



IBM zEnterprise Strategy and Direction

How new mainframe hardware and software technologies help deliver smarter systems

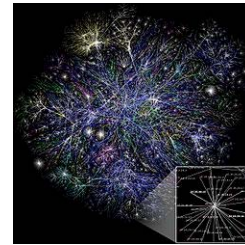
Ray Jones, Vice President

System z Software

May 2012



Lasting technologies continuously innovate and advance while preserving core values



The Inefficiencies of Existing Computing Challenge Innovation

More than
70%

of budgets on average is spent on ops and maintenance – and this percentage is growing²

2/3
of companies

go over schedule on their project/ solution deployments³

IT complexity is
doubling

every two years at its current pace¹

“Our IT systems have become complex and difficult to manage, and as a consequence IT is increasingly finding itself in the position of being a barrier to innovation rather than an enabler of it.”

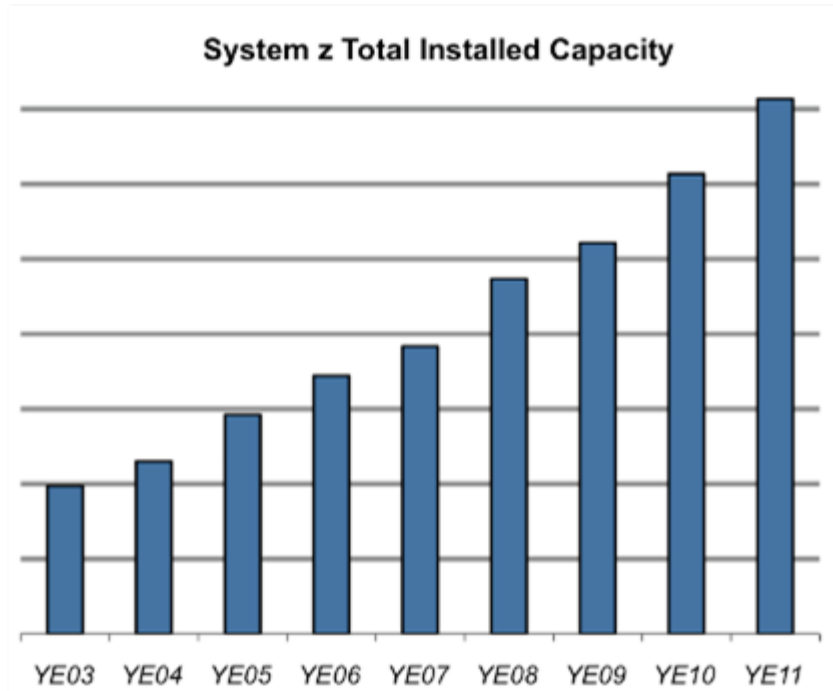
-The Bathwick Group, The road to Smarter Computing

¹ Enterprise Systems Journal, “5 Best Practices for Reducing IT Complexity”)

² IDC Analyst Matt Eastwood, IDC Directions Presentation, 2011

³ IBM Market Intelligence Time-To-Value Study, National Analysts, November 2011

Clients realize the value of zEnterprise



100+

**BladeCenter
Extension units**

950+

blades shipped

[ITD]

35%

**of System z clients
have IFLs installed**

[4Q11]

16

percent shipped MIPS
growth in FY2011

Delivered **back-to-back revenue growth** externally over the last two years,
the first time since 2003 / 2004.

* Source: IDC Server Tracker 2Q11

The complete system of systems

The IBM zEnterprise System Family



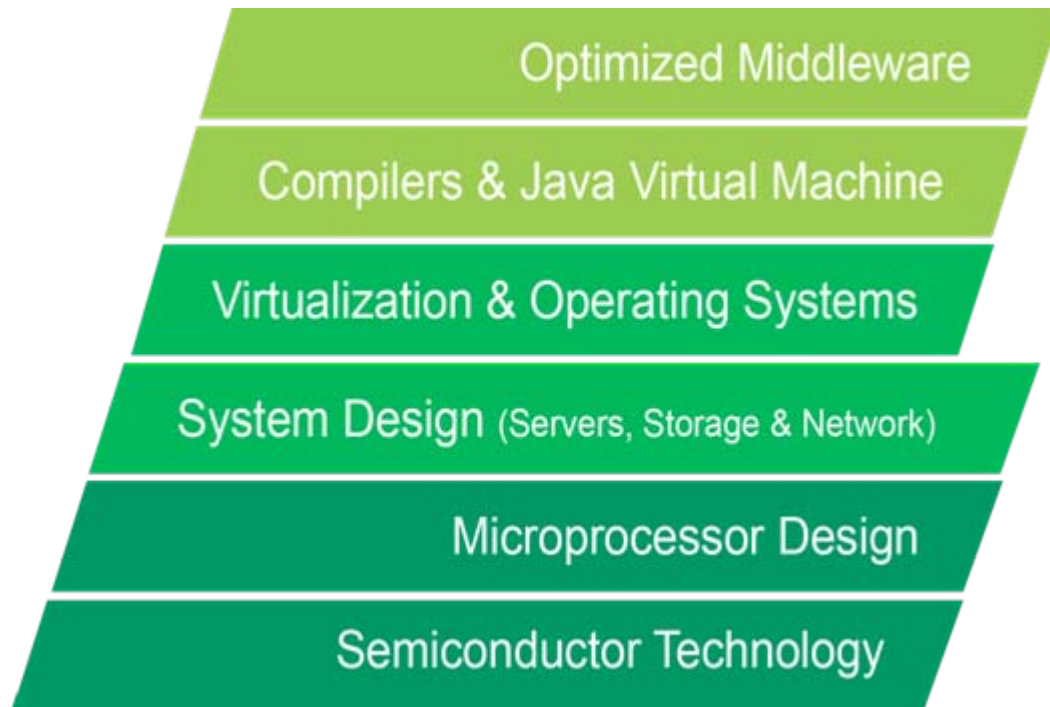
IBM DataPower XI50z

IBM BladeCenter HX5 (7873)

