



## Delivering Business Value with System z and DB2 for z/OS

Road show edition



**The Future Runs on System z**

**IBM Information**  
On Demand **2008**  
October 26 - 31, 2008 ~ Las Vegas  
The Premier Information Management  
Global Conference  
[www.ibm.com/events/informationondemand](http://www.ibm.com/events/informationondemand)

Information Management software

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## Agenda

- Introduction
  - Examples of new projects being implemented on IBM System z™ and why
  - Quick view about recent investments that have helped spur projects on System z
- New projects being driven to System z
  - Application-driven projects
  - Information-driven projects
- DB2 for z/OS improvements
- Supporting hardware and software infrastructure
- Summary



Today we are going to speak about new projects that customers are putting on System z, and the resulting benefits they are achieving. We'll start by examining application driven projects, then proceed to information driven projects. From there we will discuss the requisite supporting infrastructure that exists which helps enable the benefits to be achieved. This includes application development and delivery as well as enterprise IT management.

## New Projects Being Implemented on System z

**New self-service Web app**

**New business intelligence project**

**Web portals**

**Updated IT architecture to ↑ flexibility, responsiveness**

**Automated forms processing**

**and others** →

Primary Forces Causing Acceleration to System z	
<b>Customer forces</b> <ul style="list-style-type: none"> <li>▪ Reduce TCO via consolidation of applications and data</li> <li>▪ Provide quicker response to business requests</li> <li>▪ Improve application performance</li> <li>▪ Increase quality of service</li> <li>▪ Ability to leverage modern skills on mainframe</li> </ul>	<b>Supplier forces</b> <ul style="list-style-type: none"> <li>▪ Modern middleware honed for the mainframe</li> <li>▪ Cross-platform, integrated software development and delivery</li> <li>▪ Optimized cross-platform IT management for System z</li> <li>▪ Increased ISV support</li> <li>▪ Investment in skills development for new generation</li> </ul>

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Customers are currently implementing new, modern projects on System z. In the blue box are just a few examples. There are customer forces and supplier forces at work providing the impetus.



## Recent IBM Investments Further Contributing to Adoption of System z for New Workloads

### Application-Driven Projects

- Web 2.0 apps enabled using WebSphere Portal
- Workload consolidation benefits through common infrastructures (e.g., WebSphere® Application Server)
- Rapid time to market & low business risk with CICS® Service Flow Feature & WebSphere Adapters
- Ability to integrate existing & new assets across organizational boundaries via WebSphere MQ messaging backbone and federated ESBs
- Faster business innovation built through WebSphere Process Server

### Information-Driven Projects

- Understand and optimize business performance with Cognos 8 BI for System z
- Reduce TCO of new workloads with DB2® for z/OS Value Unit Edition
- System z as the trusted information hub with IBM Information Server for System z
- Dynamic Warehouse on System z provides critical performance for real time analysis
- DB2 9 optimized for SAP
- IMS™ 10 for critical on-line operational applications
- Content Manager v8.4 and Content Manager On Demand v8.4 support a strategic ECM platform

### Application Development and Delivery Infrastructure Incorporating System z

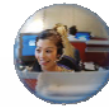
- Asset Management
- Architecture Management
- Skills Management
- Quality Management
- Change and Release Management

### Enterprise IT zService Management Center

- Interdependent Applications
- Linux and SOA
- Composite Applications
- Distributed Environments
- Power and Energy Management
- Financial and Service
- Federated Identity
- Workload and Availability
- Storage

## Application-Driven IT Projects: Typical IT Manager's Goals

- Drive more business through existing applications
  - Expand "on Platform" usage: Make applications accessible
  - Reduce cost of doing business. Leverage existing skills & assets
- Handle growing workload volumes through improved efficiencies
  - Consolidating workloads onto System z
  - Streamline interfaces: human / application / database
  - Fewer but more complete interactions
- Deliver on new business opportunities faster and more effectively
  - Recombine existing application functions to create a new business service
  - Dynamically deploy new business services



Drive more business through existing business apps by expanding the user base

Make the applications accessible from other sources: Web, mobile phones, other applications, other companies

Reduce cost of doing business leveraging the skills and assets already in place

Production ready results for less than the cost of rewriting the existing systems

Established operational resiliency and governance

Proven qualities of service

Handle growing workload volumes through improved efficiencies

Streamline the human/application interface: fewer but more complete interactions, eliminate manual steps and cross application handovers

Streamline the application/database interface: fewer but more complete interactions

Reduction of complexity and maintenance costs through common messaging, data and procedure integration, leveraging existing assets for maximum reuse

Deliver on new business opportunities faster and more effectively

Innovatively recombine existing application functions to create a new business service

Dynamically deploy new business services

Leverage in place investments

Accelerated application development, testing and deployment of new revenue-generating applications

## When System z is the SOA Hub

- **Integration**
  - Designed to handle complex transactions and roll back
  - Monitor end-to-end transactions in complex configurations
  - Allocate resources according to business goals
  - Provide single point of control across the enterprise
  - Help customers meet security and regulatory requirements
- **Business services reuse by an increasing more applications**
- **Growth add new services and capacity no disruption**
- **Performance improvements achieved when co-locating with z/OS® data**



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For a successful SOA implementation, you need an ESB that:

- Provides connectivity to all your existing environments.
- Helps ensure quality of service to support your service-level commitments.
- Handles complex transactions across multiple resource types and rolls back distributed transactions when problems occur.
- Supports effective end-to-end monitoring and measurements.
- Meets security and regulatory requirements.

When considering the ability of your ESB to fulfill these requirements, you might quickly realize that the choice of the deployment platform can affect the degree to which these requirements are met. For example, mainframes were traditionally designed to run multiple, heterogeneous workloads simultaneously and to handle unpredictability, which is increasing in the SOA environment.

So, what questions should you ask yourself when making the ESB deployment decision to help avoid having an overly complex infrastructure that consumes your resources and holds your business back? Consider your requirements in the areas of integration with your current core mainframe assets, business criticality of your new services, including your System z applications exposed as services. Consider your performance requirements and future growth opportunities and needs.

### Integration:

- Where do your critical workloads and data reside today?
- What is the value of your existing System z investment?
- How can you make the most of your existing infrastructure and skills?
- What kind of integration with other applications do you require?
- Where do these applications reside?
- How complex are the business transactions that the ESB will be handling?
- What are your requirements for monitoring and managing these complex transactions, including resource allocation and security?

### IBM System z virtualization – optimizing for integration

- Consistent, extremely high resource utilization
- Massive scale consolidation and simplification
- Workload management for business agility and flexibility

