

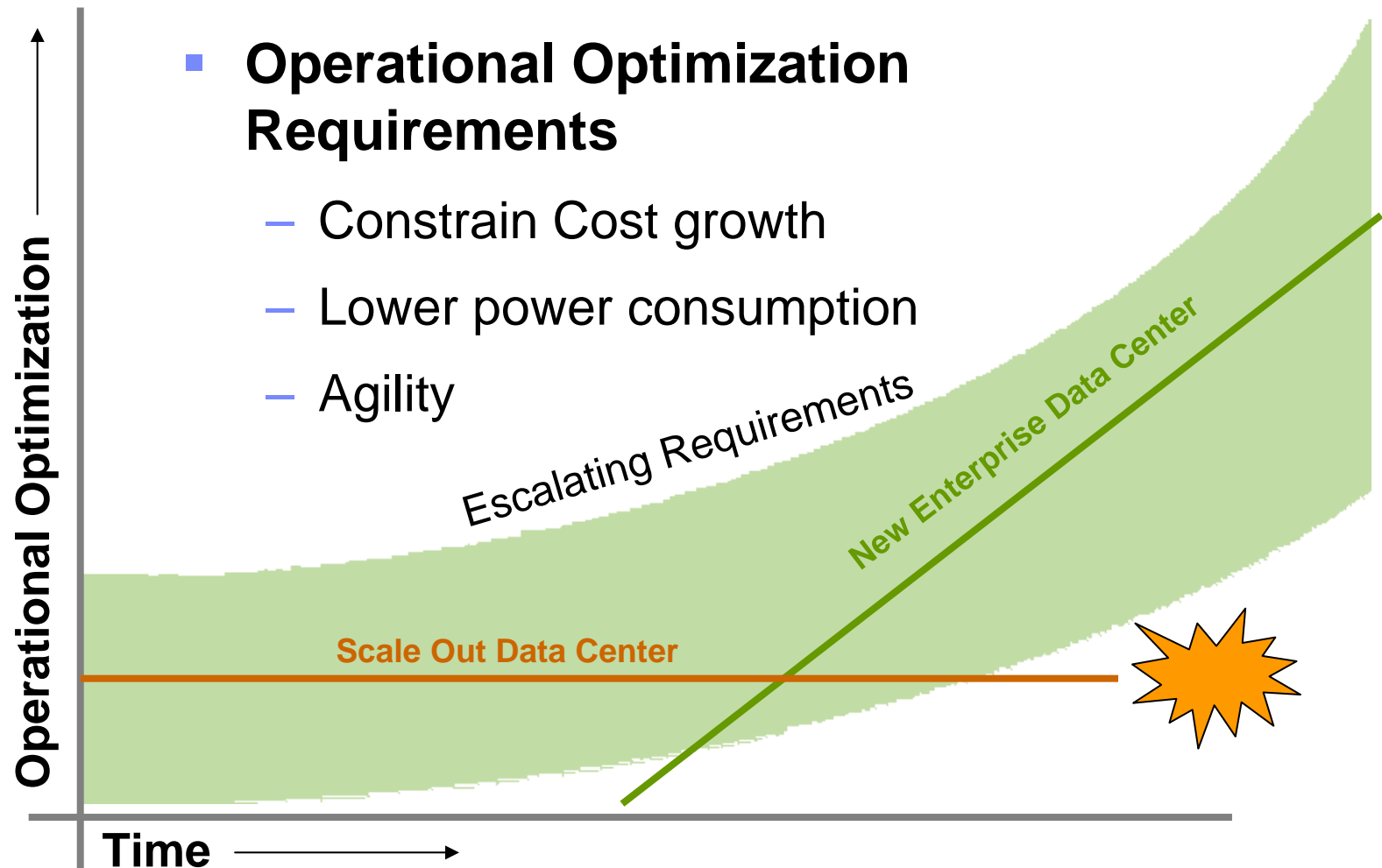


Positioning System z Strategy and Investments

Ray Jones
WW Vice President, z Software



New Enterprise Data Center – Reinventing The Data Center To Meet Requirements



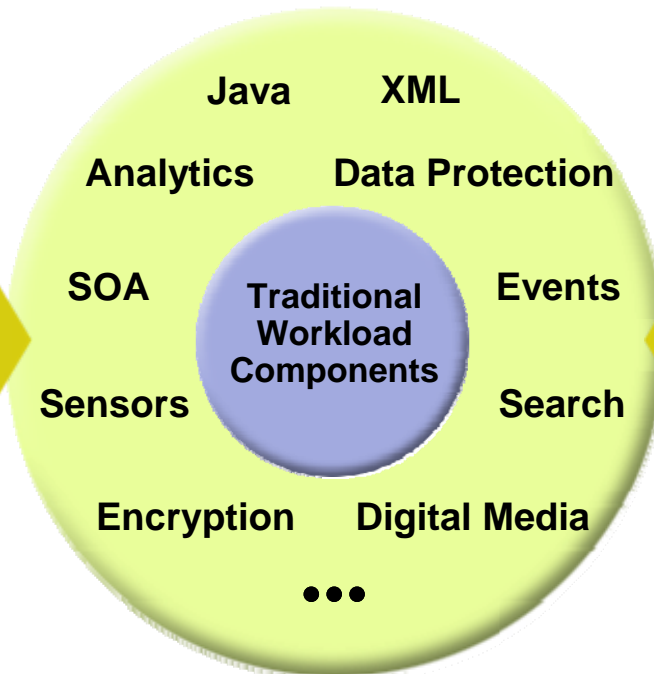
Evolving & emerging applications will drive systems optimization

