IBM Software Group

WebSphere Application Infrastructure and SOA on System z

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Agenda

- Introduction
- Business and IT challenges
- WebSphere Application Infrastructure and SOA on System z
  - WebSphere Application Server on System z (WASz)
  - WebSphere Extended Deployment (WSXD)
  - WebSphere Service Registry and Repository (WSRR)
- Conclusion

Three Main Points

1. You are facing extraordinary business and IT challenges

2. You expect IBM to provide responsive solutions and leadership to help you meet those challenges

3. The demonstrated business and industry successes, as well as exponential market growth, confirm the value of WebSphere Application Infrastructure as the foundation of your SOA on System z

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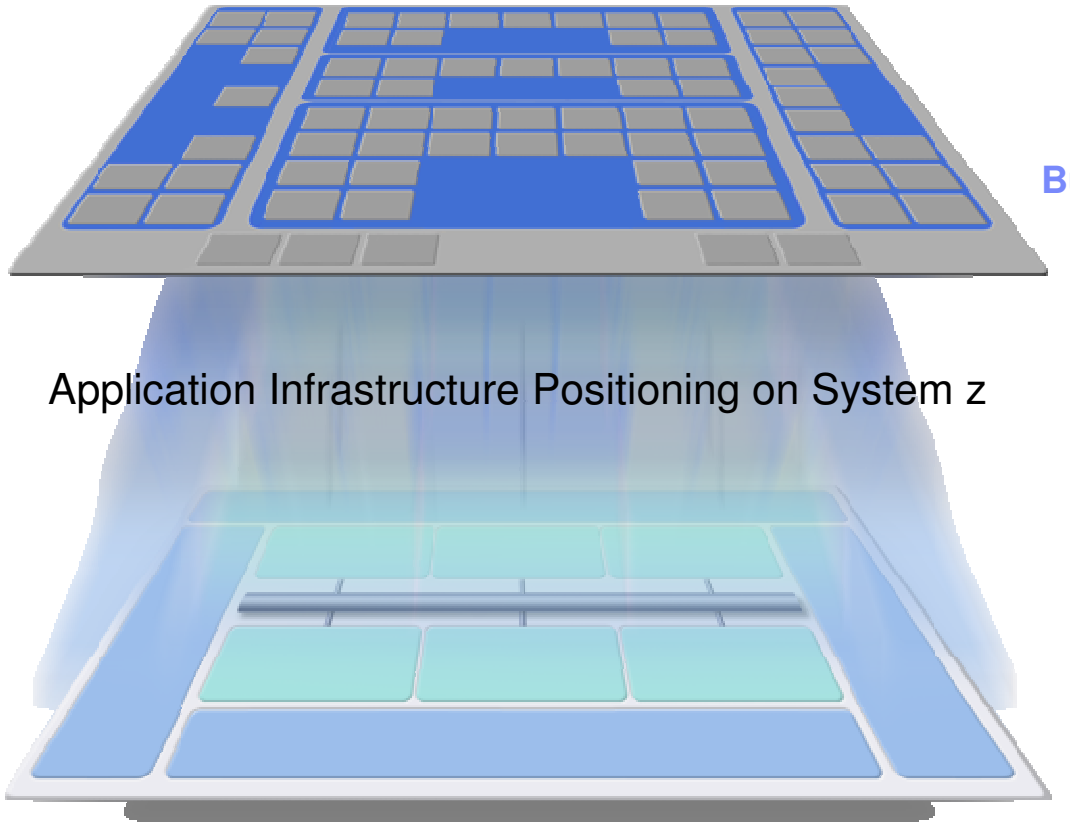
The alignment of Business and IT with SOA

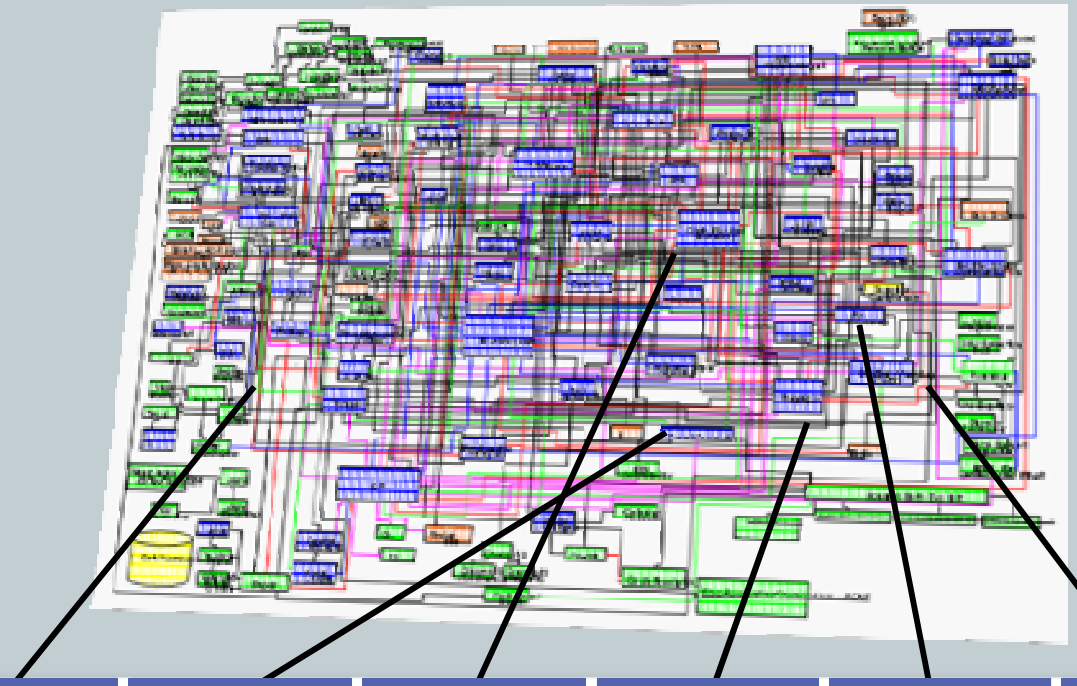


From your business and IT starting point

Business Objectives

Innovation | **Top line growth** | **Increase efficiency** | **Reduce costs** | **Gain market share**

- Complex processes and systems
- Complex applications and interfaces
- Difficult to adapt quickly
- Large portion of IT budget spent on maintenance, not on new value add investments



Resources and IT Assets

Legacy Claims Database | **Auto Claims System** | **Home Claims System** | **Life Insurance Claims** | **Business Partner Claims System** | **…**

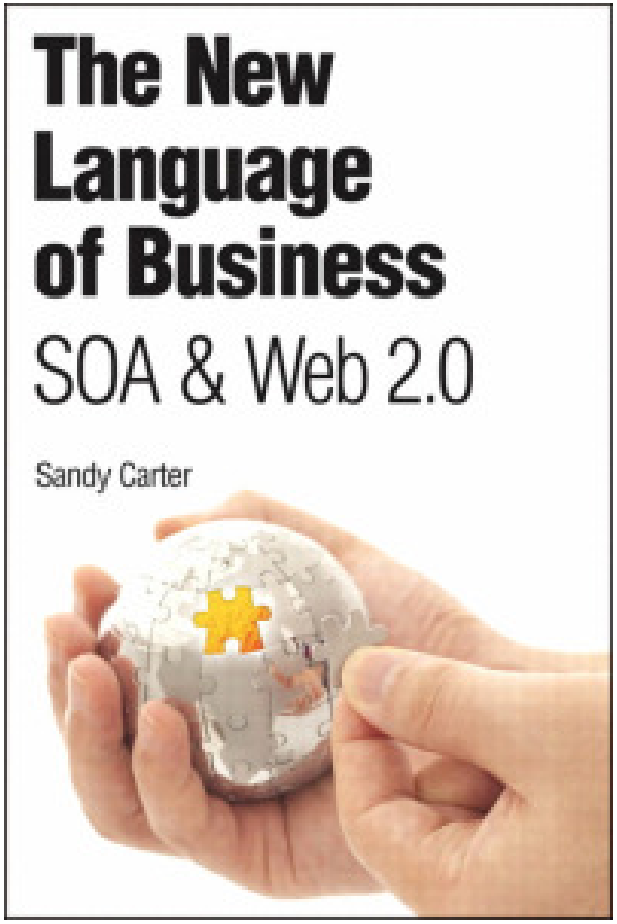
The business growth of SOA

"Innovation in IT structures is so revolutionizing that the proven successes of SOA's have enabled this segment to grow to a worldwide market opportunity of $60.3 billion in 2006.

This is a 75% increase in growth compared to 2005, when the market was estimated at $34.6 billion."

Moreover, the SOA market is expected to skyrocket, with an anticipated 54% compound annual growth through 2008, to reach $143 billion."

- The New Language of Business: SOA & Web 2.0, Sandy Carter, Pearson PLC IBM Press, 2007, p.43.