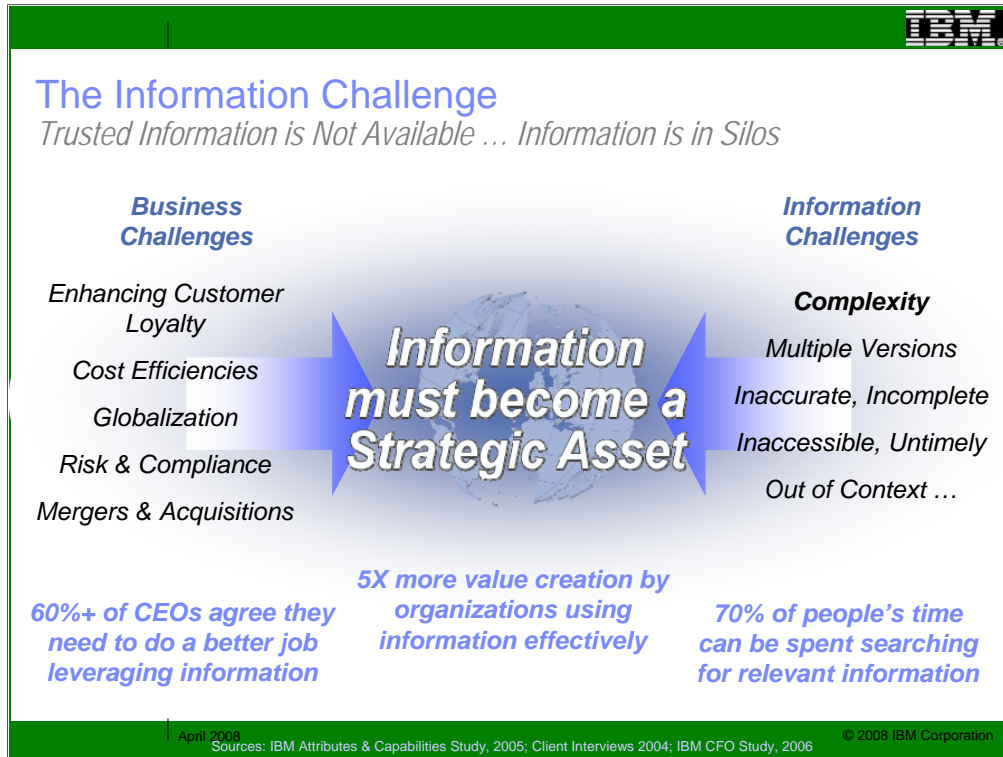
### Benefits for the ESB

- Resource allocation according to business goals
- Single point of control across the enterprise
- Workload isolation and security

### Business criticality

Questions to consider regarding critical service capabilities include:

- What are your most-critical services?
- How will the ESB downtime affect your ability to run these services, and ultimately, your business results?
- What are your service-level commitments and requirements for availability, reliability, scalability and disaster recovery?



Over the last several years, IBM has conducted several studies and interviews with CEOs and CFOs to identify their top-of-mind issues. The CEOs identified and recognized the importance of information in the global economy where information is the underlying asset that enables key strategic initiatives.

In a global organization, consistent information has to flow across systems and borders.

To understand risk, an organization needs complete information for accurate risk measurement across system silos.

To comply with a multitude of regulations, an organization needs an understanding of what information exists across the enterprise, as well as tools and processes for accessing it, retaining and disposing of it - all in a managed, streamlined fashion.

A company's relationship with its customers is largely defined by transactions over time. Effective analysis and easy access to that information paves the way to anticipating a client's next purchase or improving service rendered, leading to customer loyalty.

And the list of challenges goes on... In fact, a majority of CEOs know there is a problem here that needs to be addressed.

[Click]

So managing information the way we have in the past has become less effective. The individual point projects and supporting applications that companies have implemented over the past 30 years have created silos of information – providing fragmented views of the business. If information is available, it's often inconsistent, incomplete or inaccurate. If the information isn't available in a timely fashion, it's likely inaccurate by the time a worker does receive it. Or, the information was really developed for some other purpose and is out of context with the need at hand...

The result is an environment full of inefficiencies. Employees are spending too much of their time searching for information.

[Click]

Today industry leaders find themselves stuck between intensifying consumer, competitive and regulatory pressures on the one hand, and information management systems that are simply ill equipped to address these challenges on the other. Organizations need to develop an information infrastructure that can fast track their information – one that enables them to leverage information as a strategic asset for business innovation. Those organizations that leverage information effectively can create five times more value than those that don't.

## Why is it Challenging to Leverage Information?

**Information Silos**      **Volume & Variety**      **Business Velocity**

**47%** of users **don't have confidence** in their information

**59%** of managers **miss information** they should have used

**42%** of managers **use wrong information** at least once a week

AIIM & Accenture Surveys, 2007

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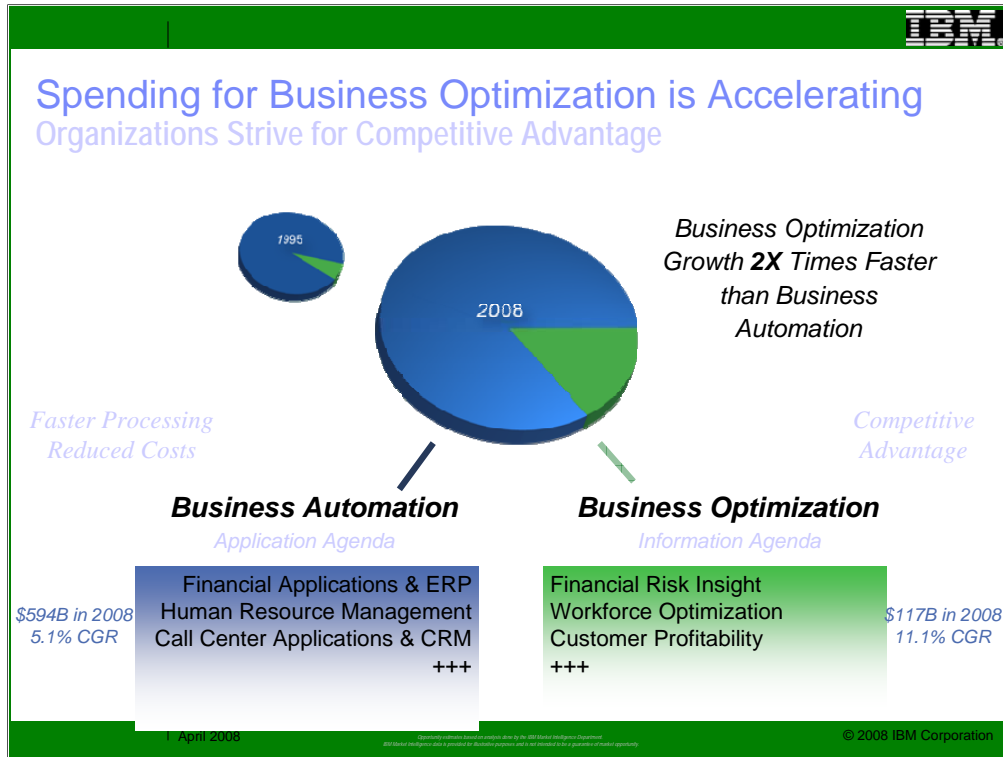
Customers need to establish trusted, accurate information from data and content silos

Customers need ability to leverage this information more effectively and generate the insights required to better serve customers, transform their business processes and make better decisions, faster – in other words, to optimize their business

Unfortunately, information continues to be a challenge for most organizations

- 47% of users don't have confidence in their information\*
- 59% of managers miss Information they should have used\*
- 42% of managers use wrong information at least once a week\*





- Over the past 10 years, technology spending on transactional work was more than six times greater than spending on tacit work (work related to more complex interactions requiring a higher level of judgment)\*
- Tacit work now accounts for 70 percent of all new jobs, and has grown to now represent more than 40 percent of total employment, and is even higher in some industries, such as financial services\*
- Competitive advantage is harder to sustain when based solely on gains in productivity and cost efficiency in transaction work\*
- For these reasons, after 20 years focused on automation to run the business, investing in an application agenda to reduce costs and drive faster processing times, companies have now accelerated their focus on optimization to drive innovation and competitive advantage, which will be driven through an information agenda

#### Gartner Comment

- Optimization goes beyond extensions to operational applications to enabling managerial and planning processes
- Ability to incorporate BI directly into process enables greater pervasiveness that tying into a single app



## Enterprise Information is on System z ... Unlock the Business Value of this Information to Optimize

*\$3 trillion/day transferred  
through IMS by one customer*

*95% of top Fortune  
1000 companies use IMS*

*Over 15 billion GBs of  
production data in IMS...*

*8 of every 10 of the largest retail banks in the US, Germany,  
Japan, and Australia use IMS for their core banking*

**24x7 ATM  
Deposits  
& Withdrawals**

**Reserves  
airline seats**



**Runs the world's  
stock exchanges  
& banking networks**

**Tracks the world's  
packages**

*DB2 for z/OS supports the world's  
largest known peak database workload*

*DB2: 9 of the top 10 global  
life/health insurance providers*

*DB2: 59 out of the top  
59 banks in the world*

*23 of the top  
25 US retailers*

**Information on Demand Software Stack is now on System z ...**

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Economics of virtualization and consolidation drive simplified information infrastructure

