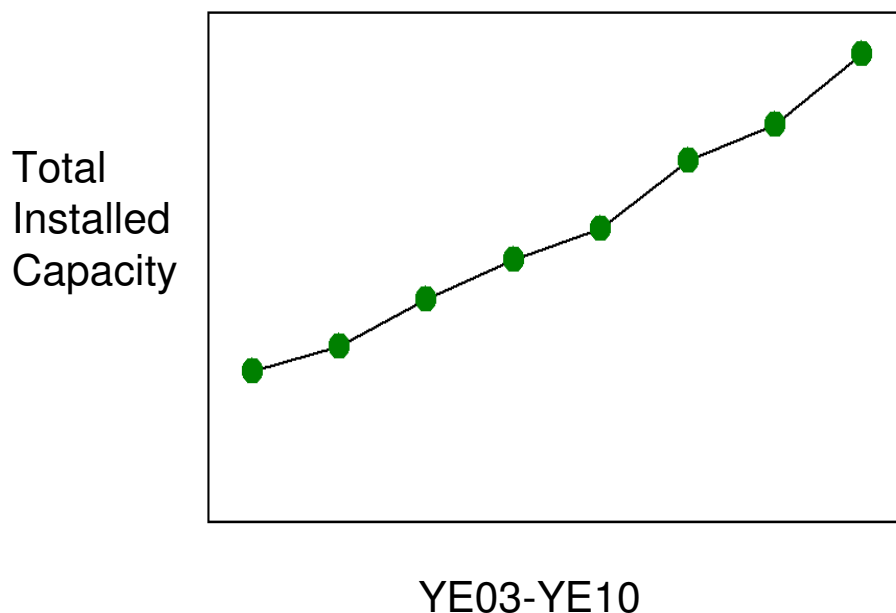
> " IBM handily claimed the server market share lead in the fourth quarter as **the company rode its new mainframe and** Power7 systems, according to Gartner. "
>
> – ZDNet, 25 Feb. 2011

> " **IBM has once again made a hit with the mainframe**, as Big Blue's Systems and Technology Group saw revenues increase 21 percent overall and mainframe sales rise nearly 70 percent in Q4 of 2010. "
>
> – *eWeek, 25 Jan. 2011*

58 percent MIPS growth in 4Q10 – the highest growth in a decade

percent year to year revenue growth in 4Q10 – the best growth in the last decade **69**

Thriving System z Ecosystem

System z Linux:
*Fastest growing
server platform*

- Installed Linux MIPS growth of 42% CAGR (2004-2010)

- Shipped IFL engine volumes increased 34% (4Q09 to 4Q10)

- 64 of the top 100 System z clients are running Linux on System z

- 32% of System z clients have IFLs installed

- Linux represents 19% of the System z install base capacity

*Thousands of ISVs
investing in
System z platform*

As of 2010:

- More than 7,000 applications are supported on z/OS and Linux on System z

- 3,250+ Linux applications are supported on System z:

- 4,000+ applications are enabled on z/OS

- There were 1,200 new and upgraded applications on System z in 2010, with 120+ new ISV partners added to the platform.

*Worldwide adoption of
mainframe curriculum*
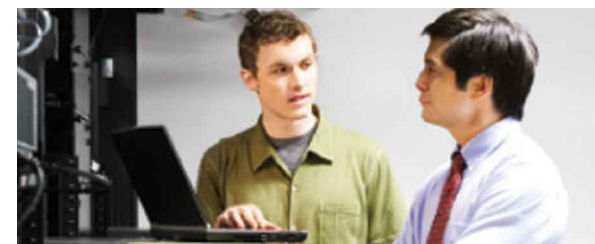
University adoption:

- 814 schools enrolled globally, 50%+ outside of US

- Continued flow of schools adding curricula

- 32,941 students from 17 countries have participated in Master the Mainframe contests since 2005

Introducing **SystemzJobs.com**

The IBM System z Job Board at **SystemzJobs.com** is a new resource to connect IBM System z clients, partners, and businesses with students learning the mainframe and professionals seeking System z job opportunities.

SystemzJobs.com lets you post your job requirements for job seekers to review and apply.

Benefits of using SystemzJobs.com

- Free, secure, and easy to use
- Specialized audience of mainframe educated students and experienced professionals
- Global pool of mainframe talent