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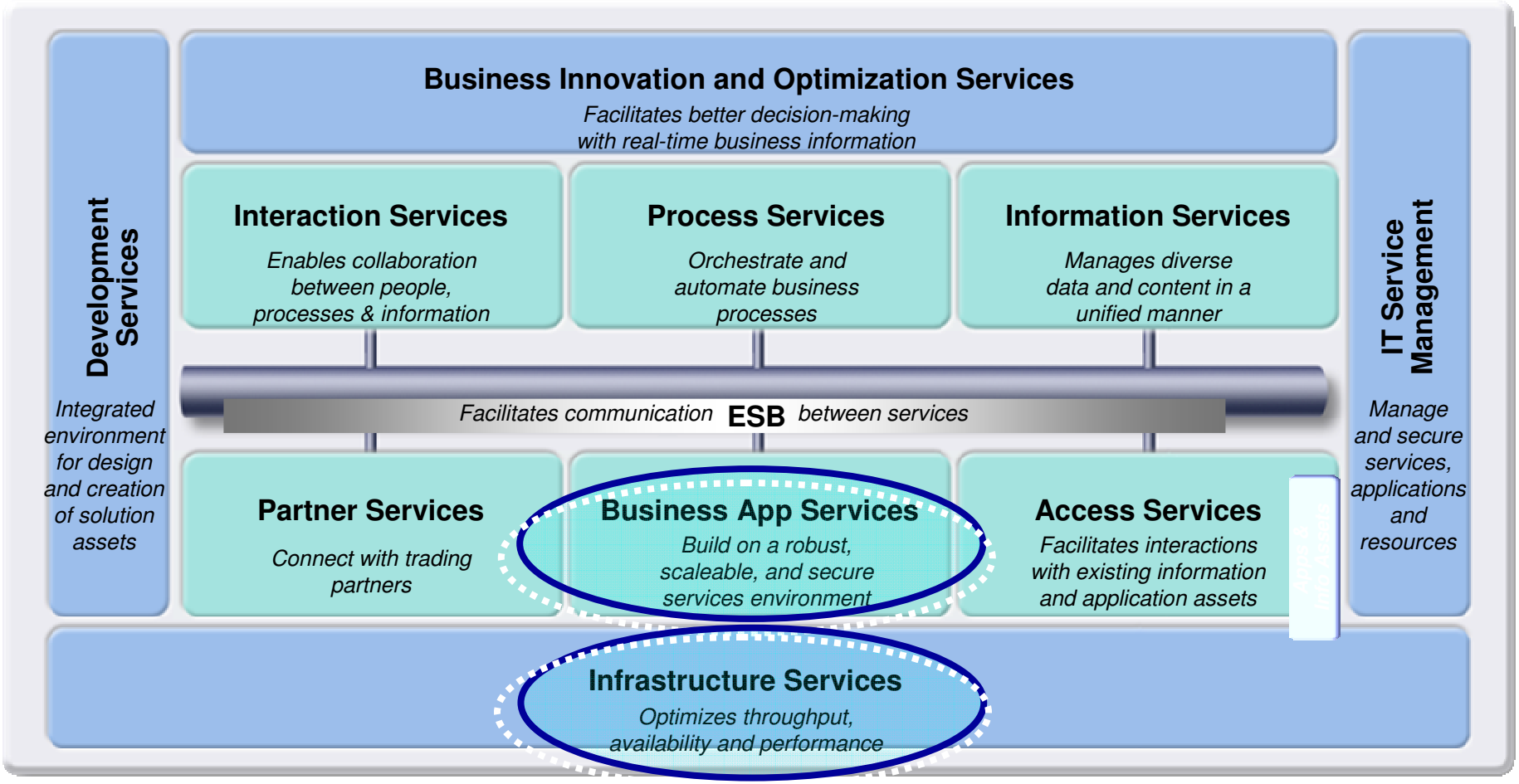
Application Infrastructure is the cornerstone of an SOA deployment



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Why IBM Application Infrastructure?

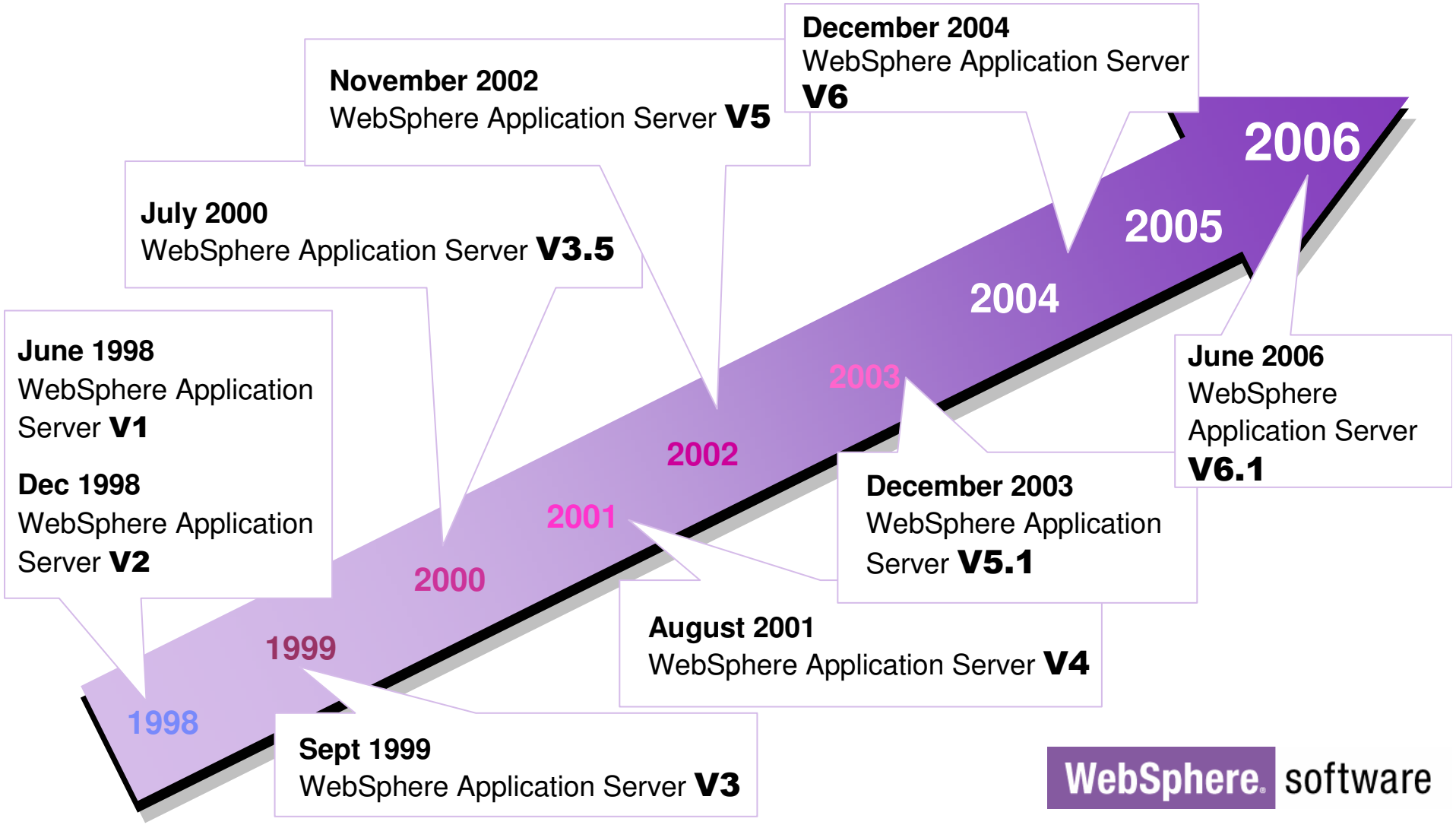
" WebSphere Application Server is one of the most popular J2EE platforms: It has been on the market for many years, enjoys vast industry support and has an impressive installed base…"

Gartner

Gartner rates WebSphere Application Server #1 in Market Share with 34%
Up 24% year to year!

*Gartner Magic Quadrant for Enterprise Application Servers, 2Q06. By Yefim V. Natis, Massimo Pezzini, Kimihiko Iijima, Michael Barnes, August 2006

WebSphere Application Server - A Mature, Proven Platform



WebSphere. software

Core Features Common Across These Configurations

Features

- Full J2EE 1.4 ***(J2SE 5)*** programming model *plus extensions:* eg. Internationalization services; dynamic query capability, scheduler services...
- ***Built-in JMS*** messaging provider: once and once only assured delivery, fully transactional
- ***Application Server Toolkit***, including tools for creating web services, portlets, SIP apps…and tight integration with Rational tools (deploy directly to WAS)
- Easy to use management console and Integrated performance monitoring
- Broad platform, DB & language support
- Tight integration with the rest of the WebSphere Platform
- ***Install Factory*** - *Streamlines the up-and-running process to just one simple step, making installation and deployment easy, reliable and repeatable*

Core Benefits

- Secure, reliable, flexible infrastructure
  - ➙ Help improve development cycle times & get you to production faster
- Higher ROI and lower TCO by reusing existing assets & skills
- Fast time-to-value with fewer programming steps & real out-of-the-box performance
- Makes dynamic IT environments simple & efficient to monitor/manage
- Positioned for growth: scale quickly & securely; seamlessly add more capability

WebSphere Application Server V6.1 Performance Rocks!

