



Building a connectivity solution for Smart SOA on System z



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Smart SOA	RS/6000	System z

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Key Takeaways

1. Connectivity on System z – fundamental to Smart SOA
 - ✓ Connects virtually any commercial IT system
 - ✓ Provides availability, security and compliance to help you meet your business objectives
 - ✓ Integrates easily with your key System z business environments (e.g. CICS, IMS) to help reduce risk and cost of core application reuse
 - ✓ Provides connectivity for your business services that matches Service Levels of your System z applications
 - ✓ Ensures flexibility and scalability needed for growth and shared services workload balancing
 - ✓ Adoption of SOA on System z is growing
2. IBM is continuing to invest in the mainframe
 - ✓ SOA products and services
 - ✓ Significant investment for the next five years to drive simplification
 - ✓ Continued focus on the ecosystem



SOA: Unlock business value.
→ New software and services.

The Business Landscape is Changing

Forcing Companies of All Sizes to Respond to a 'Flat World'

Innovation that matters to CEOs:

- Extend the ability to collaborate inside & outside
- Innovate business models & processes
- Leverage information for business optimization
- Integrate globally
- Agile business processes

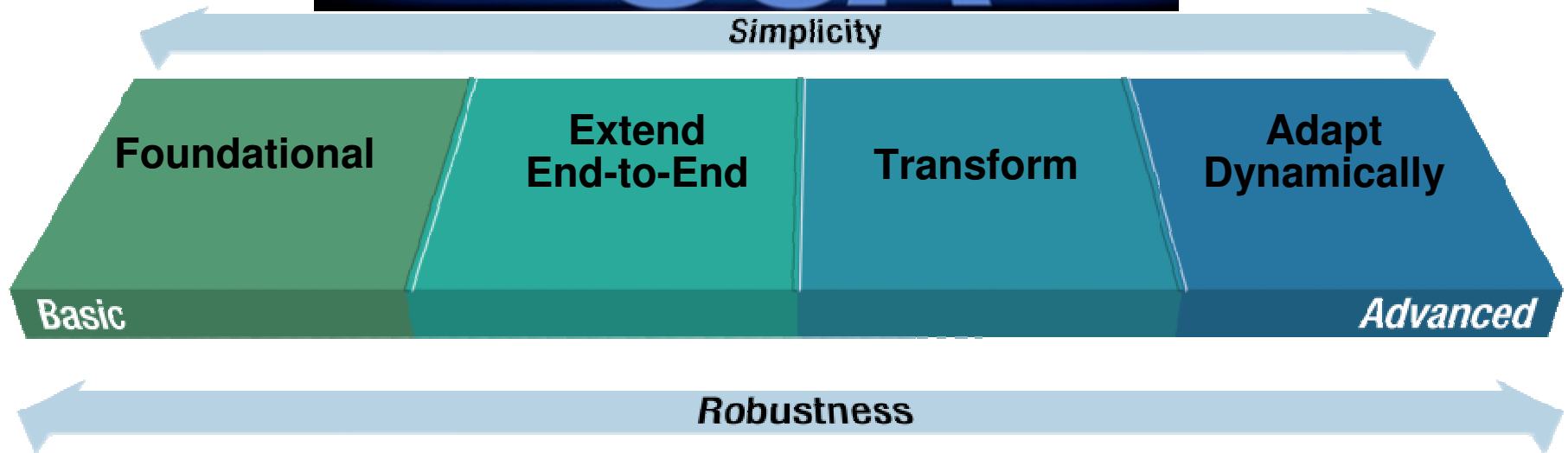


87% expect fundamental change in next 2 years
78% believe innovation requires business and technology

*“The scale and pace [of global economic integration] is unprecedented
... the greater part of the earth’s population is now engaged.”*

There is a Smarter Way!

Aligning Service Oriented Approaches



Smart SOA Delivers Value to Both Business and IT

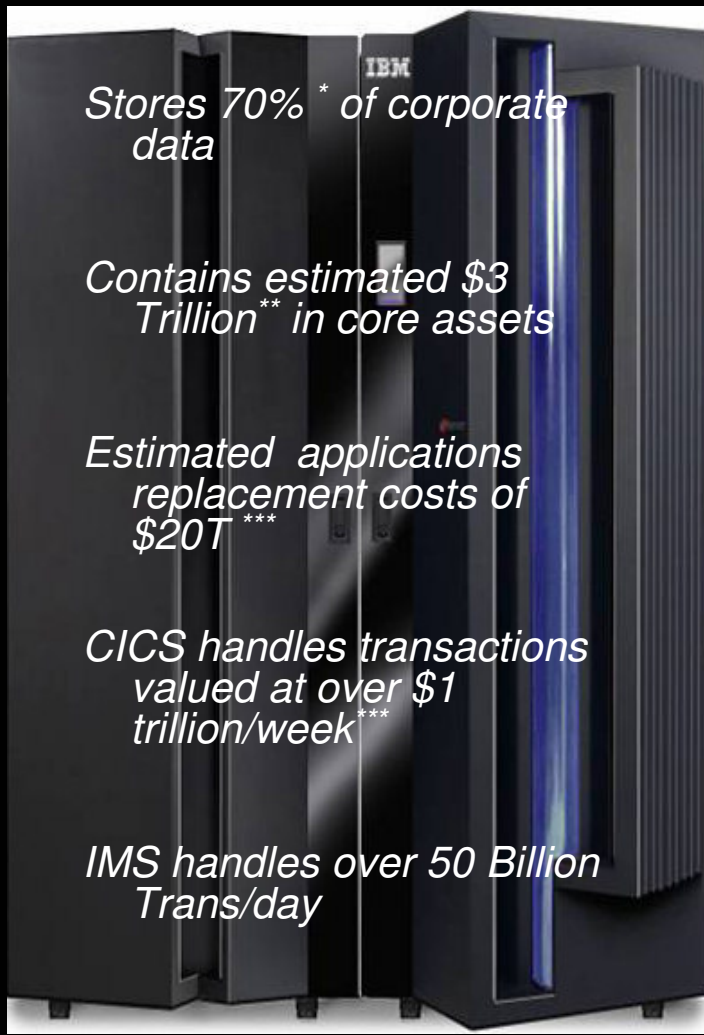
Distinct Value with Every Path

Regardless of Where You Choose to Engage

<i>Value to business</i>	Greater agility in specific, departmental business areas	Optimization and innovation across end-to-end business processes	Business model innovation to support the Globally Integrated Enterprise	Predictive business automatically responding to market forces
Scope	Collaboration within a line of business	Coordination across lines of business	Enterprise-wide organizational cooperation	Enact significant shifts without direct IT involvement
	Foundational	Extend End-to-End	Transform	Adapt Dynamically
	Basic			Advanced
<i>Value to IT</i>	Focused, proven, high-ROI projects	End-to-end business process management to innovate and optimize	IT for strategic advantage and business model innovation	Technology becomes invisible
% functions expressed as services	<10%	<40%	<80%	>80%
% of services reused	<5%	<20%	<50%	>50%

There is a Smarter Way!

Continue creating value from your z assets



Smart SOA

Build an SOA around your core mainframe applications

- Highly virtualized and energy efficient – driving out cost and complexity
- Comprehensive security and resiliency – minimizing risk and downtime
- Centralized corporate data serving – a platform for business analytics
- A foundation for SOA – IT that responds to the business
- An ecosystem that is flourishing – ISVs and academic initiatives

Improving Business Agility

...and the challenge of integrating existing applications

“Legacy modernization is morphing into a strategic function. IT can't afford to toss away reliable application transactions indiscriminately.”