Both enterprise and special purpose capabilities will be needed – integration will be critical

Evolving & Emerging Workload Components

Special purpose systems and accelerators

Optimized for a broad set of applications or components



Optimized for a specific set of applications or components

Hybrid systems will optimize to workloads

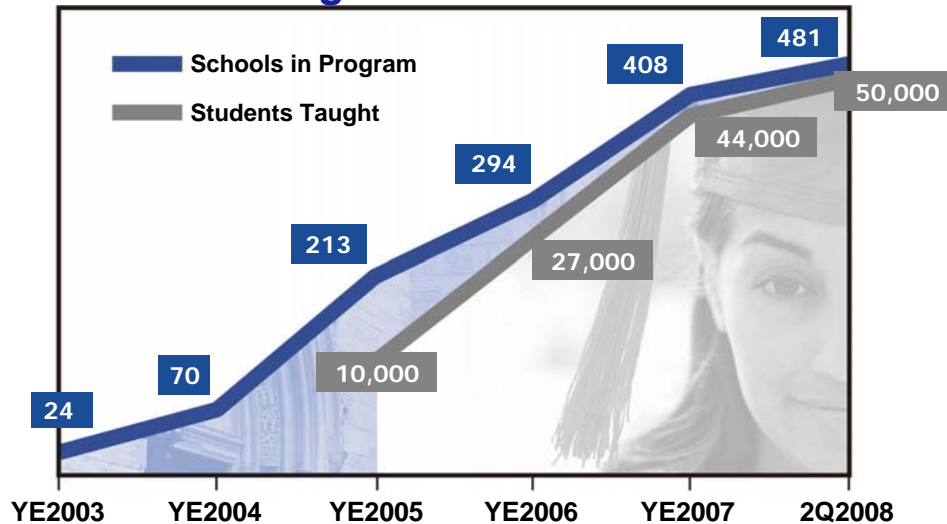
The z Software Strategy



- **Reinvigorate the System z Ecosystem:**
 - Attract New System z Customers and Application Workloads
 - Retain and Grow Existing System z customers
 - Make the Mainframe Relevant to a new IT Generation
- **Platform Modernization and Simplification are key:**
 - Evolve as a Modern Server
 - Systematic Reengineering of the Software Stack
 - More Open Standards Compliant and Common Middleware
 - Integration with the z Platform for Added Functions
 - Accelerate innovation on System z with new Application Development Capabilities
 - Deliver Extensive Data Management Services
 - Leading Edge Relational Function
 - Reinvigorated Data Warehousing Competitiveness
 - Autonomic Tooling to Augment Human Expertise
 - Bring Virtualization to a new Level
 - Logical as well as Physical Consolidation
 - Manage many Systems as if they were One
 - More End to End Management Capability from a z Central Point of Control

Adding mainframe skills for the community

Growing Academic Initiative



Available at the Summit



- Participation – 481 schools registered, >50,000 students attended mainframe education
- 25 z roundtable events held on campuses across the US
- 1136 schools /9 countries participated in Student Mainframe Contest
- Access to mainframes world wide for schools
- Customers are connecting with schools enabled by IBM's Academic Initiative

ISV Ecosystem Continues to Grow

- **Continued growth on the z platform in 2008**
 - Over 100 new ISV partners
 - More than 125 new Linux applications added
 - 89 new/upgraded WebSphere® and DB/2 on z/OS application/tools
- **ISV Partner loyalty**
 - Over 3,000 applications on z/OS 1.7 and above (including 176 early z/OS 1.10 adopters)
 - 86% of our ISVs maintain OS currency
- **Increased investments**
 - Remote access, developer discounts, ISV partnering and training, Linux programs, consultative support, public sector ISV program management
- **Strengthened relationships and teaming, e.g.:**
 - Oracle and System z Linux solutions
 - SAP data serving, business intelligence, new rate card
 - SAS Enterprise Business Intelligence
 - ACI and eFunds retail banking payments solutions
 - Oracle FLEXCUBE CoreBanking (retail) enabled on z/OS on DB2 and WebSphere



z/OS V1.10 Preview - Integration with the z10

... scalability and performance

- HiperDispatch for intelligent dispatching of work for optimized performance¹
- Up to 1TB of real memory² and 64 processors (zIIPs, zAAPs, and CPs)³ per LPAR
- Extended Address Volume (EAV) capability for large storage volumes, improved storage management^{4,5}
- Large (1 MB) pages expected to reduce memory management overhead for exploiting applications³
- Support for Hardware Decimal Floating Point enables high performance computing for your commercial workloads³
- Support for InfiniBand Coupling Links^{1,6}

... networking and connectivity

- Policy-based networking helps create a network responsive to your application needs¹
- Automatic intrusion defense capabilities⁴

...availability

- Basic HyperSwap – for high availability disk^{3,*}
- Parallel Sysplex and GDPS enhancements

... simplified operations

- Capacity Provisioning Manager can monitor and dynamically activate/deactivate capacity³
- New z/OS Management Facility – planned – a single, modern, Web-browser based management console for z/OS, intended to simplify day to day operations and administration of a z/OS system. *

....improved economics

- Added XML exploitation of specialty engines³
- zIIP assisted z/OS Global Mirror (XRC)³

(1) available with z/OS V1.7 with appropriate maintenance

(2) available with z/OS V1.8 and appropriate maintenance, 1TB memory on z10 E56 and E64 only