GA: 6/30/06

IBM benchmarks show WebSphere Application Server V6.1 is:

- *Up to **40% faster** than V6.0.2*
- *Up to **56% faster for Web Services** than V6.0.2*

Leading Edge Performance

Industry-recognized benchmarks will show V6.1 to be:

- *Up to **48% faster** than V6.0.2*
- ***Faster than the nearest competitor***

* Based on IBM metrics, 2006.

Technology Simplification

Session Initiation Protocol (SIP) in WebSphere

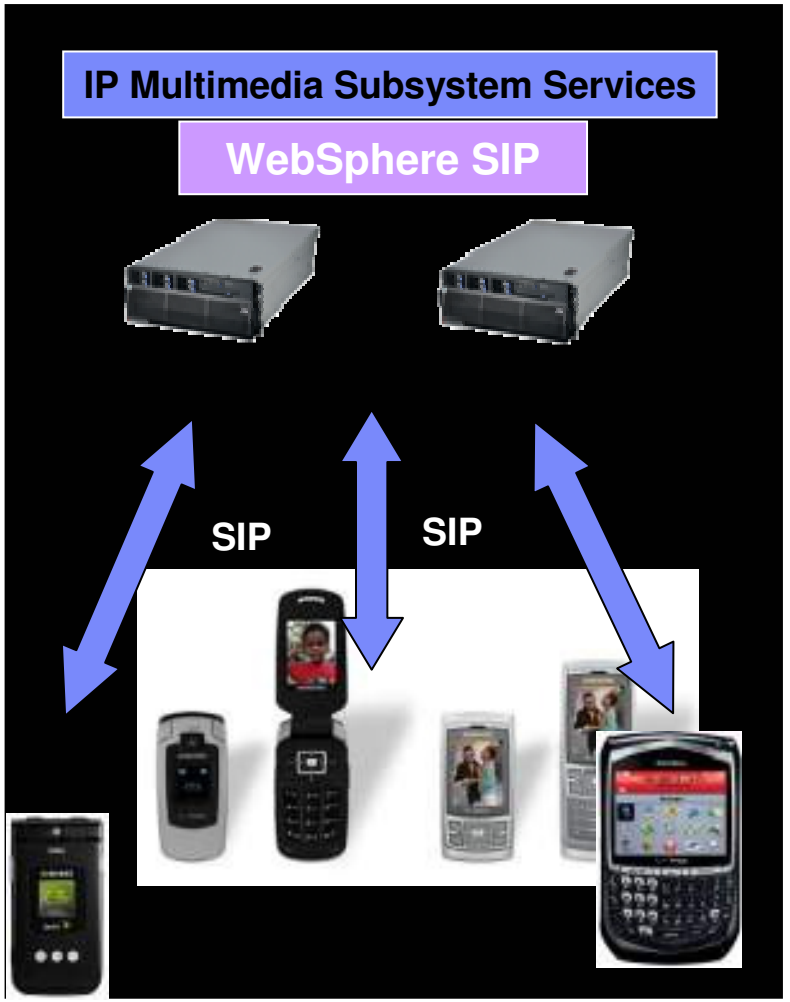
NEW!

Next generation applications for the enterprise are being built on SIP

- SIP provides a signaling and call setup protocol for IP-based communications
  - Superset of the call processing functions & features present in the public switched telephone network
  - Permits familiar telephone-like operations: dialing a number, causing a phone to ring, hearing ringback tones or a busy signal
- Collaborative applications
  - Chat/Instant messaging
  - Video conferencing, video over IP
  - Voice over IP is built using SIP
- Entertainment/Gaming
- IP Multimedia Subsystem – The next generation telecommunications architecture.

Full integration into WebSphere v6.1

- SIP Servlet 1.0 (JSR-116) support
- Proxy capabilities for High availability
- SIP Tooling in the Application Server Toolkit
- Performance Monitoring



JEE 5

- **The Java Enterprise Edition 5 specification**
  - Final Release to the Java Community Process in July 2006
  - The major theme for JEE5 is ease of development and usability (or consumability).

The following JSRs directly support the ease of development goals of Java EE 5 and are mapped to their respective FEP or product releases

*** JSR-127 (JavaServer Faces 1.0) - Currently supported in WAS 6.x**

*** JSR-181 (Web Services Metadata for the Java Platform) –**

- Included in Web Services FEP

*** JSR-220 (EJB 3.0) - included in EJB 3 FEP**

*** JSR-222 (JAXB 2.0) - Included in Web Services FEP**

*** JSR-224 (JAX-WS 2.0) - Included in Web Services FEP**

*** JSR-52 (JSTL 1.1) – In plan for WAS v7**

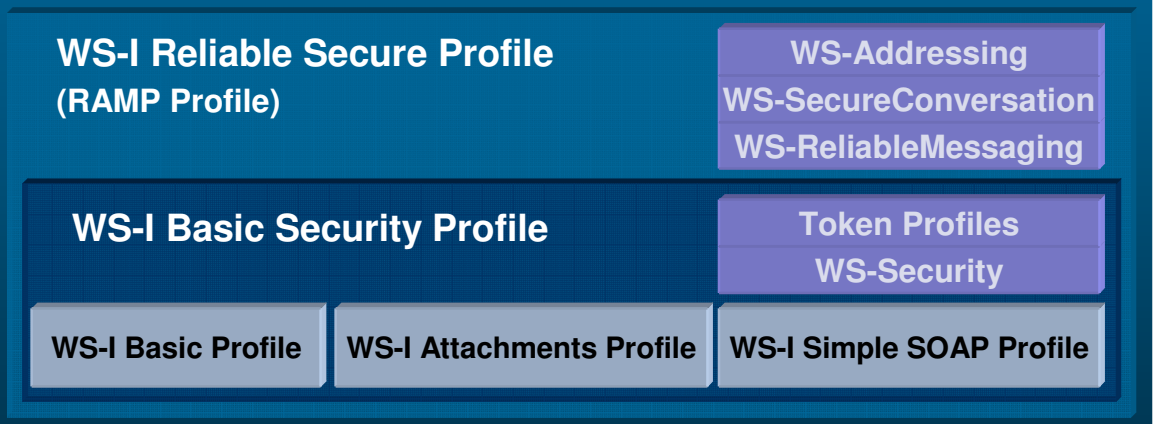
WAS Community Edition: We delivered JEE5 (including EJB 3.0) in WebSphere Application Server Community Edition v2.0 Oct 2007.

WAS 6.1 Web Services Feature Pack

Making web services simple

Asynchronous, reliable Web Services Through Support for Key Web Services Standards

- **Status:** eGAd 8/31/07 for production use with WebSphere Application Server v6.1
- **Interoperable, Reliable Web services:** Send messages asynchronously, reliably, securely and in an interoperable way with other vendors
- **Easy-to-implement**
  Simplify development of Web Service providers and clients: Add XML data and processing functions to Java applications easily



- **Consumable and Extensible**
  Simplified management of these Web services profiles makes it easy to configure and reuse configurations, so you can introduce future profiles more seamlessly

EJB 3 Technology

Simplified programming model with persistence

Status: GM'd for production use with WebSphere Application Server v6.1 - 11/30/07

1. Familiar programming models
   - Easier to develop with familiar programming approach such as POJO
2. EJB 3 and JPA
   - Technology you need to satisfy Java EE 5 requirements
3. Java Persistence API
   - New API simplifies the development of Java EE and Java SE applications using data persistence.
   - Draws upon the best ideas from persistence technologies such as Hibernate, TopLink, and JDO.
4. Support for simplified frameworks
   - Simplifies Java development with technology such as Spring

Web 2.0/Ajax Technology

Simplify Rich Internet Application Development

Status: GM'd for production use with WebSphere Application Server 12/21/07

- Improve the **interactivity** and **usability** of Web applications through the use of Ajax (Asynchronous JavaScript and XML) via a supported, enterprise-ready distribution of the Dojo Toolkit, enabling:
  1. A more integrated and differentiated user experience which can lead to longer sessions and increased customer loyalty
  2. Responsive, local actions which can result in fewer abandoned transactions and higher completion rates

dojo the javascript toolkit

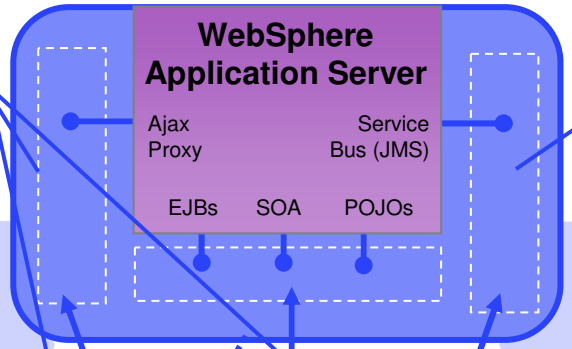
OpenAjax alliance

- Enable more **responsive** Web 2.0-style interaction patterns, such as the ability to asynchronously push events from the client to the server, as well as support for tagging and feeds

WAS Feature Pack for Web 2.0 Highlights

Web 2.0 to SOA Connectivity
For enabling connectivity from Ajax clients to SOA services and other JEE assets. Extends enterprise data to customers and partners through web feeds.

