IBM Software Group

z9 Executive Software Briefing

Maximize Your Investments in Mainframe Software

Ray Jones

WW Vice President, z Software

March 2006

e business on demand.

The New Face of z/OS

Simplifying and Modernizing the Mainframe for the New Generation of IT Professionals

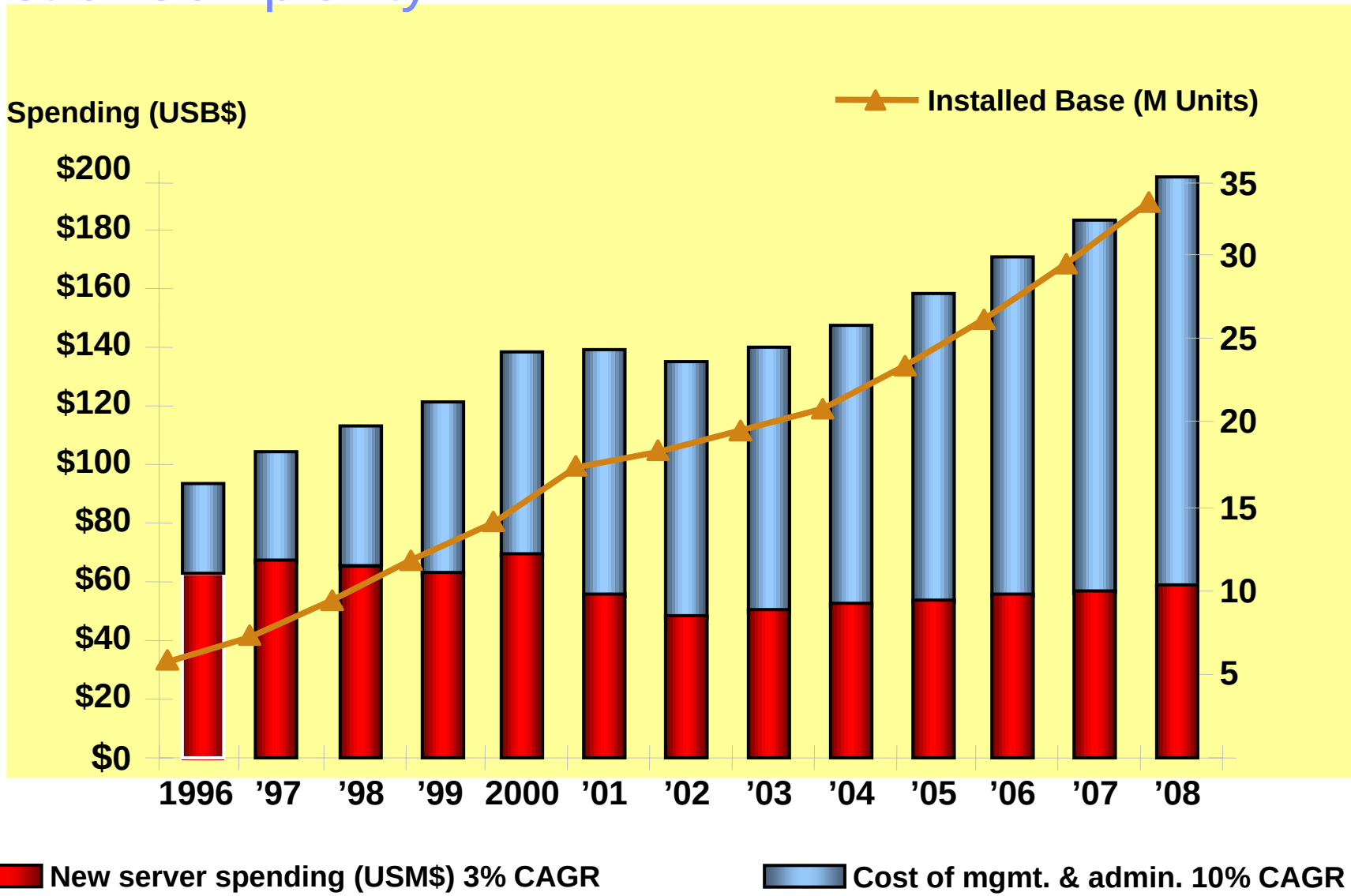
Fill the pipeline with new talent:

- IBM Academic Initiative is reaching out to colleges and universities
- Emerging Country Mainframe Growth Initiatives
- WebSphere z/OS Application ISV Porting Initiative

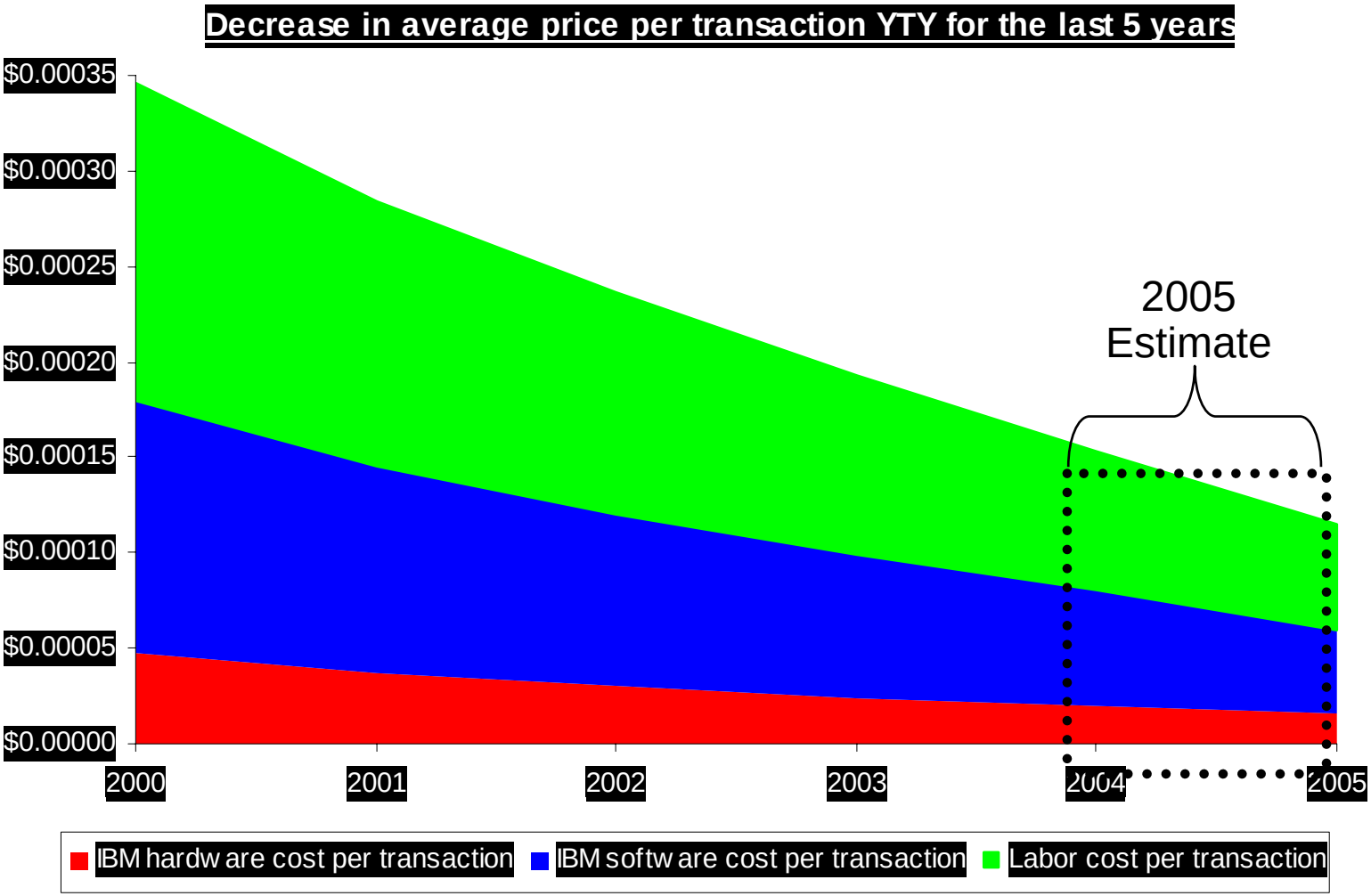
Reduce z/OS complexity; make it easier to develop experts:

- Eliminate, automate, and simplify complex tasks
- Modernize the “face” of z/OS
  - Maintain current “faces” for experienced users
- Leverage cross-platform management solutions from IBM

Cost of Complexity



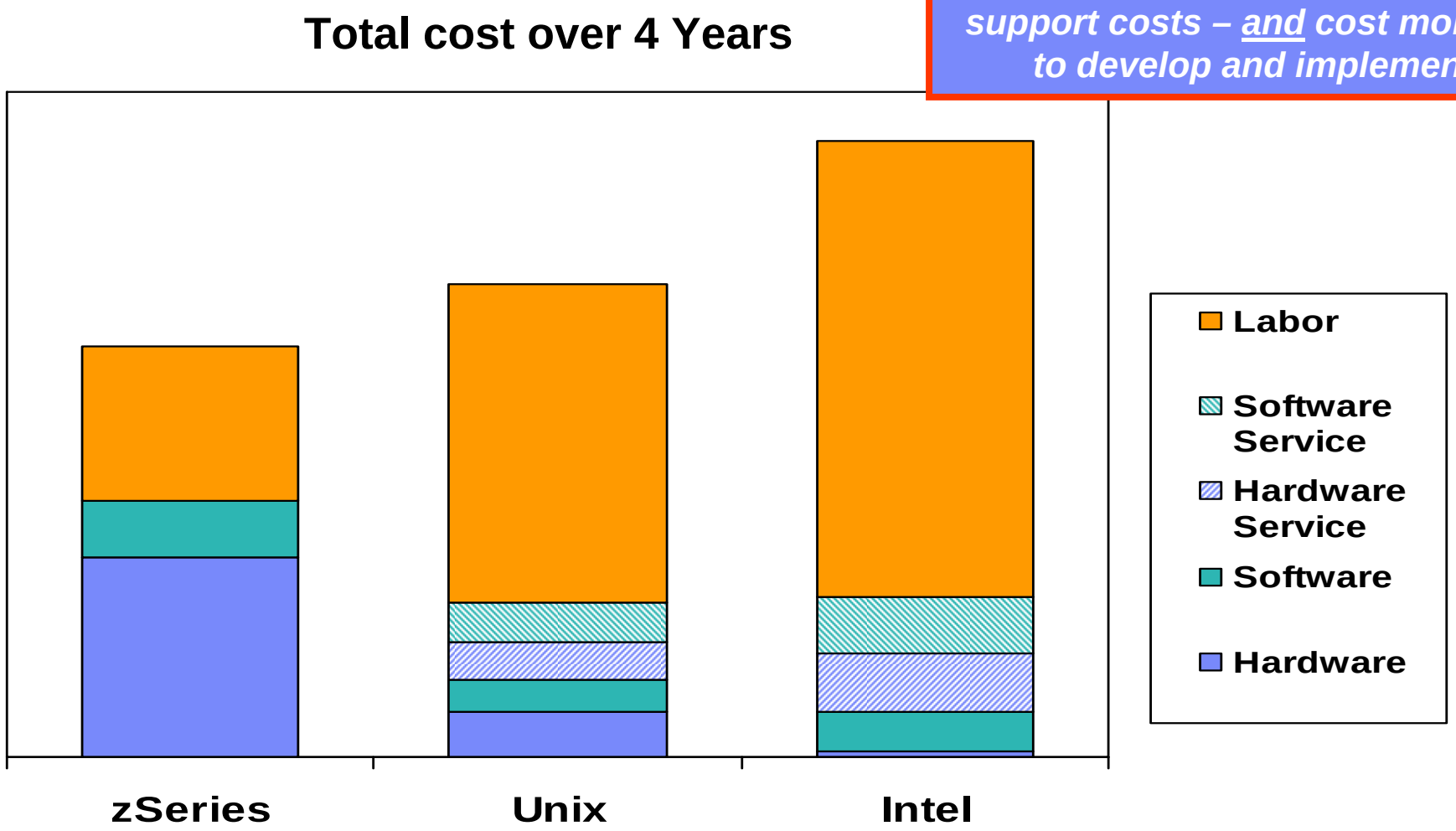
Mainframe hardware, software & labor costs have decreased 17.3% per year