(3) available with z/OS V1.9 and appropriate maintenance

(4) planned for z/OS V1.10

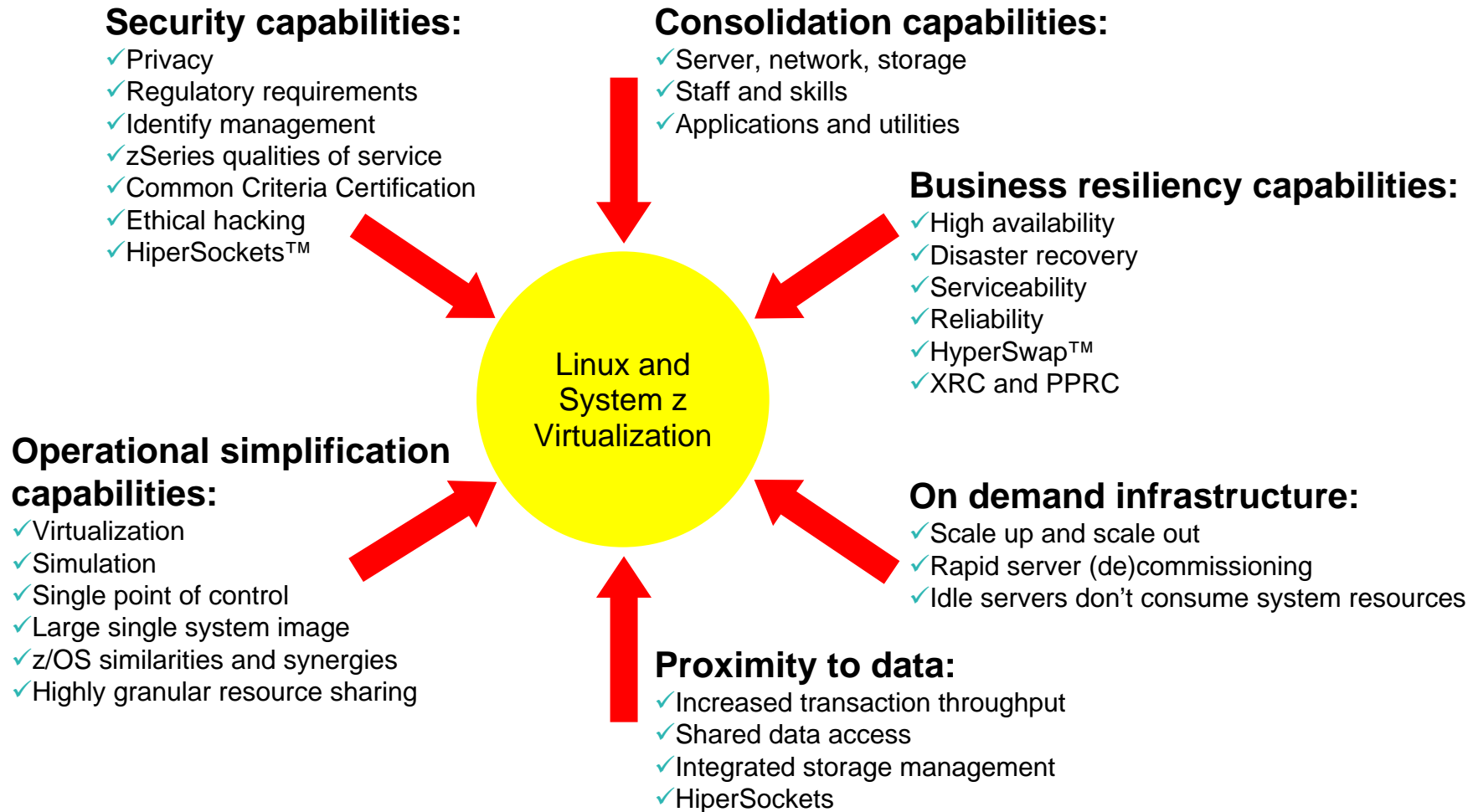
(5) with appropriate storage

(6) Planned availability 2Q08

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

Linux and z/VM on System z

Providing Value Propositions for Linux Workloads



Choices To Run A Banking Workload



HP Servers



HP Servers with VMWare



System z10

	<u>HP Servers</u>	<u>HP Servers with VMWare</u>	<u>System z10</u>
Server Model	DL145	DL585	System z
# of Servers	350	45	1
Cores	700	360	24
Memory GB	700	720	352
Software Licenses	742	352	40
System Administrators	35	18	5
Floor Space (m ²)	12.5	7	5
Utility (kWh/Year)	3.2M	697K	127K

**5 to 7
millions
annual
operational
savings
with
System z**

2,466,450 rated capacity

1,263,555 rated capacity

14,238 MIPS

Low Utilization

Medium Utilization

High Utilization

Compiler Optimizations & Performance

- **Maximize Exploitation of z10 Hardware Architecture¹**
 - Exploit latest hardware without need of expert knowledge of architecture
 - Enables users to exploit performance edge of hardware without source code changes
 - Exploit 36 NEW z10 instructions from the General-Instructions-Extension facility
 - Exploit IEEE Decimal Floating-Point (DFP)
 - Exploit Additional Floating-Point Registers (AFP)
 - Exploit 64-bit instruction set and registers even in 32-bit code
 - Support IEEE Binary Floating-Point which eases platform portability
 - Maximize application performance using new & innovative optimization technologies
 - Reduces total cost of ownership
 - Up to 10-25% Performance Improvements²

¹ Individual features in the content list may not be applicable to all IBM compiler languages. Check specific language documentation for details.