- Enables increased focus on business processes

- Reduces systems and information related costs

- Enhances growth with higher levels of business flexibility and responsiveness

Integrated Information Processors (zIIPs) integrate information and transaction processing across the enterprise

- Frees up processing on central processors and reduces overall processing costs for ERP, data warehousing, and systems management workloads

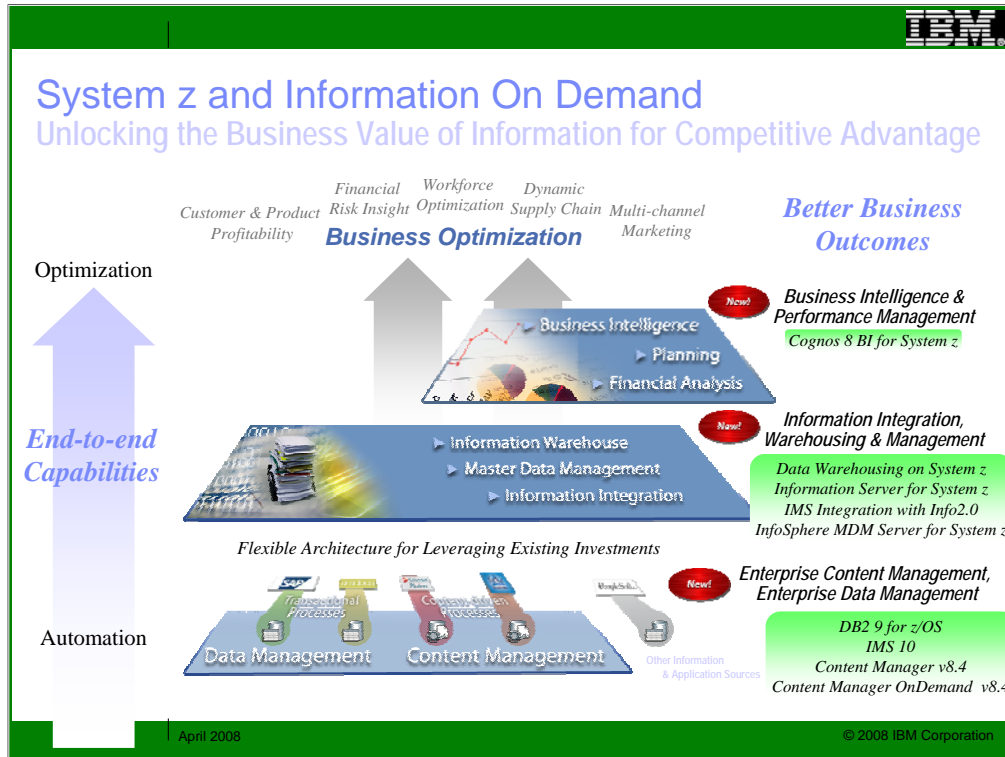
Tightly integrated environment optimizes XML and SOA data serving for new information intense workloads

- High performance processing of DB2 9 pureXML through z/OS XML System Services

- Faster XML parsing with zIIP and zAAP support increases TCO benefits

Optimized communications information workloads between virtual environments

- HiperSockets™ virtual network technology reduces access time to critical information across virtual environments




We believe that there are 3 key things that organizations require to unlock the business value of information for competitive advantage...and this is what Information On Demand is focused on.

- 1) Organizations need the ability to manage data and content over its lifecycle, as part of the individual processes and applications across the enterprise...this requires data and content management capabilities to support your different processes and applications.
- 2) Organizations then need to establish accurate, trusted information across these different processes and applications for a single view of the truth...a single view of customers, of products, of revenue, etc...and they need a “flexible” architecture that can leverage all of their existing investments...accurate, trusted information is established through information integration, data warehousing and master data management.
- 3) These first two components have really been our IOD story up until recently...with the acquisition of Cognos, we are now providing our customers with the ability to leverage that trusted information to better understand how their business is performing, and begin optimizing performance across the enterprise...and this is accomplished through business intelligence and performance management

These are the three main components required by organizations to unlock the business value of their information, but the ultimate object our clients have is to drive better business outcomes. And that’s what we are focused on with all of these components...helping our clients improve customer and product profitability, provide increased financial risk insight for better business decisions, optimize the workforce and control labor costs, enable more dynamic supply chain management, and support multi-channel, event driven marketing initiatives.

IBM provides the most complete, end-to-end capabilities for Information On Demand, with every component focused on helping customers optimize their business.




**New Information On Demand Software for System z**  
*Better business decisions, faster and with a lower overall TCO*

**Cognos 8 Business Intelligence for System z** *Coming!*

Reports and analyzes hundred of millions of transactions directly on the mainframe  
 Ensures everyone across the organization can quickly identify and respond to critical business trends  
 Provides a competitive advantage through improved decision making from business data

- Accepting participants for a customer beta program with Cognos 8 BI for Linux on System z

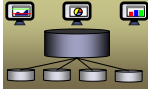


**DB2 for z/OS Value Unit Edition** *Now Available*

New one-time-charge offering that simplifies the deployment of new application workloads  
 Strengthens the role of System z as a cornerstone for key business initiatives such as SOA, DW, BI & SAP  
 Delivers pureXML which optimizes information availability in the new enterprise data center

**Data Warehousing on System z**

More than 50 new features in the last two releases of DB2 for z/OS supporting warehousing  
 Information Server for System z - brings new scalability, information consistency and performance to System z customers



**InfoSphere Master Data Management Server for System z** *Coming!*

More effectively manage high-value operational information

- Customers, suppliers, partners, product materials and employees

Addresses and solves the root cause of master data complexity

*Information on Demand Software Stack is now on System z*

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## Information Management Announcements:

### **Cognos 8 BI for System z (IOD)**

IBM's Cognos 8 BI for System z will help IT departments who have operational data on mainframes respond much faster to company requirements for business intelligence reporting and analytics. They will be able to significantly reduce the window between when the data is collected and when it is analyzed. This will help IT help lower overall management costs and complexity by leveraging one single platform to unlock the business value of information to provide a competitive advantage. Further, companies benefit by putting their most sensitive intelligence information on the most secure platform.

IBM is currently accepting participants for a beta program on Cognos 8 for Linux on System z. General availability is planned for the second half of 2008.

### **DB2 Value Unit Edition,**

IBM is also announcing the immediate availability of DB2 for z/OS Value Unit Edition which provides a new one-time-charge offering that simplifies the deployment of new application workloads. This new version is available for both DB2 9 for z/OS and DB2 for z/OS Version 8. This offering further strengthens the role of System z as a cornerstone for key business initiatives such as SOA, Data Warehousing, Business Intelligence and packaged applications such as SAP.

### **Data Warehousing on System z**

DB2 for z/OS have delivered more than 50 new features in the last two releases in support of customer requirements for data warehousing.



## DB2 for z/OS Value Unit Edition (VUE) New option for DB2 one time charge pricing

- **Only for net new and qualified workloads**
  - Net new workloads
  - Only commercial packaged applications, data warehouses, and WebSphere applications
  - Running on zNALC for z/OS

### **Customer Value**

- ✓ Add new applications to System z without increasing existing monthly license charge
  - ✓ Purchase DB2 up front with new applications
  - ✓ Control z/OS stack costs
- **Strengthens System z role as a cornerstone for new applications such as SOA, data warehousing, operational BI, ERP, and WebSphere**

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The DB2 for z/OS Value Unit Edition (VUE) is a new option for DB2 one time charge pricing. This Only for Net New Workload in new and existing DB2 for z/OS customers with qualified workloads on z/OS.

Net new workloads limited to commercial packaged applications, data warehouses, and WebSphere applications running in a partition, machine, or sysplex using zNALC for z/OS

Customer Value:

- Customers can now add new applications to System z without increasing their existing monthly license charge stack cost.
- Purchase DB2 up front along with new applications (capital vs expense).
- Control z/OS stack costs (pay only for what you use)
- It is possible to have single version charging for a longer period.

