System z Server Strategy and Direction: Delivering on the Promise of Smarter Computing

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Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

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As our planet becomes smarter

We are seeing dramatic shifts that are changing the way the world works … both business and society

- 3 million new blog posts a day
- 10 billion tweets a year
- 3.5 billion pieces of content per week

Nothing is changing more than IT …

- The way it's accessed … ubiquitously
- The way it's applied … for insight
- The way it's architected … integrated & flexible

The demands placed on the data center have never been greater

32.6 million servers worldwide

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

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

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

Between 2000 and 2010

- servers grew **6x** ('00-'10)
- storage grew **69x** ('00-'10)
- virtual machines grew **51% CAGR** ('04-'10)

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

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

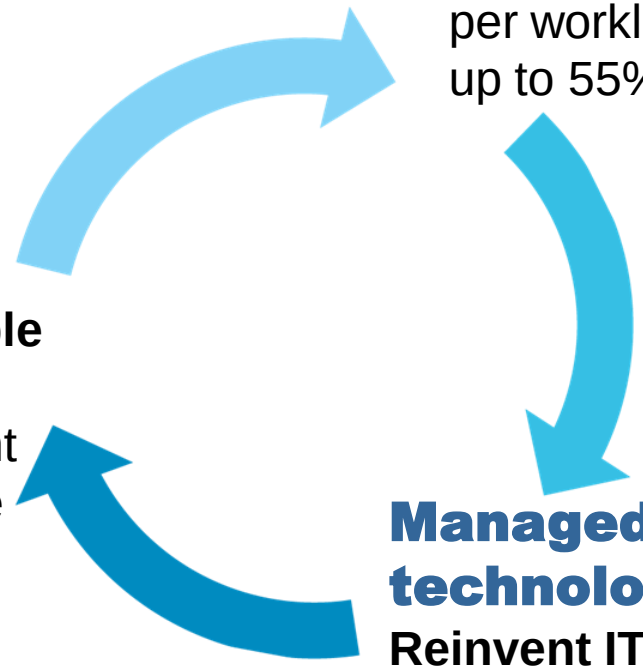
Internet connected devices **growing 42% per year**

Since 2000 security vulnerabilities grew **eightfold**

… while IT budgets are growing less than 1% per year.

Smarter computing:
The IT infrastructure that enables a smarter planet

Doing More for Less



Tuned to the task

Drive greater performance and improve IT economics: total cost per workload can be reduced up to 55% with Optimized Systems

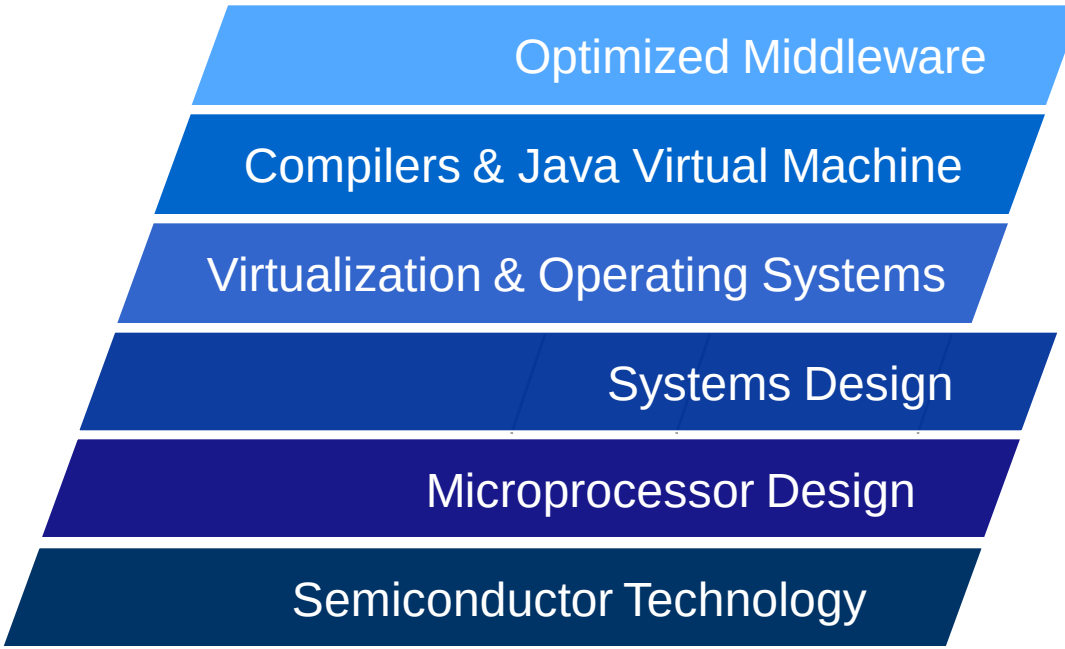
Managed with cloud technologies

Reinvent IT: 60% of CIOs plan to use cloud technologies and 55% of business executives believe cloud enables business transformation