Source: zProject Office

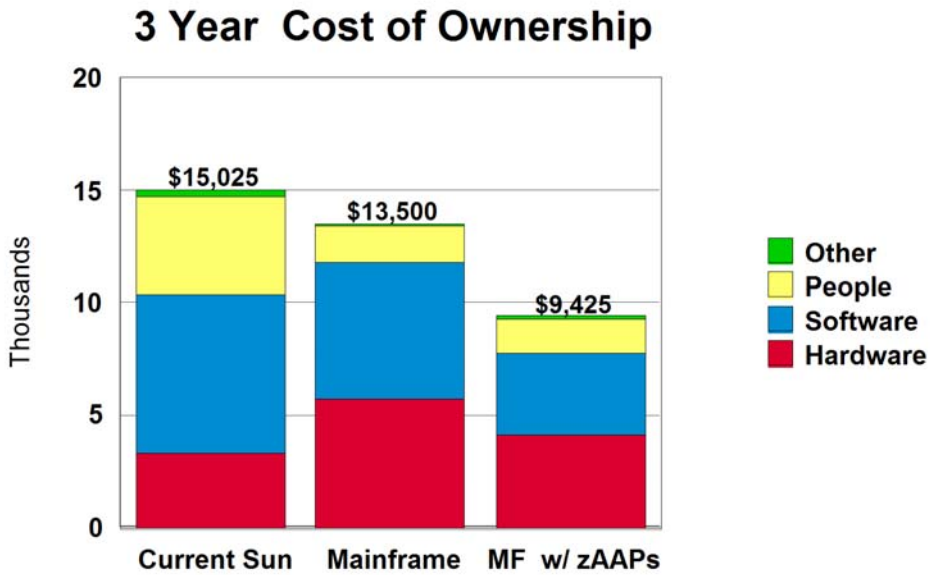
The Total Cost of Ownership View

Distributed servers have higher service, monitoring and support costs – and cost more to develop and implement!



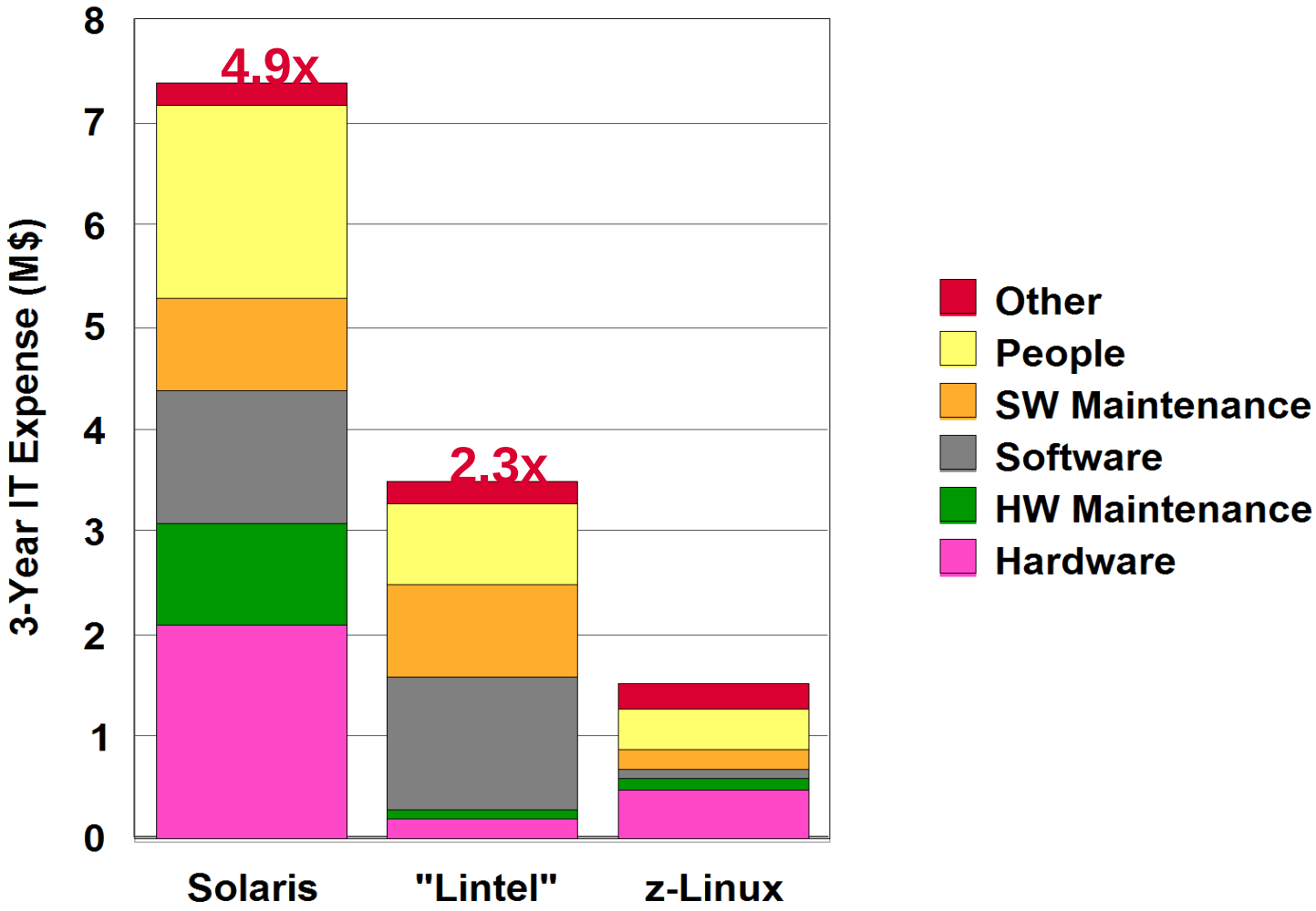
People costs are often *hidden* in distributed implementations

- In a recent typical study, a customer thought they only had 24 UNIX servers
  - But these were just the PRODUCTION servers
  - In addition they had 49 servers for Development, Test and Disaster Recovery
- They needed 44 people to support these servers and $7M software
  - Running at only 20% utilization
- A comparable zSeries implementation would have required just 20 servers
  - Requiring 16 people to support
  - Using $6M software (over 3 years)



- They thought the Solaris environment was 1/5 the cost of the mainframe…
  …but in fact the **zSeries TCO was 37% less**

Web Trading Application Costs



Sun 3-year cost ~ 4.9 x z-Linux
Lintel/Windows 3-year cost ~ 2.3 x z-Linux

Types of DB2 for z/OS Workloads That May Benefit from zIIP

1 -ERP or CRM application serving*

- For applications, running on z/OS, UNIX, Linux, Intel, or Linux on System z, that access DB2 for z/OS V8 on a System z9 109, via DRDA over a TCP/IP connection DB2 gives z/OS the necessary information to have portions of these SQL requests directed to the zIIP

2 - Data warehousing applications*

- Requests that utilize DB2 for z/OS V8 star schema parallel queries may have portions of these SQL requests directed to the zIIP when DB2 gives z/OS the necessary information

3 – Some DB2 for z/OS V8 utilities*

- A portion of DB2 utility functions used to maintain index maintenance structures (example LOAD, REORG, and REBUILD INDEX) typically run during batch, can be redirected to zIIP.

* The zIIP is designed so that a program can work with z/OS to have all or a portion of it's Service Request Block (SRB) enclave work directed to the zIIP. The above types of DB2 V8 work are those executing in SRB enclaves, portions of which can be sent to the zIIP.

z/OS 1.8 Trends and Directions

Scale

- Up to 4 TB real storage in single z/OS image
- Increased serialization support for DB2, middleware

Performance

- Better device management
- Improved z/OS USS performance

Optimization

- Improved WLM management for zAAP workloads
- Better management of batch workloads in a Sysplex

Availability

- Improved Sysplex & GDPS recovery times

Application Integration

- Optimized to consolidate distributed applications on z/OS
- Optimized set of SML parsing services for middleware

Security

- Improved RACF interoperability across platforms
- Key encryption enhancements

Networking

- Autonomics for monitoring and recovering IP in a sysplex
- New facilities for configuring IPv6

Ease of Use

- Health Checker integrated into z/OS Management Console
- Improved hardware configuration diagnosis

Enterprise-wide Management

- Enterprise workload management enhancements
- A new version of the Common Information Model (CIM)

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

IBM Virtualization Engine – Complete Portfolio

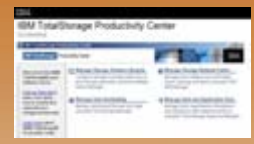
IBM Virtualization Engine

Virtual Access

Programmatic access

Virtual view

VE Console



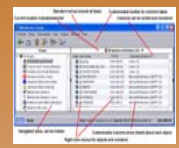
IBM TotalStorage Productivity Center

Virtual Management

Workload & performance managers
Resource management, modeling, mapping

Enterprise workload management

Workload virtualization



Resource management

Resource dependency & mapping

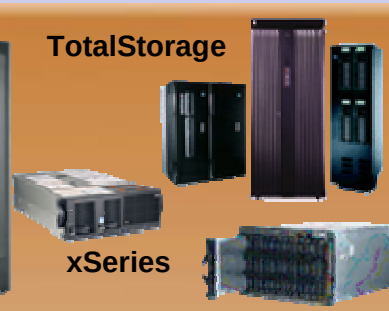
Virtual Resources

Resource virtualizers
Partitioning, virtual machines, I/O, networks, VTS

IBM Server & Storage Systems

System z9 zSeries

TotalStorage



xSeries

BladeCenter

iSeries

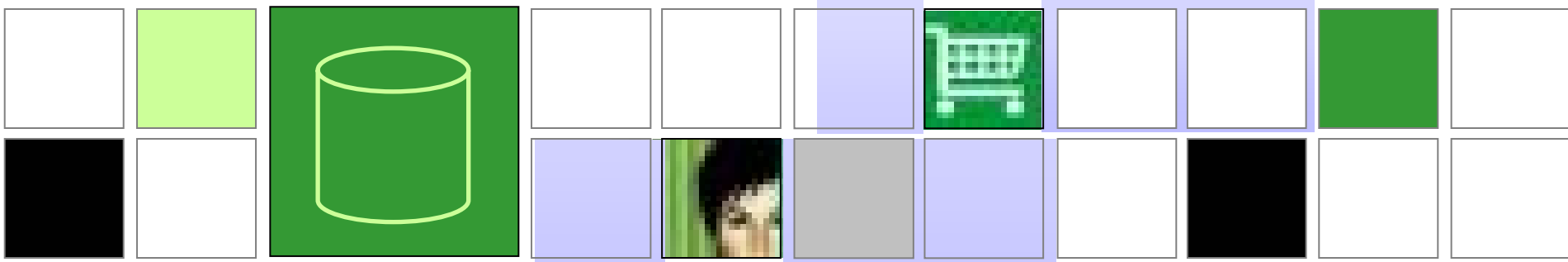
pSeries

OpenPower

Virtualization Planning Tools

DB2 for z/OS vNext – Addressing corporate data goals

- Improved IT Infrastructure In Support of Compliance Efforts
  - Trusted security context
  - Database roles
  - Auditing capabilities
  - Encryption improved
- Simplify development and porting
  - Many SQL improvements that simplify porting
  - Native SQL stored procedures
  - Default databases and tables paces
  - Automatic unique indexes to support primary keys
- Decrease Complexity and Cost
  - Fast table replacement
  - Partition by growth
  - Table append
  - Volume-based COPY/RECOVER
  - Optimization Service Center
- Evolve Your Environment & SOA
  - Integrated XML
  - WebSphere integration