VUE strengthens the System z role as a cornerstone for new applications such as SOA, data warehousing, operational BI, ERP, and WebSphere. See the Feb. 26, 2008 announcement for more.

[http://www.ibm.com/common/ssi/rep\\_ca/1/897/ENUS208-041/ENUS208041.PDF](http://www.ibm.com/common/ssi/rep_ca/1/897/ENUS208-041/ENUS208041.PDF)



## Potential Environmental Savings

System z can help you dramatically improve your Carbon Footprint

Example scenario: 1528 UNIX servers vs. 4x System z9 54-way frames

Environmentals	Current	Alt. Case
Total RackU	9,198	na
Racks	500.0	4.0
Total kW	2,203	41
Adjusted kWh/yr	19,396,862	360,956
Heat BTU/hr	5,038,017	93,752
CO2 tonnes /yr	8,341	155
Carbon tonnes /yr	2,276	42
RIPs /kW	425	2,400
RIPS / tonne CO2	112	634
W/m2	14,373	6,000
RackU / Server	6.0	2.0
Watts / Server	1,442	200

**CO<sub>2</sub> Reduction = 27,073 Trees**

Source: Scorpion Study results 2007

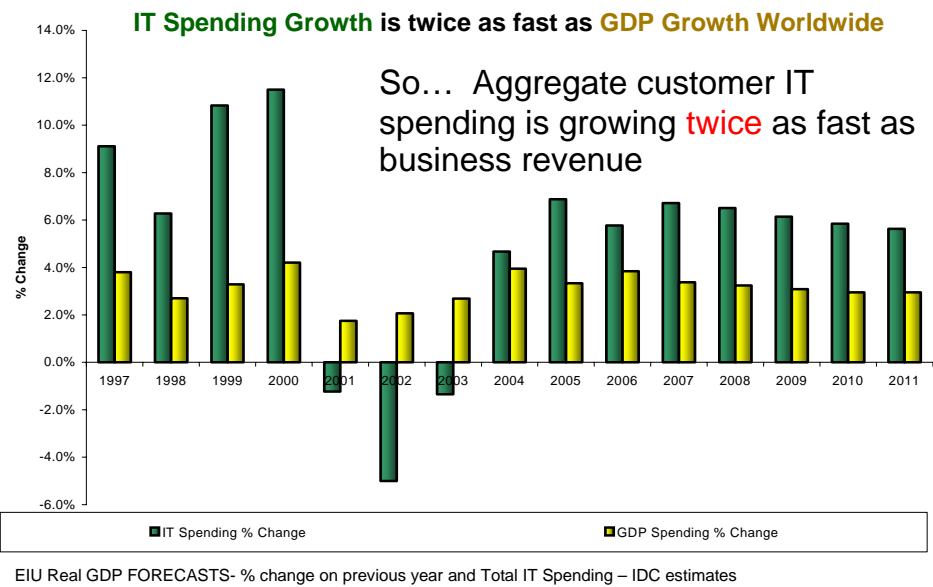
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\* All performance information was determined in a controlled environment. © 2008 IBM Corporation. Actual results may vary.

This chart shows the CO<sub>2</sub> reduction effect, the Environmental effect, of consolidating 1,528 Unix servers onto 4 z9 EC 54-way mainframes.



## Top Down Look at IT Spending

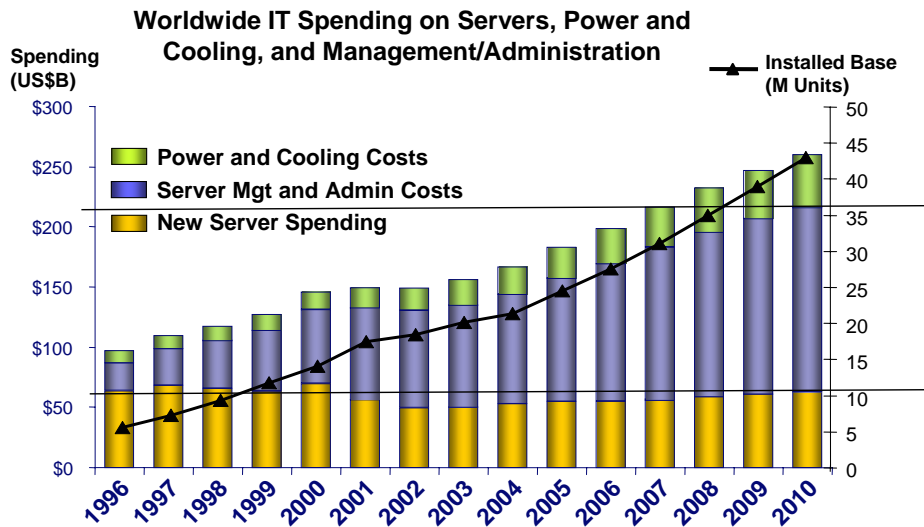


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IT Spending around the world is growing at a about twice the pace of the WorldWide cumulative Gross Domestic Product. This is not what businesses want to see. Simply put, you want your Revenue to grow faster than your Costs if you are to grow Profit. That's the end to which all businesses endeavor!

## Distributed Scale Out is a Contributing Factor



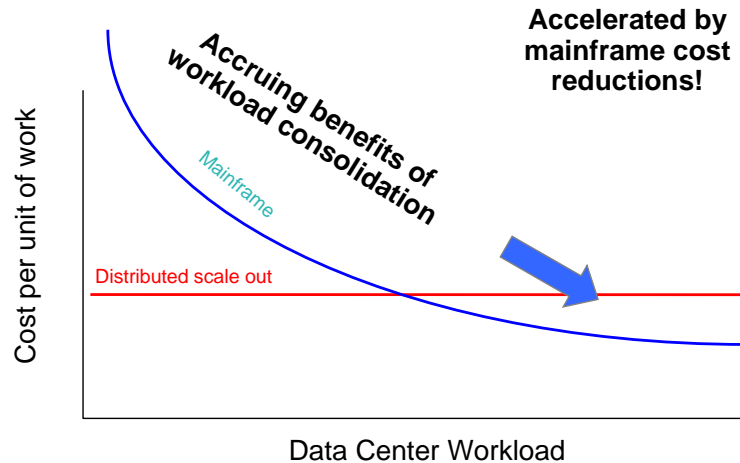
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Source: IDC Corporation

The scale out of Distributed computing is a significant contributing factor to the growth in IT spending. New server spending has remained fairly constant. But as servers grow, so have the costs related to Server Management and Administration, as well as, the Power and Cooling Costs.



## Mainframe Cost Per Unit of Work Goes Down as Workload Increases



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As you can see, this is a contrast to the value proposition of Mainframes. On the distributed machines, the cost per unit of work scales linearly as the workload grows... Whereas on the mainframe, the more you do, the cheaper it becomes per unit of work. If the decision makers truly look at the Total Cost Of Ownership (not just acquisition), this is a no brainer, the z platform is the one to grow your business on!

## What have we done lately?

CPU

+ Memory

+ I/O and disk

+ Software

+ Energy and floor space

+ People

---

**Total cost of ownership**



### Value for money

hardware pricing, CPU saving

specialty engines zIIP, zAAP, ...

compress disk space

software pricing

reductions for tiers

parallel sysplex aggregation

z990, z9, z10 -10% charge units

subcapacity, zNALC, Value Unit

What are we doing to help you hang on to your money? Cost and value is the bottom line. Total cost of ownership or TCO is a frequent conversation with executives and managers. Each of the resources has a cost, and the most costly one for customers is people costs. As the cost of computing continues to decline and the cost for people continues to rise, the future will be dominated by people costs. Many of the important changes in DB2 are to improve people productivity.

Processing costs are often the most visible charges. Some customers charge almost all costs back by processing. Processing costs continue to be reduced for general purpose processing, as CPU power increases. Specialty engines such as zIIP and zAAP reduce the cost of processing power further. The traditional cost has been expressed in thousands of dollars per MIPS, and that figure would be roughly \$140 for specialty engines today. The latest change was the z10 zIIP, with the same cost as earlier specialty engines and roughly 50% more processing power.