AJAX Messaging
For connecting Ajax clients to real-time updated data like stock quotes or instant messaging.

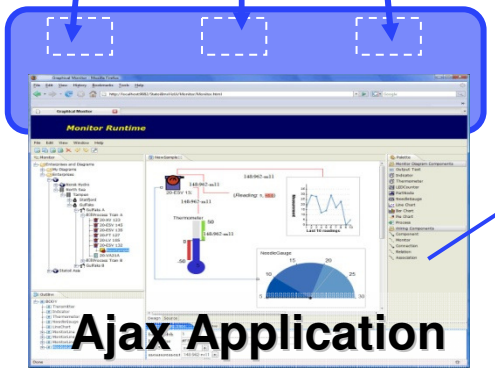


External Web Services

Event-Driven Data

IBM $125.25 +$2.50... MSFT $43.75 -$1.50 ...

Web Feeds



Ajax Application

Ajax Development Toolkit
Best-in-class Ajax development toolkit for WebSphere Application Server based on Dojo, an Open Source JavaScript runtime.

WAS V6.1 for z/OS

Integrated into the fabric of the z/OS operating environment

1. Replicated Server cluster provide a mechanism to leverage shared data for scale and availability
2. Workload management allows WebSphere to work with existing subsystem for optimal access to existing assets.
3. No single points of failure, integrated with z/OS recovery mechanisms
4. Integrated with local SAF security, applications isolated from system for additional integrity
5. Integrated with z/OS automation capabilities for superior manageability

Hardware, operating system, and middleware working together to bring true 99.999% application availability to your business critical services.

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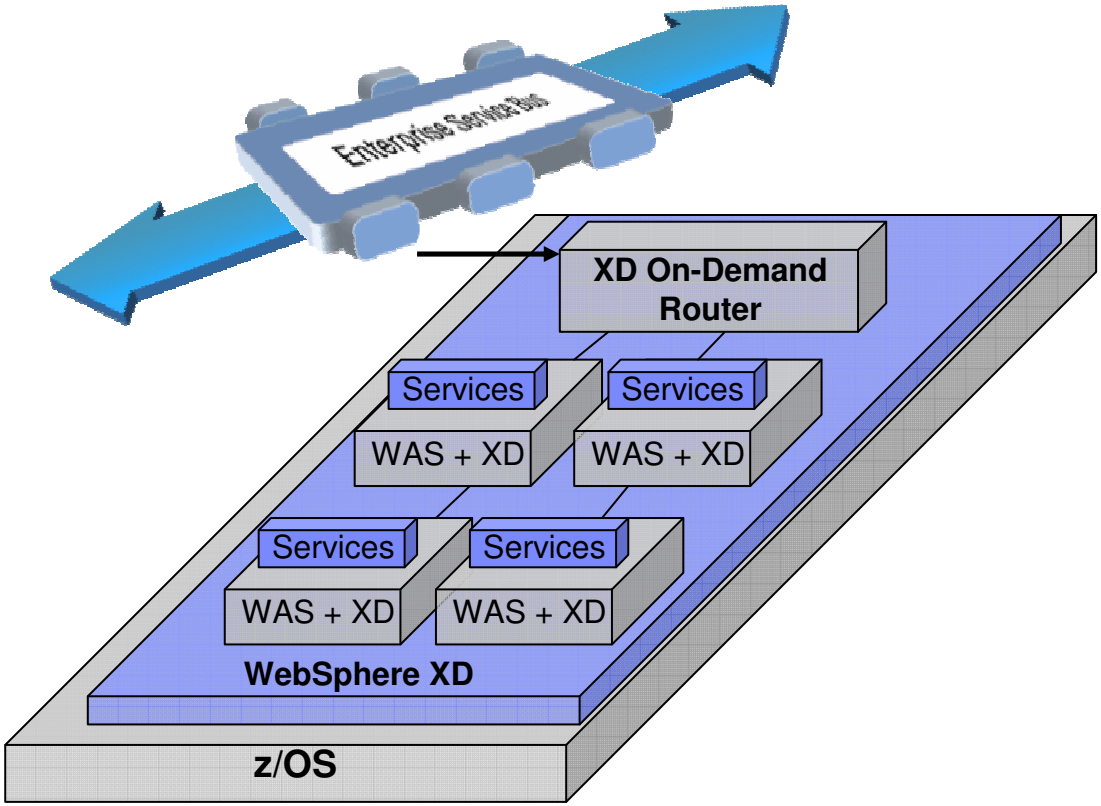
SOA with WebSphere XD



- Enhanced ***manageability*** features for your SOA infrastructure
- Improve the ***resiliency*** of your SOA infrastructure
- Facilitates the adoption of ***batch processing*** into your SOA strategy

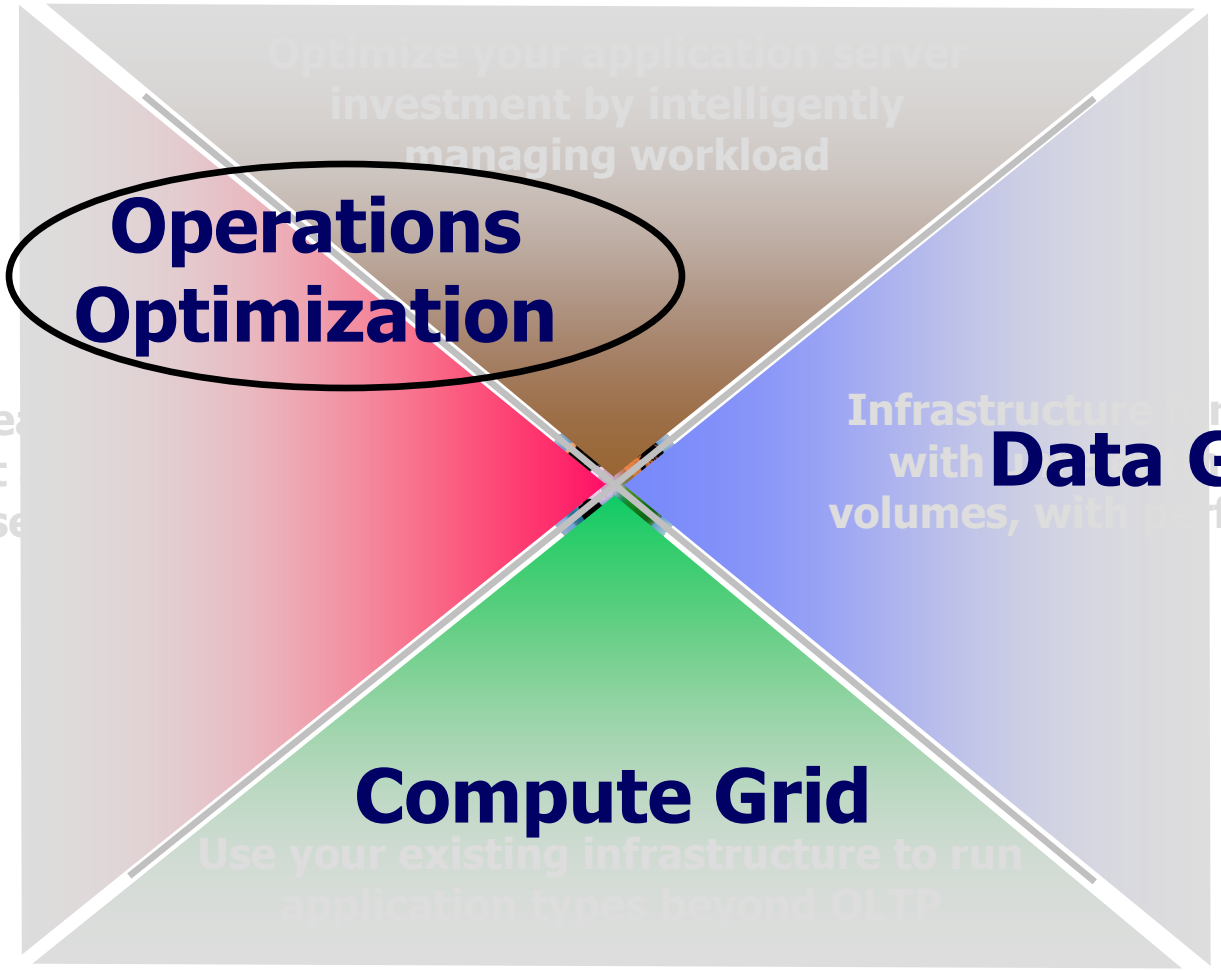
WebSphere Extended Deployment (XD)