IBM BladeCenter PS701

IBM DB2 Analytics Accelerator V2.1

IBM is pioneering advances in systems design



1) Expertise

- Workload Characteristics
- Workload interdependencies
- Architecture options

2) Software

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

3) Hardware

- Multi-core architectures
- Advanced threading
- Low latency

IBM's consistent, sustained investments in System z

System z





Freedom through design



- Offer real-time transactional analytics
- Provide infrastructure as a service for heterogeneous cloud
- Enable new capabilities with flash memory
- Increase performance and system capacity
- Continue leadership on single-thread performance
- Improve OS / app availability via real-time monitoring / diagnosis

IBM Software for System z

Smart Computing for Smart Businesses

Scalability	Availability	Security	Flexibility
			
<p><i>With the new z114, Indiana Farm Bureau Insurance has up to four different ways to run Java workload on the mainframe while handling a constant stream of around 11 transactions a second from 7 am to 7 pm daily and allowing for a 25% growth all in the same purchase price</i></p>	<p><i>Electronuclear, subsidiary of Electrobras, eliminated manual process and accelerated information flows including ERP systems, backup systems, and recovery operations resulting in 99.999% availability AND reduced payroll processing days and month end closing times</i></p>	<p><i>PSP consolidated its entire IT infrastructure on System z for issuing credit cards and ATM transactions because of its PCI compliance with the highest level security and unmatched scalability.</i></p>	<p><i>City and County of Honolulu migrated from a Windows environment to develop a cloud environment to offer software-as-a-service to other departments resulting in management of hardware and services in hours vs. weeks</i></p>

IBM Compilers Exploit System z for Maximum Performance

- Compilers exploit new hardware instructions introduced by System z
- Code generated by the compilers is highly tuned for System z
- Boost in performance of applications running on System z

z/OS XL C/C++

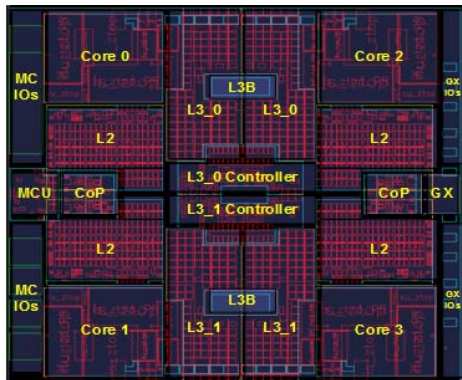
Enterprise COBOL for z/OS

Enterprise PL/I for z/OS

135 new / changed instructions

NEW! z/OS XL C/C++

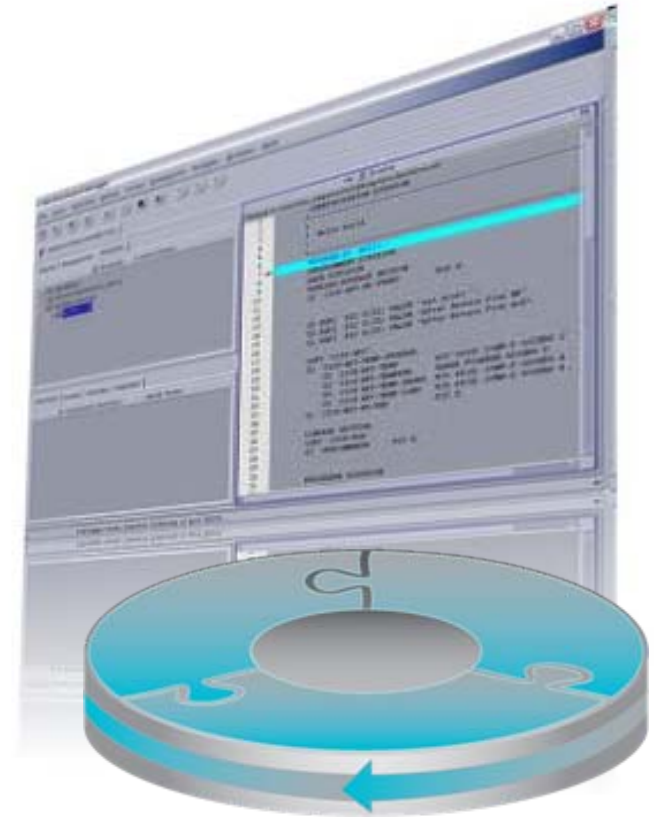
- Up to 5% improvement on applications
- Metal C optimization
- Portability enhancements for multiple languages
- Productivity enhancements for complex applications



Modernizing Enterprise COBOL infrastructure

COBOL Vnext Beta Compiler

- Improve delivery of z/Architecture exploitation
- Incorporate leading-edge optimization and code-generation technology to Enterprise COBOL for z/OS
 - Improve performance, maximize machine utilization, and reduce cost of ownership
 - Provide solid foundation to support new hardware features (e.g. decimal floating point, 64 bit...), and future System z processors
- Source and binary compatibility
 - No need to recompile old code
 - Support linking together of “old” and “new” code for correct programs
 - Plan to remove some old/obsolete syntax and report if old syntax is found