CICS Directions

CICS provides technologies for an On Demand world

- ✓ Application Transformation
- ✓ Integration
- ✓ Operational Efficiency

CICS ensures lasting value of applications in modern Enterprise solutions

1/02

CICS TS V2.2

- Support for EJB'S
- JDBC/SQLJ Access to DB2 Data
- JCICS access to VSAM data
- ECI over TCP/IP
- Integrated Translator for COBOL & PL/I

EJB support

12/03

CICS TS V2.3

- Performance improvements for Java programs
- Addition of CICS Web Support to the JCICS classes
- Interactive debugging for COBOL and Java applications
- SOAP for CICS
- Performance improvements in CICS-DB2® attachment

High Performance JAVA

03/05

CICS TS V3.1

- Web Services capabilities to extend apps to SOA
- Support for industry leading SSL protocol
- Optimised CICS data exchange capabilities
- New interfaces for Enterprise Management
- Leverage WD4Z for application tranformation and integration.
- Enhanced C/C++ programs performance

Web Services

next 24 Months

CICS TS V3.n

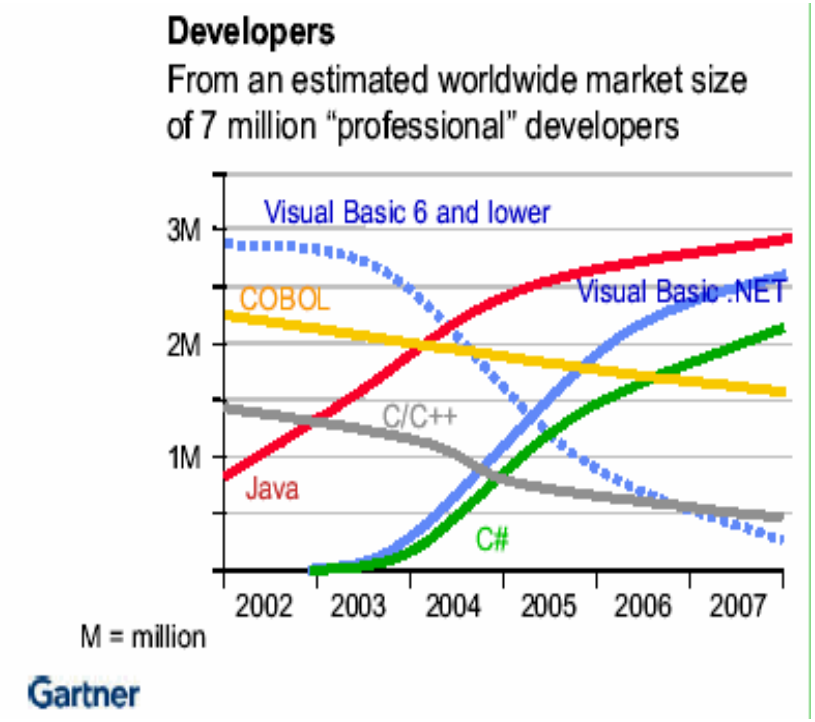
- CICS-to-CICS conne with an IP network
- Enhance Web Servic capabilities
- Higher application p efficiency
- Extend Web Service support for COBOL d types
- Enterprise wide worl management
- Remove capacity restraints relating to sources

SOA

Is re-writing COBOL logic appropriate?

- **Significant business intelligence exists in legacy**
  - "200 Billion lines of COBOL code in existence" ***eWeek***
  - "5 Billion lines of COBOL code added yearly" ***Bill Ulrich, TSG Inc.***
  - "Between 850K and 1.3 Million COBOL developers" ***IDC***
  - "Majority of customer data still on mainframes" ***Computerworld***
  - "Replacement costs $20 Trillion" ***eWeek***

- **Rewriting - is it an option.....**
  - How long will it take? (lose strategic benefit)
  - Who will do it?
    (Who has the business knowledge?)
  - Can you certify accuracy of your business model?
  - How much will it cost?
  - Risk?
  - Longer path lengths



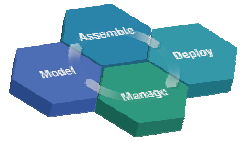
Flexible IT requires Service-Oriented Architecture (SOA) tools from IBM

Branham Group has done the analysis vs MS .NET!

"IBM Tools are more productive for building robust server side applications"

Model key components of the app	**IBM 2.4x faster**
Build Web Services from scratch	**IBM 2.1x faster**
Build Web Services from existing code	**IBM 2.6x faster**
Build a portlet	**IBM 2.2x faster**
Build a portlet & attach to core systems	**IBM 3.2x faster**

Flexible Options for a z SOA Environment



Increased capabilities / automation

Business Process

WebSphere Process Server

Designing, automating and managing composite applications and operational business processes

Built on WebSphere ESB

ESB

WebSphere ESB

Provides Web Services connectivity and data transformation

Built on WebSphere Application Server

WebSphere Message Broker

An an advanced Enterprise Service Bus. Provides universal connectivity and data transformation

Built on WebSphere MQ

Lifecycle Tools

WebSphere Application Server

CICS

IMS

WebSphere MQ

zSeries Integrated Tools Portfolio

Platform Readiness

Integration & Infrastructure

Deploy

Application Deployment and Integration

Transact

Data, Transaction Management and Run-Times

Test

Application Testing, Debugging, and Quality Assurance

Workload Optimization

OS

Security

zSeries Application Enabling Foundation Services

Sysplex

Virtualization

Develop

Enterprise Application Development and Modernization

Manage Information

Data Information Management

Information Management

Infrastructure Management

Manage Systems

Performance Monitoring and Measurement

End to end management

Monitor

The SOA Lifecycle

- Build JAVA or COBOL apps
- Compose Web services from existing CICS and IMS transactions

WebSphere Integration Developer*
WebSphere Developer for z Series
Enterprise COBOL and PL/I Compilers
Problem Determination Tools

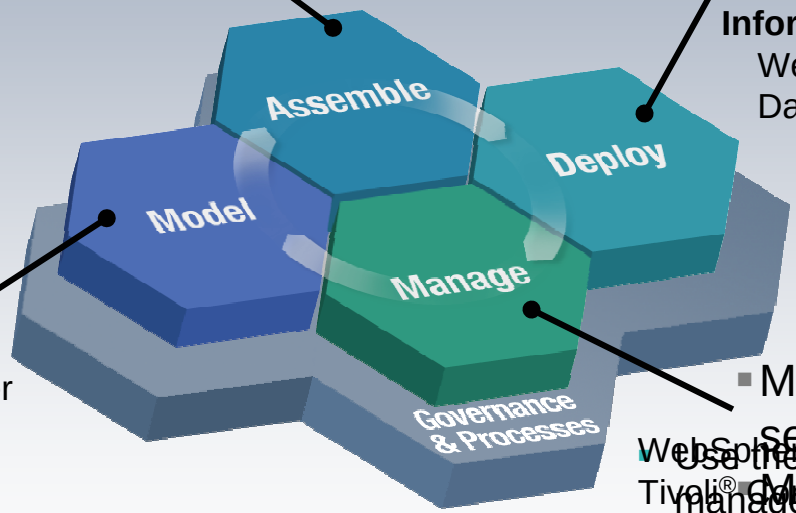
Process:
- Integrate people, processes and information

WebSphere Message Broker for z/OS
WebSphere Extended Deployment
CICS Transaction Gateway

- Retain mainframe QOS
- Connect applications across all platforms enterprise-wide

People:
WebSphere Portal for z/OS

Information:
WebSphere Information Integrator
DataStage TX



- Gather, analyze & model existing assets to create reusable business services

WebSphere Business Modeler
WebSphere Studio Asset Analyzer
CICS Interdependency Analyzer
Asset Transformation Workbench

- Manage applications & services
- Use the latest middleware and management tools to reduce operational overhead
- Manage identity & access
- Monitor business metrics

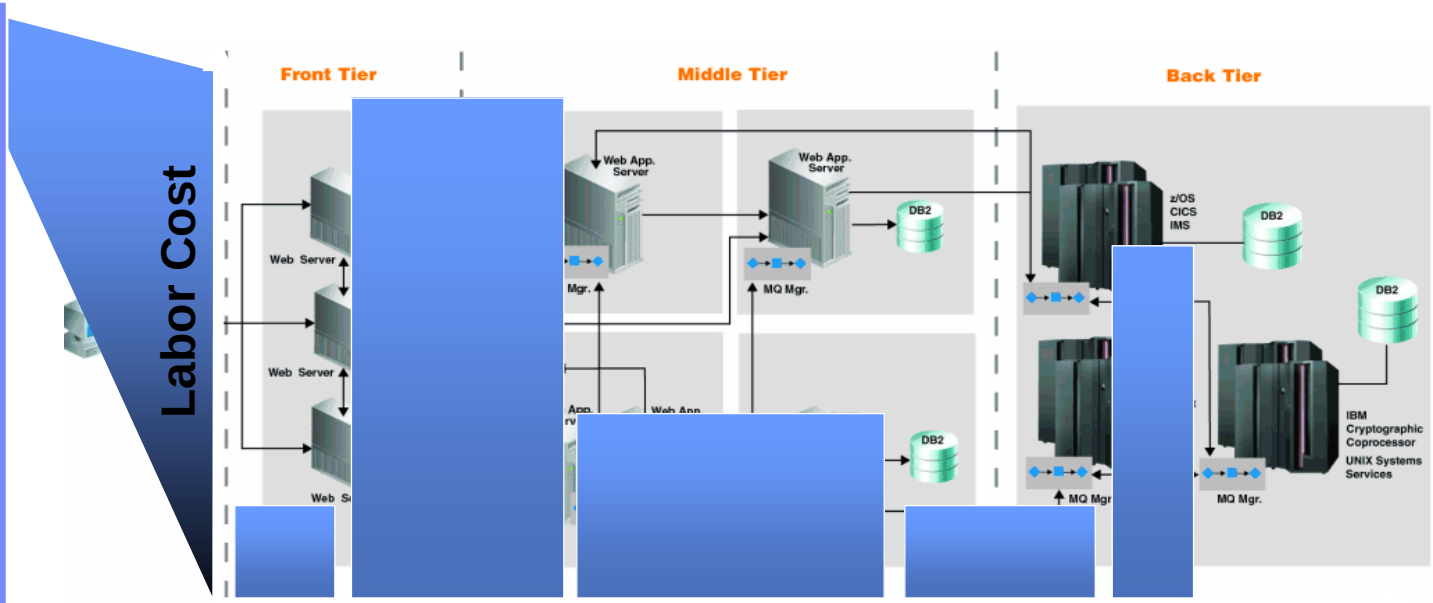
WebSphere Business Monitor
Tivoli® Composite Application Manager
Tivoli Federated Identity Manager
CICS Operations Tools.