-- Phil Murphy, Forrester Research, April 2007

Software archeology

Assets

Layer of disjointed, poorly understood enterprise assets, preventing reuse

Architectures

Tightly-coupled architectures hindering IT flexibility

Skills

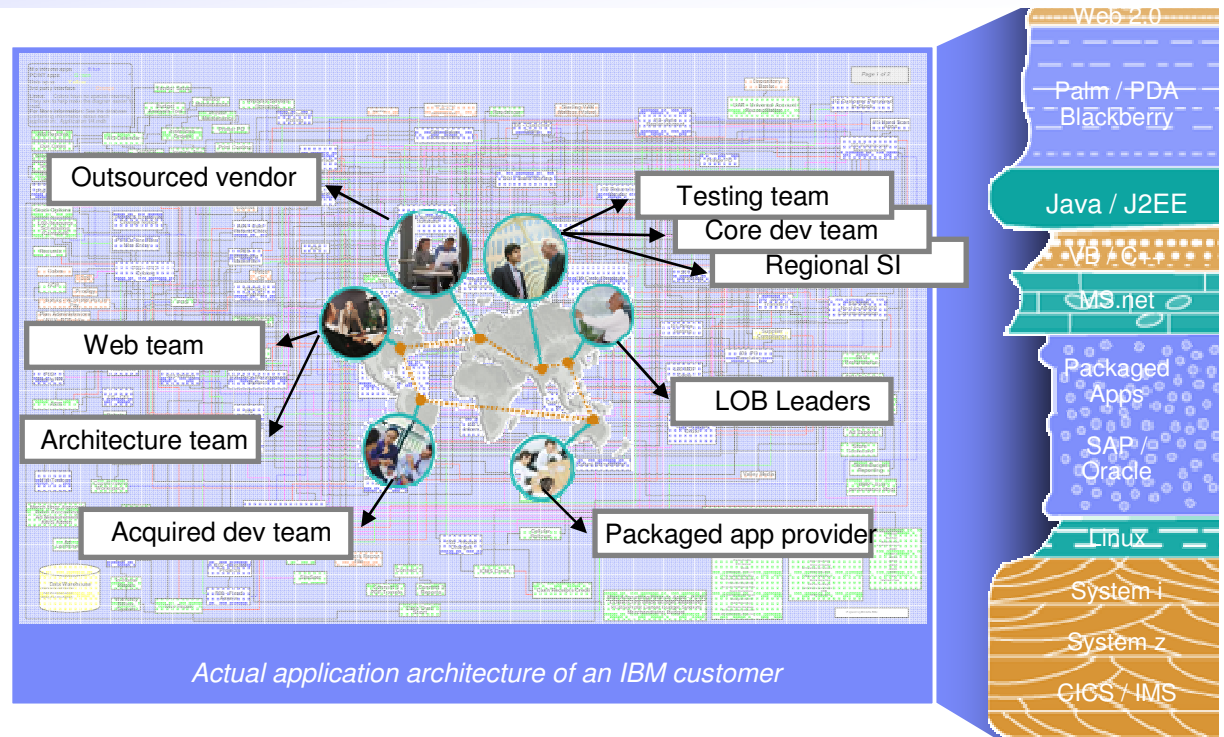
IT skills shortage and silos limiting staff productivity and mobility

Processes and tools

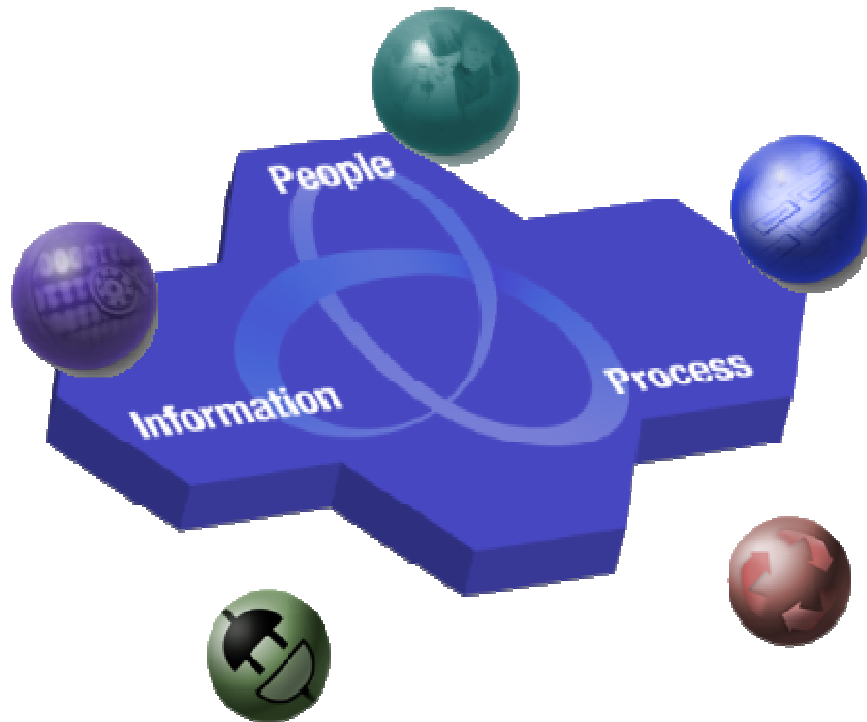
Duplicate processes, tools and infrastructures limiting collaboration