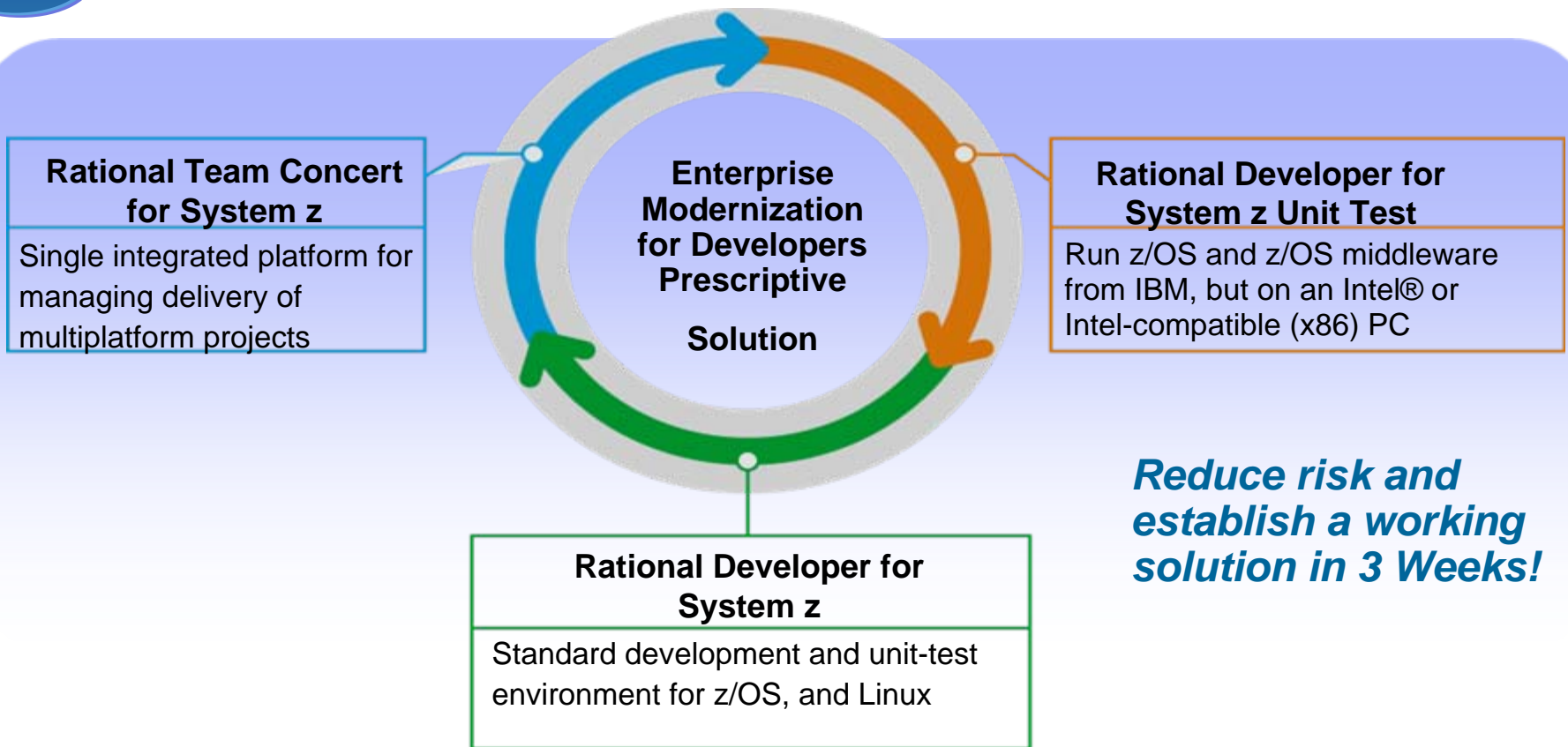


Closed beta – contact rkoo@ca.ibm.com if interested in participating

Enterprise Modernization for Developers Prescriptive Solution Service Offering

New!

Establishing a modern, integrated, and collaborative application lifecycle management infrastructure



- ✓ Establish a modern, high-productivity development platform
- ✓ Simplify initial install and configuration via specific project plan and check lists
- ✓ Common use case scenarios & integrations.
- ✓ Implements a field-tested usage model, targeting a small, focused team of developers to ensure successful deployment

Simplify IT with Application Portfolio Management

Shift cost from maintenance and operations to innovation and new business development

Employ a cyclical process using information and analytics that produces objective and transparent decisions around investing, consolidating, modernizing, or replacing applications.

- Provides an understanding of application cost, value, risk and enhancement potential
- Provides out-of-the box workflows, role-based views, collaborative decision support, financial analysis and analytics to guide decisions
- Defines as-is and to-be architectures, architectural alternatives and roadmaps.
- Drives actionable decisions by defining and managing application and project roadmaps.

*Using application portfolio management, customer found a payback time of **13 months**, a 3-year ROI in excess of **100%**. and savings on average **\$1.5M** in a very short time ¹*



NEW!

- Entry points: Focal Point (FP) only, or FP + System Architect (SA)
- Rational Team Concert integration
- Added scenarios: Consolidation, Modernization, Investment Management, SLA Optimization.