Maximize re-use and avoid the cost and risk of new application development projects.

Architectural Complexity Exposes Organizational Complexity

Desktop Experts and Tools	Network Experts and Tools	Application Experts and Tools	Database Experts and Tools	Server Experts and Tools	Mainframe Experts and Tools	Storage Experts and Tools	Unix Experts And tools

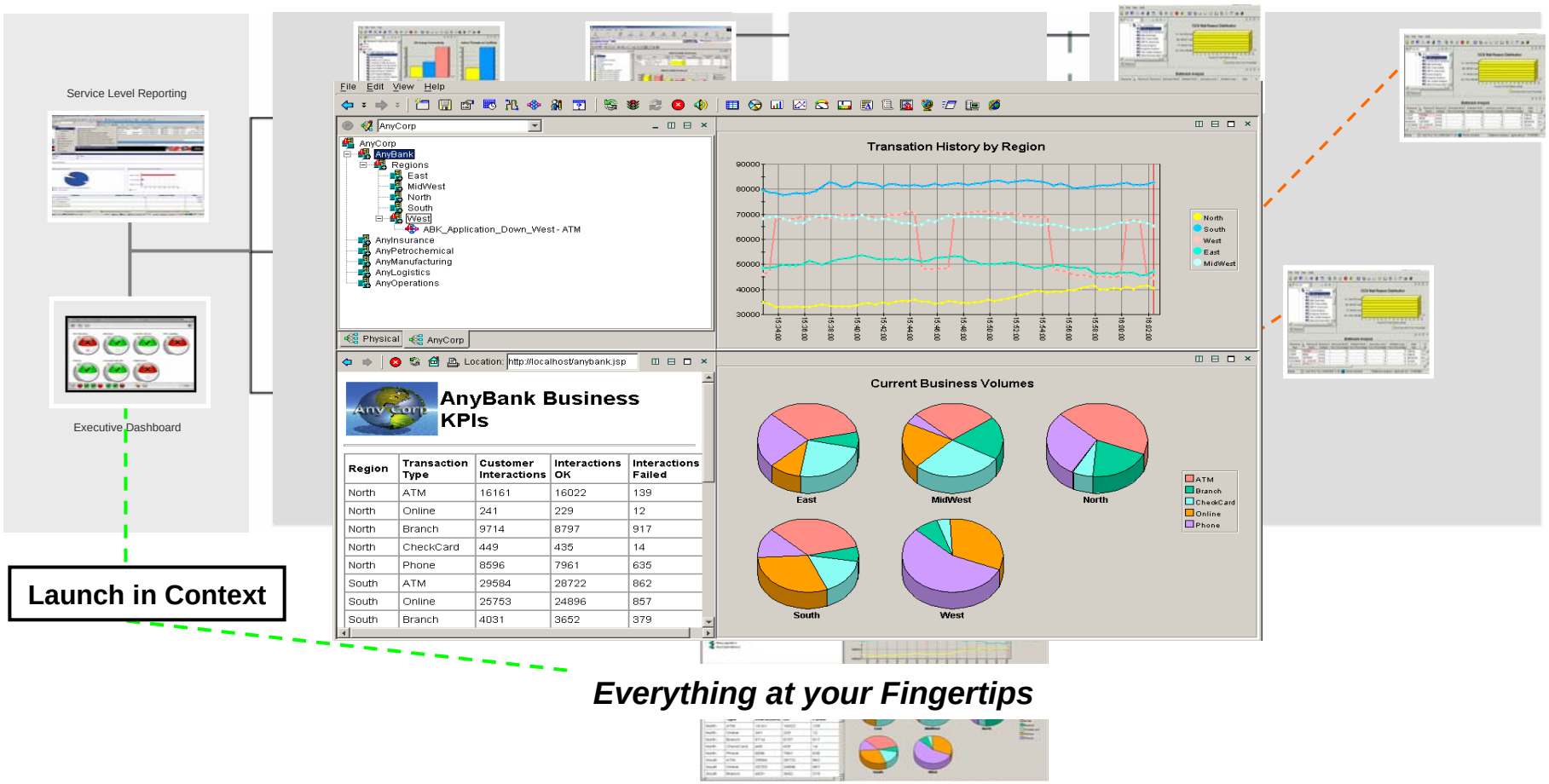
- Availability Management
- Change Management
- Service Level Management
- Security Management
- Information Lifecycle Management
- Release Management



Tivoli Enterprise Portal – 2006 is all about Integration

A Dynamic Role-based Workspace for Integrating IT Operations Silos – One portal to monitor the overall health of the infrastructure

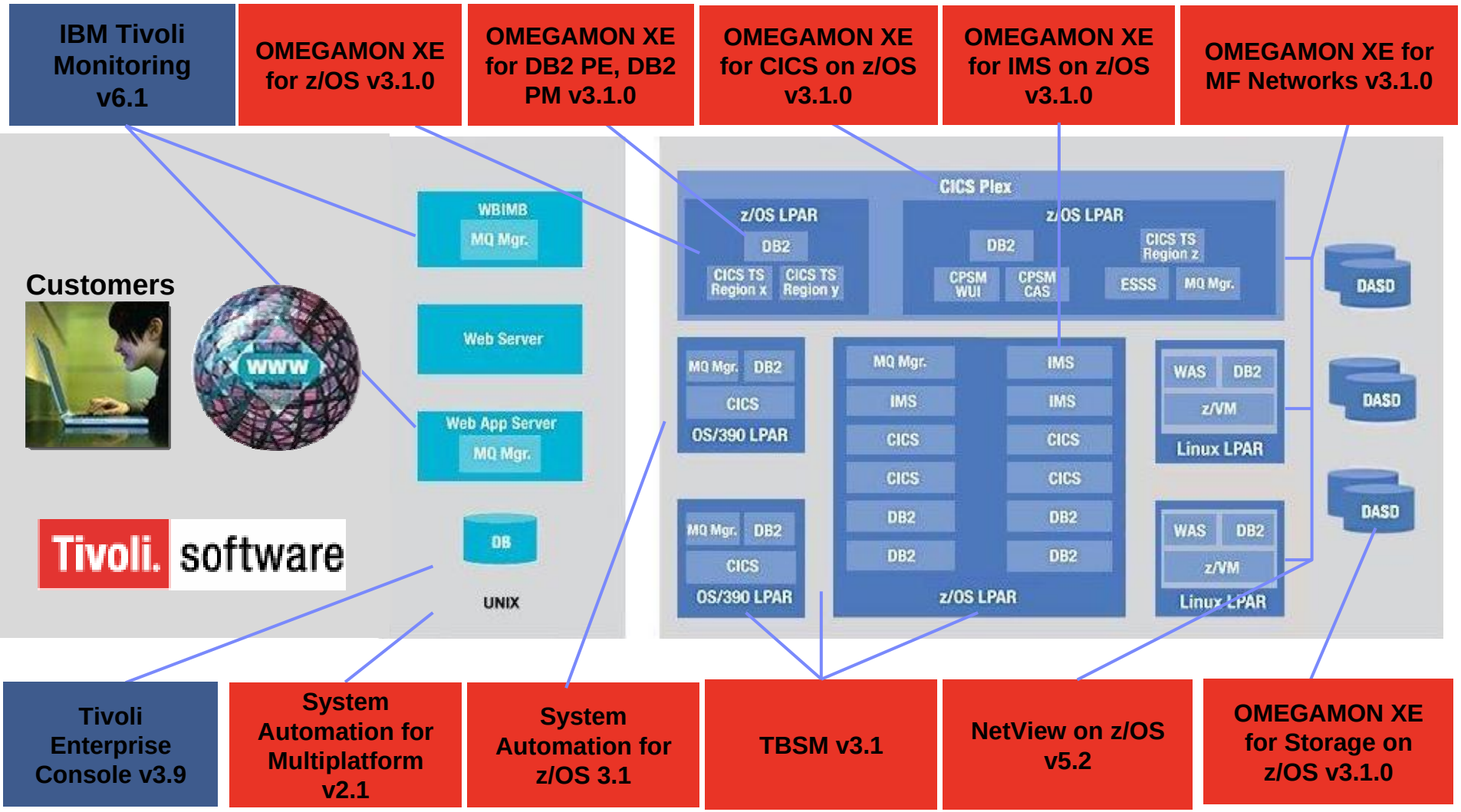
Business Services **Distributed Resources** **J2EE Transactions** **Mainframe Resources**



Region	Transaction Type	Customer Interactions	Interactions OK	Interactions Failed
North	ATM	16161	16022	139
North	Online	241	229	12
North	Branch	9714	8797	917
North	CheckCard	449	435	14
North	Phone	8596	7961	635
South	ATM	29584	28722	862
South	Online	25753	24896	857
South	Branch	4031	3652	379

Everything at your Fingertips

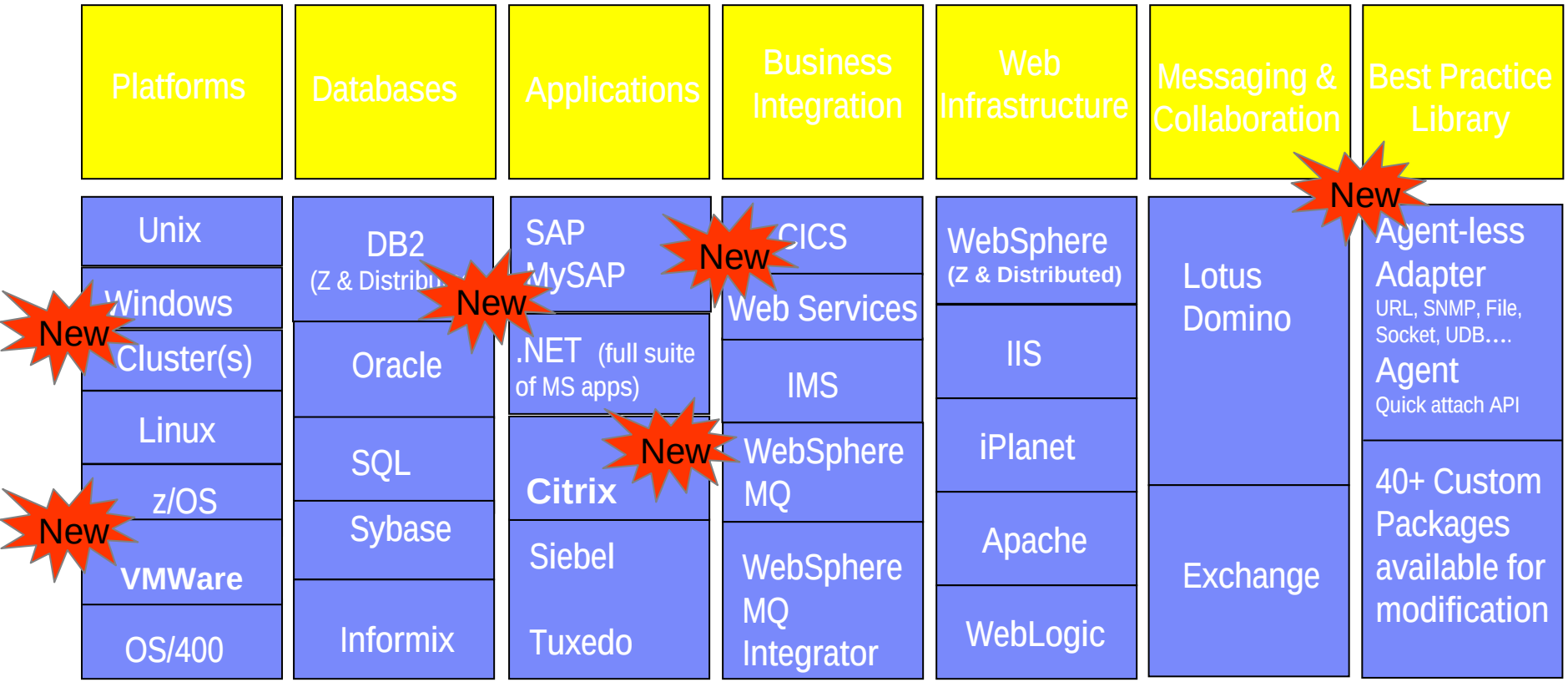
z/OS Management



Integrated End to End Support for Heterogeneous Environments

Available with ITM 6.1, Omegamon & ITCAM management

IBM Tivoli monitoring spans the breadth of your IT environment and provides fast time to value because it's so easy to deploy!