Software costs are higher than hardware costs for most customers, generally in a range of three to ten times higher. This is the reason that specialty engines are so attractive, as the software running on them does not incur software charges. Unit software costs continue to decline in many ways. Software charges have many options, but some of the basic tenets are consistent for most. System z software is charged for the processing capacity of the machine, taking into account multiprocessor effects, rather than using a linear scale. Larger amounts of processing power reduce the unit cost by more than 90%. The z990, z9 and z10 generations have each reduced the charging units by 10% over the prior generation. Changing from z900 to z10 processors would reduce the software charge units by about 28% for the same processing power. Additional options for reducing software charges include parallel sysplex charging, subcapacity pricing, zNALC pricing, and the new Value Unit Edition.

I/O costs include the disk space and the transfer to the processor. Both costs are addressed by the work to use System z effectively. Compression for data uses z/Architecture instructions to be efficient, with a solid track record since 1993 and improved performance in the latest generations. Index compression in DB2 9 adds to the savings.

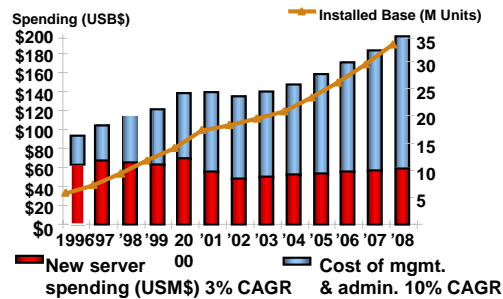
The key for pricing is the value. DB2 for z/OS delivers a very high quality of service. The service is shared, so that administration time is reduced. The amounts of processing, memory, disk and people can be reduced by effective sharing, delivering the best value for the money.



## Reduced TCO and Administration Requirements

- DB2 9 further reduces cost of ownership and System z-specific skill needs
- Improved productivity with increased consistency with DB2 family and other relational databases
- Cost reductions through processing reductions, use of zIIP, disk compression and improved memory use

IDC: Since 2000, Labor Costs Have Exceeded the Cost of All Servers ... and are Still Growing



### Decreasing cost of IT?

After consolidating SAP & DB2 on System z, IT expenses as a percentage of sales decreased from over 2% of sales to .9%!

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Improvements in total cost of ownership are very broad for DB2 9. Performance improvements include ways to reduce CPU times, reducing hardware and software costs. Both software and hardware can be reduced by using zIIP processors. DB2 9 has a new category for use of zIIP – in remote native SQL procedures and in expanded ability to run in parallel.

Improved productivity is a larger cost reduction for many customers. Productivity changes help with application life cycles and with database administration. DB2 9 reduces the need to have skills and knowledge specific to System z. Applications from other platforms and other DBMS can be ported to DB2 more easily. These changes also improve DB2 family consistency.



## Enhancing Skills for IBM Mainframes

### Today

- Training your "in-house" skills
- Road shows and workshops
- Skills vitality and certifications

### Building 20,000 Skilled Mainframe Professionals by 2010

- IBM academic initiative for zSeries
- Educating university/college students worldwide
- New and updated courses



### Simplifying Software Management for Next Generation

- Basics information
- Easy to use/learn portal
- Automated tasks and integrated software

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**IBM continues to invest in skills for the IBM mainframe, IMS and DB2** In IBM we're focusing on making IMS and the IBM mainframe environment easier to understand, use, and manage. We continue to invest heavily to build platform skills both internally and externally.

One initiative focuses on providing training and education for customer "In-house" skills, via classes, workshops, and educational materials accessible through a new education web portal. Another initiative is the Roadshows and Workshops for building understanding of mainframe value, helping customers make design decision, or leveraging core technologies, such as GDPS and the Sysplex for greater value.

We set a goal of bringing 20,000 mainframe trained resources into the marketplace by 2010, and we've made significant advancement toward that goal. One indicator is the exponential growth in IBM Academic Initiative for zSeries, up from 20 in 2004 to over 150 colleges and universities today

In addition to building skills, we are simplifying z/OS interfaces, so skills requirements to manage the environment are reduced. Tasks are being automated, eliminated, or streamlined from operations to problem determination to configuration.

**Additional Info:** Today we provide a comprehensive set of customer education programs available world wide and in a variety of formats, accessible through the portal. Our goal is to evolve the portal with new materials which leverage university courses and internal IBM education, new learning tools and classes with roadmaps and classifications ( beginner, advanced etc ) to enable greater learning. As it evolves, our customers will have access to an array of deliverables, some of which IBM uses internally, accessible from one place, there to address requirements by skill level and job assignment.

Inside IBM, we implemented multi-year technical skills vitality initiatives, with investment in the millions, focused on bringing in new talent and enhancing IBM skills through education and mentor programs. These skills will directly help customers. We also launched our zSeries Sales Certification in December 2004, and had over 300 certified partners and IBMers in the first 60 days. We will announce a technical certification shortly. Via certifications, our customers we can be assured of qualified and quality skills both inside of IBM and our partner value net.

We have added 10 new/updated courses and more by end of the year, and are making great progress in emerging markets, such as, China touching students via 7 key schools. . Other programs which aid in this growth are the Summer Faculty Seminar to educate teachers about mainframes, the addition of mainframes hubs to provide system access at no charge to faculty and students , the University Ambassadors program to establish IBM relationships with faculty and administrators, and a Student/New Hire Network to get students interested in mainframes, amongst others. This is a phased implementation enabling our new generation of IT professionals with simplified z/OS management. Many tasks will be automated, eliminated, or streamlined from operations to problem determination to configuration. Also included is an easy to use and learn z/OS management portal and z/OS "basics" information designed for new users. And of course this is integrated IBM Tivoli and other systems management products. All of these changes came as the result of a true community effort - design teams from z/OS, IBM middleware and system management product, as well as more than 40 z/OS customers.



## DB2 for z/OS Version 8

### *Extending the limits*

SQL OLTP Leadership	<ul style="list-style-type: none"> <li>• Lengths of table names, columns, statements</li> <li>• Cursor scrolling</li> <li>• New expressions &amp; recursion</li> <li>• Predicates &amp; diagnostics</li> </ul>	
Performance & scalability	<ul style="list-style-type: none"> <li>• Index, materialized query tables,</li> <li>• Faster, more efficient I/O</li> <li>• Reduce CPU with multi-row fetch &amp; insert</li> <li>• More storage, partitions &amp; log</li> </ul>	
Database changes without an outage	<ul style="list-style-type: none"> <li>• Add a new partition or rotate partitions</li> <li>• Extend columns</li> <li>• New backup and restore system</li> </ul>	
Integration with platform and applications	<ul style="list-style-type: none"> <li>• System z, z/OS &amp; TotalStorage</li> <li>• Middleware stack</li> <li>• SAP, PeopleSoft, Siebel and others</li> </ul>	


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Version 8 is the twelfth and largest ever release of DB2 for z/OS. It brings new synergy with the System z hardware and uses the z/OS 64-bit virtual addressing capabilities. V8 improves data support, application development, and query function enhancements for e-business. It also builds on the traditional System z and DB2 characteristics of availability, exceptional scalability, and performance for the enterprise database management system of choice. V8 has been re-engineered for e-business on demand, with many fundamental changes in architecture and structure. Key improvements enhance scalability, application porting, security, architecture, and continuous availability. Management for very large databases is made much easier, while 64-bit virtual storage support makes management simpler and improves scalability and availability. This new version breaks through many old limitations in the definition of DB2 objects, including SQL improvements, online schema evolution, longer names for tables and columns, longer SQL statements, enhanced Java and Unicode support, enhanced utilities, more log data sets, more partitions, and many more advantages. Customers, vendors and consultants tell us that DB2 for z/OS Version 8 is exciting for them. It is a very important milestone.