² Performance improvement results based on select benchmarks. Results will vary depending on application.

Run-time Environment

High-Volume Transaction Processing for Mission-Critical Applications

WebSphere

- WebSphere portfolio is designed to be common across all platforms
- Use of Java insulates the programs from the actual platform and provides the cross-platform portability
- Common code provides the same functionality across platforms
- Common set of APIs
- Common programming model, common administrative functions

CICS

- Support of CICS transactions as a services requester or services provider in an SOA with full support for WSDL and SOAP

IMS

- Provides connectivity infrastructure to integrate and re-use services within an SOA
- IMS SOAP Gateway exposes IMS transactions as Web services and provides access without additional software requirements

WebSphere Application Server v7.0 (3Q 2008)

Standards Currency

- Standards currency with Java EE 5, including EJB 3.0, enhances productivity and ease of use.
- New JDK 6 for improved performance and reduced footprint.
- Enhanced Web services standards.

Consumability, Simplicity and Performance Improvements

- Flexible systems management options.
- Enhanced diagnostic tools that help pinpoint problems.
- Security enhancements.
- New virtual image delivery option.
- Tight integration across the WebSphere family of products improves ROI .

New Application Types and Workloads

- Improved performance, scaling and reliability.
- Reduced cost of managing and administering large numbers of individual servers.

Performance

- ✓ Improvements in response time for static and dynamic content with Fast Response Cache Acceleration in z/OS 1.9.
- ✓ Increased application runtime performance with focused analysis and code path improvement effort for JEE, WebServices and Connectors.

High Availability and Reliability

- ✓ High Availability Manager based on Cross-System Coupling Facility (XCF).
- ✓ Thread Hang Recovery improves server reliability and performance.

Consumability and Usability

- ✓ Redesigned data collection facility to improve chargeback capabilities.
- ✓ More unified install and configuration tasks (load modules in HFS).

Simplification for faster time to market

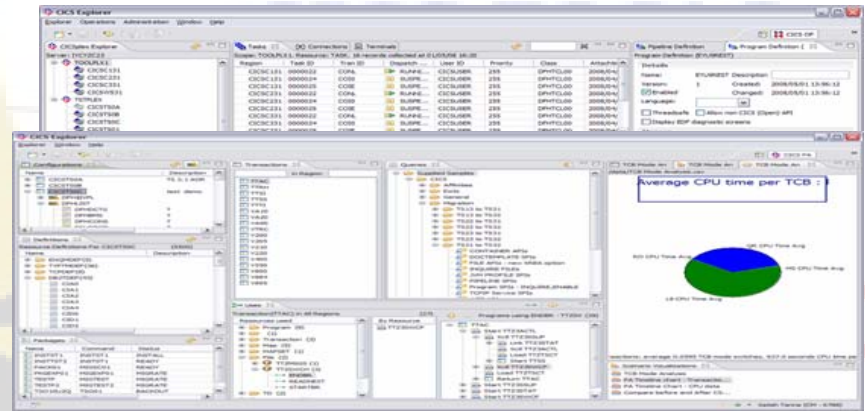
CICS Explorer - New Face of CICS



Foundation



- Simplified access to CICS
 - Extending the success of eclipse based Explorers to CICS
 - Delivering revolutionary integration of development, administrative, and operations tools
- Enable new staff to become effective almost immediately
- Enable shorter development cycles
- Provide faster time to market
- Improve productivity & protect service-levels
- Offer reduced cost of ownership for key CICS applications



“1000 times better than the previous UI.” - Customer
 “I believe it will be greatly received in our environment.
 Two of our development groups are keen to try it as soon
 as it becomes available.” - Independent Software Vendor
 “Much, much more intuitive”, “A lot more room to grow”,
**“If you are not using it,
 or you're not trying it, well, you should!”**
 - Gary Barnett, The Bathwick Group