¹Forrester TEI Study

DB2 10

Customers seeing reduced costs, simplified workloads through proven technology



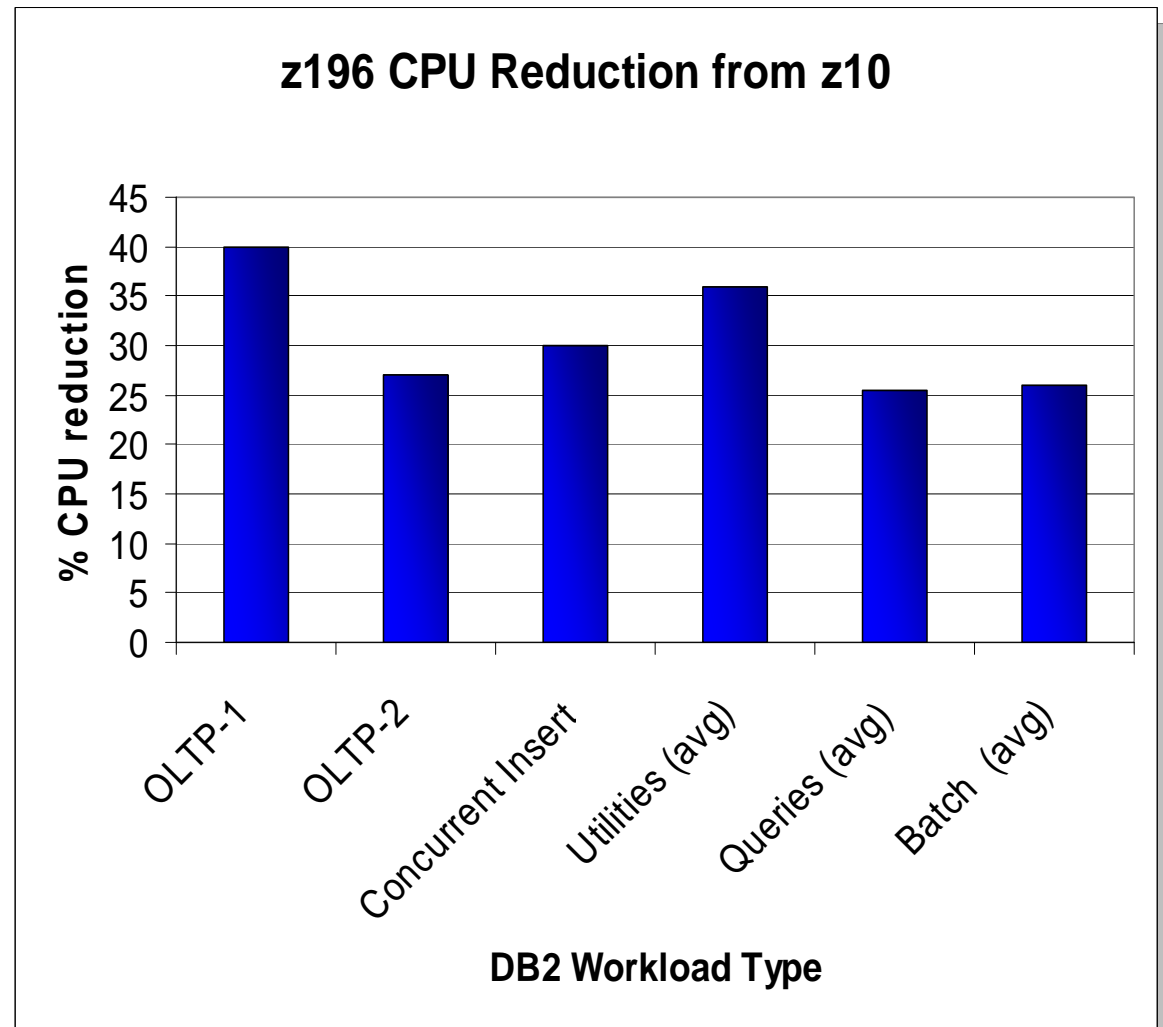
Reduced Costs	Simplified Workloads	Proven Technology
<p>“Based on the performance metrics from our controlled test environment, we see a significant amount of CPU and Elapsed time savings. This release has many features that will help bring down our operating costs.”</p> <p>Morgan Stanley DB2 Team</p> 	<p>“With DB2 10 able to handle 5-10 times as many threads as the previous version, the upgrade will immediately give the bank some much-needed room for future workload growth while simultaneously reducing their data sharing overhead.”</p> <p>Paulo Sahadi - Senior Production Manager, Information Management Division at Banco do Brasil</p> 	<p>“Every single SQL statement we have tested has been better or the same as our current optimal paths – we have yet to see any significant access path regression. We had to spend a lot of time tuning SQL with DB2 9, but we expect that to disappear when we upgrade to DB2 10.”</p> <p>Philipp Nowak, BMW DB2 Product Manager</p> 
<p>“The new temporal functionality in DB210 for z/OS will allow us to drastically simplify our date-related queries. In addition, we’ll be able to reduce our storage costs by using cheaper storage for inactive rows and reduce our processing cost by having DB2 handle data movement more efficiently than the custom code we’ve written to do the same work in the past”</p> <p>Large Insurance Company - DB2 10 Beta Customer</p>	<p>The biggest improvement for us was the enhancement regarding SAVE DATA support. We force customers to run their CPU-intensive queries in batch and in prior releases they failed after running for hours just because the table already existed and there were minor differences in the column definition”.</p> <p>Walter Janissen- ITERGO Informationstechnologie GmbH</p> 	<p>The new audit capabilities in DB2 10 will allow tables to be audited as soon as they are created, which is an obvious benefit for the business and will reduce costs and simplify our processes”</p> <p>Guenter Schinkel -Postbank Systems AG</p> 