Investments

Increasing maintenance costs limiting flexibility for new investments



Connectivity is fundamental to help leverage your z assets

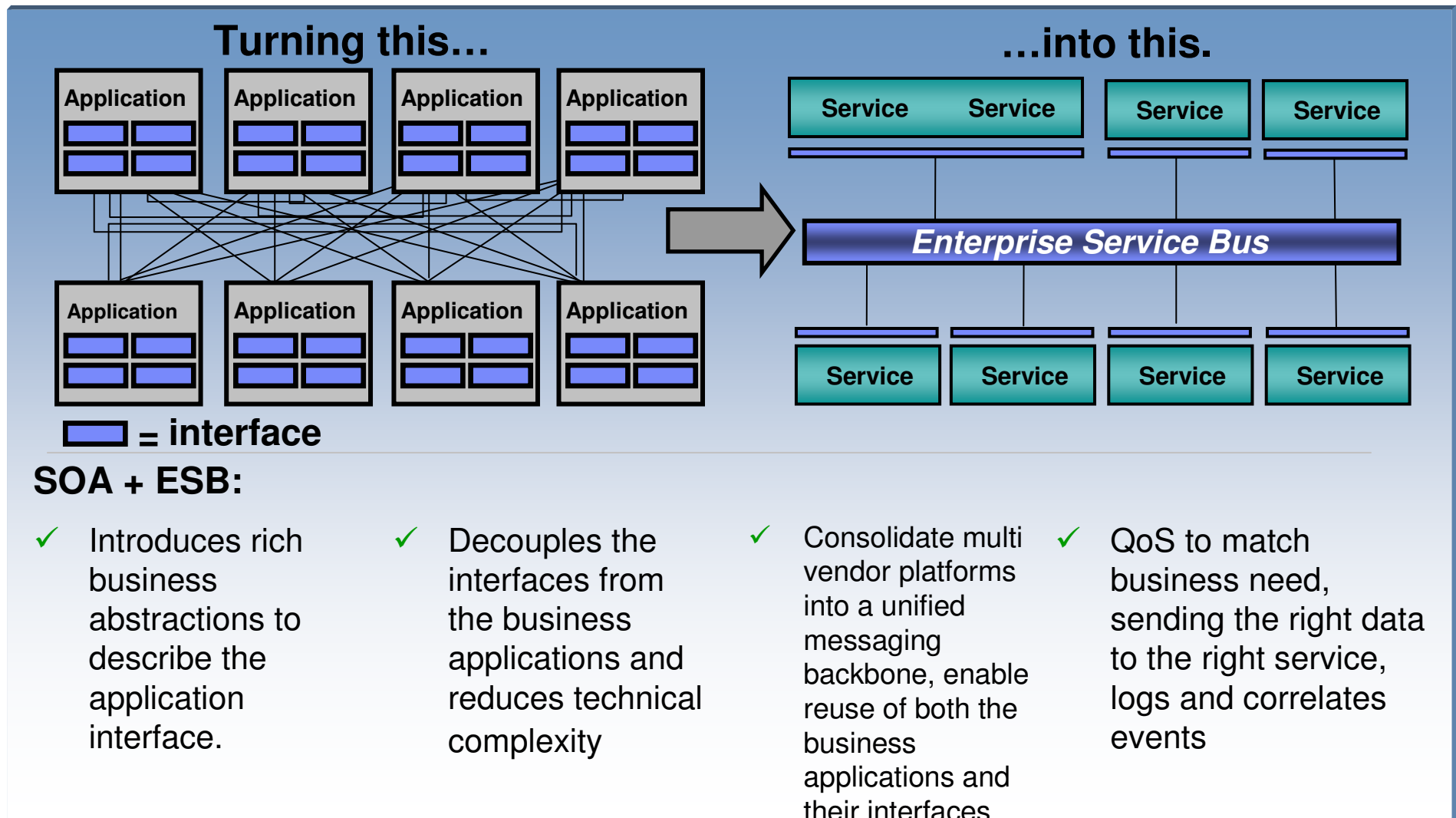


Connectivity Entry Point:

Share information and data seamlessly and reliably across your customers, business partners, employees, contractors, and all your IT assets



SOA with an ESB – Simplifying Interfaces and Applications

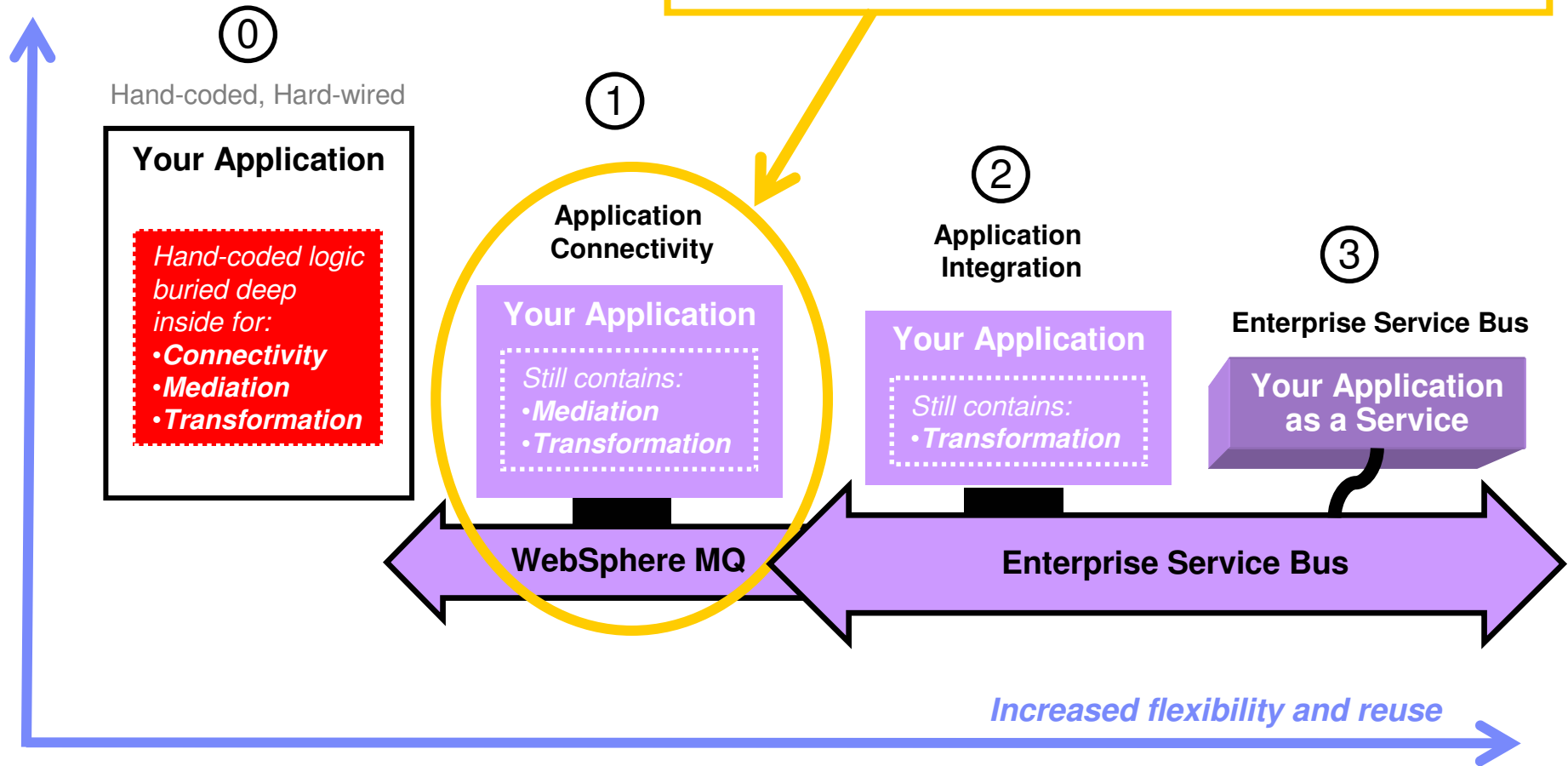


The ESB → Virtualizes access to services.

WebSphere MQ – Your First Step To SOA

More code to develop and maintain

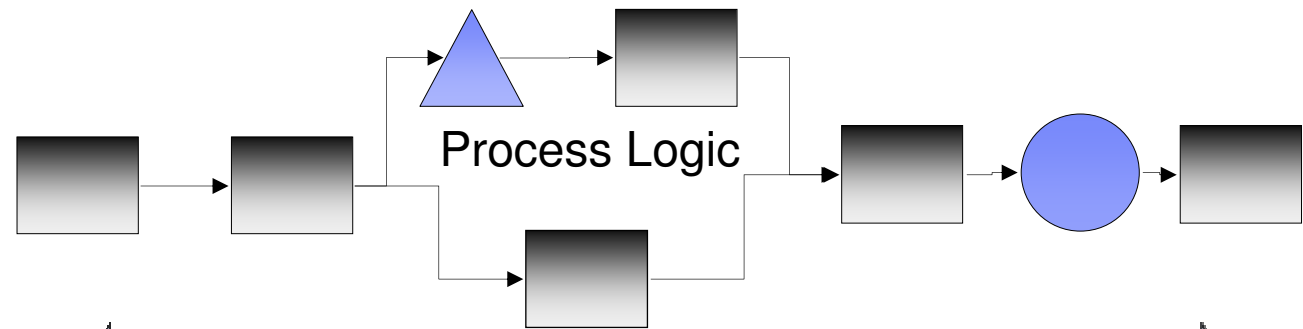
Replaces hardwired connectivity with flexible, reliable coupling that externalizes the connectivity logic so it can be managed and modified independent of your application



The ESB decouples connectivity logic from application and process logic thus making SOA possible