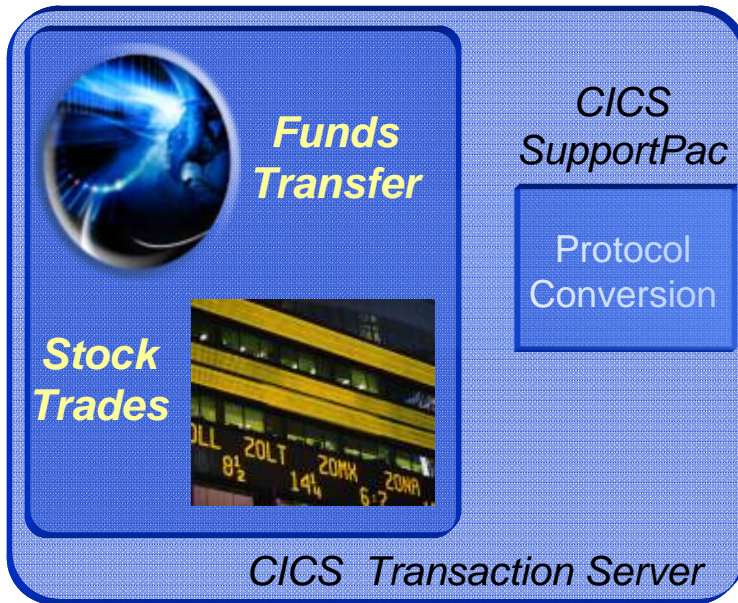
Visibility

IBM Powers Events on the Mainframe

Business Event Processing for 3,000+ CICS Customers

**Coming
4Q2008**

CICS Event Sources



Detect fraud and take action

Event Streams



WebSphere Business Events



WebSphere Business Monitor

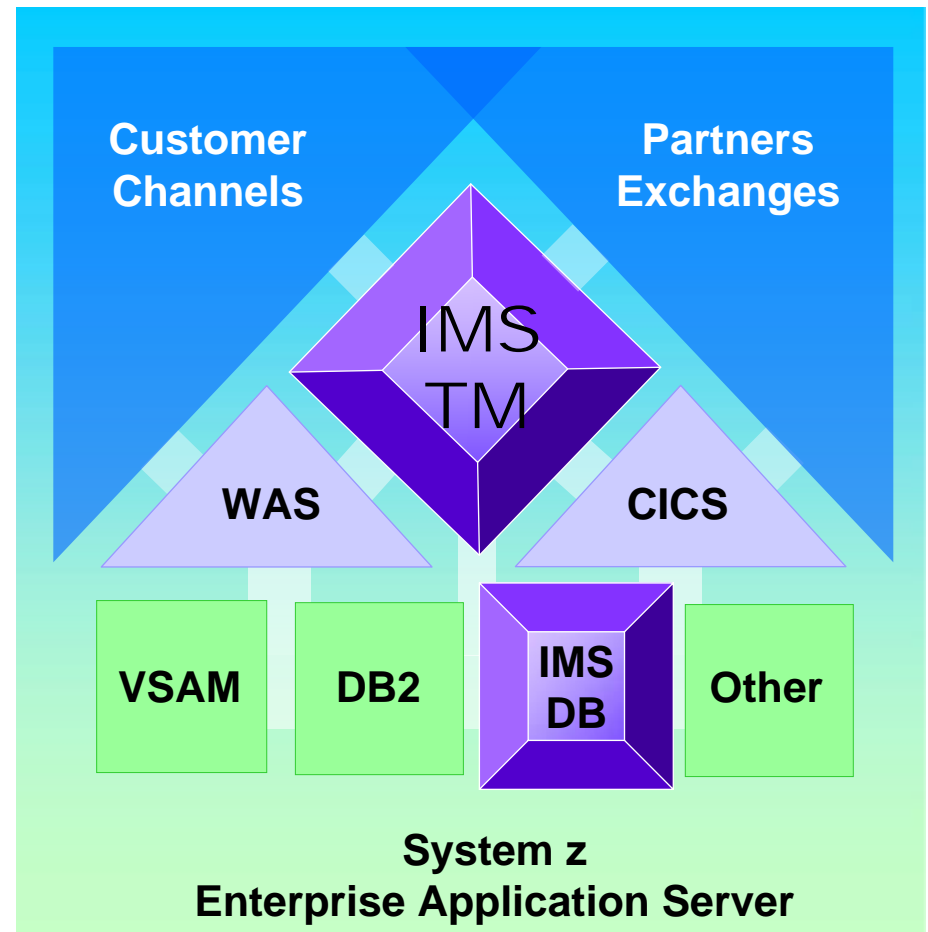


WebSphere Process Server

Achieves visibility, business agility, governance and fraud recognition

IMS: The High-Performance Application and Data Server for System z

- * Integration focal point for SOA: key to successful Enterprise Architecture services
- * Remarkable performance
- * Rock-solid reliability and security
- * Most cost efficient run-time environment
- * Integrated message queuing, transaction processing and data base management
- * Open, standard interfaces allowing 'any-to-any' connectivity and access
- * Fully integrated into today's A/D toolsets
- * Natural XML support
- * Flexibility and investment protection: Robust runtime support including JAVA, C, COBOL, PLI and Assembler

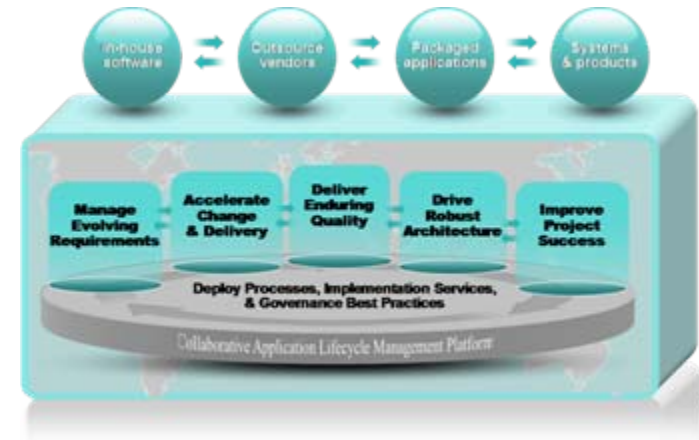


Learn more at www.ibm.com/ims

Software Delivery Platform

Multi-Platform Application Development

- Common Eclipse-based IDEs ... same look and feel similar to Java and Microsoft's IDEs
- Common programming model based on EGL, provides a platform-independent model for developing cross-platform SOA and Web 2.0 applications and deploying optimized code for the target platform (J2EE application server, IMS, CICS)
- Integration of mainframe runtime assets into Web 2.0 and an SOA runtime
- Compiler commonality across platforms



- Same software testing and quality management tools
- Multi-platform discovery, re-use and management of software assets
- Consolidated team infrastructure leveraging "Jazz" to increase collaboration and communication