System z9 Security helps provide system and data integrity – End to End

Protect Data in Transit

Protect privacy of customer & employee information

Encryption with key management
Highly secure data transfer

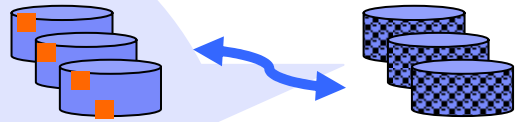
Information Integrity

Ensure integrity of information, SoD for encryption of data at rest

Encryption of data for archival

Encryption

z/OS key management capabilities
Long term key management



The Secured Business Environment

Secure exchange of business critical information

Enabling non-z/OS servers to communicate securely with z/OS.

OpenSSL
Open SSH

IPsec

Shared I/O, storage, memory, CPU

Crypto Express 2
secure key

Highly secure transfers across the Internet
Trusted exchange with open standards & support for IP encryption

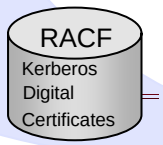
Common Criteria Rating

Digital Certificates

PKI and Digital Certificates

Directory Services

Managing identity across enterprise

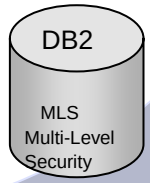


Distributed directory services

Security Administration

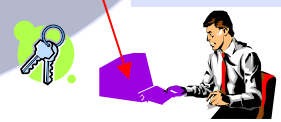
Security Server

Data Security



Single repository of data with various levels of security

Trusted business transactions



Identrus compliant Certificates

Tivoli End-to-End Software Asset Management

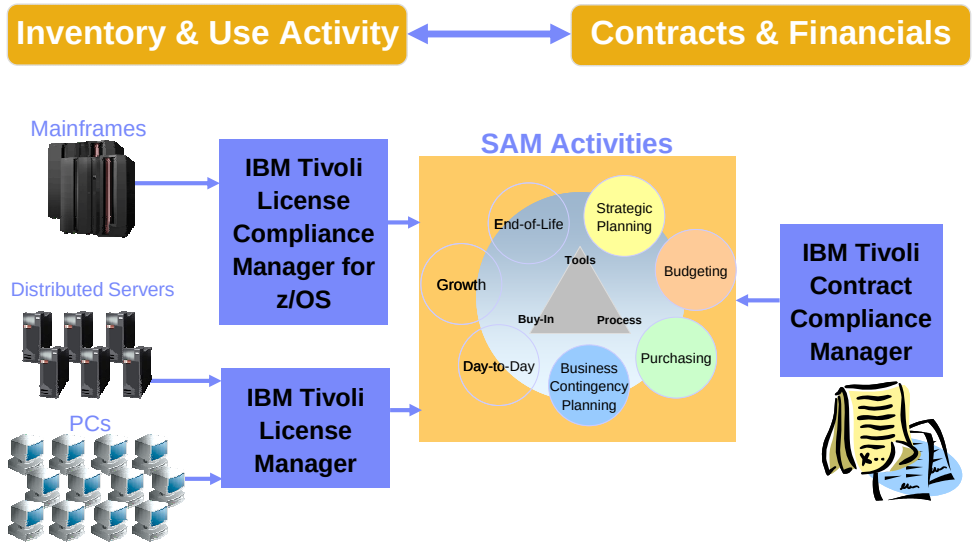
Business Issues

- Software costs are difficult to “control”
- Potential for unexpected expensive software contract compliance audit penalties
- Hard to find key “software product use activity” information needed for effective software asset management
- Difficult to shift software spending to align with business needs

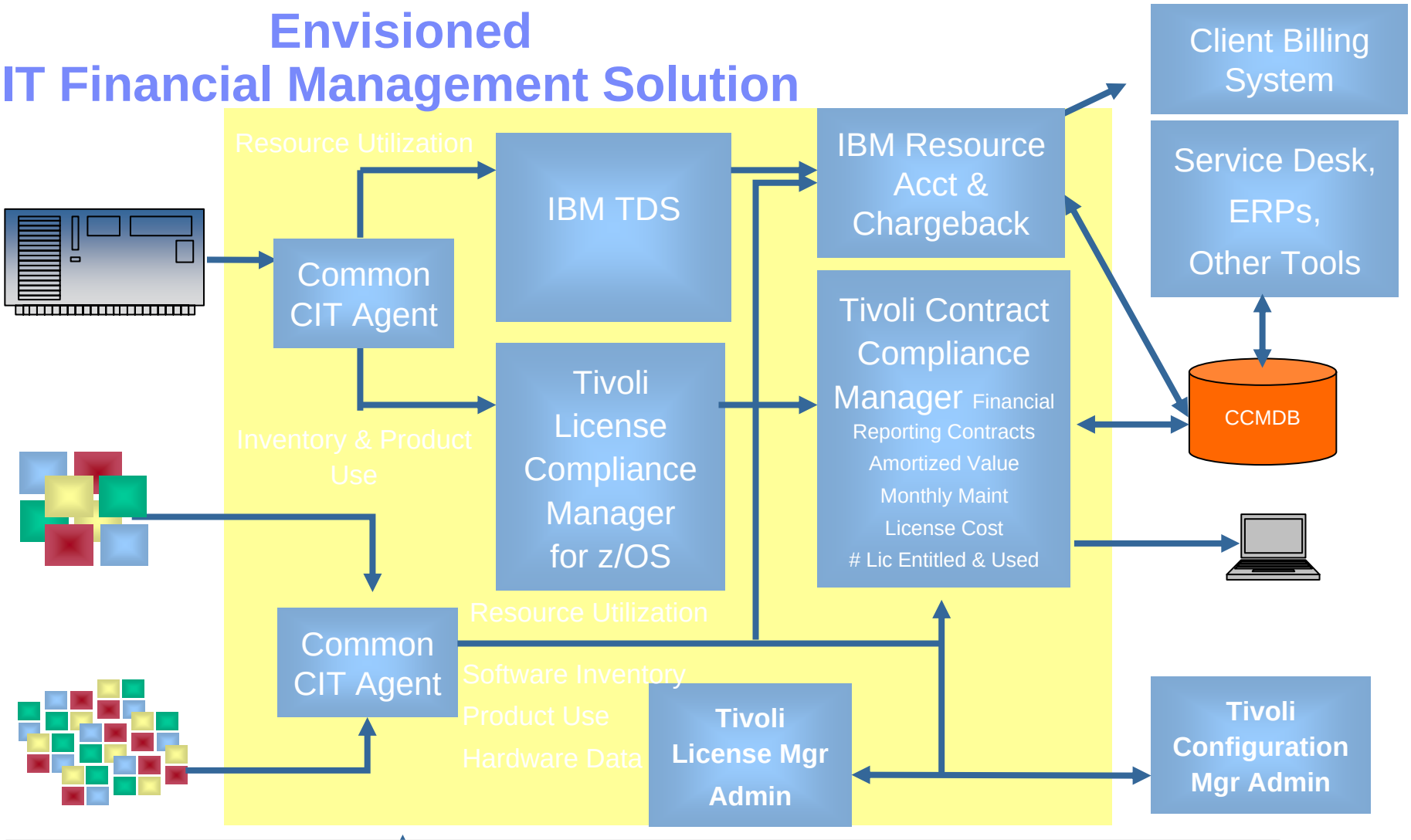
Business Value

- Tivoli end-to-end software asset management solutions help you control software costs and contract compliance exposure to free up funds for priority projects
- Helps organizations demonstrate adherence to stringent accounting standards (Sarbanes-Oxley

IBM Tivoli License Compliance Manager for z/OS
IBM Tivoli License Manager
IBM Tivoli Contract Compliance Manager



Envisioned IT Financial Management Solution



The combination of IBM products delivers an end-to-end IT financial management facility to our customers, enabling them to manage their inventory, contracts and costs associated with the use of IT assets and then allocating resource utilization for chargeback.

Database Tools to Address TCO

60%+ of CEOs need to do a better job capturing and understanding information rapidly in order to make swift business decisions

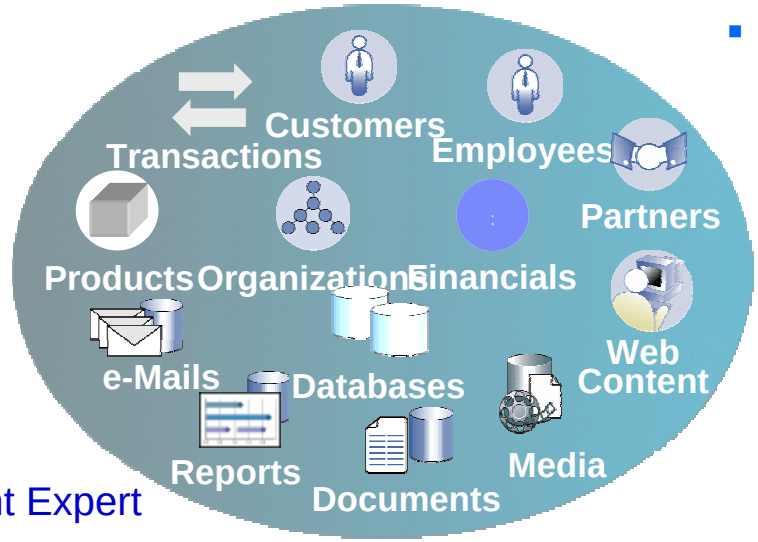
30-50% of design time is copy management

- DB2 Utilities Enhancements
- DB2 Thread Expert

79% of companies have 2+ repositories… 25% have 15 ***or more***…

…and **48** disparate financial systems & 2.7 ERP systems in the average $1B company

- DB2 Change Management Expert



30% of people's time is spent searching for relevant information

- DB2 Optimizer Expert
- OMEGAMON DB2 Performance Expert

122 Terabytes disk storage in 2005…
37% CGR disk storage growth '96-'07

- DB2 Optimizer Expert

40% of IT budgets may be spent on compliance

- DB2 and IMS Expert & IMS Audit Expert
- DB2 Regulatory Compliance Suite

zSeries Center of Excellence Services Offering - zCoE

- Integrated IBM services offering to ensure clients success by improving skills, processes, and practices to support the design, development, deployment and management of solutions in the zSeries environment.

zCoE Services Offering delivers:

- Assessment of client solutions to help ensure success
- Single point of contact across IBM Brands
- Best Practices across IBM Technologies
- Skills transfer to clients' or partners' design, development and operations staff
- Expertise to ensure successful adoption of new techno

- Offerings include:
  - Project Management
  - Architectural Design Reviews
  - Security Solutions
  - Installation and Configuration
  - Application Development and Test
  - Deployment and Production Operations
  - Capacity Planning
  - Performance Monitoring and Tuning
  - Premium Support

Contact: Brian Senn/Austin/IBM

http://www.ibm.com/servers/eserver/zseries/about/charter/offerings.html

Summary

- We are improving TCO on zSeries
- We are investing in and delivering new technologies on z Software and Hardware.
- We are exploiting the Integration of the z System to deliver new Value
- We have affordable and competitive tools to solve customer ISV concerns.
- We are increasing investment in z technical skills.