Separation of concern = greater business flexibility

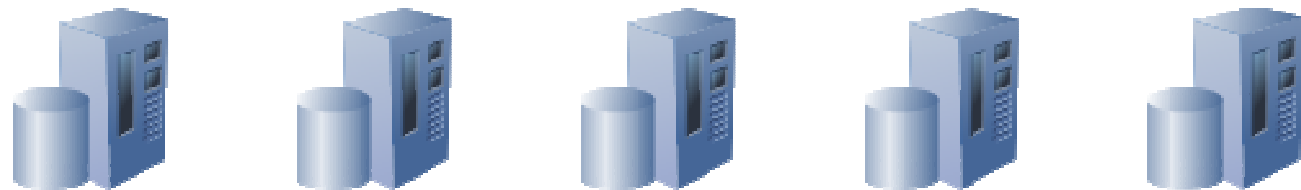
Flexible
“Uncluttered”
 Business
 Process Logic



Intelligent
 Connectivity
 Logic



“Uncluttered”
 Well Defined
 Self-Contained
 Application /
 Service Logic



Application/Service Logic

ESB offerings from IBM WebSphere

IBM is the only vendor to deliver the most complete ESB Portfolio



Optimized with WebSphere Application server for an integrated SOA platform

WebSphere Enterprise Service Bus



Purpose-built hardware for simplified deployment and hardened security

WebSphere DataPower Integration Appliance XI50



Built for universal connectivity and transformation in heterogeneous IT environments

WebSphere Message Broker

By 2009, Analysts state multiple ESBs will be required to grow your SOA!

ESB offerings from IBM WebSphere

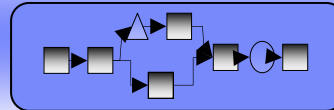
An ESB without limits to enable complete SOA and BPM solutions

Service Registry



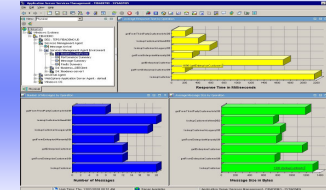
WebSphere Services Registry and Repository

Service Orchestration and BPM



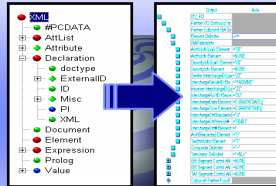
WebSphere Process Server

Service Monitoring



Tivoli CAM for SOA

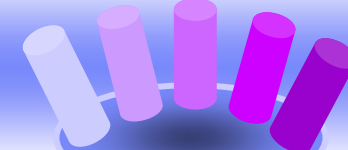
Universal Transformation



WebSphere Transformation Extender

ESB offerings from IBM WebSphere

Service Enablement



WebSphere Adapters

Enterprise Messaging Backbone



WebSphere MQ

SOA Security Appliance

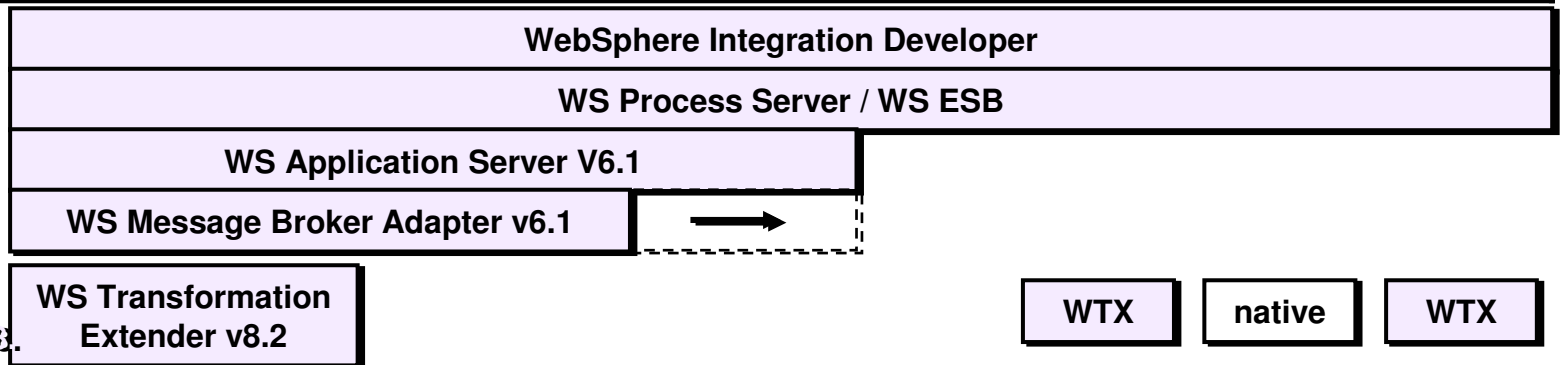


WebSphere Data Power XML Security Gateway XS40

WebSphere Adapters V6.1 on System Z

<http://www.ibm.com/support/docview.wss?uid=swg27006249>

	SAP	P/Soft	Siebel	JDE	Oracle	JDBC	Email	FlatFile	FTP
z/OS	●	X	X	X	●	●	●	●	●
RedHat Enterprise Linux	●	●	X	X	●	●	●	●	●
SUSE Linux	●	●	X	X	●	●	●	●	●



As at february 2008.

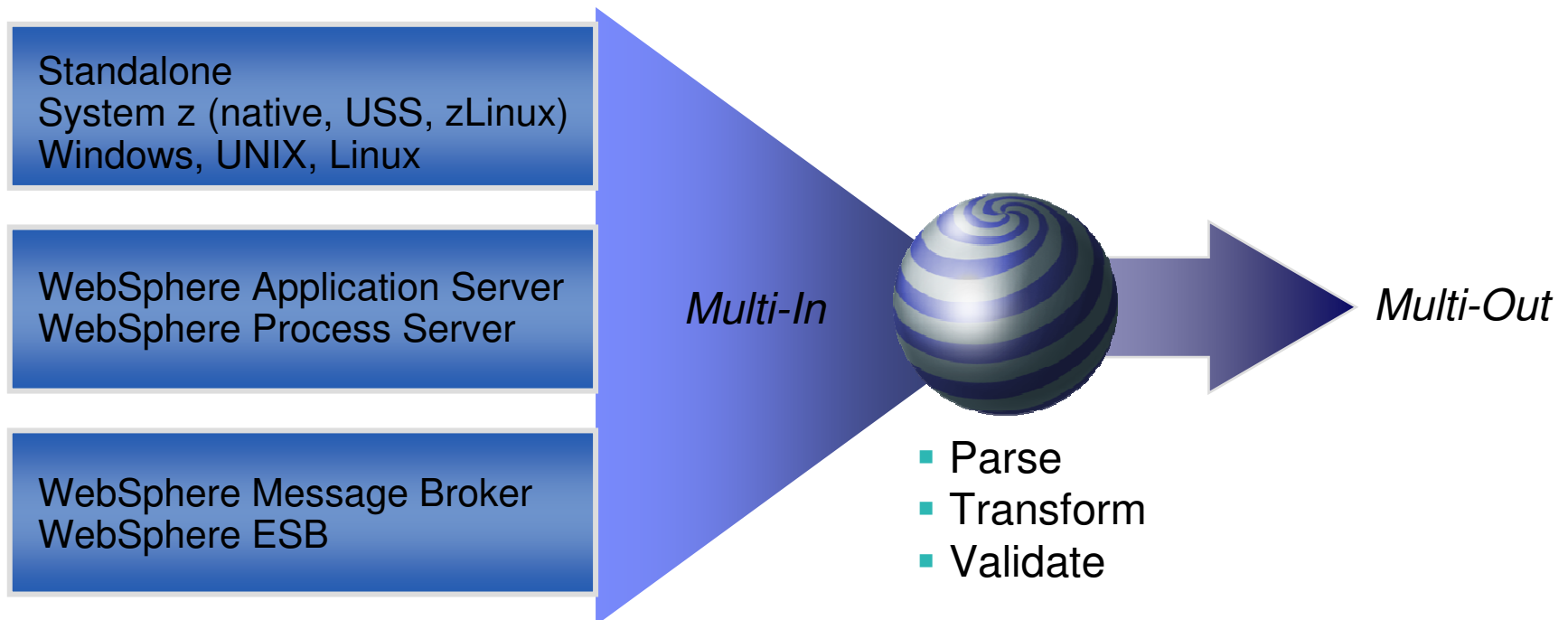
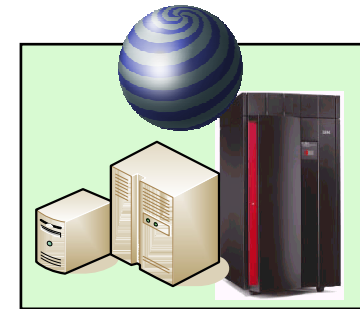
An adapter is the preferred method of connectivity when...