Software innovation through collaboration

- "Think and work in unison"
 - Integrated source control, work item and build management
- Assess real-time project health
 - Capture data automatically and unobstrusively
- Automate best practices
- Real time, in-context team collaboration
 - Make software development more automated, transparent and predictive
 - Dynamic processes accelerate team workflow
 - Out-of-the-box or custom processes
- Unify software teams
 - Integrate a broad array of tools and clients
 - Extend the value of ClearQuest and ClearCase
 - Support for System z (3Q)

IBM Rational Team Concert

transparent *integrated presence*
 wikis OPEN real-time reporting
 chat automated hand-offs Web 2.0
custom dashboards automated data gathering
EXTENSIBILITY *Eclipse plug-ins* services
 architecture **FREEDOM TO CREATE**

JAZZ TEAM SERVER

Open and extensible on

jazz

- ✓ Collaborate in context
- ✓ Right-size governance
- ✓ Day one productivity

IBM Data Studio



Data Architect

- Design
- Logical Modeling
 - Physical Modeling
 - Integration Modeling

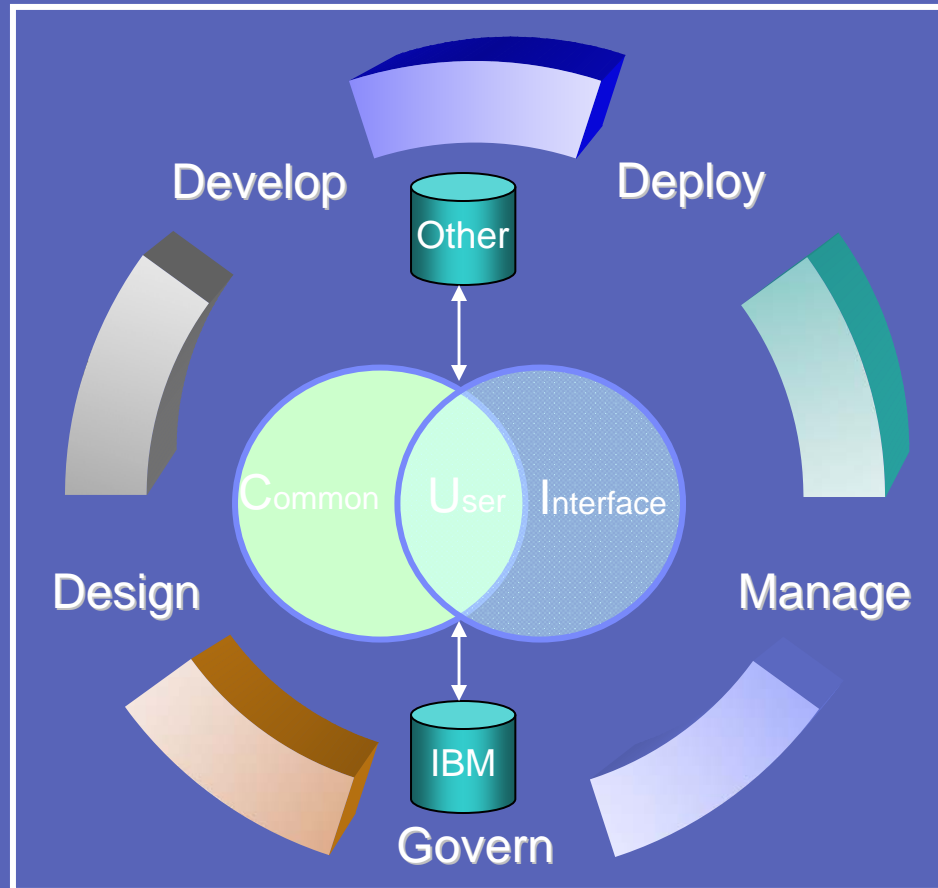
- Develop
- Coding
 - Debugging
 - Teaming
 - Testing
 - Tuning



Application Developer



Database Developer



A Consistent and Integrated Solution



Database Administrator

- Manage
- Database Administration
 - Data Management
 - Change Management
 - Recovery Management
 - Storage Management
 - Performance Management

- Govern
- Security Access
 - Security Analysis
 - Data Auditing
 - Data Archiving
 - Data Masking
 - Data Encryption