Designed for data

Harness all the available Information: 89% of CEOs want better insight via business intelligence and analytics

Tuned to the task: Elements required to design an optimized system



Domain Knowledge

- Workload characteristics
- Workload interdependencies
- Architecture options

Software

- Full stack integration
- Middleware tuned for hardware
- Integrated management across architectures

Hardware

- Multi-core architectures
- Advanced threading
- Low latency

Optimized Systems offer architecture choices, help drive down cost per workload and improve performance

System z

Power Systems

System x

System Storage

Shared Elements

Systems Software

System Networking

IBM zEnterprise System: Capabilities for smarter computing

An integrated system of systems that delivers freedom by design.

Designed for data

Integrates operational data and advanced analytics …

… to deliver actionable insight within a timeframe that matters.

Tuned to the task

Consolidates workloads and collapses infrastructures…

… to deliver superior economics to the business.

Managed with cloud technologies

Flexible delivery of high quality services…

… for the convergence of enterprise computing and cloud computing.

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

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**

… and extends to heterogeneous workloads

IBM zEnterprise BladeCenter Extension (zBX)

- **Integrated IBM Certified Components**
- **System z support**
- **Expanding OS support for z196**
- **Simplified management**

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

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

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

Transforming the way resources are managed and deployed

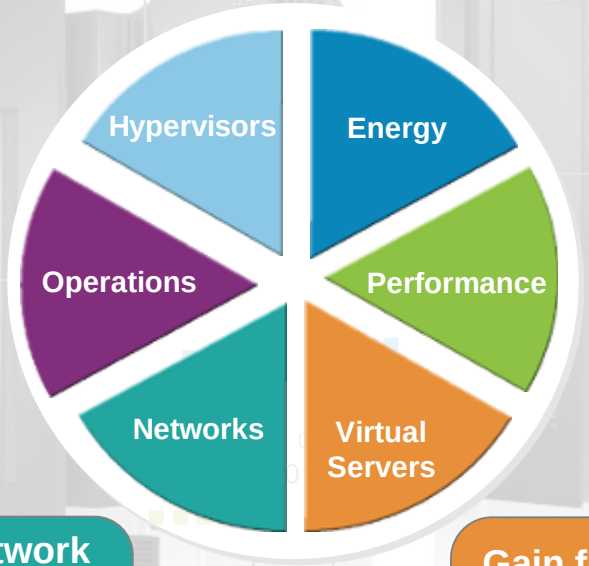
Workload awareness to optimize the system resources

Simplified installation of hypervisors

Energy cost savings

Save time, cost and simplify asset management

Improve and simplify cross-platform availability procedures



Allow critical workloads to receive resources and priority

Smart business adjustments based on workload insight

Factory installed and configured network

Improved network security with lower latency, less complexity, no encryption/ decryption

Gain flexibility, consistency and uniformity of virtualization

Provide the business with faster time to market

Clients are realizing the value of System z and hybrid computing

65+ BladeCenter Extension units

350+ blades shipped

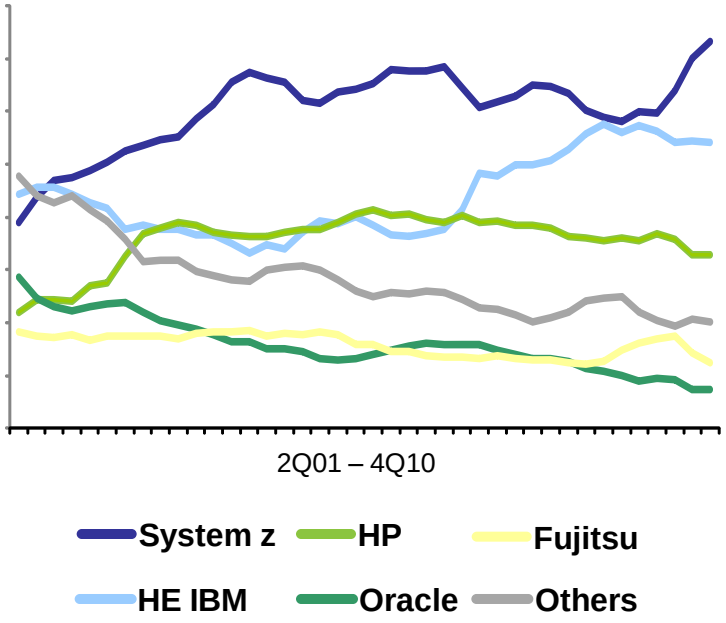
An IBM Benchmark validated the benefit of zEnterprise running POWER7 blades for an Italian client's SAP workload – moving from **60K bills per hour to 430K bills per hour.**