Version 8 includes dozens of changes in SQL, improving family consistency in many cases, playing leapfrog in others, pushing DB2 SQL beyond current boundaries for enhanced application portability, open standards. Longer names for tables and columns mean that customers can use more meaningful names, matching standards. Longer SQL statements help with SQL that is generated or used in an SQL procedure. Here are some: multi-row INSERT, FETCH & UPDATE, GET DIAGNOSTICS, INSERT within SELECT, IDENTITY Column enhancements, SEQUENCES, CURRENT PACKAGE PATH, Dynamic Scrollable Cursors, Common Table Expressions, Scalar Fullselect, Materialized Query Tables, Unicode SQL, XML Publishing and much more. These changes improve our customer productivity, consistency across the DB2 family and ability to port applications. If you want to design or write applications for the entire DB2 family, then use the IBM DB2 Universal Database SQL Reference for Cross-Platform Development. Many barriers that limit our customers are removed: using 64 bit memory, providing consistent table and column name lengths, allowing 2 megabyte SQL statements, 4096 partitions, and three to ten times the log space. Customers encountered many limitations over the past 20 years, and lifting the limits required extensive reengineering for some. Other limits allow improved scalability and availability, such as tripling the active log size and ten times the archive logs. Allowing sixteen times the number of partitions allows a table to use one partition per day for eleven years.

Key performance enhancements deliver better family consistency and run many times faster. Being able to make database changes without an outage, such as adding a partition, is a breakthrough for availability. Alter your table and go, no need to drop and redefine. Online schema evolution is more resilient. The most important change for many customers is the ability to use ALTER in many places instead of needing to drop and redefine. We call this online schema evolution, and it can reduce outages by hours or days for a major database structure change. Database administrators can add a partition to an existing partitioned table space or rotate the partitions. Other changes in online schema evolution allow better partitioning and improved disk access, avoiding random access with more effective database designs. Many enhancements improve our integration with System z, z/OS and with key vendor applications like PeopleSoft, SAP and Siebel.



## DB2 9 for z/OS

### Addressing Corporate Data Goals


SOA Enablement	<ul style="list-style-type: none"> <li>• pureXML</li> <li>• Optimistic locking for WebSphere</li> <li>• LOB performance, usability</li> </ul>	
Dynamic Warehousing	<ul style="list-style-type: none"> <li>• Many SQL improvements</li> <li>• Dynamic index ANDing</li> <li>• Histogram statistics</li> <li>• New built-in OLAP expressions</li> </ul>	
Simplification, Reduced TCO	<ul style="list-style-type: none"> <li>• Optimization Service Center</li> <li>• Index compression</li> <li>• Partition By Growth tables</li> <li>• Cloned tables, Not logged tablespace</li> <li>• Volume based backup / recovery</li> </ul>	
Workload Consolidation	<ul style="list-style-type: none"> <li>• More online schema changes</li> <li>• Online REBUILD INDEX</li> <li>• Trusted context and ROLES</li> <li>• Parallel Sysplex clustering improvements</li> </ul>	

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One of the key initiatives of V8 was online schema evolution, and that theme is expanding and changing to be data definition on demand. These are key improvements for resilience. One of the important changes is to be able to replace one table quickly with another. Another is to be able to rename a column or an index. A new type of table space combines the attributes of segmented and partitioned, without a partitioning key. Rebuild index can be run with much less disruption. Online table space reorganization for a few partitions is improved a lot, removing the BUILD2 phase for all types of secondary indexes. Table space and index logging can be altered. Changing DB2 early code does not require an IPL.


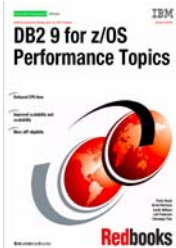
Many other improvements help with performance, with scalability and with availability. Index on an expression can be combined with caseless comparisons to improve text search. Improved insert rates can result from improved latching of the log data. Significant reductions in cpu usage are provided with new utilities.

Today's complex applications include both transactions and reporting, so performing both well is imperative. The key improvements for reporting are optimization enhancements to improve query and reporting performance and ease of use. More queries can be expressed in SQL with new SQL enhancements. Improved data is provided for the optimizer, with improved algorithms. Improved cpu and elapsed times can be achieved with the FETCH FIRST clause specified on a subquery. The INTERSECT and EXCEPT clauses make SQL easier to write.



## DB2 9 cost savings: Selected features that save CPU or storage

- Index compression
- zIIP and SQL native stored procedures
- CPU reductions in most utilities: LOAD, REORG, RUNSTATS, RECOVER, CHECK, ...
- INSERT performance enhancements
- Improved performance for VARCHAR
- Improve LOB performance and manageability
- DDF 64-bit shared memory
- 10 to 15% improvement in virtual storage
- Improved query performance
- Enhanced index split, larger pages and sequential key insert
- See much more in the DB2 9 Performance Topics redbook, SG24-7473

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Index compression can save around half of the disk space used for indexes. This is especially helpful in a data warehousing environment.

Utility cpu time reductions:

10% to 20% in Copy, Recover table space / index\*

5% to 30% in Load\*, Reorg\*, Rebuild Index\*

20% to 60% in Check Index\*

35% in Load Partition\*

30% to 40% in Runstats Index\*

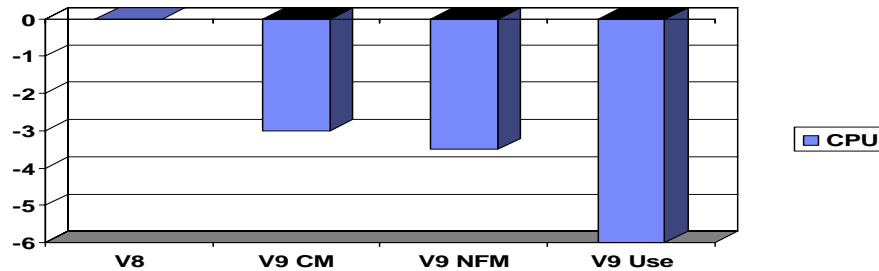
40% to 50% in Reorg Index\*

70% in Load Replace Partition with dummy input

\* Indicates that the savings are in the index processing.

See much more in DB2 9 Performance Topics redbook, SG24-7473

## DB2 9 z9, z890 & z990 performance plan example scenario



Utilities	DB design adjustments
Histogram statistics	Index improvements
REBIND	application changes
DSNZPARMS	native SQL procedures
	SQL adjustments

Your situation will vary. Less CPU is better.  
z800 and z900 expect +5% to +10% CPU

If you have a z9, z990 or z890, this is expected to be a common shape for a DB2 9 performance plan, starting with zero for the V8 baseline. When you first move to DB2 9, total DB2 CPU time generally decreases from 0% to 5% for z9, z890 and z990 customers, shown here as a first step -3%. Utility CPU reductions help immediately. Some work will be about the same (+/-3%). Start with reorgs and collect improved histogram statistics when useful. The DB2 9 CM performance plan REBINDs the primary packages and adjusts DSNZPARMS. The REBINDs provide most of the improved access paths. On z800 or z900 the initial cpu expectation is +5 to +10% regression, more if there are many columns, so making adjustments is more important.

In moving to NFM, some additional DSNZPARMS are adjusted and all plans and packages are rebound. The DB2 9 use line takes wider advantage of DB2 9 performance improvements. Database designs start taking advantage of new indexing options, such as compression, index on expression and larger pages. After making the design changes, REORG the data and REORG or REBUILD the indexes, get the improved statistics and REBIND. Native SQL procedures, added use of zIIP, and improved SQL continue the improvements in this phase.

Scenario: Customer mix of DB2 CPU time is 30% in utilities, 70% in SQL access. With 10% improvement for the utilities, we get a -3% net, assuming that SQL is the same as before. With optimization improvements, another -1/2% improvement shows up in DB2 9 NFM. Then as design adjustments, reorgs and rebinds are performed, we get improvements from varchar improvements, native SQL procedures and improved SQL, another -3%.





**Dynamic Warehousing**  
A New Approach to Leveraging Information

Information On Demand to Optimize Real-Time Processes



Action

Dynamic Warehousing

OLAP to Un...  
Recom...