For more customer references visit

<http://www-01.ibm.com/software/data/db2/zos/testimonials.html>

DB2 and zEnterprise 196

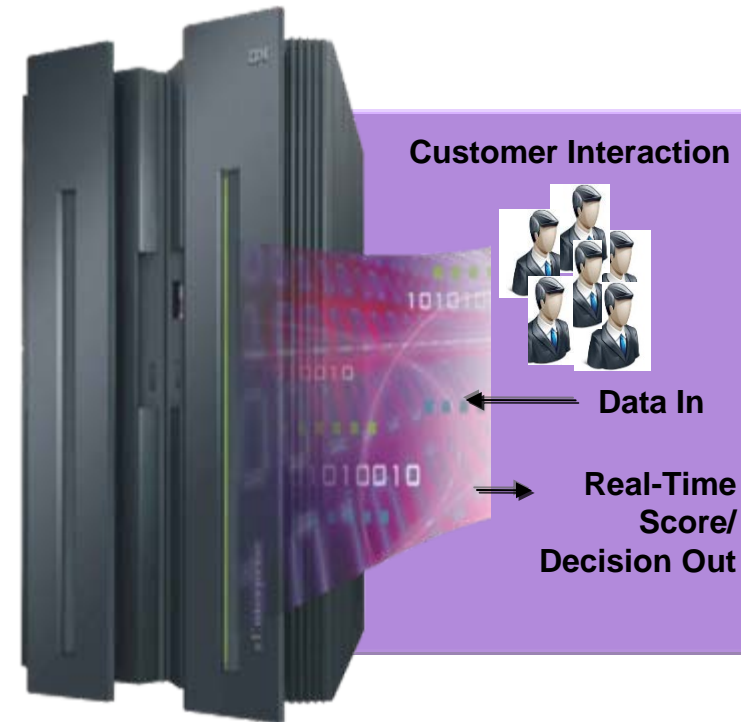
- **CPU reduction in all types of DB2 workloads**
 - Larger processor cache (1.5MB L2 per core, 24MB L3 per chip, 129MB L4)
 - Various types of DB2 9 and 10 workloads show 20% to 40% DB2 CPU reduction compared to z10 processors.



Preview: New Analytics Technology on System z

Real time scoring of transactional data in DB2 10 for z/OS

- **Delivers better, more profitable decisions at the point of customer impact**
 - Enables more informed customer interaction
 - Improves customer service
 - Increases revenue per customer ratio
 - Heightens customer retention
 - Improves fraud identification and prevention
 - Reduces risk and exposure
- **With improved accuracy, speed and performance while reducing cost and complexity**
 - Improves accuracy by scoring new and relevant data directly within the OLTP application
 - Scales to large data volumes to improve accuracy of data models
 - Delivers the performance needed to meet and exceed SLAs of OLTP applications
 - Minimizes demand on network, HW, SW and resources



*Part of an extensive
Business Analytics
solution on System z!*

DB2 Utilities: Delivering Day 1 Support and more !

Significant reductions in CPU and elapsed time with more zIIP offload

Using leading-edge technology to break performance barriers

- *Virtual elimination of CPU & elapsed time through use of FlashCopy technology*
- *Complete elimination of CPU & elapsed time through improved utility avoidance techniques in engine & IBM's DB2 Tools*
- *DB2 Sort can cut CPU cost & elapsed time by over 33%*
- *Customers can address one of their biggest cost challenges – utility ISV costs*
- *More features to come, more customers re-evaluating how to save \$\$\$*



IBM DB2 Analytics Accelerator

Capitalizing on the best of both worlds – System z and Netezza

Blending System z and Netezza technologies to deliver unparalleled, mixed workload performance for complex analytic business needs.



- **Leverages the strengths of System z and Netezza**
- **Extreme Performance for complex analytics**
- **Breakthrough technologies - hardware acceleration**
- **Tightly integrated into DB2 for z/OS**
- **Creates a highly secure environment for sensitive data analysis**
- **Reduced cost and complexity**
- **Summary: Performance, availability and scalability**

Accelerating decisions to the speed of business

Cloud-style CICS applications and infrastructure

CICS Transaction Server for z/OS V5.1 Open Beta

New!

*Cloud-style CICS
development, deployment
and operations built on
WAS Liberty profile*

Available to download
at
ibm.com/cics/openbeta
from July 13th, 2012

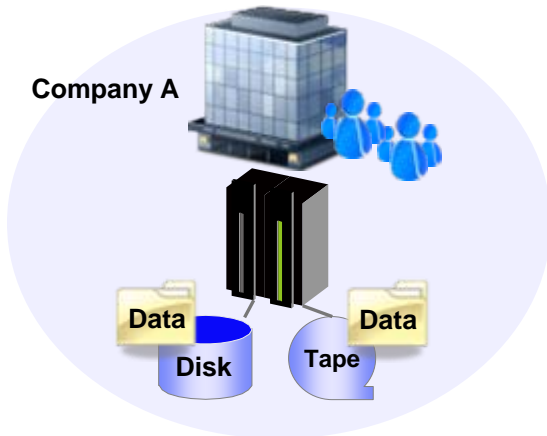
- **Platform as a Service (PaaS)** capabilities that can be used to host Software as a Service (SaaS)-based CICS applications.
- **Policy-based management** to automatically modify the behaviour of tasks that exceed predefined thresholds, during runtime.
- **Fast and lightweight Java web container** combining Java Servlets and JSPs with fast local access to CICS applications.
- **Capability and scalability advancements** that allow CICS applications to do significantly more, with much greater ease.