- ...an application has a large number of interfaces
 - ▶ A single instance of an adapter provides one place to access multiple interfaces
- ...an application is not enabled for web services connectivity
 - ▶ Even when applications are web-service enabled, this often covers only a subset of functionality
- ...customers are on multiple versions of the application which each have different interfaces
 - ▶ Many applications have old versions that are still in use by customers and do not have the same degree of open connectivity as later versions
 - ▶ Using an adapter to encapsulate the integration logic minimizes the impact of upgrading between application versions
- ...it is common for customers to customize the application's functionality
 - ▶ A meta-data driven adapter helps customers to service-enable their custom functionality without having to also customize the adapter

IBM WebSphere Transformation Extender

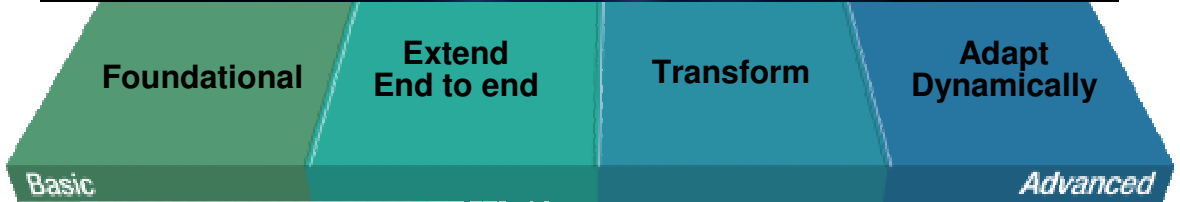
- **Transform, validate, and enrich document files and, messages, containing complex and variable data structures**
- **Deliver trustworthy information for critical business initiatives**
- **Help Meet regulatory compliance requirements**



Complex Data requires Powerful Capabilities

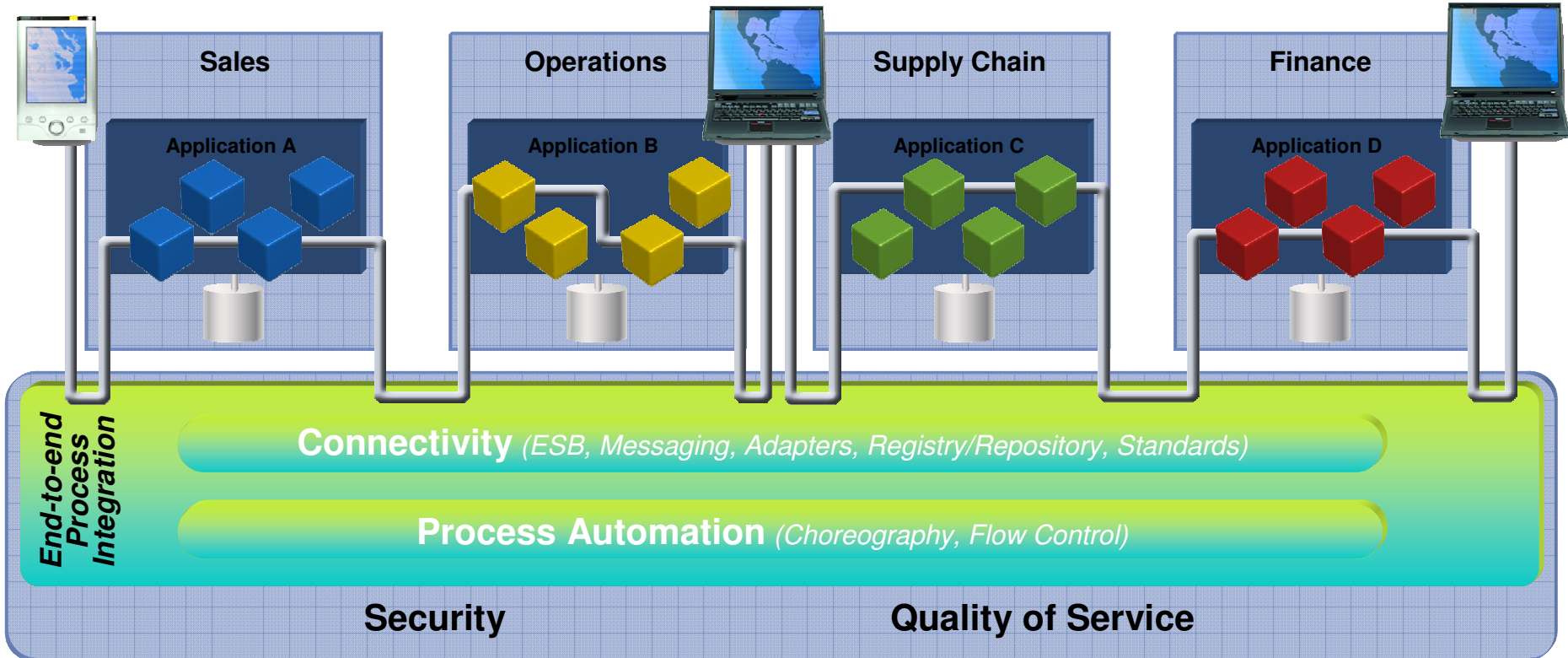
- *Code-Free Design and Deployment*
 - *There is no “language” to TX, the transforms and data process are all maintained within the spreadsheet-like GUI, and you never need to drop down to writing code to handle complex transforms. You create portable “transformation objects”.*
- *Self-describing Data Model*
 - *WebSphere TX uses data in its native format, and has a unique mechanism for describing data in its native form. WebSphere TX is able to handle complex and mixed data types using one design environment*
- *Data Validation as part of the transformation process*
 - *data is validated to content rules and context usages as part of the transformation process. You do not need to write separate logic or have separate executions in order to provide extremely rich data validation*
- *High-Throughput of Complex Transforms and Enhancements*
 - *WebSphere TX has a unique many-to-many model of transforming and processing data, which allows it to execute all transforms, lookups and data enrichments with only one pass at the data, making it one of the most performing transformation engines on the market*
- *One Engine – Mature – with Multiple Deployment Options including Z*
 - *Using the same design environment, you can deploy transformation to a number of runtime environments including ,embedded, standalone batch and event driven scenarios across a number of OS platforms.*