XD contains 3 components available as a single, integrated package or 3 individual components

Compute Grid	Operations Optimization	Data Grid
- *Transactional Batch* - *Compute Intensive Tasks* - *Manage non-Java workloads* - *z/OS Integration Patterns*	- *On-Demand Router* - *Extended Manageability* - *Application Editions* - *Health Management* - *Runtime Visualization* - *Virtualization*	- *Distributed Caching* - *Partitioning Facility* - *In-memory Databases*

WebSphere XD Packaging Structure

Available as a single, integrated package or as 3 individual components



XD Operations Optimization

- ***Improving the** resiliency **of your middleware infrastructure***
  - A health management infrastructure
  - Continuous availability – interruption-free application updates
  - Checkpointing the configuration of the WebSphere runtime
  - Visualization technologies
- ***Features for Distributed platforms***
  - Application virtualization services
  - A goals-oriented runtime for WAS and Non-WAS middleware
  - Service policies and relative application priorities
  - multi-media applications over voice and video via SIP

Health Management

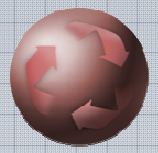
Challenge:
- ◇ Recognize health issues in my environment and automatically correct them
- ◇ Allow me to determine what I consider a health condition and the appropriate corrective action

Solution → **XD Health Management Framework**

XD offers out-of-the-box health policies and actions across all supported application environments and allows them to be customized

Comprehensive Health Policies

Custom Health Conditions



Custom Health Actions

Health Management

- **XD can monitor servers for common health problems and take corrective action**
- **Conditions include:**
  - Memory Leaks or Excessive Memory Usage
  - Hung Servers
  - Excessive Requests Timeouts or Response Time
  - Storm Drains
  - Extended Service Policy Violation
  - Server Age and Max Requests
- **When detected an action plan can be put into effect automatically**
  - Notify administrators (including via email)
  - Capture diagnostics information (java thread or heap dump)
  - Restart server
- **Server restarts are smart and done in a way to prevent outage and service policy violations**

Manage Multiple Application Versions

Challenges:

- I want to support different versions of my applications for my users or customers for continuous availability
- I need a more agile production deployment process, where I can quickly back-off new application versions to prevent loss of service
- I'd like to better support iterative development; and potentially use my free resources in my production environment for application testing

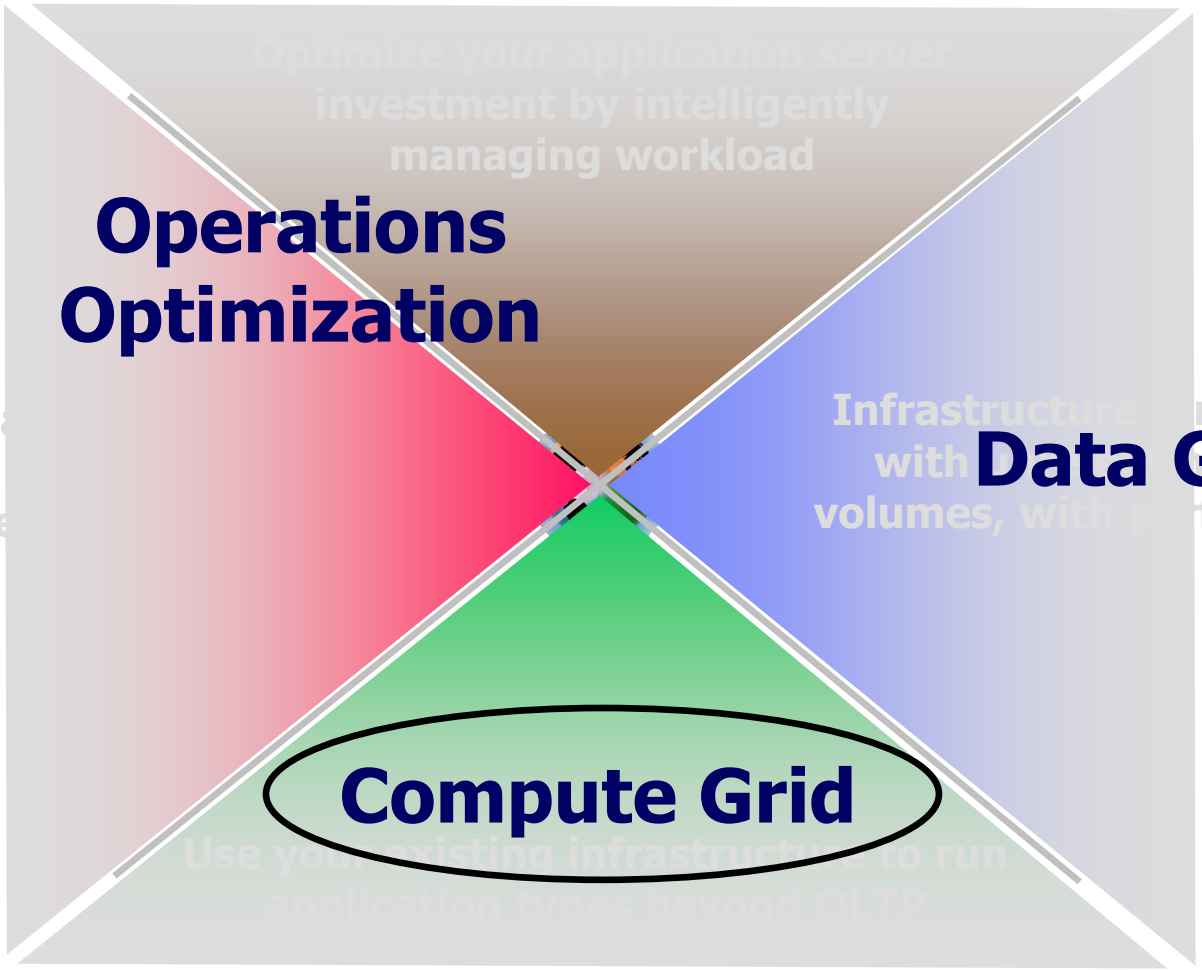
Solution → **Application Edition Manager**

Dynamically introduce, run, and manage multiple versions of the same application in your infrastructure

- Coordinates the activation of application editions **and the routing of requests to the application**
- Validation Mode **enables final pre-production testing of an application edition by a select group of users**
- Routing Rules **allow intelligent routing to multiple application editions in production**

WebSphere XD Packaging Structure

Available as a single, integrated package or as 3 individual components



Batch and SOA

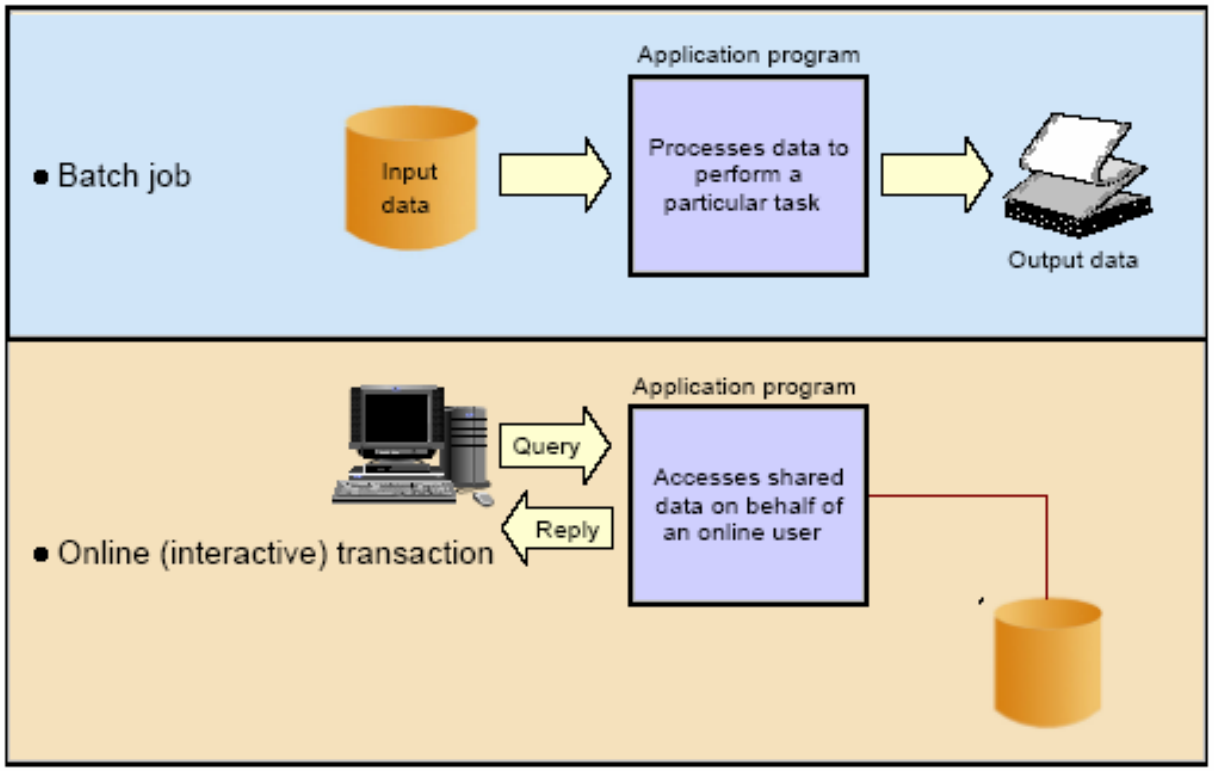
" business function used in online transactions may be the same business function used in batch processes, so organizations should think about their IT modernization strategy and consider SOA as a standardized application integration mechanism"