A Holistic Approach to System Design – System z9 Software

Designed to protect, manage and integrate your on demand environment

Business Integration

- J2EE 1.4 and Web services support
- Simplified deployment and management of WebSphere
- Secure data transfer between over 35 platforms
- zAAP execution for WebSphere Java Workloads
- SOA

System z9 Infrastructure Management

IT Service Management

- End-to-end infrastructure management
- Manage job scheduling resources across the network
- Improvements in
  - Automation
  - Network management
  - Charge back management
  - Parallel Sysplex systems management

Business Resiliency and Security

- Improved access to z/OS configuration files from other platforms
- Security software management
- Connect to identity data in multiple repositories
- Manage software assets

Platform Readiness

•Maximize business value with new versions of the middleware:
CICS TS V3, DB2 V8, IMS V9, WebSphere MQ V6, NetView® V5.2
•Exploiting the features of z/OS and z9109

Hannaford, a US supermarket chain, moved to a System z9

Business Challenges

- Differentiate in highly competitive marketplace with world-class supply chain
- Reduce cost of hundreds of servers, improve availability and security

Solution

- Introduce CAO system, consolidate to IBM System z9 and Linux

"Thousands of employees … now have access to the same, up-to-date data, giving us a competitive advantage." **Bill Homa, CIO**

Results

- Reduced cost of goods
- Improved sales, service & customer satisfaction
- Increased BP sat
- Significant IT cost reduction

"We are saving hundreds of thousands of dollars by not having computer operators running systems from the z9 down to Microsoft server… we actually have a smaller IT staff now than we did 5 years ago, … managing probably 10 times the processing power."

Another example

First National Bank Omaha

	Servers	***Reliability***	***Utilization***	***Staff***
First move: Implemented distributed computing architecture that became **too difficult to monitor, maintain, upgrade and scale**	▪ 30+ Sun Solaris servers ▪ 560+ Intel servers	Un-acceptable	12%	24 people growing at 30% year
Next move: Consolidated back on the mainframe	z990	Much improved	80% with additional reserve capacity ***on-demand***	Reduced to 8 people

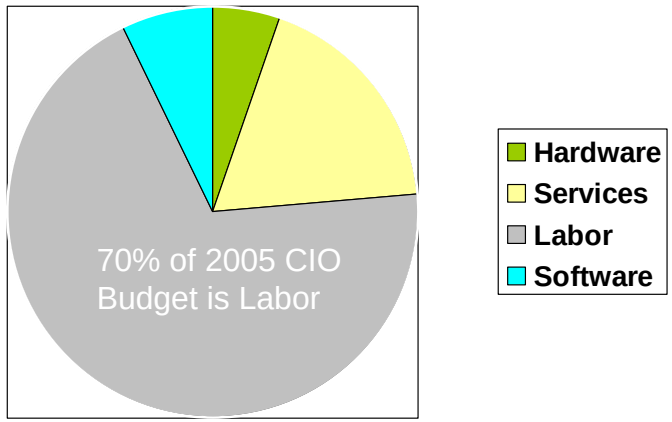
*Under-utilization affects the efficiency of **all** associated costs (not just the hardware but also software and labor)*

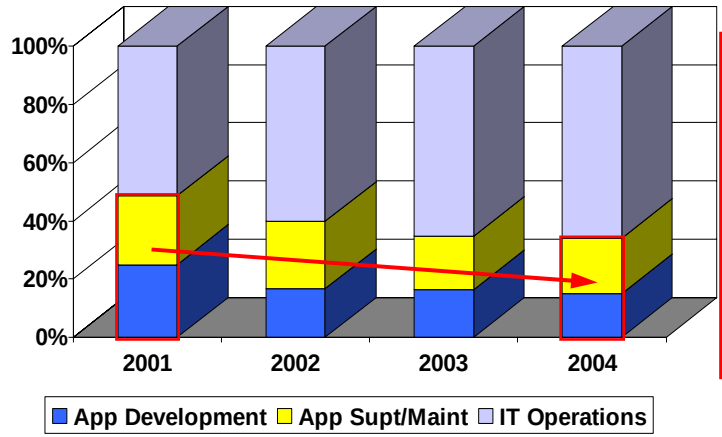
TCO factors considerations (often ignored)

- ***Availability***
  - High availability
  - Hours of operation
- ***Backup / Restore / Site Recovery***
  - Backup
  - Disaster Scenario
  - Restore
  - Effort for Complete Site Recovery
  - SAN effort
- ***Infrastructure Cost***
  - Space
  - Power
  - Network Infrastructure
  - Storage Infrastructure
- ***Additional development and implementation***
  - Investment for one platform – reproduction for others
- ***Controlling and Accounting***
  - Analyzing the systems
  - Cost
- ***Operations Effort***
  - Monitoring, Operating
  - Problem Determination
  - Server Management Tools
  - Integrated Server Management – Enterprise Wide
- ***Security***
  - Authentication / Authorization
  - User Administration
  - Data Security
  - Server and OS Security
  - RACF vs. other solutions
- ***Deployment and Support***
  - System Programming
    - Keeping consistent OS and SW Level
    - Database Effort
  - Middleware
    - SW Maintenance
    - SW Distribution (across firewall)
  - Application
    - Technology Upgrade
    - System Release change without interrupts
- ***Operating Concept***
  - Development of an operating procedure
  - Feasibility of the developed procedure
  - Automation
- ***Resource Utilization and Performance***
  - Mixed Workload / Batch
  - Resource Sharing
    - shared nothing vs. shared everything
  - Parallel Sysplex vs. Other Concepts
  - Response Time
  - Performance Management
  - Peak handling / scalability
- ***Integration***
  - Integrated Functionality vs. Functionality to be implemented (possibly with 3rd party tools)
  - Balanced System
  - Integration of / into Standards
- ***Further Availability Aspects***
  - Planned outages
  - Unplanned outages
  - Automated Take Over
  - Uninterrupted Take Over (especially for DB)
  - Workload Management across physical borders
  - Business continuity
  - Availability effects for other applications / projects
  - End User Service
  - End User Productivity
  - Virtualization
- ***Skills and Resources***
  - Personnel Education
  - Availability of Resources

IT Infrastructure Trends – Cost

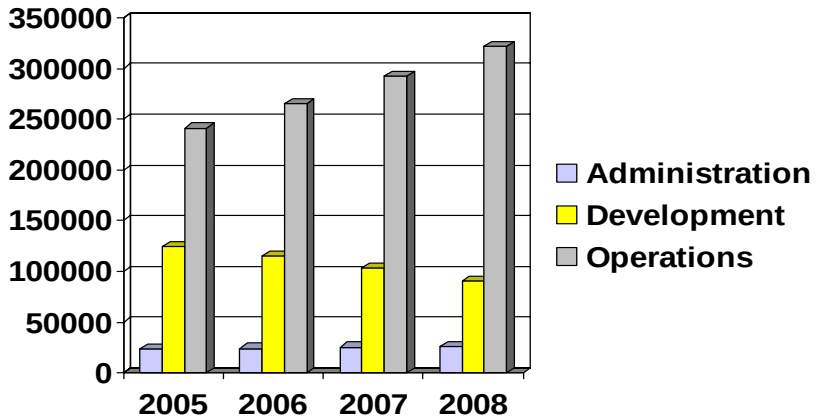
Decrease in Efficiency as IT Spending Shifts to Operations Labor





Application development & support labor has dropped from 48% to 34% of IT Labor spend over previous 4 years

- 70% of CIO budget is labor
- Operations labor will be 73% of CIO labor budgets by 2008
- at -10% CGR to 2008 Application development will decline
- $325B in operations labor by 2008



Source: Tivoli Commissioned IDC Study 1Q05

zSeries - The Mainframe for Mixed Commercial & e-business Workloads

Near-linear scalability	**up to 900,000+ concurrent users**
More secure transactions	**>6000 SSL/sec vs. <200 SSL/sec**
"Mean Time Between Failure“	**measured in decades vs. months**
1/4 network equipment costs	**Virtual versus Physical**
1/25th Floor Space	**400 Sq. Ft vs. 10,000 Sq. Ft**
1/20 energy requirement	**$32/day vs. $600/day**
1/5 the administration	**< 5 people vs. > 25 people**
Highest average resource utilization	**>70% vs.. <15%**

WSJ.com THE WALL STREET JOURNAL. ONLINE

November 14, 2005

Power-Hungry Computers Put Data Centers in Bind

- Today's servers draw too much electricity and generate too much heat
  - E.g. 3,800 watts per square foot in 2005 from 250 watts per square foot in 1992
  - Also the "tiniest new circuitry leaks current when switched off"
- If planners miscalculate, servers overheat, damaging circuitry or causing shutdowns
  - "Power-related problems in 2005 will cause 4 of the 20 major failures, up from 2 of 20 last year"
- Outcomes:
  - Major reconstructions – digging up parking lots, knocking down walls
  - 4 - 5 times increase in power utility bills
  - $20,000 electrical-system upgrade
  - $150,000 air-conditioning upgrade
  - Room temperatures averaging 92ºF → erratic machine behavior
  - Reducing raised-floor occupancy
  - Building new facilities
- "The people who buy computers often aren't the people who have to manage them"

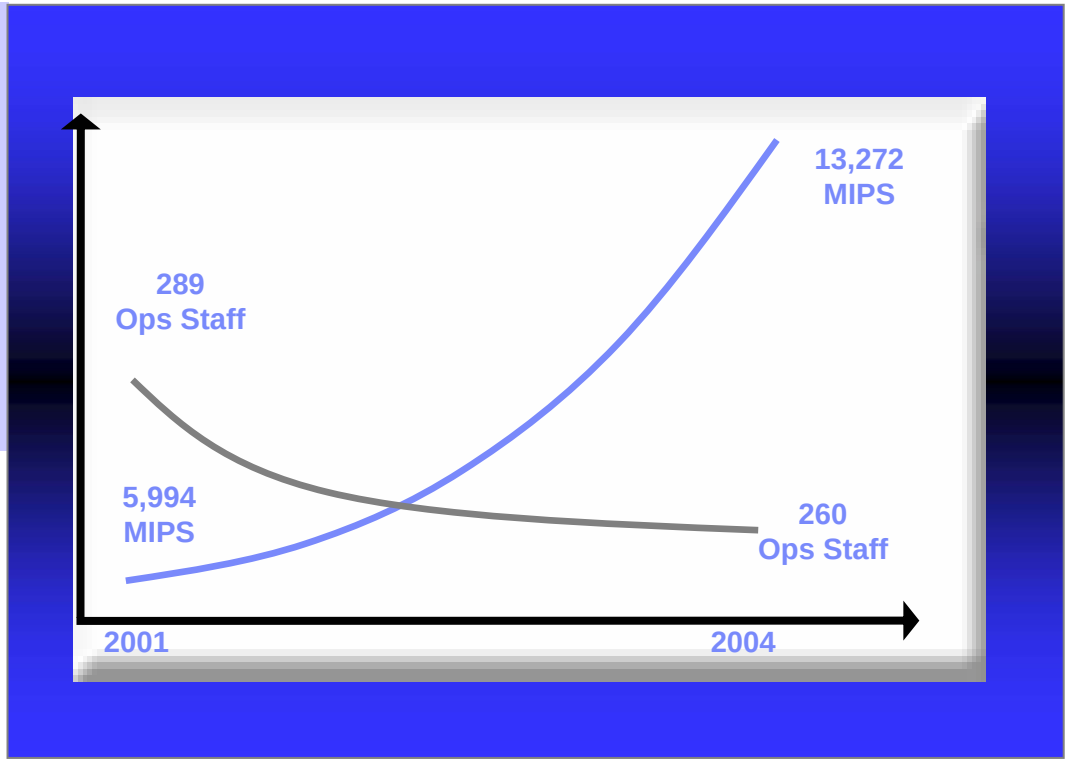
Pomona Valley Medical Center:

*"**temporary shutdown** of systems serving the hospital's laboratory, **$40,000 in damage** to servers and hard drives, and prompted a **$500,000 retrofitting of the cooling system**"*

Gartner finds that data center staffing levels for z have not significantly changed despite large increase in MIPS

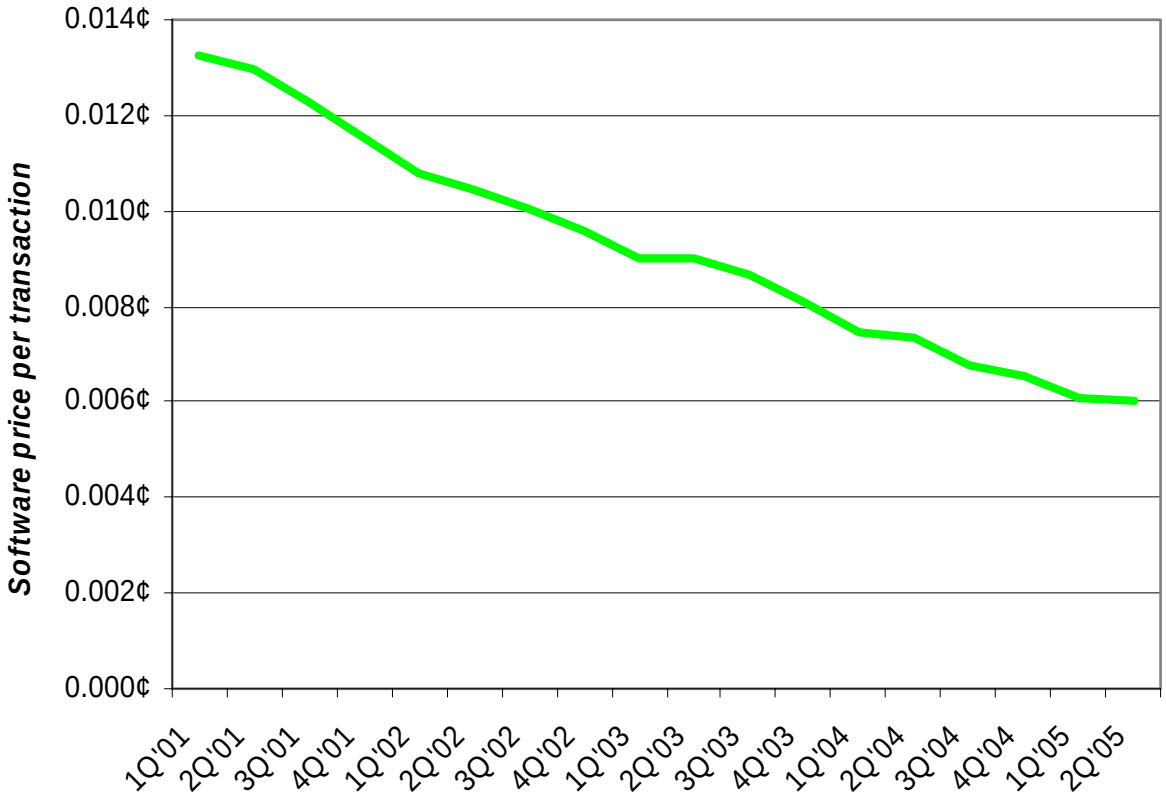
"Since we published our last high-level perspective of the ratio between MIPS and head count in 2001, the largest z/OS installations have more than doubled their 'MIPS to head count' ratio."

L. Mieritz, M. Willis-Fleming – Gartner, 2004



Gartner

Decrease in average zSeries IBM SW price/transaction YTY for the last 54 months



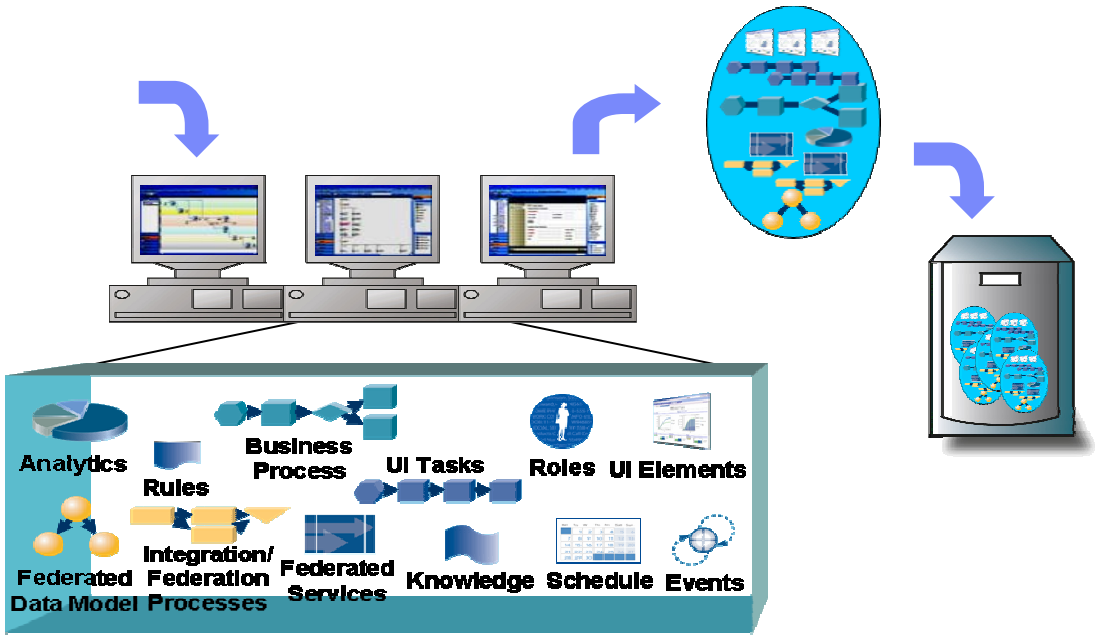
Key factors behind this decrease:

- sub-capacity pricing
- consolidation to fewer, bigger boxes
- improved price slopes and OS pricing
- organic growth allowing move up the software pricing curves
- 'Tech Dividend' for newer zSeries machines
- ZELC & NALC
- specialty engines (zAAPs, IFLs)
- zIIP

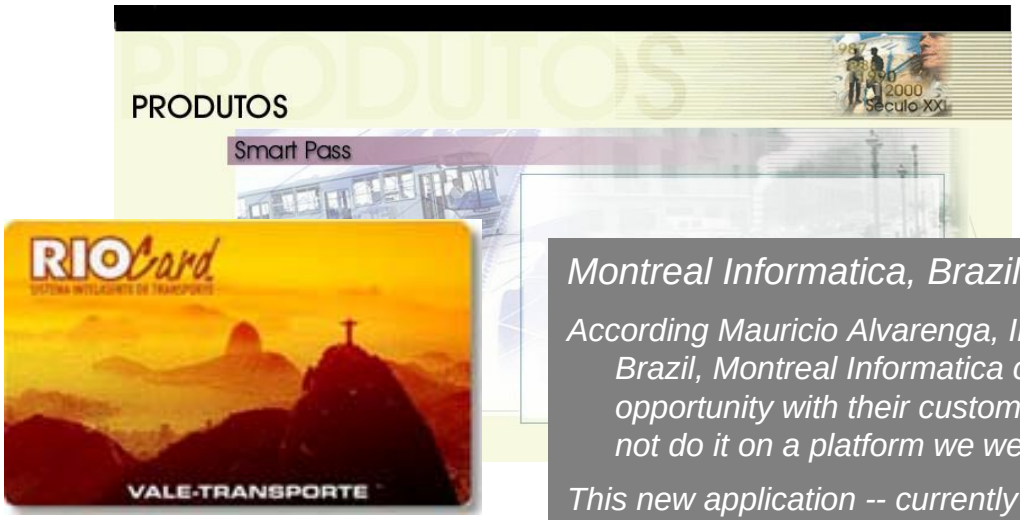
Source: IBM SWG Finance
Data is WW customer revenue only (not IGS)
Data includes specialty engines
'Highway conditions .. mileage may vary'

Siebel Component Assembly On IBM Mainframe Is

- Open standards based technology
- Built from the ground up to optimize benefits of running natively on IBM Mainframe
- Provides exceptional levels of performance, scalability & reliability



Benefits of zAAP on the Mainframe : Montreal Informatica



M.I. MONTREAL INFORMÁTICA

Montreal Informatica, Brazil

According Mauricio Alvarenga, Infrastructure Manager of Montreal Informatica, Brazil, Montreal Informatica chose the IBM eServer zSeries for their business opportunity with their customer Fetranspor, because in their words "We could not do it on a platform we were not comfortable with'.

This new application -- currently managing 1.5 million transactions from 600 Smart cards through 11,000+ buses, ferries and subways for the Brazilian employee transportation program-- required scalability, reliability, and security and 'zSeries fit that requirement.' In addition, Alvarenga adds that the zAAP essentially 'took the financial load off our shoulders' by allowing for a less expensive and more flexible way to handle this new application which is one of the largest transportation programs of its kind in the world.

Continuing into 2006, Montreal Informatica plans to extend the use of the zAAP for other applications. As Alvarenga notes "Performance has been very good, and with the strength of zSeries security and scalability, Montreal Informatica has the opportunity to anticipate Fetranspor's program growth as well as increasing the services to other and prospective customers.

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Benefits of zAAP on the Mainframe: MIB Group Inc

MIB Group Inc., Massachusetts

The IBM eServer zSeries provides high availability and flexibility to support processing demands for MIB's customer-facing applications. Application developers across multiple environments have reliable application development support on only one server and the zSeries hardware provides enough scalability to support the client's growing data needs.

Leveraging the zAAP feature, the MIB can size and easily adapt server resources to meet the business needs in its production environment. The zAAP feature also limits resource demands and development costs and supports increased developer productivity. Prior to activating the zAAP feature on its development LPAR, the company experienced approximately 40 peaks - or full central processing unit (CPU) usage - in a two week period. After implementing the zAAP feature, the company experienced only 20 peaks.

Additionally, all of the features of the zSeries and IBM WebSphere software provide the security to help MIB meet even the tightest regulatory mandates for its sensitive medical data.