The SOA Entry Points grow with you
Use the same software as your needs advance



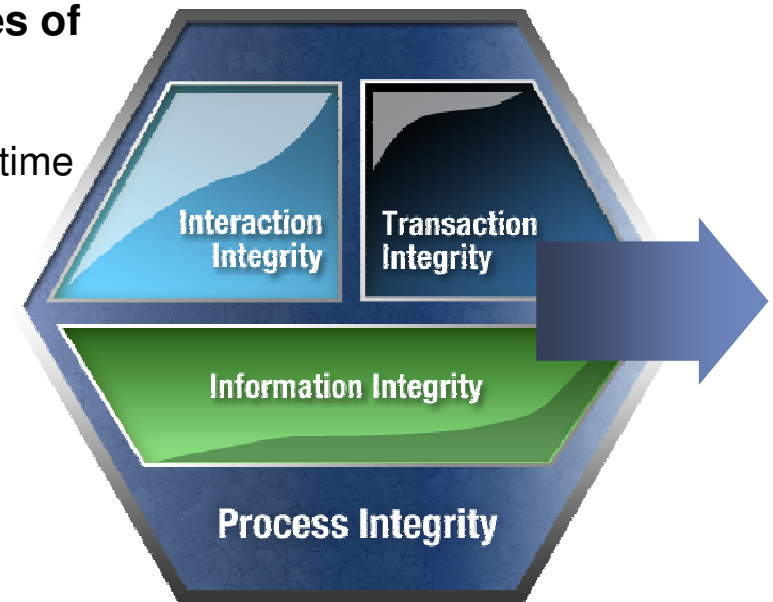
Process Integrity is Critical to Advanced SOA Projects To Achieve Business Agility Without Sacrificing Integrity

Process Integrity is the degree to which loosely coupled “open” systems deliver the reliability, consistency, scalability and predictability of tightly coupled “closed” systems



Transaction Integrity Assures Consistency of Execution Enabling Consistent Transaction Processing in an SOA Environment

- **Transaction Integrity ensures that individual updates of IT / business resources are linked together and processed as a single unit of work**
 - Atomic transactions are short-lived and operate in real-time in a single unit of work
 - Transactions can be long running, lasting seconds or months, and can include multiple atomic transactions
- **Key Transaction Integrity Products:**
 - WebSphere Process Server, WebSphere ESB, WebSphere Application Server
 - WebSphere Message Broker, WebSphere MQ
 - WebSphere DataPower Integration Appliance XI50
 - WebSphere Service Registry and Repository
 - WebSphere Adapters
 - CICS Transaction Server



Process Integrity Demands High Quality of Service

Scalability, Availability and Performance are Fundamental

- **Maintaining High QoS in End-to-end Processes**
 - Workload management and high availability of transactions
 - SOA appliances to accelerate XML and security processing
 - Virtualization to enable flexible allocation of resources
- **Performance Testing and Monitoring**
 - Performance testing and problem analysis tools
 - Runtime monitoring to proactively identify performance problems in end-to-end processes
- **Key Quality of Service Products:**
 - Tivoli Composite Application Managers
 - WebSphere Application Server
 - WebSphere XD
 - WebSphere DataPower SOA Appliances
 - Rational Performance Tester Extension for SOA Quality
 - IBM Systems Servers



Quality of Service

Process Integrity Demands High Quality of Service

System z is uniquely capable of ensuring QoS

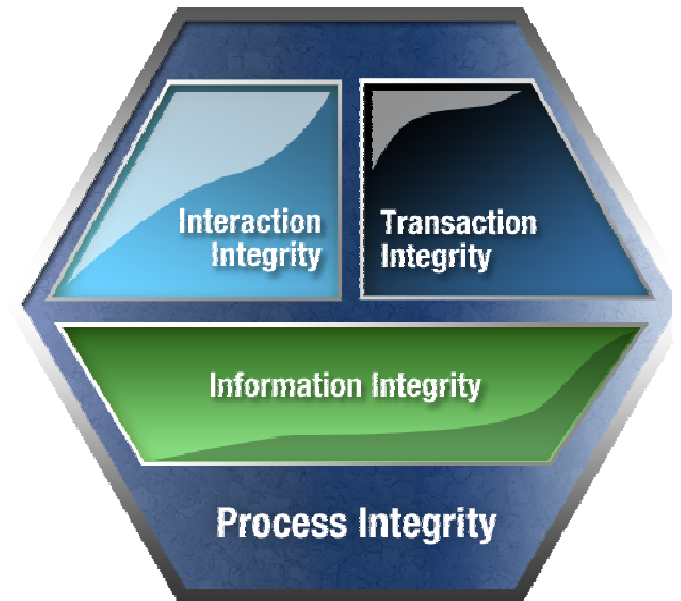
- Up to 99.999% availability in a Parallel Sysplex to avoid planned and unplanned outages
- Change management and rolling maintenance reduces planned outages
- GDPS enables recovery of whole systems across vast distances in split second time
- Component level recovery for both hardware and software
- Automated recovery response to failures including restart and isolation, as appropriate
- Dynamic workload balancing across systems and logical partitions for 24x7 operations

A large bank running their ESB on System z has seen 99.99% availability since their initial deployment two years ago.



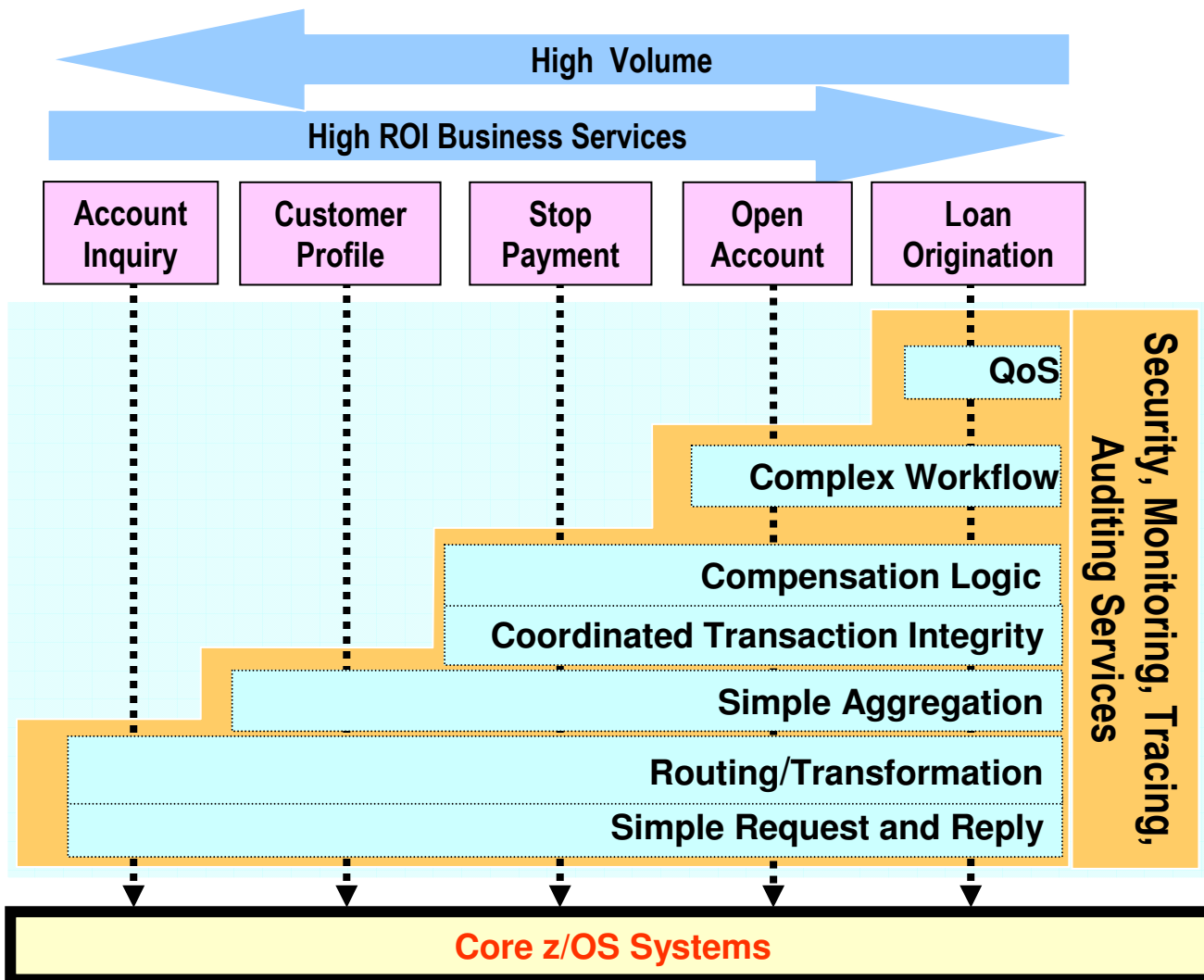
Process Integrity with Connectivity software for System z