"When we confirmed that the z196 met our needs very well, we ordered our own two z196 systems—each with one zBX [IBM zEnterprise BladeCenter Extension]—with a great deal of confidence."

– Per Johansson, Senior Manager, Mainframe Global Infrastructure & Operations, Volvo Information Technology

IBM System z marketplace momentum

IDC: 1Q11 R4Q WW
$250K+ Server Share*



> … IBM's System z solutions continue to play **integral roles in existing and emerging enterprise cloud computing** environments for many years to come.
>
> ***– Charles King***

> From its groundbreaking mainframe architecture to its cutting edge cross platform integration, zEnterprise™ represents a **radical departure from computing as usual**.
>
> ***– Ptak, Noel & Assoc.***

86 **percent MIPS growth in 2Q11** – culminating in the **best four-quarter period** in the past five years

61 **percent year to year revenue growth in 2Q11** – the strongest 2Q growth in the last decade

* Source: IDC Server Tracker 1Q11

Extending the hybrid model

zEnterprise 196

- New I/O subsystem for improved system connectivity and performance
- Security enhancements

zEnterprise Unified Resource Manager

- Plan to deliver APIs to enable management of Unified Resource Manager from external tools*

zEnterprise BladeCenter Extension (zBX)

- Introduction of select System x® blades into zBX
- Broaden application support and integration
  - Linux on System x
  - Windows on System x*

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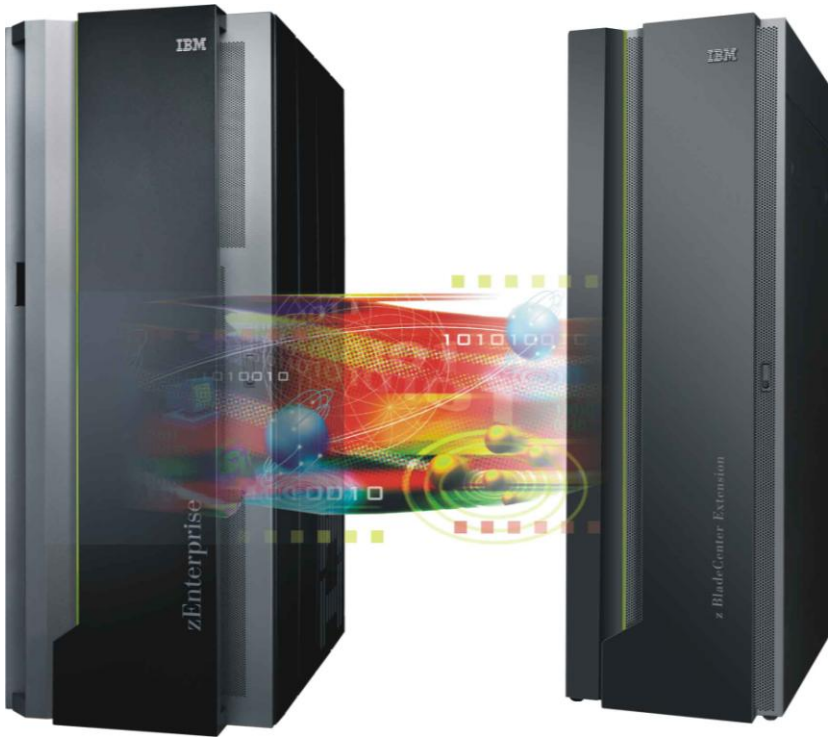
Bringing the benefits of hybrid computing to more clients