- Gartner Research

- **Reusing business services is a fundamental principle of SOA**
- **Batch workloads are an integral part of any IT infrastructure**
- **XD Compute Grid delivers an Enterprise Java Batch infrastructure…**
  - Share business logic across OLTP and Batch
  - zAAP-Eligible
  - Keeps business logic in close proximity to the data for performance and security
  - Advanced execution models and System-Z Integration
    - Leverage traditional z/OS Batch Facilities
    - Collocate native batch applications (COBOL, C, C++, etc) with XD Compute Grid
  - Leverages System-Z and WebSphere z/OS Qualities of Service

What are “Batch Jobs”?

- Process millions of business critical transactions “behind the scenes”
  - Without user interaction, asynchronous…
- **IBM has a strong heritage and significant capabilities in batch!**



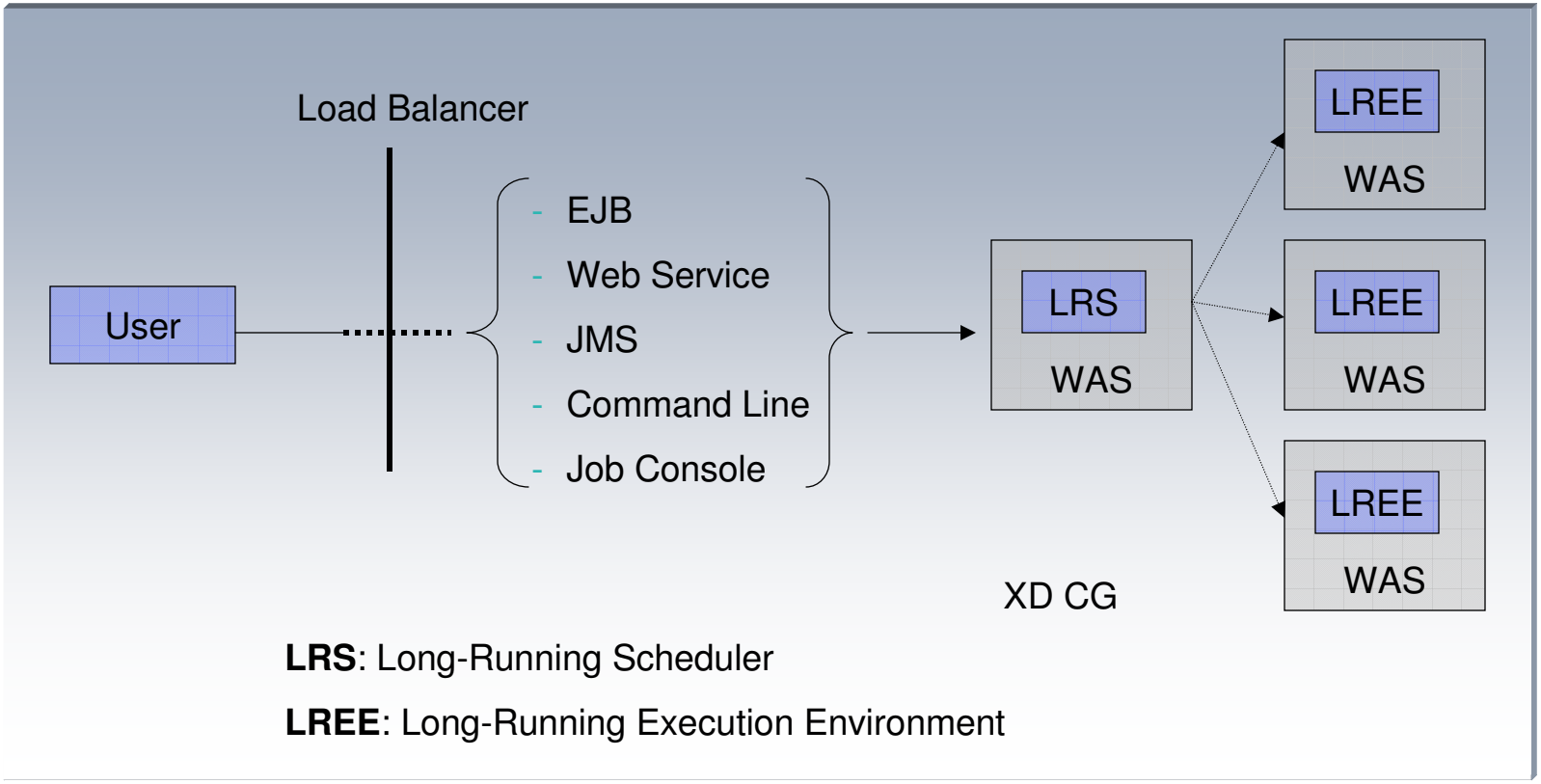
Examples

- Payment Processing
- Shipment Processing
- Report Generation
- Claims Processing
- Inventory Management
- End of Day/Month/Quarter/year processing

WebSphere XD Compute Grid summary

- **The XD Batch Container supports Java-based Batch Applications.**
- **These applications allow for batch access to enterprise applications hosted in WebSphere. They have available to them WebSphere resources:**
  - **Transactions**
  - **Security**
  - **high availability**
  - **Leverages the inherent WAS QoS**
- **The XD Batch Container provides services such as**
  - **Check Pointing**- the ability to resume batch work at some selected interval
  - **Batch Data Stream Management**- the ability to handle reading, positioning, and repositioning data streams to files, relational databases, native z/OS datasets, and many other input and output sources.
  - **Highly Parallel Batch Jobs** –infrastructure for dispatching, managing, and monitoring parallel batch jobs.

WebSphere XD Compute Grid Architecture



WebSphere XD Compute Grid Use-Cases

- Batch Modernization
- Highly parallel batch jobs
- Dynamic OLTP and Batch infrastructure
- Batch as a service
- Replacing existing java batch frameworks
- Sharing business logic across OLTP and Batch

Challenges of Batch Processing

- **Technical Challenges of Batch Processing**
  - ***Performance***
  - ***Recoverability***
  - ***Availability***
- **Business Challenges of Batch Processing**
  - Manage ***Operations Costs***
  - Manage ***Maintenance Costs***

The role of WebSphere XD Compute Grid

- **Maximize Performance**
  - Benefit from z/OS optimizations for data access on the mainframe
  - Apply massively parallel execution with Compute Grid
- **Assure Recoverability**
  - Batch Checkpoints are backed by JTA transactions with Compute Grid
- **Ensure Availability**
  - Leverage WebSphere and System Z High Availability
- **Reduce Operations Costs**
  - Leverages zAAP processors on System Z
- **Reduce Maintenance Costs**
  - Integrate processes for both OLTP and Batch
  - Share business logic across both domains
  - Leverage existing batch processing artifacts such as enterprise schedulers.

XD Compute Grid Value Proposition

- Delivers a zAAP-eligible enterprise java batch execution environment built on WebSphere for z/OS
- Enables the incremental migration of COBOL to Java thereby reducing the risks associated with a batch modernization project
- Integrates with existing enterprise batch schedulers such as TWS, CA7, Control-M, Zeke to help deliver a robust, cost-effective, WebSphere-based batch execution environment
- Enables new execution patterns including: Dynamic OLTP and Batch runtime environment built on WebSphere for z/OS; highly parallel batch jobs; and many others.
- Integrates with the overall SOA strategy of reuse by enabling one to share business logic across both the OLTP and Batch worlds
- Delivers high-performance batch processing by leveraging the System-z, z/OS, and WAS z/OS performance optimizations gained when executing within close proximity of the data.