KPT/CPT implemented CICS in a cloud and now users can perform transactions directly on their ERP system saving time and money.

Preview: Mainframe services with dynamic capacity, usage-based pricing and high availability - IBM SmartCloud Enterprise+ for System z – z/OS

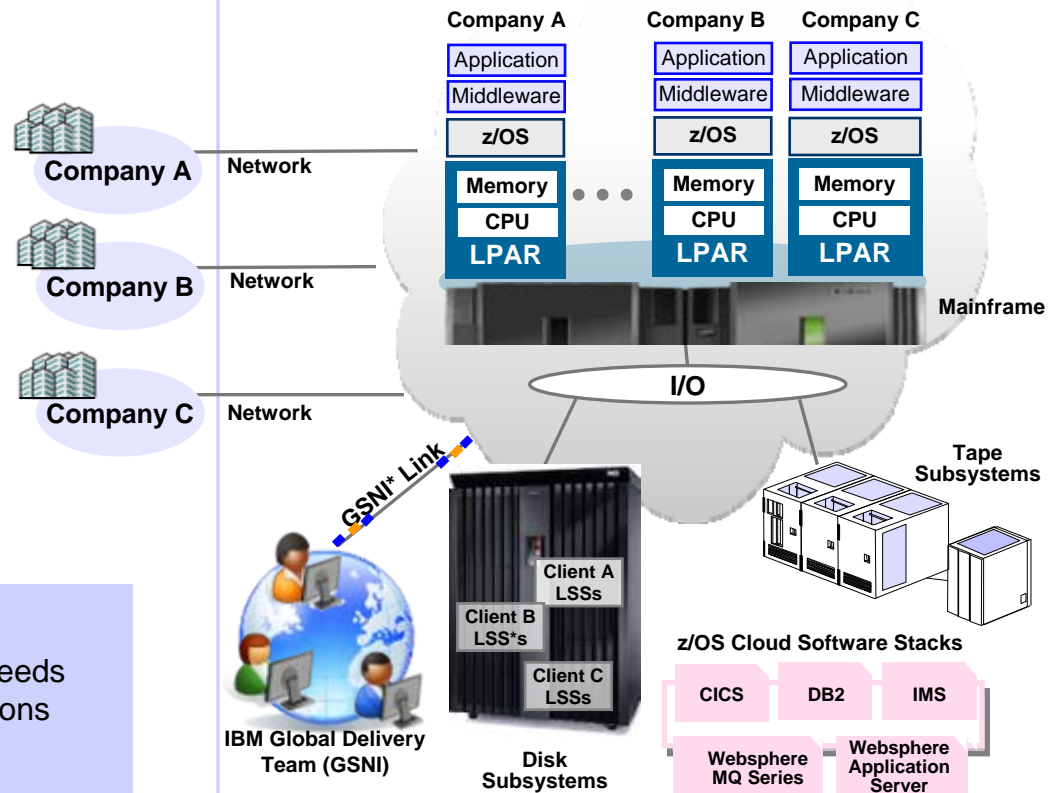
BEFORE

Dedicated IT resource



AFTER

IBM SmartCloud Enterprise+ for System z



Benefits

- Flexibility and scalability that meets your business needs
- Secure design and high availability configurable options
- Standard software and state of art technologies
- Cost effective delivery model
- Skills and expertise delivered by mainframe experts

Available in US and UK only

Announced at IBM Cloud Innovation Forum

Scaling with Java Applications

Java 6.0.1

zEnterprise and Java 6.0.1: Engineered Together

- Up-to 2.1x improvement to Java throughput
- Reduced footprint
- Tighter integration with z/OS facilities
- Improved responsiveness in application behavior
- Extends Enterprise applications to mobile devices

J9 R2.6 Virtual Machine

- Significant enhancements to JIT optimization technology
- zEnterprise exploitation of instructions and new pipeline
- New Balanced GC policy to reduce max pause times
- Default GC policy changed to gencon

z/OS Unique Enhancements

- JZOS 2.4.0
- z/OS Java unique security enhancements

Performance

- **2.1x** improvement to multi-threaded workload
- **1.93x** improvement to CPU-intensive workload



WebSphere Profile for System z

- **The WAS for z/OS Liberty profile is a composable application server profile of WAS with *optional* extensions for z/OS**

- New architecture from prior version, full profile still available to allow for all existing apps to run
- Liberty is not full WAS, the rest will come over the next few years, initial focus Web Apps
- Applications written for Liberty run in full profile unchanged
- Simplified and reduced configuration for both WAS and zOS
- Getting new applications up and running on WAS for zOS now much quicker
- Greater consistency enables improved internal development for SWG and STG products building on Liberty, an example is zOS Management Facility