- WebSphere MQ for z/OS, WebSphere Message Broker for z/OS, WAS for z/OS, WESB for z/OS
 - Fully ARM-enabled
 - Workload Management
 - Goal-oriented resource allocation
 - Workload scaling, workload isolation
 - Takes full advantage of Parallel Sysplex for with MQ Shared Queues
 - Sophisticated heterogeneous transaction coordination
 - Supports DB2 data sharing, CICS EXCI support and Resource Recovery System (RRS) global transaction coordination
 - RACF for integrated security
 - Reporting and Chargeback



- **Reduced points of failure**
- **Faster processing**
- **Fast End-to-end recovery**

Summary: ESB deployment is dictated by business requirements



As the complexity of the business transaction increases (rightward movement) the workload becomes more targeted to a mainframe deployment:

- Need to handle complex transactions
- Ability to effectively monitor end-to-end transaction
- Rollback/compensate support
- Stringent security/isolation requirements
- Elimination of 3 tier latency (value of proximity to data)

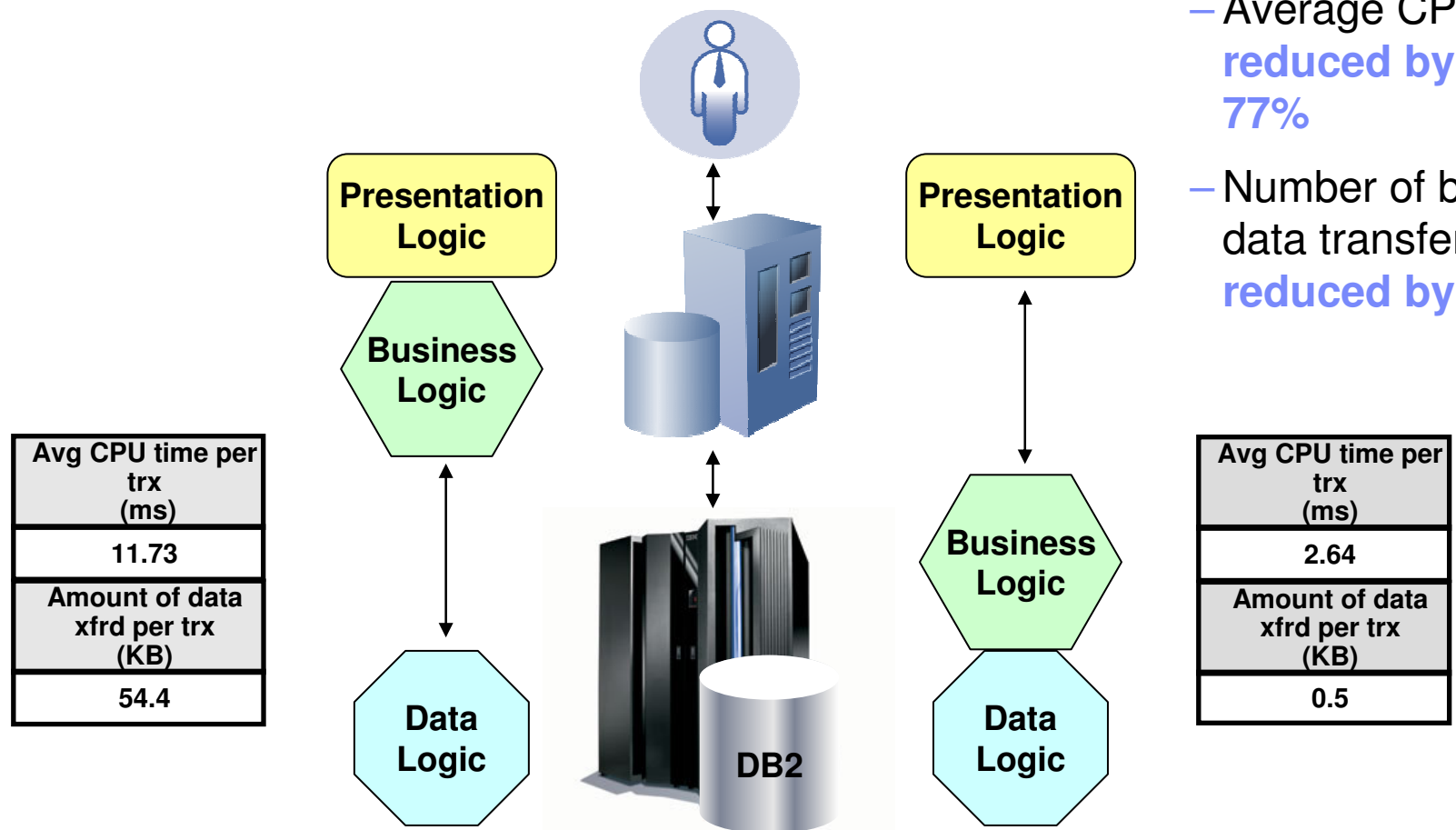
Thank
You



Additional considerations for placing workloads on z



Performance: The value of proximity



Per EJB transaction:

- Average CPU time **reduced by over 77%**
- Number of bytes of data transferred **reduced by 99%**

Transportation industry POC

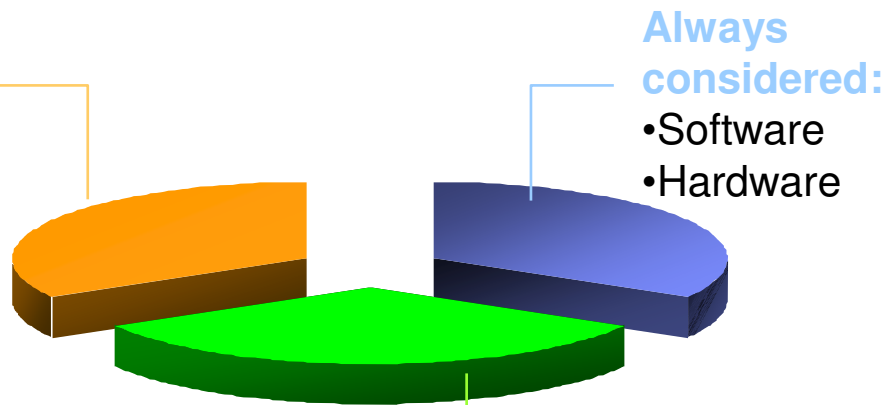
*<http://www.ibm.com/support/techdocs>, *Optimizing WebSphere Performance on DB2, WP100558**

Cost of Ownership

- The cost of running incremental workload on the mainframe goes down as the total workload grows
- Consolidation opportunities accelerate the benefit
- When considering your ESB deployment, consider Total Cost of Ownership vs Total Cost of Acquisition