Query & to Un...  
What happened

Reporting

**Dynamic Warehousing Requires:**

1. Real-time access – in context
2. Analytics – as part of a business process
3. Unstructured information – extracted knowledge
4. Extended capabilities – tightly integrated

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Traditional warehousing focused on query and reporting to understand what happened, and evolved to enable OLAP and data mining to understand the why those things happened and recommend future action.

Dynamic warehousing is a new approach to address the primary business challenges that organizations face today, which requires the ability to deliver the right information to the right people at the right time to more effectively leverage information and enable more effective business decisions. It's about information on demand to optimize real-time processes. I think of dynamic warehousing as the business intelligence analog of Service Oriented Architecture (SOA). Dynamic Warehousing includes four key abilities:

1. Support for real-time access to aggregated, cleansed information, which can be delivered in the context of the activities and processes being performed;
2. Embedded analytics that can be leveraged as part of a business process;
3. The ability to incorporate knowledge from unstructured information; and
4. A complete set of integrated capabilities that extend beyond the warehouse to enable Information on Demand

*The distinction between data warehousing and online transaction processing is blurring. Data warehousing and analytic applications are accessing operational or near-real-time data. Transactions have become more complex to provide better interaction and productivity for people. Dynamic warehousing has capabilities and strengths on all IBM platforms. The traditional mainframe strengths for consistency with operational data, high security, and continuous availability match well with dynamic warehousing. Why would you have a warehouse on DB2? That's where the data resides.*



Helping to drive down the cost of IT  
*Now even more workloads can benefit from zIIP*

- Integrate data across the enterprise, optimize resources and lower the cost of ownership
  - **Centralized data serving**
  - **Network encryption**
  - **Serving XML data** *new!*
  - **Remote mirror** *new!*
  - **Use by ISVs**
- zIIPs offer economics to help you
  - **PLUS** zIIP price same for z10 EC as z9 EC

*Available 9/07*



**IBM System z10 Integrated Information Processor and  
 IBM System z9 Integrated Information Processor**

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zIIP can help to integrate data across the enterprise by optimizing resources and lowering the cost of ownership for eligible data and transaction processing workloads

**Centralized data serving** – First to exploit zIIP were workloads such as BI, ERP, and CRM applications running on distributed servers with remote connectivity to DB2® V8

**Network encryption** – zIIP becomes an IPsec encryption engine helpful in creating highly secure connections in an enterprise

**Serving XML data** – zIIP is enabled for XML parsing, first to exploit this is inserting and saving DB2 9 XML data over DRDA®. See this paper for more detail.

DB2 9 and z/OS System Services Synergy Update,  
<http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP101227>

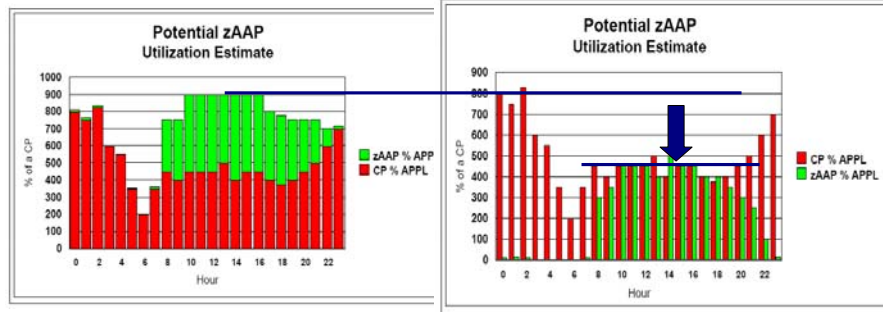
**Remote mirror** – zIIP becomes a data mirroring engine with zIIP assisted z/OS Global Mirror function (zGM, formerly XRC) helpful in reducing server utilization at recovery site (with z/OS V1.8 and above)

Exploiting of zIIPs by ISVs

zIIPs offer economics to help you

**PLUS** zIIP price is same for z10 EC as z9 EC and we offer no charge MES upgrades when moving to new technology

## Why do zIIPs, zAAPs and IFLs Reduce Cost?



1. **Hardware costs:** By moving workload from general purpose processors to zIIP, zAAP and IFL processors (higher cost to lower cost processors).
  2. **Software Costs:** license/maintenance costs based on number of and usage of general purpose central processors. Specialty engines can reduce # of CP's.
- No z/OS software charges based on zIIP, zAAP and IFL processors or usage.

zIIPs and zAAPs do not add functional capabilities, but they do address hardware and software costs. In addition to being lower cost processors for the specialty purposes, they allow you to reduce the license and maintenance cost for software on z/OS, as there is no z/OS software charge for processing running on zIIP, zAAP or IFL processors.



## DB2 & IBM zIIP value

Portions of DB2 for z/OS V8 and **DB2 9 (blue)** workloads may benefit from zIIP\*:

- 1 - ERP, CRM, Business Intelligence or other enterprise applications
  - Via DRDA over a TCP/IP connection (enclave SRBs) (enclave SRBs, not stored procedures or UDFs)
  - **DB2 9 for z/OS Remote native SQL procedures**
  - **DB2 9 XML parsing via DRDA to fully utilize zIIP**



★ New Specialty Engine

- 2 - Data warehousing applications\*: Large SQL Requests using parallel queries, including star schema

- **DB2 9 higher percentage of parallel queries eligible for zIIP**

- 3 - DB2 Utilities LOAD, REORG & REBUILD\* (DB2 utility functions used to maintain index structures)

\* zIIP allows a program working with z/OS to have all or a portion of its enclave Service Request Block (SRB) work directed to zIIP. Above types of DB2 work are those running in enclave SRBs, of which portions can be sent to zIIP.

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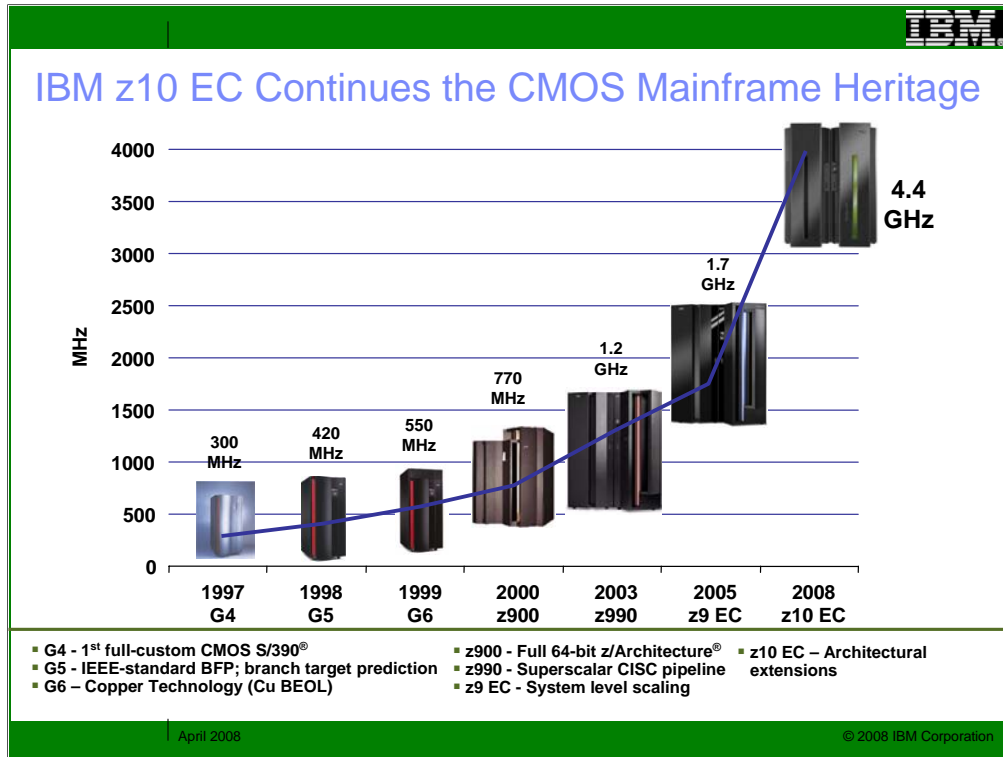
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DB2 9 uses zIIP in two new ways, remote native SQL procedures and increased use of parallelism. See presentation F06 by Terry Purcell. The zIIP is designed so that a program can work with z/OS to have all or a portion of its enclave Service Request Block (SRB) work directed to the zIIP. The above types of DB2 V8 work are those executing in enclave SRBs, of which portions can be sent to the zIIP. Not all of this work will be run on zIIP. z/OS will direct the work between the general processor and the zIIP. The zIIP is designed so a software program can work with z/OS to dispatch workloads to the zIIP with no anticipated changes to the application – only changes in z/OS and DB2.