- Significantly improved performance
- Continued exploitation of System Z and z/OS through ***optional*** extension to components (WLM, HA, Security)
 - Server startup time for simple applications is < 5 seconds
 - Projected throughput for simple web-apps +20%
 - Significantly reduced real storage and disk requirements
 - ~20-25 MB disk footprint
 - ~50-75MB real storage per server
- Expected use cases for Liberty on zOS:
- **Test of Web Applications using zOS Resources (DB2, IMS(future), CICS(future))**
 - **Lightweight production**
 - **Cloud production where server density matters**
 - **Imbed Servers**

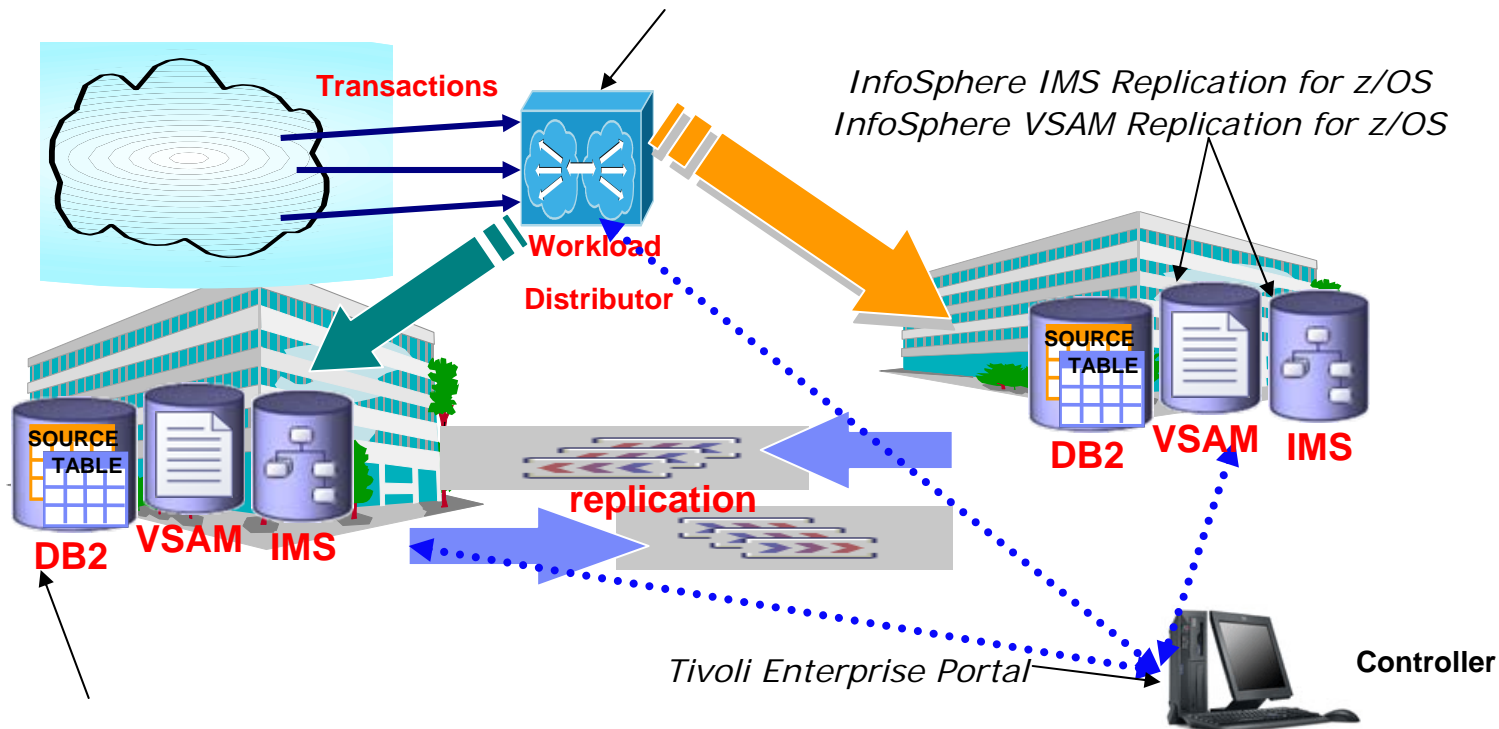
Customer feedback after viewing demos

“It has to be a demo trick, it can’t start that fast. Its like the moon landing, it never happened”

I can see how I can include WAS for zOS in my cloud now”

IBM GDPS/Active-Active for Continuous Availability

- Provides continuous availability for *two or more sites separated by unlimited distances*
 - Planned workload switch - **20** seconds from active site to standby site
 - Unplanned workload switch - **120** seconds from active site to standby site
 - Planned site switch - (9 * CICS-DB2 and 1 * IMS workloads) **20** seconds
 - Unplanned workload switch - **107** seconds



Equens Italia improves business performance and achieves near-continuous systems availability with zEnterprise

Targets 100% systems uptime with zEnterprise with zBX, DS8000 and GDPS



Processes annually 9.7 billion payments and 3.9 billion POS and ATM transactions

- **High operating costs** due to management of many distributed Intel servers
- Needed to **eliminate a disaster recovery scenario** by running all applications in parallel among two data centers with 0% impact to users

Benefits:

- ✓ With GDPS automation, **parallel applications ran immediately and less than 30 minutes** for the others that were not candidates to run in parallel
- ✓ **Eliminated funding for the deployment of new hardware and reduced operational cost** by moving systems and applications to the zBX
- ✓ **Freed up square footage and reduced energy usage in the data centers** by reducing distributed systems and moving to zBX
- ✓ **Significant performance gains** due to the fast network connection to the zEnterprise with zBX