Getting started

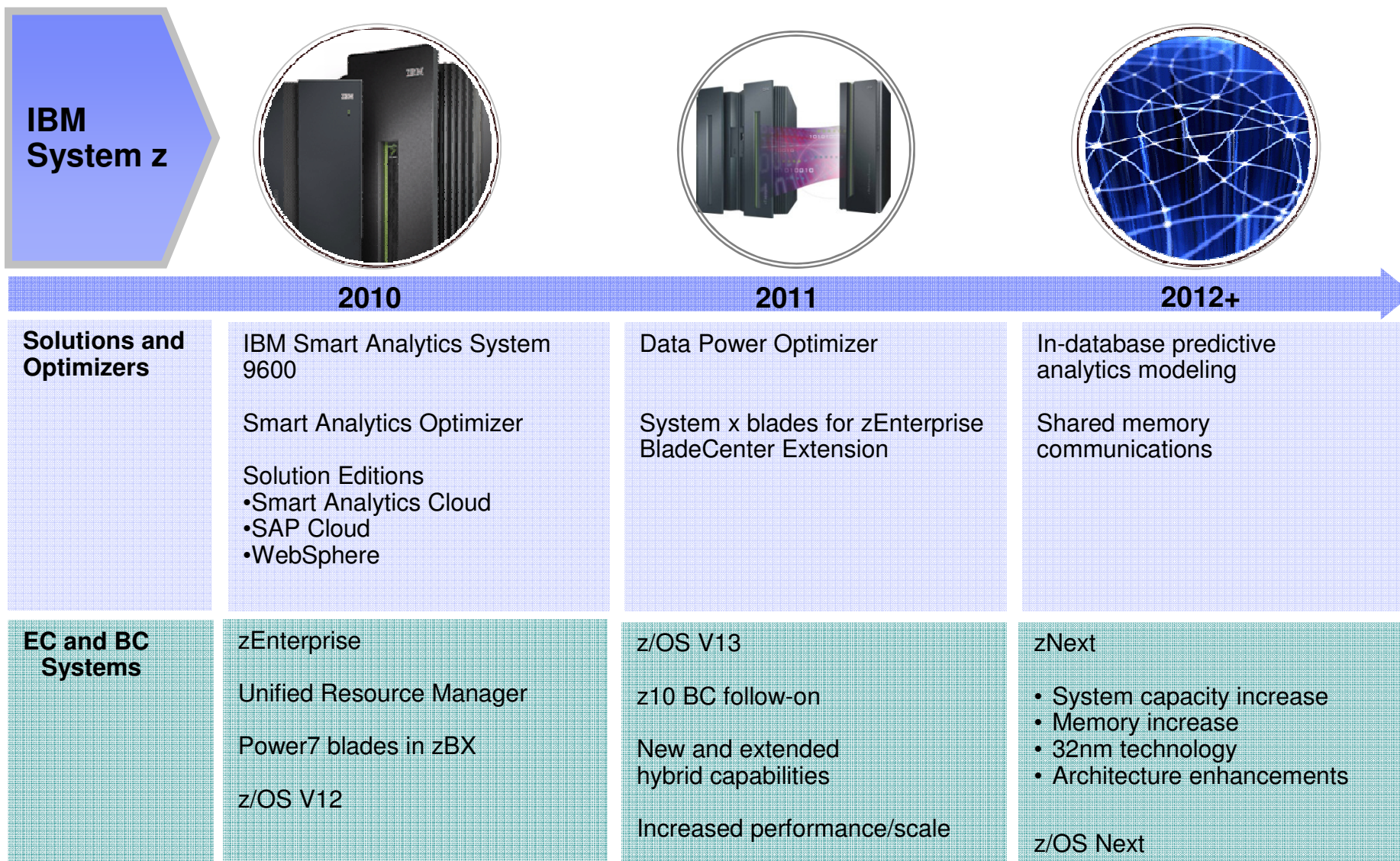**Follow these steps at SystemzJobs.com to get started:**

1. Create a secure account
2. Post your job description
3. Connect with qualified candidates
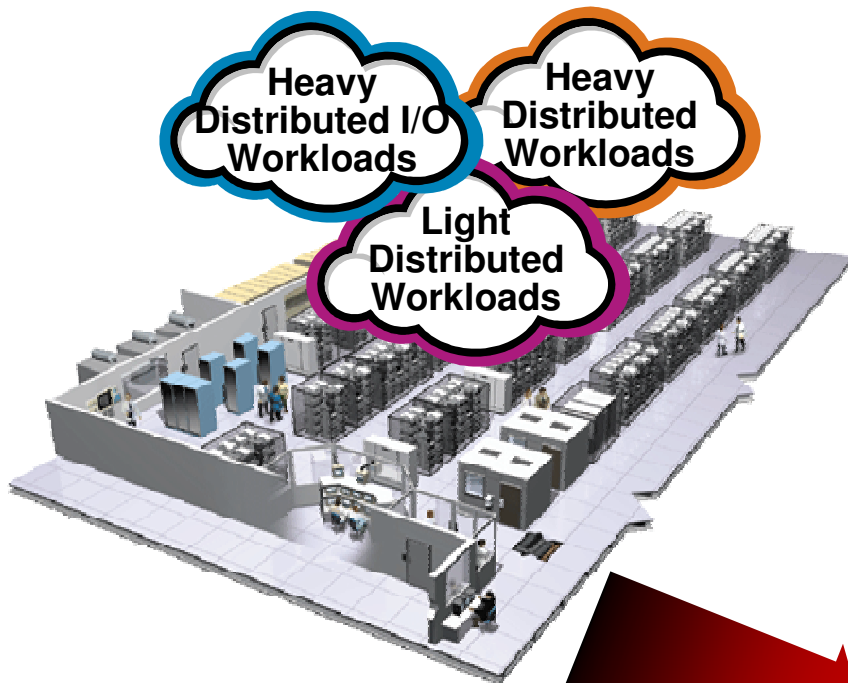
Sponsored by the IBM Academic Initiative, System z

Visit: **ibm.com**/university/systemz

Questions? Contact zSkills@us.ibm.com

System z Future Direction

IBM System z	2010	2011	2012+
Solutions and Optimizers	IBM Smart Analytics System 9600 Smart Analytics Optimizer Solution Editions •Smart Analytics Cloud •SAP Cloud •WebSphere	Data Power Optimizer System x blades for zEnterprise BladeCenter Extension	In-database predictive analytics modeling Shared memory communications
EC and BC Systems	zEnterprise Unified Resource Manager Power7 blades in zBX z/OS V12	z/OS V13 z10 BC follow-on New and extended hybrid capabilities Increased performance/scale	zNext • System capacity increase • Memory increase • 32nm technology • Architecture enhancements z/OS Next

zEnterprise is a Roadmap to the Data Center of the Future

- Lowest cost per unit of work for large scale workloads

- Revolutionary cost reductions for smaller scale workloads

- Data center simplification

- Improve quality of service

- *No Other Platform Can Match!*

Heavy Distributed I/O Workloads

Heavy Distributed Workloads

Light Distributed Workloads

Mainframe workloads

+

distributed workloads best fit for cost

Thank you.