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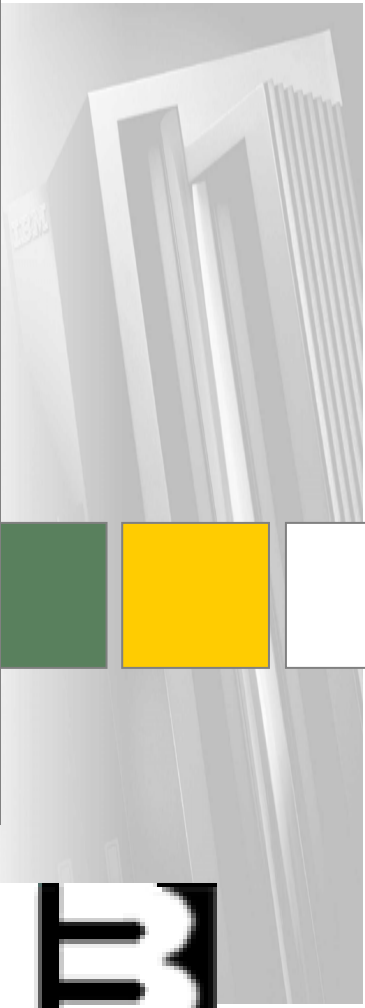


Benefits of zAAP on the Mainframe: Farmers Insurance

FARMERS

Gets you back where you belong.®

Farmers Zurich

Farmers online application experiences CICS transaction volumes of up to 45 million per day, supporting approximately 50,000 users

90% of the revenue business is supported by applications running within WAS for z/OS, which also communicates with applications running off-platform

zAAPs reduced the MIPS on a key application from 1200 MIPS to 700 MIPS

- *"Experiences tell us that zSeries is a must, because that is the only platform that can help us deliver all of these qualities. Quality is really, really important, because our customers are dependent upon the availability of these applications and the platform."*
- *- Claudia Ku, Dir of Tech Services*

A Vision for Advanced Data Serving with System z

System z Enterprise Hub for Mission Critical Data

- With a strong foundation for transaction processing, built on 40+ years of technology innovation, System z with z/OS and DB2 provides a premiere platform for data serving, today and into the future*
- Building on industry leading System z integrity and security, IBM is continuing to invest to support customers' Information on Demand needs across a heterogeneous IT infrastructure.*

Today's Capabilities

- Industry leading data integrity and security via multi-level security, encryption and certifications
- Architecturally unique data sharing solution for centralized view of data
- Highest levels of scalability and availability for enterprise class database workloads and enterprise applications
- Comprehensive systems and data management environment

*Extension of capabilities**

- New specialty engine with DB2 exploitation to help leverage data for mission critical ERP, CRM, and Data Warehousing workloads
- Enhanced database support for regulatory compliance, open standards, and improved autonomics
- Support for encryption of data at rest (tape subsystem) w/ z/OS key mgmt
- Data protection via technology enhancements to achieve the highest levels of security certifications

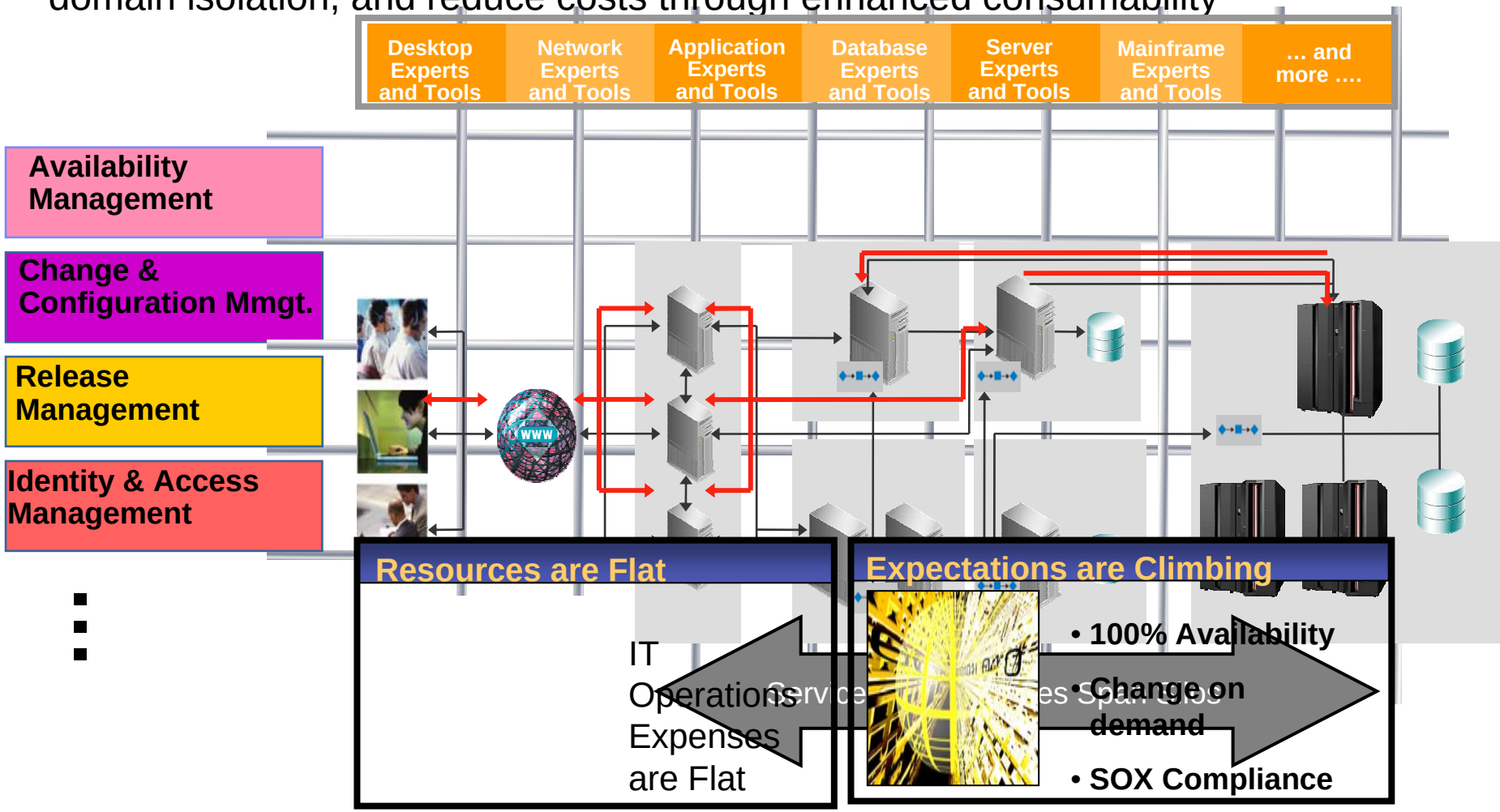
*Future direction**

- Continued improved access to data and improved price/performance with additional zIIP exploitation
- DB2 enhancements to reduce the need for z/OS specific skills
- DB2 table scan acceleration via DS8000
- Support for encryption of data at rest (disk subsystem) with z/OS key mgmt
- Extended support to handle larger volumes of data, with improved scalability and continued balanced system design

Barriers to success in Availability

Complexity of IT Operations is increasing due to proliferation of SME Silos and widespread adoption of complex Composite Applications

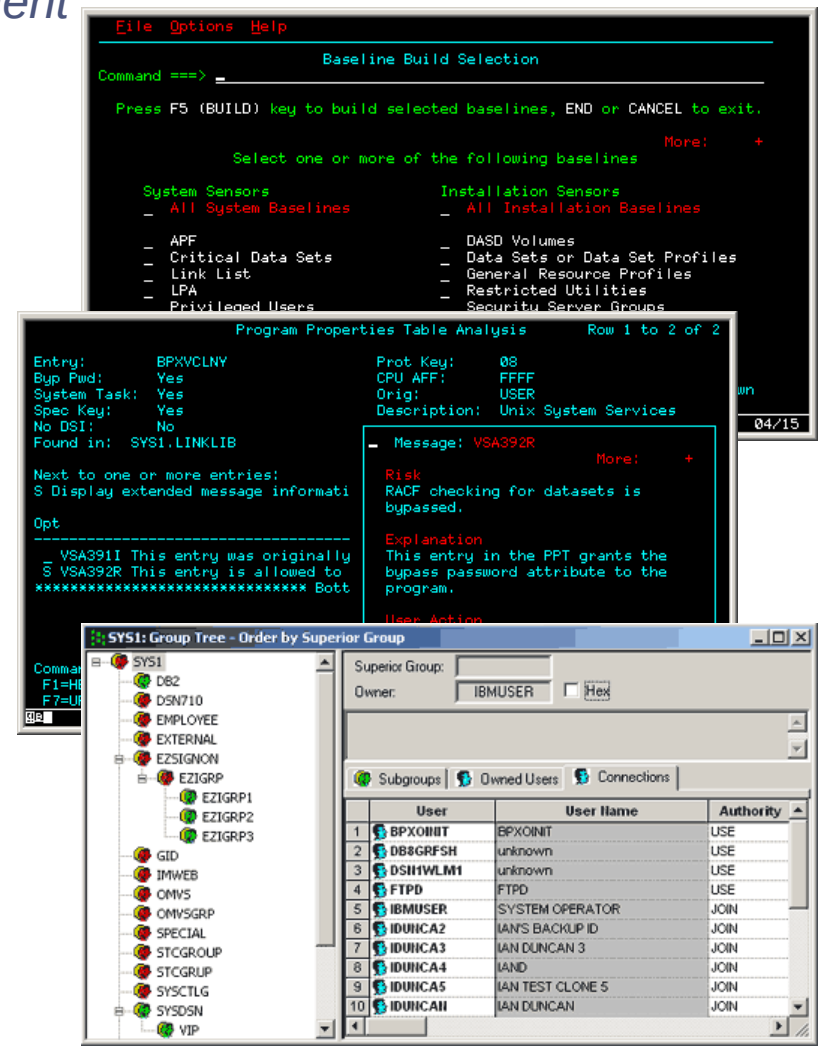
Tivoli and Availability Products to the simplify process management, enhance cross domain isolation, and reduce costs through enhanced consumability



zSeries Infrastructure Management – **Security Management**

Complete zSeries security management solution, including administration, integrity auditing, and intrusion detection and management

- **Vanguard Administrator simplify and enhance RACF security management**
- **Vanguard Analyzer assists with security system snapshots or full-scale zSeries security audits**
- **Vanguard Enforcer manages and enforcing security policy in z/OS and RACF**
- **Vanguard Advisor provides Event Detection, Analysis and Reporting capabilities for the z/OS and RACF**
- **Vanguard Security Center offers browser-based RACF and DB2 security administration on z/OS**
- **IBM Tivoli Security Administrator for RACF provides low cost, rapidly deployable RACF management solution**



Advancing toward goal of 20,000 mainframe educated students in marketplace by 2010

- IBM Academic Initiative
  - School register & agree to teach or do research on mainframes
  - IBM provides course material, access to systems (hubs)
  - IBM assists with connecting customers and schools (co-ops, program curriculum, technical support, and professional instructors)
- 215+ Schools WW (up from 20+ in early ‘04) & 300+ professors registered
- Mainframe Specific Initiatives
  - Courses
  - Recruiting materials
  - Mainframe hubs
  - University ambassadors
  - Customer advisory council
  - Customer/school relationships
  - Student/new hire network
  - zNextGen community
  - Student mainframe contest
  - Summer faculty & T3 seminars

More info: **www.ibm.com/university/zseries**

Simplify z/OS Operations with Tivoli Enterprise Portal

-- New management console integrates tools, data and processes

Tivoli Enterprise Portal

Mainframe

- Host and Distributed Infrastructure Management
  - OMEGAMON XE
  - NetView for z/OS
  - SA for z/OS
- Composite Application Management
  - *Transaction Tracking, J2EE, SOA*
- zAAP processors and Cryptographic Coprocessors
- CICS TS 3.1
- DB2 v8.1

Process Integration

Business Systems Mgmt

Service Support

Service Delivery

Distributed

- UNIX
- Windows
- Linux
- OS/400
- DB2, Oracle, Microsoft SQL, Sybase
- mySAP, Siebel
- HACMP
- Microsoft Exchange
- Microsoft .NET
- Virtual Servers - Citrix, VMWARE ESX

End-to-End Management