Virtualization and Optimization - NEW APIs

Consolidation, virtualization and energy efficiency to reduce cost, complexity and help align IT resources

- **Statement of Direction¹ - Application Program Interfaces (APIs) for Unified Resource Manager**
 - Provide access to the same underlying functions that support the Unified Resource Manager user interface

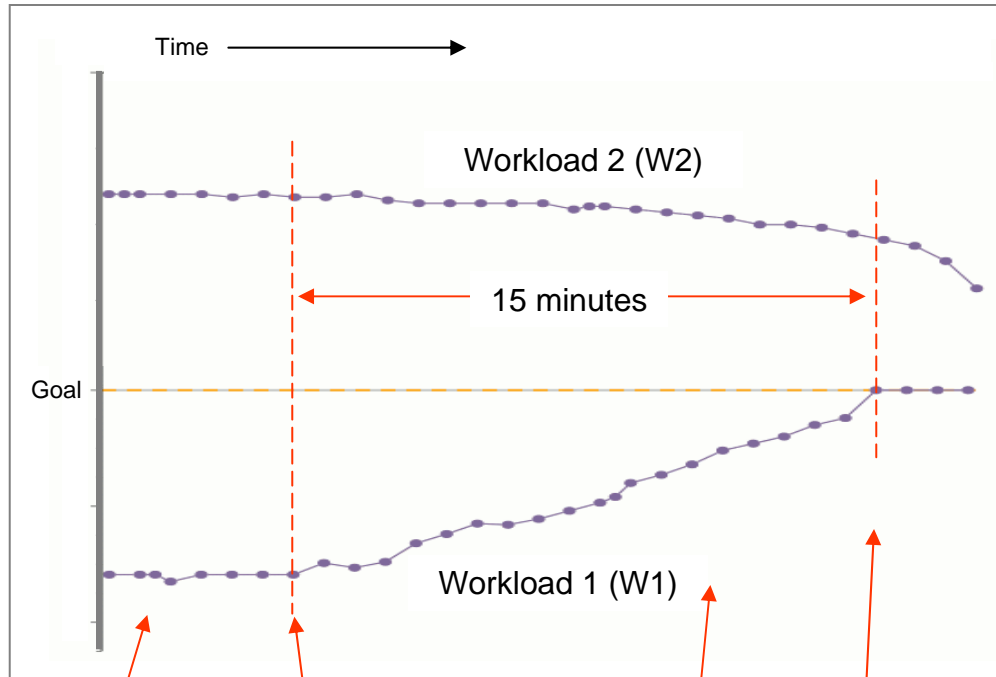
- **Statement of Direction¹ - Tivoli Integrated Service Management for zEnterprise API Support**
 - Today, Tivoli products provide significant functionality that supports zEnterprise environments. Tivoli intends to provide additional capabilities made possible with Unified Resource Manager APIs.



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

Performance Manager Lab Test

Automatic Allocation Of CPU Resource



1. No performance management. W1 is underperforming, and W2 is over-performing.
2. Performance Manager is turned on. zManager detects W1 is underperforming.
3. Over time, zManager adjusts CPU resources, taking from W2 and giving to W1.
4. W1 reaches performance goal.

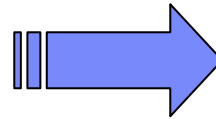
- zManager monitors virtual machine performance and automatically adjusts CPU resources as needed
- Considers priority and performance relative to service level agreement goals
- Reduces the need to over-provision CPU resources

Italian Utility Company Using SAP

The Current: z10 + Power systems with DB2 for z/OS database, 60K bills per hour

Client Requirement

- Expect to add up to 30 million customers in the next 18 months
- Require throughput greater than 150,000 bills / hour

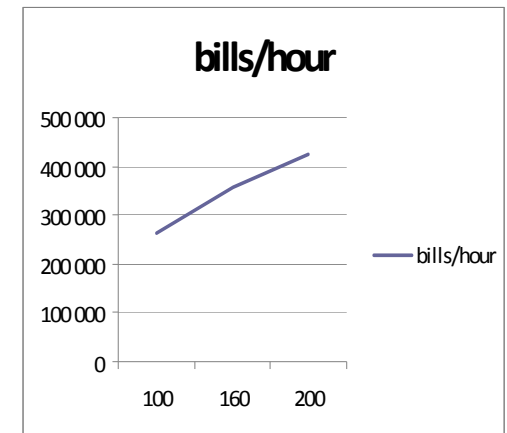


- z196 and zBX with POWER7 blades
 - Unified Resource Manager with dedicated network
 - Latest functionality in DB2 V10
- ✓ **Results: up to 426,000 bills per hour**



Hybrid Computing Benefits:

- ✓ Over **600%** improvement in current configuration
- ✓ Hardware setup: implementation of zBX Power Blades in only **2 days**
- ✓ Very good linear **scalability** either on scale-up for DB2 on z, or scale out on pBlades on zBX
- ✓ **Low latency** due to the dedicated IEDN network



System z – 45+ years in the making

- **The world's most trusted transaction processing and data server for business critical applications**
- **The world's most cost-efficient platform for data center consolidation and virtualization**
- **The world's most dependable and scalable hardware and middleware platform for new business applications**
- **A thoroughly modern application environment for traditional and Cloud delivery models**



The zEnterprise 196 is the world's fastest and most scalable enterprise system. (50 BIPS)

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Notes:

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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