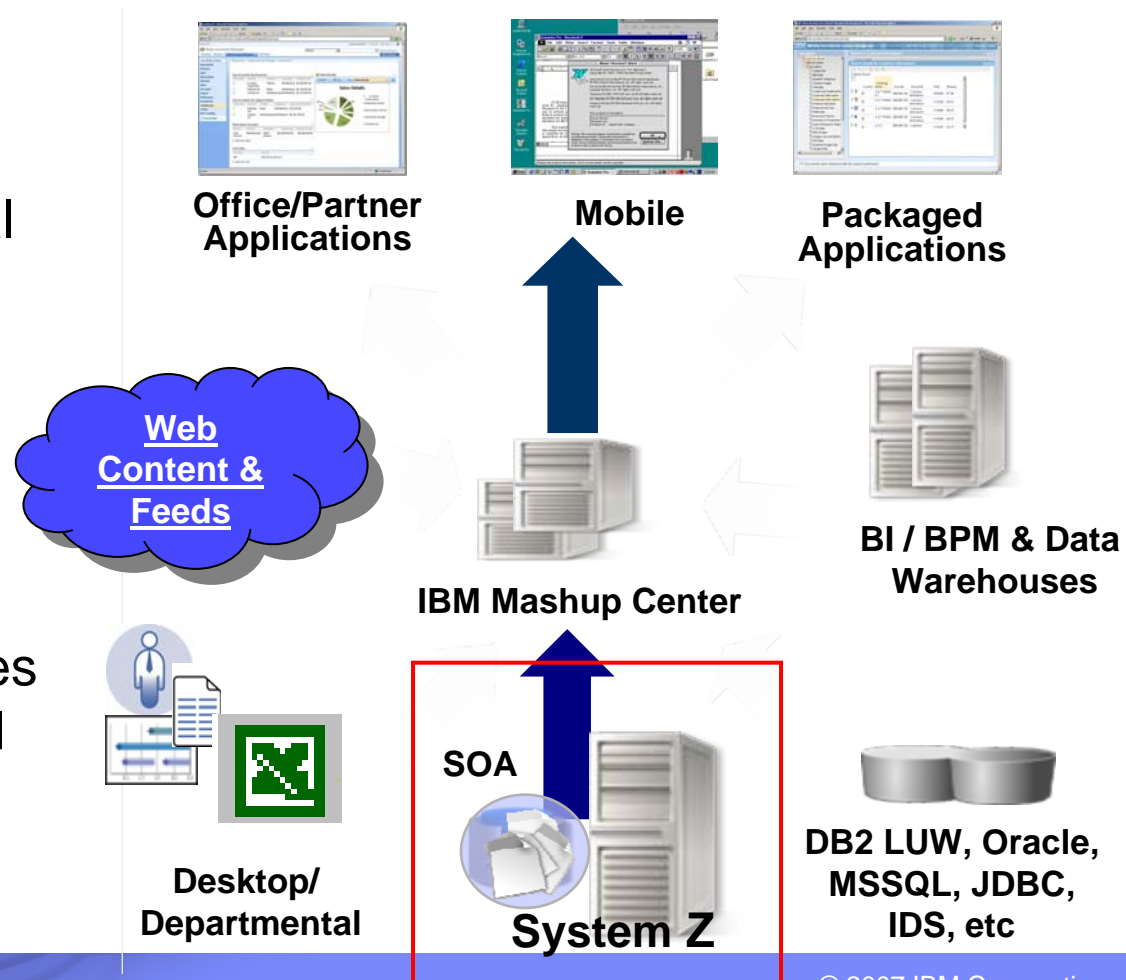
Security Administrator

Enterprise Modernization & Web 2.0

Mashups with IBM Mashup Center

- ✓ Unlock System z data for use in Web 2.0 mashups
- ✓ Mashup System z data with web, personal, departmental & enterprise information
- ✓ Reduce development costs with reuse of existing IT assets
- ✓ Reduce cycle time to minutes not weeks with LOB created applications

IBM Mashup Center Extends System z Data Management repositories into new applications & new consumption modalities



Information Management

Commonality Across Platforms

- Common client for accessing databases. Identical database semantics across SQL, XQuery (XML), JDBC, ODBC, etc.
- Identical methods to transform stored procedures or queries into Web services
- Same database logical and physical design tools
- Database developer productivity optimized across platforms with tools such as IBM Data Studio, Rational Data Architect, and IBM Optim
- Same Eclipse-based GUI database application development tools

People, Processes, Applications



- Content repositories located on multiple platforms are virtualized for platform-neutral access with IBM's Information Integration Content Edition
- New CMIS content standard enables applications to interoperate with multiple ECM repositories from different vendors on different platforms
- Common set of database admin. and SQL tuning tools
- Information Server provides appropriate connectors for common applications

DB2 for z/OS Technology Themes

- ✓ **Extend the lead in transaction processing availability, scalability and performance**
- ✓ **Reduce cost of ownership and System z-specific skill needs**
- ✓ **Enable high-volume transaction processing for next wave of applications**
- ✓ **Improve data warehousing and OLTP reporting**

DB2 9 for z/OS delivers on more than 225 requirements submitted by customers, business partners, and worldwide user group communities

Next DB2 release will continue driving these themes

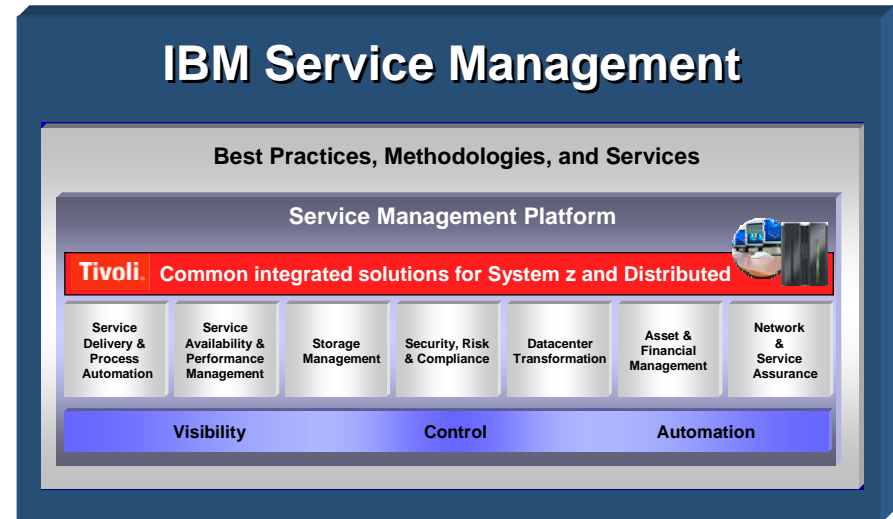
Service Management

Enterprise-wide Unified Service Management Across All Platforms

Common User Experience

- End-to-end management across all platforms
- Common user interface / Dashboards
- Unified reporting
- Process flows based on ITIL v.3
- Automated, integrated threshold setting and reporting across z and distributed platforms
- Common data warehouse for integrated reporting
- Common financial and asset management across all platforms