Introducing the IBM **zEnterprise 114 (z114)**

- Priced, packaged and performance for the mid-sized enterprise
- Lower-cost entry point for z114*
- Extreme granularity to best fit existing and new workloads
- Built to support future data center design, modernization and efficiencies
- Investment protection with upgradeability from z9 BC and z10 BC™ and to z196 M15



Bringing the strengths and capabilities of the IBM zEnterprise in a package designed for mid-sized businesses

*Price will vary by country

zEnterprise technology designed for small and mid-sized businesses

zEnterprise 114 (z114)

Machine Type: 2818

2 Models: M05 & M10

New technology in a new package

- Modular two-drawer design for lower cost of entry
- Granularity for right-sizing your system
- Additional scale for consolidation and growth
- Improved data center efficiency
- Same qualities of service as the z196
- Hybrid enabled to drive workload expansion and integration

Improved Platform Economics

- New software curve
- Lower hardware maintenance
- Lower specialty engine and memory prices
- Upgradeability for investment protection

Up to **18%** Improvement for traditional z/OS workloads [1]

Up to an ADDITIONAL **25%** Improvement in CPU intensive workloads via compiler enhancements[2]

Up to **12%** Total capacity improvement [1]

Scales From **26 - 3100** MIPS

Up to **130** available capacity settings

From **1-10** configurable cores for client use includes CPs, IFL, zIIP, zAAP, and ICFs

From **0-2** IBM provided spare cores

Up to **256** GB RAIM fault tolerant memory

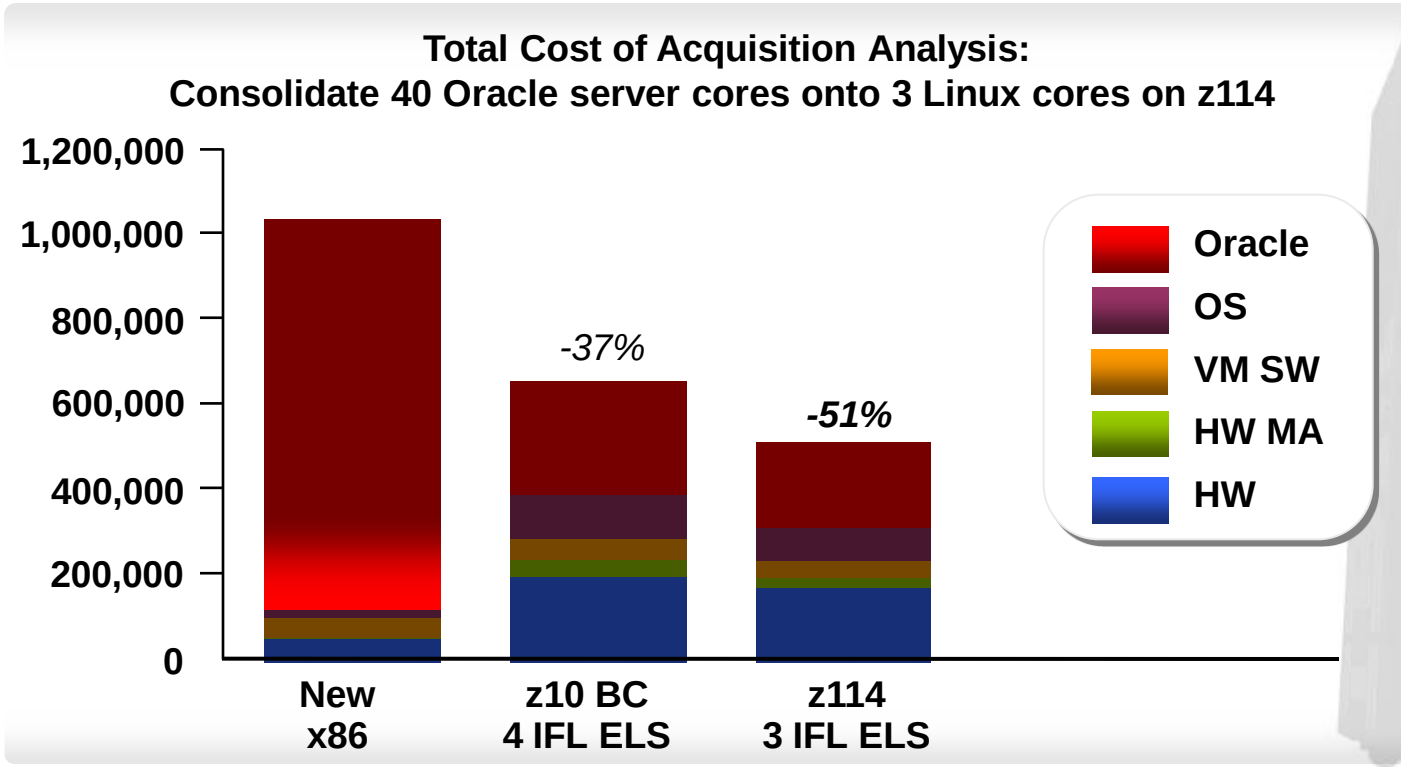
Fully Upgradeable from the IBM System z10 Business Class™ (z10 BC) & IBM System z9® Business Class (z9 BC); and to the z196 M15