IBM DB2 for z/OS version 8 was the first IBM software able to take advantage of the zIIP. Initially, the following workloads can benefit:

- SQL processing of DRDA network-connected applications over TCP/IP: These DRDA applications include ERP (e.g. SAP), CRM (Siebel), or business intelligence and are expected to provide the primary benefit to customers. Stored procedures and UDFs run under TCBs, so they are not generally eligible, except for the call, commit and result set processing. DB2 9 remote native SQL Procedure Language is eligible for zIIP processing. BI application query processing utilizing DB2 parallel query capabilities; and functions of specified DB2 utilities that perform index maintenance.

- For more, see <http://www.ibm.com/systems/z/ziip/>



The design of the IBM System z10™ processor chip is the most extensive redesign in over 10 years, resulting in an increase in frequency from 1.7 GHz (z10 EC) to 4.4 GHz on the z10 EC. It is designed for secure data serving, yet also was enhanced to provide improvement enhances for CPU intensive workloads. The result is a platform that continues to improve upon all the mainframe strengths customers expect, yet opens a wider aperture of new applications that can all take advantage of System z10s extreme virtualization capabilities, and lowest TCO Vs distributed platforms.

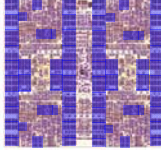

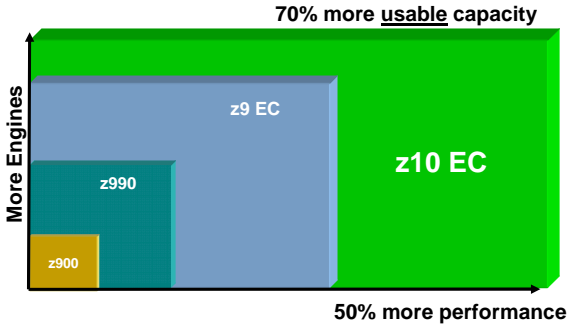


## z10 Unprecedented performance & capacity

*Transforming the economics of the data center*

- Lower software license costs
- Lower labor costs
- Lower energy and facilities costs

- Enterprise Quad Core technology – 4.4 GHz
- Up to 2x performance increase in CPU intensive tasks
- Enhanced capacity 64-way model
- Up to 1.5 TB Memory, 3x more
- 6 GBps InfiniBand® for faster I/O and Coupling Links

70% more usable capacity

z900    z990    z9 EC    z10 EC

50% more performance

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*IBM's next-generation, 64-processor mainframe, which uses Quad-Core technology, is built from the start to be shared, offering greater performance over virtualized x86 servers to support hundreds to hundreds of millions of users.\*1*

*The z10 also supports a broad range of workloads. In addition to Linux, XML, Java, WebSphere and increased workloads from Service Oriented Architecture implementations, IBM is working with Sun Microsystems and Sine Nomine Associates to pilot the Open Solaris operating system on System z, demonstrating the openness and flexibility of the mainframe.*

*From a performance standpoint, the new z10 is designed to be up to 50% faster and offers up to 100% performance improvement for CPU intensive jobs compared to its predecessor, the z9, with up to 70% more capacity.\*2*

*[http://www.ibm.com/systems/z/news/announcement/20080226\\_annnc.html](http://www.ibm.com/systems/z/news/announcement/20080226_annnc.html)*



## IBM System z10 Benefits for DB2

- **Faster CPUs, more CPUs, more memory**
  - 50% more n-way performance “on average”
  - 62% more uniprocessor performance
  - 70% more server capacity (56->64 CPUs)
  - Up to 64 CPUs, z/OS 1.9 needed for 64-way in a single lpar
  - Up to 1.5 TB, z/OS 1.8 needed for >256G in a single lpar
- **Infiniband Coupling Facility links**
- **New OSA-Express3, 10 GbE for faster remote apps**
- **HiperDispatch**
- **Hardware Decimal Floating Point facility**
- **1MB page size (DB2 X plans to exploit)**
- **50+ instructions added to improve compiled code efficiency (DB2 X plans to use)**

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The new z10 has faster processors and more processors. One early measurement showed 40-50% throughput improvement or approximately 30% CPU time improvement with z10 compared to z9. Larger memory: DB2 users can potentially see higher throughput with more memory used for DB2 buffer pools, EDM pools or SORT pools. Improved IO: improvements in the catalog and allocation can make the large number of datasets much faster and easier to manage. Disk IO times and constraints can be reduced.

Substantial improvements in XML parsing can result from use of the zIIP and zAAP specialty engines. The z10 zIIP and zAAP engines are much faster at no additional cost. The zIIP processors can be used for XRC processing.

**HiperDispatch:** Only available on z10 EC. Combination of z/OS software and firmware. Minimum z/OS R1.7 + IBM zIIP Web Deliverable Support for z/OS V1.7 to enable HiperDispatch. z10 EC Driver level 73G. Single HIPERDISPATCH=YES z/OS IEAOPTxx parameter dynamically activates HiperDispatch



## z/OS 1.10 Benefits for DB2

- **Extended Addressing Volumes up to 223 GB/volume**
  - VSAM data sets only at first (enabled for DB2 database objects)
  - Needs appropriate DS8000 ucode, DB2 apars on V8 / DB2 9
- **Additional XML use of zAAP and zIIP<sup>1</sup>**
- **z/OS XML performance enhancements**
- **WLM enhancements for lower priority lock holders to boost priority when higher priority waiters (DB2 X plans to exploit)**
- **TCP/IP performance enhancements**
- **HiperSockets Multiple Write Facility for better performance for bigger message sizes (like DRDA)**
- **Hash DSAB for better Open/Close performance**
- **Basic Hyperswap<sup>2</sup> to remove DASD controller as a single point of failure**
- **zIIP assisted Global Mirroring (XRC)<sup>2</sup>**

<sup>1</sup> Planned rollback to z/OS 1.7

<sup>2</sup> Planned rollback to z/OS 1.9

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The current maximum of the DASD space is 64K cylinders per volume. z/OS 1.10 will lift the limit and support up to 256K cylinders (higher on the future release) with EAV based on DS8000.

APARs PK58291 and PK58292 provide EAV support in DB2.



## Summary

- Significant performance gains for IBM software running on System z
- New software announcements further benefit System z customers
  - Utilizing System z as an information hub
  - Applying modern processes and software lifecycle management tools
  - Foundation for transaction-based workloads and SOA
  - End-to-end visibility, control and automation across the service management, technical support, operations, security and financial management
- System z platform for new workloads helps clients attain
  - Faster response to demands by business for change
  - Reduced dependency on specialized skill-sets
  - Reduced cost of workloads, management, and risk associated with changing IT infrastructure
  - Better alignment of IT with business
- DB2 for z/OS improvements and cost savings

### New software announcements further benefit System z customers

Utilizing System z as an information hub

Applying modern processes and software lifecycle management tools to the mainframe

Foundation for transaction-based workloads and SOA

End-to-end visibility, control and automation across the service management, technical support, operations, security and financial management



DB2 for z/OS Business Value

# Questions?



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Thanks for coming. We appreciate your questions and are looking forward to your feedback in the question and answer session.