IBM Service Management



Built on a Common Infrastructure

- Monitoring solutions all use a shared infrastructure across all platforms
- Process automation engine based on a shared infrastructure – common solution for discovery & configuration management
- Business Service Management based on a shared infrastructure for events

Investment in System z for Hybrid Systems Management



Linux on System z Management

Delivered ITSM infrastructure, systems and workload automation as well as provisioning and deployment solution to Linux on System z – providing a centralized ISM infrastructure on the most reliable platform in the industry



Asset & Financial Management

Continue to invest in asset management – both IT and Enterprise assets, software license usage, capacity management and usage and accounting



Green Data Center

IBM's Project Big Green dedicating \$1 billion to energy topics over the next three to five years, aims to deliver new, power-centric management solutions designed to help our customers reduce IT data center power consumption. IBM Tivoli Monitoring for Energy Management is the only product on the market that provides visualization into the data center energy usage.



SOA Management

Invested in a comprehensive integrated SOA service lifecycle management solution running on System z



End-to-End Security Management

IBM continues to focus on the enterprise security market, spending \$1.5 billion on security research and integration to round out our security offerings

Project 'Big Green'



Double compute capacity with no increase in consumption or impact by 2010

IBM to reallocate \$1 billion each year

- To accelerate “green” technologies and services
- To offer a roadmap for clients to address the IT energy crisis while leveraging IBM hardware, software, services, research, and financing teams
- To create a global “green” team of almost 1,000 energy efficiency specialists from across IBM

Re-affirming a long standing IBM commitment

- Energy conservation efforts from 1990 – 2005 have resulted in a 40% reduction in CO2 emissions and a quarter billion dollars of energy savings
- Annually invest \$100M in infrastructure to support remanufacturing and recycling best practices

Major proof point for Project Big Green

IBM'S PROJECT BIG GREEN SPURS GLOBAL SHIFT TO LINUX ON MAINFRAME

ARMONK, NY, August 1, 2007

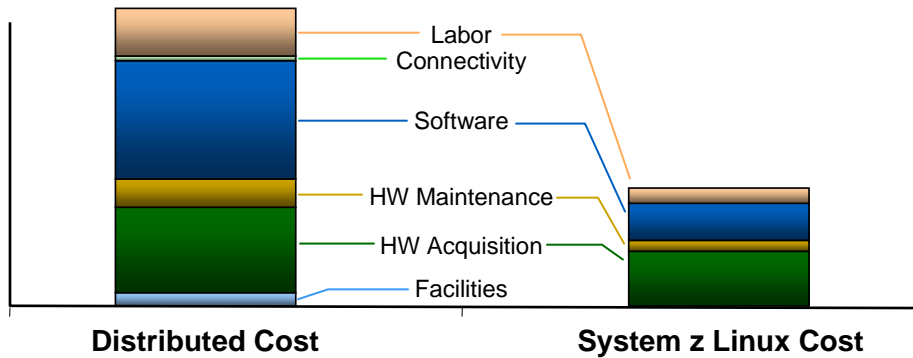
- *IBM will consolidate and virtualize thousands of servers onto approximately 30 IBM System z™ mainframes*
- *Substantial savings expected in multiple dimensions: energy, software and system support costs*
- *The consolidated environment will use 80% less energy and 85% less floor space*
- *This transformation is enabled by the System z sophisticated virtualization capability*



Think what we could do for you

Client View of TCO Comparison for Similar Distributed Workload vs. System z Linux results in Potential 60-75% Gross Costs Savings / 5 yrs

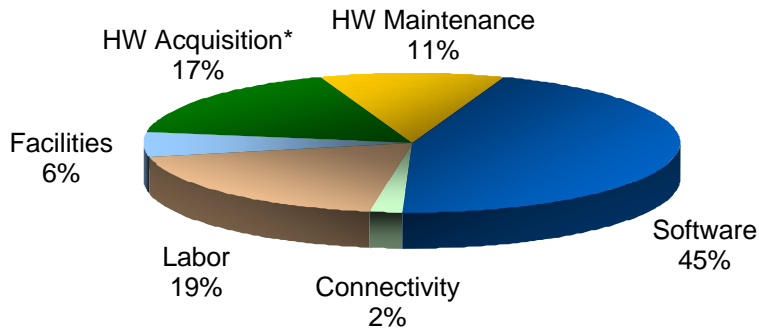
Operating Cost: Distributed vs. Mainframe



Dramatic Simplification

Unit	Distributed	System z Linux	% Reduction
Software Licenses	26,700	1,800	93%
Ports	31,300	960	97%
Cables	19,500	700	96%
Physical Network Connections	15,700	7,000	55%

Potential Savings: Categories as a % of Gross Savings



* HW Acquisition compares server/disk refresh of distributed environment to the cost of acquiring new mainframes/storage

Results will vary based on several factors including # of servers and work load types

Summary

- **We are delivering a New Generation of z Software and Hardware**
- **The z Ecosystem Now Enables Leap Frogging to the Next Generation of Applications**
- **System z is Being Rearchitected for Enterprise Data Serving**
- **Evolving and Emerging Applications are Driving Hybrid Systems Approaches**
- **Its All About the Economies of Scale and How z Capability and Quality of Service makes a Difference – especially in hybrid topologies**