[1]Relative capacity and performance compares at equal software levels as measured by IBM Large System Performance Reference (LSPR) workloads using z/OS® 1.11, Results may vary

[2]The z114 will exhibit up to 25% increase for CPU intensive workload as provided by multiple C/C++ compiler level improvements when going from z/OS 1.09 to z/OS 1.12

Consolidate and reduce costs with Linux

- Consolidate an average of **30 distributed servers** or more on a single core, or **hundreds** in a single footprint.
- Deliver a virtual Linux server for approximately **$500 per year** or as little as **$1.45 per day per virtual server** (TCA)[1]



[1] Based on US Enterprise Linux Server pricing. Pricing may vary by country. Model configuration included 10 IFL cores running a mixed workload averaging 31 virtual machines per core with varying degrees of activity. Includes zEnterprise hardware and z/VM virtualization software. Does not include Linux OS or middleware software.

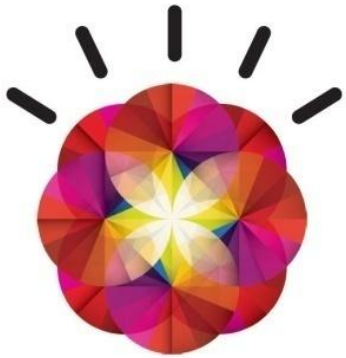
[2] Distributed server comparison is based on IBM cost modeling of Linux on zEnterprise vs. alternative distributed servers. Given there are multiple factors in this analysis such as utilization rates, application type, local pricing, etc., savings may vary by user.

New offerings to help deliver smarter computing

Designed for data

NEW! IBM Smart Analytics Optimizer V1.2 (preview)

- Incorporating Netezza technologies to further expand number of queries that benefit from this optimizer model



Tuned to the task

NEW! Tivoli Integrated Service Management for System z API Support (SOD)*

- Enhanced portfolio exploiting new zEnterprise HMC interfaces

Managed with cloud technologies

NEW! Cloud and Lifecycle Management for zEnterprise

- Cloud benefits through standardization, automation and virtualization of services

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Get started and realize value quickly

1. Consider acquisition opportunities

IBM zEnterprise 114 financing offer

Acquire z114 today – defer payments until 2012.

2. Get started on an implementation

zEnterprise set-up and migration services

Accelerate the adoption of zEnterprise System technology and realize the value sooner.

3. Migrate your competitive workloads

zEnterprise BladeCenter Extension offer

Realize the full benefits of the zEnterprise System by replacing HP blades with up to six, free zBX Power or System x blades.

4. Integrate IBM storage

IBM DS8000 BC is ideal for z114 workloads

Implement the unparalleled availability of the DS8800, with an attractive entry price point.