Often overlooked:

- Maintenance
- Development and Test software, hardware and maintenance



Always considered:

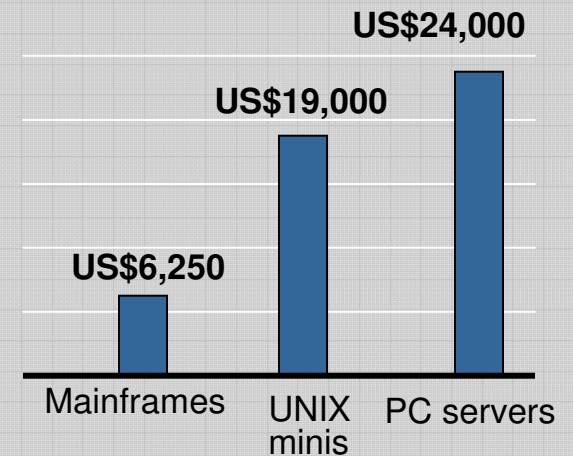
- Software
- Hardware

Rarely considered:

- People
- Power/Cooling
- Space
- Ease of growth
- Cost per application

Arcati

Predicted average cost per end user in 2010



Five-year costs for hardware, software and maintenance

Arcati Research 2005.
 "The Dinosaur Myth 2004 Update."

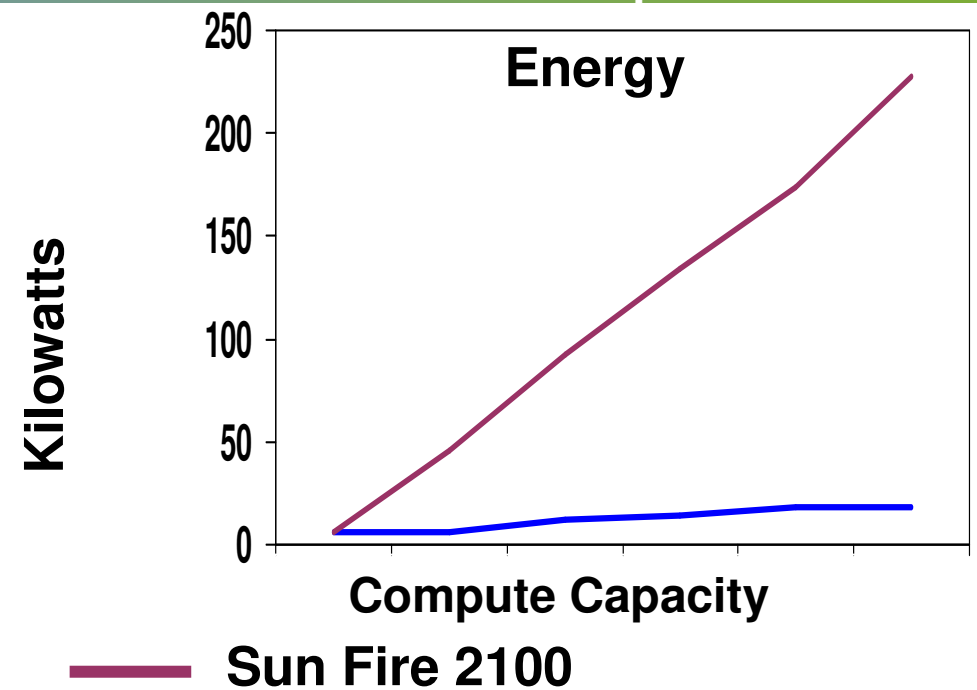
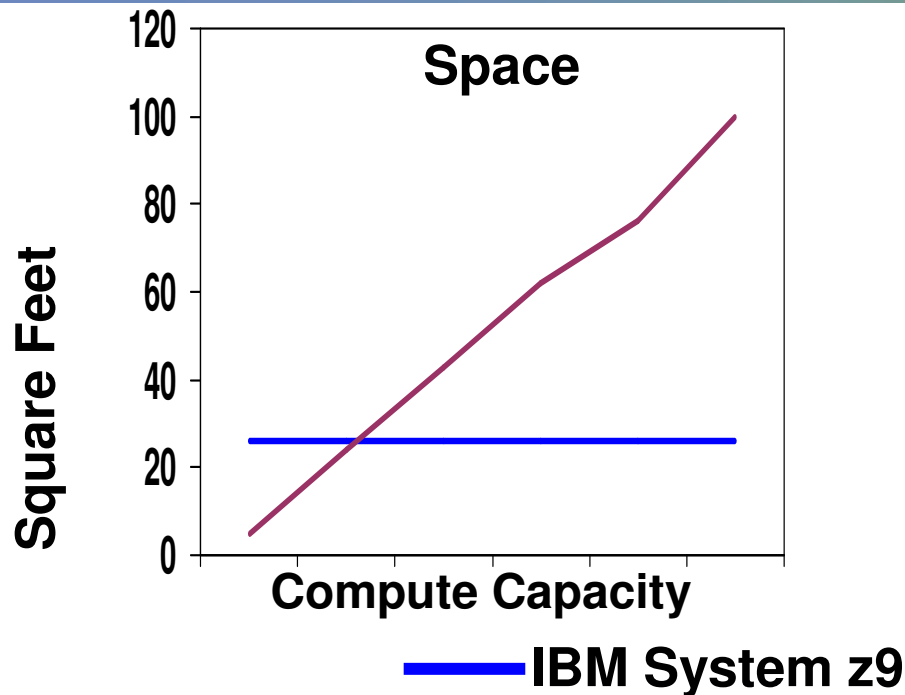
Power and environment – sustainability makes business sense with System z

“By 2008, nearly 50% of data centers worldwide will lack the necessary power and cooling capacity to support high-density equipment. “

Gartner, Inc., "Gartner's Top Predictions for IT Organizations and Users, 2007 and Beyond", by Daryl C. Plummer et al, December 1, 2006

System z - Most Energy and Space Efficient

- Mainframe consumes one twelfth the electrical power, provides four times the work in the same space



Why loose coupling?

- **Tighter coupling tends to cost more over time:**
 - Synchronizing multiple organizations on change
 - Adapting, redeploying updated components without affecting others
 - Making changes is hard and expensive, or impossible:
 - Knowledge is distributed throughout the code
 - Same people are solving business and infrastructure problems
 - Different parts of the solution are difficult to manage separately
 - Hard to move, hard to scale, hard to distribute, hard to replace
 - More coupling implies more expensive testing
- **Loose coupling requires greater investment up front:**
 - More design work
 - More implementation work

Several service elements must be considered when thinking about coupling:

- **Service**
- **Message**
- **Interface**
- **Contract**
- **Policy**
- **Conversation**
- **State**
- **Transactions**
- **Process**

What is an Enterprise Service Bus?

- An ESB enables integration between loosely-coupled applications and services within and across
 - **Services oriented architectures** – where distributed applications are composed of granular re-usable services with well-defined, published and standards-compliant interfaces
 - **Message driven architectures** - where applications send messages through the ESB to receiving apps
 - **Event driven architectures** - where applications generate and consume messages anonymously
- Mediations within an ESB enable intelligent processing of service request/responses, events, messages
 - At application endpoints or distributed through the infrastructure of the Bus
 - Capabilities include:
 - Matching and routing of messages between services
 - Conversion of transport protocols between requestor and service
 - Transformations (e.g. XML to XML translations, DB lookups, aggregations),
 - Distribution of business events from/to disparate sources.
- **Enabling simple application integration across different platforms, programming models & messaging standards**
 - underpinning Business Process and managed Business Partner integration