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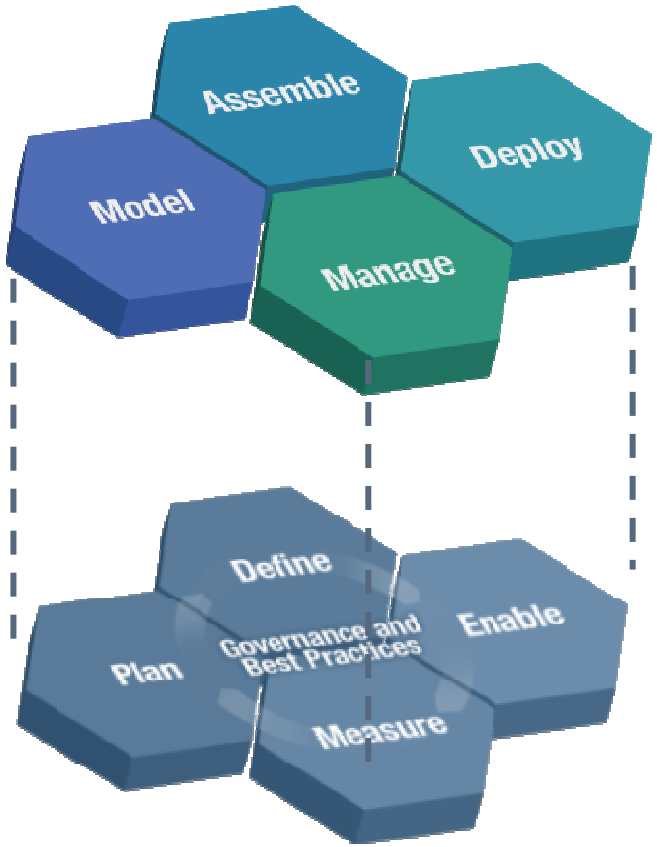
SOA Governance is a key requirement for overall successful SOA implementations

You only need one service to need governance. You only need one service to destroy your business.

Gartner

SOA Governance defined

Effective management of the Service Lifecycle



What is IT governance?

Establishing decision making rights associated with IT

Establishing mechanisms and policies used to measure and control the way IT decisions are made and carried out

What is SOA governance?

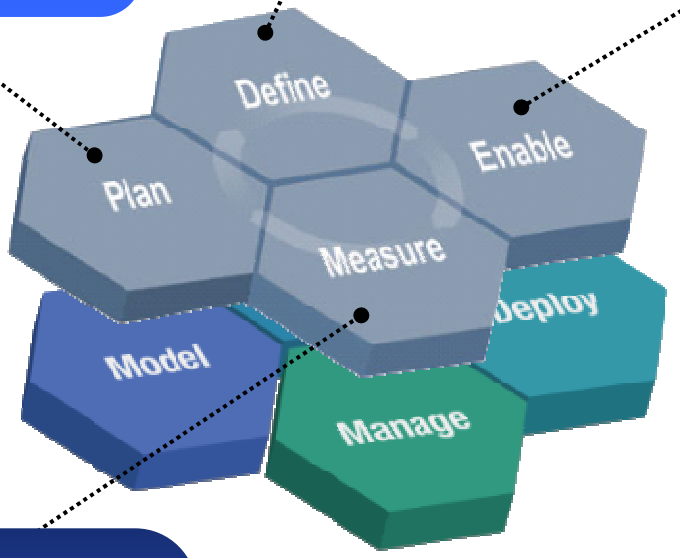
Extension of IT governance focused on managing the lifecycle of services

SOA needs a registry and repository to enable governance

Design the Governance Approach

Scope the Governance Need

Put the Governance Model into action



Manage & Monitor the Governance Processes

A registry AND repository is needed to enable SOA governance

- **Infrastructure to publish, classify and discover services**
- **Makes rich service metadata available to runtime applications**
- **Provides impact analysis and change validation**
- **Manages the lifecycle of services**

What is a registry… a repository?

Registry?

Contains information about services such as…

- Service interfaces
- Descriptions
- Parameters

Repository?

Stores information about the nature of service usage

An integrated Registry / Repository Solution is needed govern and manage SOA for maximum value