System z improves IT efficiency across industries.*

44%
lower cost per credit card transaction

20%
lower cost per airline passenger

31%
lower IT spend per consumer loan

26%
lower cost per new vehicle

25%
lower cost per mega watt hour produced

25%
lower cost per retail store

24%
lower cost per hospital bed

23%
lower cost per barrel of oil

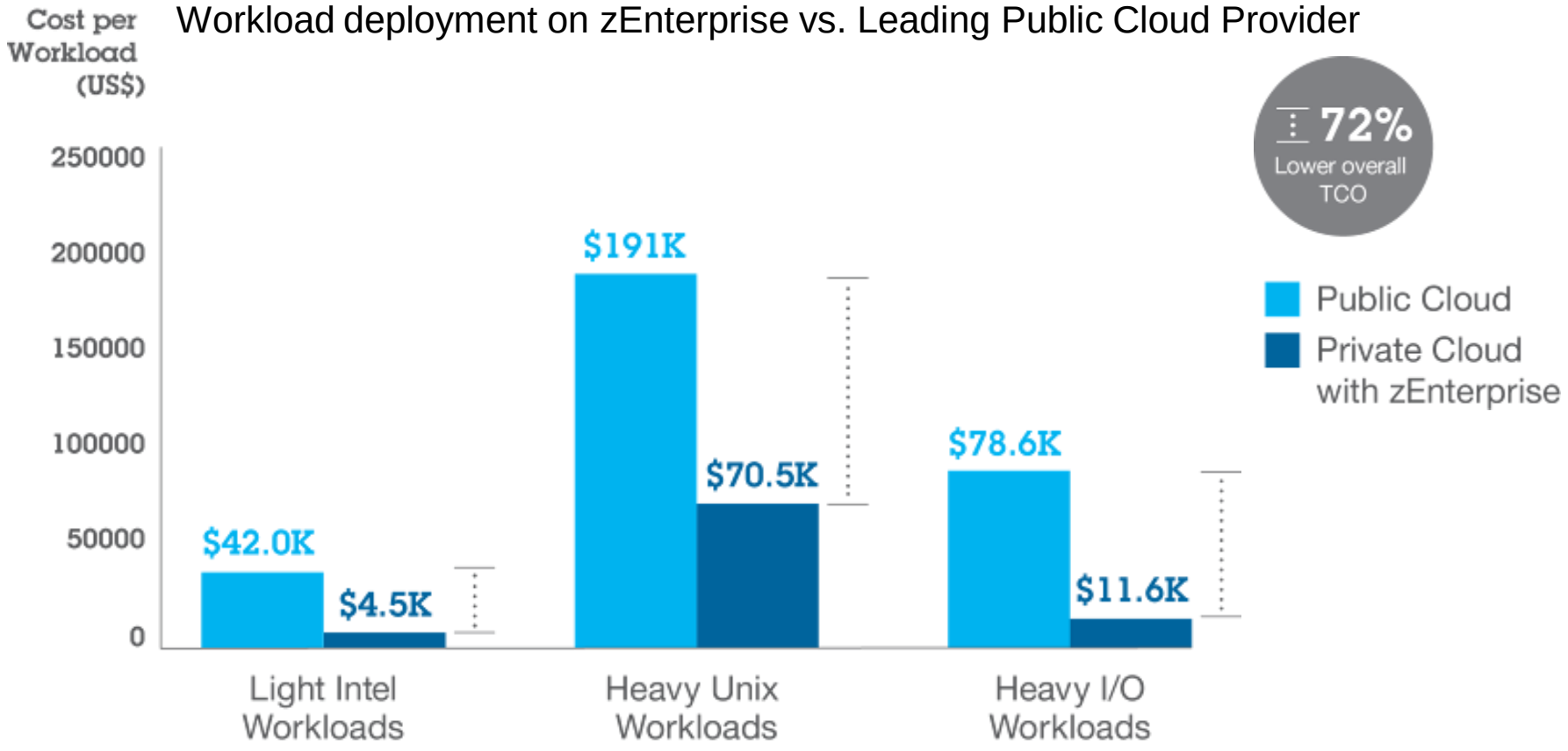
*Based on Dr. Howard Rubin Study

Tuned to the task: zEnterprise excels in key workload areas

	IT Optimization, Consolidation & Cloud	Enterprise Modernization	Multi-Tier Applications & Workloads	Business Intelligence & Analytics
Challenge	Complexity in managing distributed environments and need to reduce IT costs	Modernize the mainframe environment	SAP (or other multi-tier applications) for core business processes that have the database tier on z and application tier on a distributed platform	Too many source data points for transactions and analytics
Value	▪ Cloud in a box ▪ Fit for-purpose architecture ▪ Lower TCO	▪ Reduce risk, cost ▪ Rapid deployment ▪ Hybrid computing	▪ Eliminate silos ▪ Improve management / operations ▪ Reduce cost ▪ z qualities of service	▪ Single source of data ▪ Optimized queries – without application changes

IT optimization, consolidation & cloud

Workload deployment on zEnterprise vs. Leading Public Cloud Provider



Source: Based on IBM internal studies

Enterprise modernization

Web Services

Business Process Management

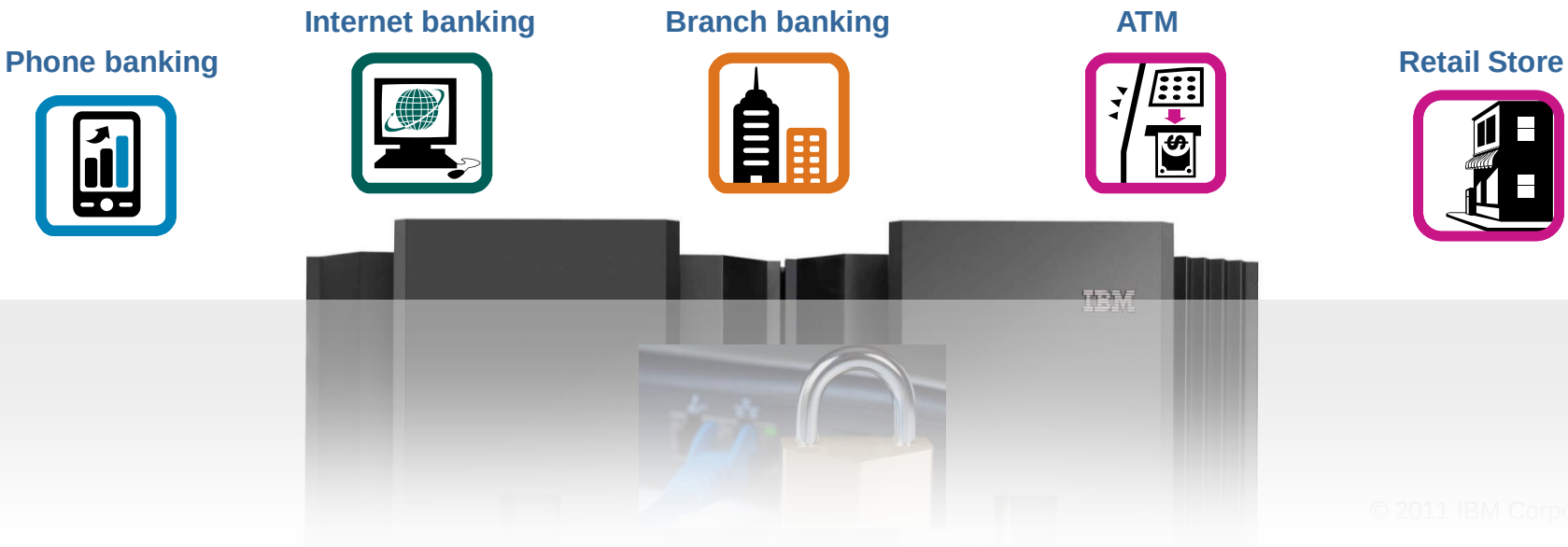
Rules

Enterprise Service Bus

Events

Multi-tier applications & workloads

- **Single centralized database** that supports all access methods with real-time operational data
- **Massive scale** allows access from vast numbers of users simultaneously without degradation in service levels
- **Unmatched security, availability and transactional integrity** enables access 24/7 and protects data



Business intelligence & analytics

- Integrates data serving, data warehousing and business analytics in a **single, integrated approach**
- Integrates operational data and advanced analytics for **actionable insight**
- **Utilizes best fit technology** for each query to maximize performance and delivery of information

Clients utilize System z for smarter computing

"With a single zEnterprise platform…from a consolidated platform perspective, we will have the ability to be agile and to compete—and to provide competitive pricing for our clients." – Mark O'Gara, Highmark

Modernizing to its mission-critical applications to reduce costs and risk, while speeding application and service delivery by reusing assets instead of rebuilding them.

Moving core-banking operations to a System z-SAP solution to make the customer banking experience simpler and more efficient.

Generating valuable data in real-time to support more than 3.5 million patients per year and business units across the spectrum of healthcare.

Clients are realizing the value of System z

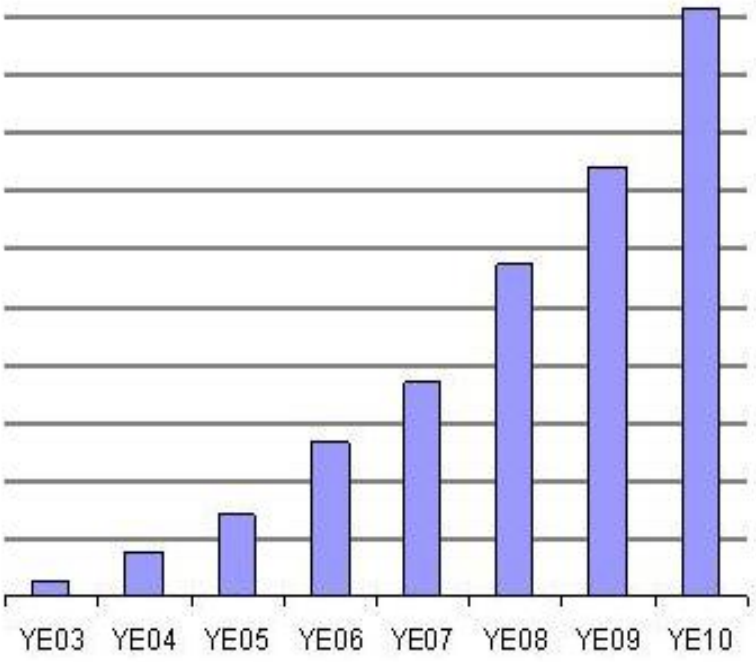
New-to-z clients

- IT services provider plans to position zEnterprise as its cloud platform
- Public sector client consolidated x86 for its processing needs
- Chinese bank chooses System z for core-banking
- Others include: a steel company, IT services company, communications company, US city

Unisul, a Brazilian university, selected System z for its online education needs; it's also partnering with IBM to offer enterprise computing courses at the university through the IBM Academic Initiative – System z.

Dramatic growth with new workloads on System z

System z Installed Specialty Capacity



SAP

54% revenue growth year to year (2Q11)

Linux

- Total clients running Linux on z: 34% (2Q11)
- Installed IFL MIPS increased 26% (2Q10 -2Q11)

WebSphere

Total clients running WebSphere Application Server on z: 21% (2Q11)

Cognos

131% revenue growth year to year (2Q11)

68 new clients have implemented IBM System z since 3Q10

Open technology offers ultra-high performance and cost savings

Underpinned by a thriving System z ecosystem

Thousands of ISVs invest in System z

7,000+ applications supported on z (3250+ Linux and 4000+ z/OS)	1,200 new and upgraded applications on System z in 2010	120+ new ISV partners added to the platform

"Banks have to be up 24x7x365 in today's market. …System z has a proven track record of high availability both within an implementation and also within an entire enterprise with business continuity and failover capabilities."

– Frank Sanchez, FIS

Worldwide adoption of mainframe curriculum

814 schools enrolled with more adding curricula	32,941 students from 17 countries participated in Master the Mainframe contests	SystemzJobs.com connects System z clients, partners and businesses with students and professionals seeking z jobs

"The contest allowed us to have a real-world experience with real projects. I feel learning DB2 was one of the reasons I was able to advance to a database-focused job at work."

– Jay Thomas, Pace University

IBM continues to invest in and develop System z

IBM System z

2011

and beyond …

- DataPower XI50z
- zEnterprise 114
- zEnterprise 196 GA2 for new and extended hybrid capabilities, including Linux support in zBX
- New zEnterprise Statement of Direction for Windows support in zBX
- z/OS V13
- IBM DB2 Analytics Acceleration for z/OS v2 (SoD)

Leadership technologies

- Improve performance and system capacity
- Continue leadership on single thread performance
- Improve OS / app availability via real-time monitoring and diagnosis
- Further simplify management of zEnterprise workloads

Transformational technologies

- Enable new capabilities with flash memory
- Take advantage of connectivity tools and other industry trends

Simplify and reduce cost with IBM zEnterprise

- **An integrated system of multiple architectures for optimizing the deployment of multi-tier workloads**
- **Creating a single point of control for management and administration to reduce operational overheads by up to 80%, including:**
  - Power and Facilities
  - Labor
  - Software Licenses

Lower cost of acquisition by up to 56%*

Reduce cost of ownership by up to 55%*

- Based on IBM analysis of a large Financial Services company Datacenter. See details on ibm.com/systems/zenterprise/
- Deployment configurations based on IBM studies and will vary based on workload characteristics. Price calculations based on publicly available US list prices, prices will vary by country.

Freedom by design: A hybrid computing model ideally suited for an Enterprise Cloud

Clients are using System z to as part of their infrastructure transformation to deliver …

- **Superior economics**
- **Better decision making**
- **Accelerated innovation**

… that together deliver **better business outcomes**.

Thank you.