Business process vitality

New value through reuse of assets

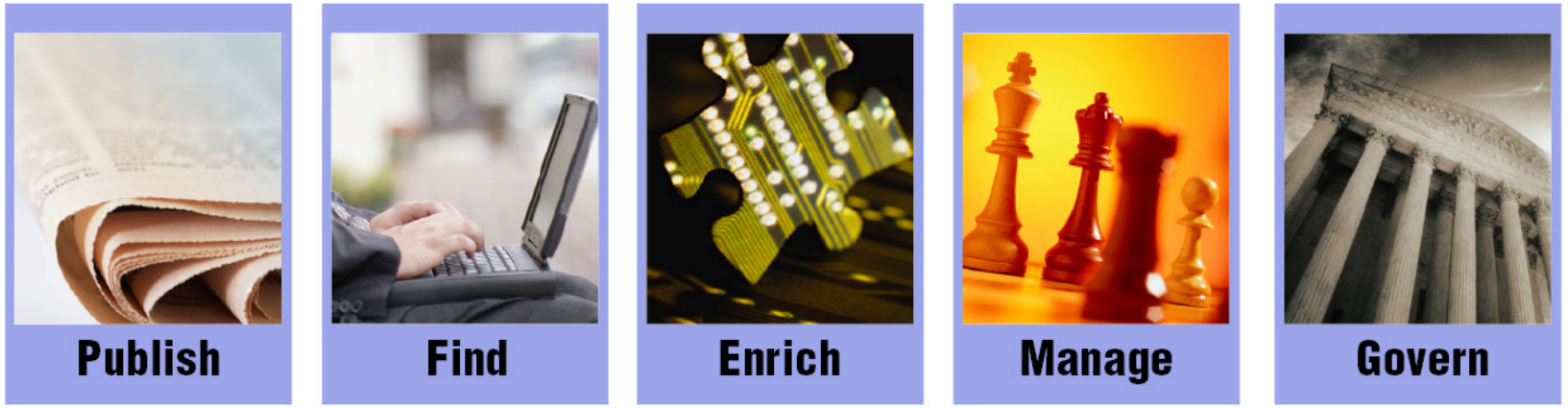
Improved connectivity

Closer alignment of IT to business

Business Flexibility

IBM WebSphere Service Registry and Repository

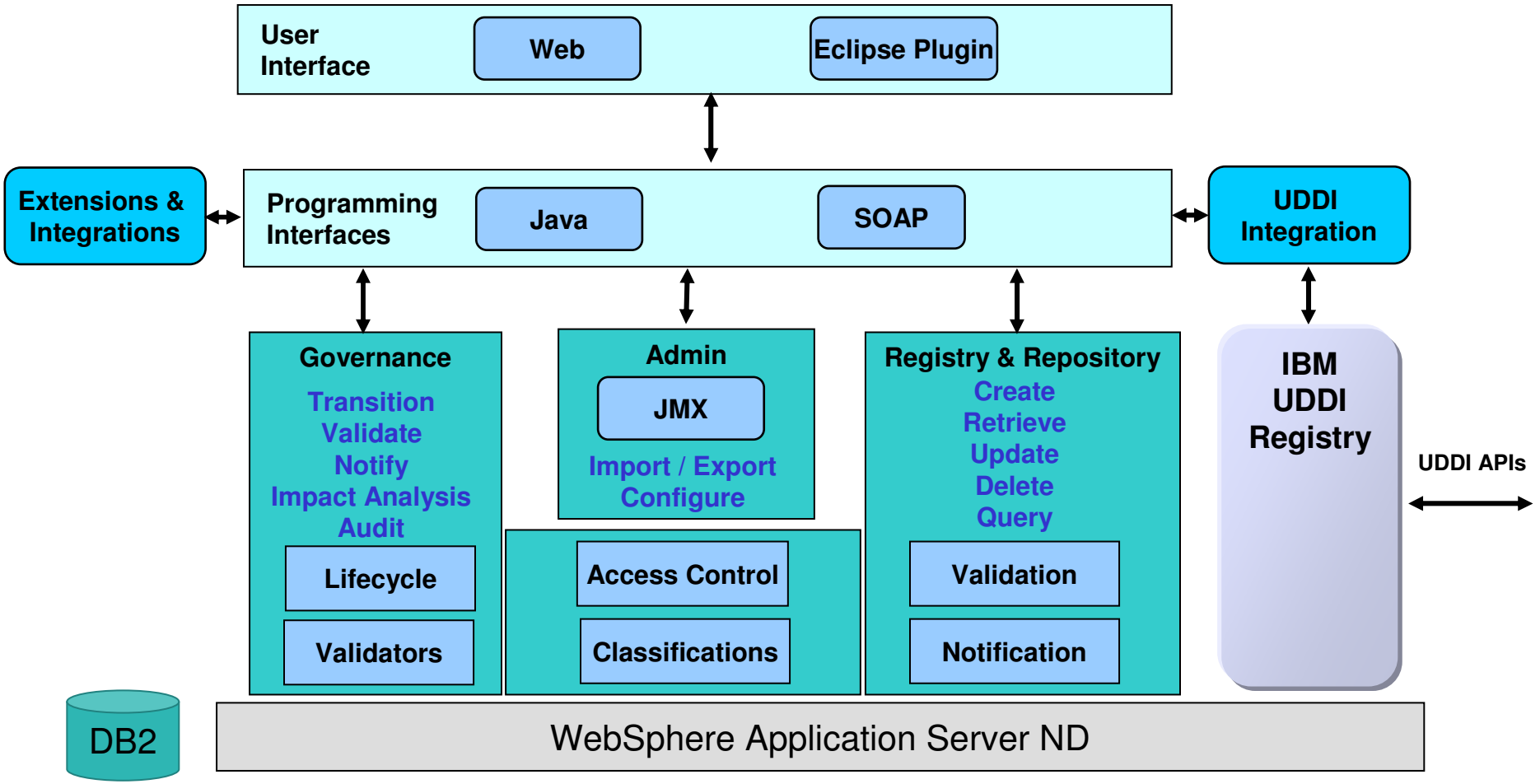
Maximize the business value of your SOA



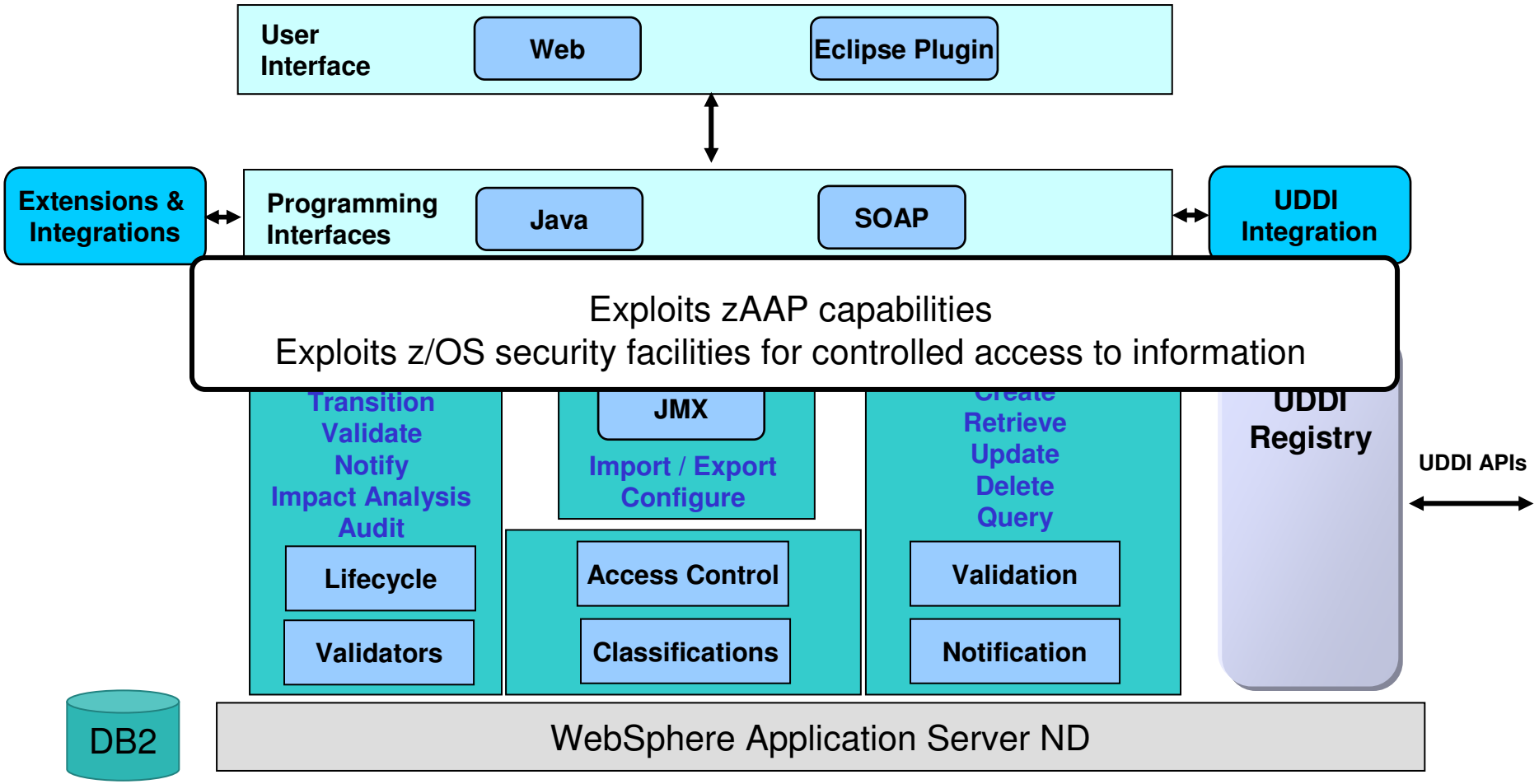
IBM WebSphere Service Registry and Repository 6.1

An essential component of your SOA

WebSphere Service Registry and Repository Architecture

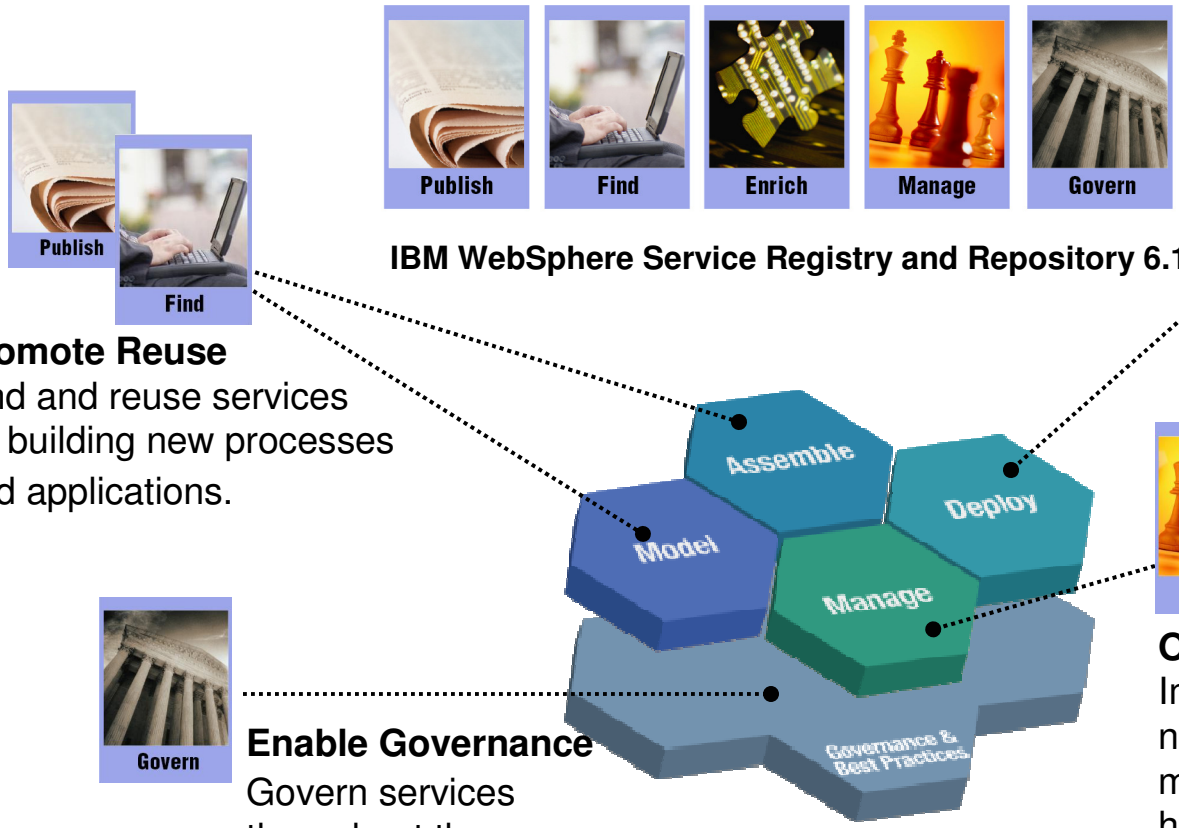


WebSphere Service Registry and Repository Architecture



WebSphere Service Registry and Repository

Provides value throughout the service lifecycle



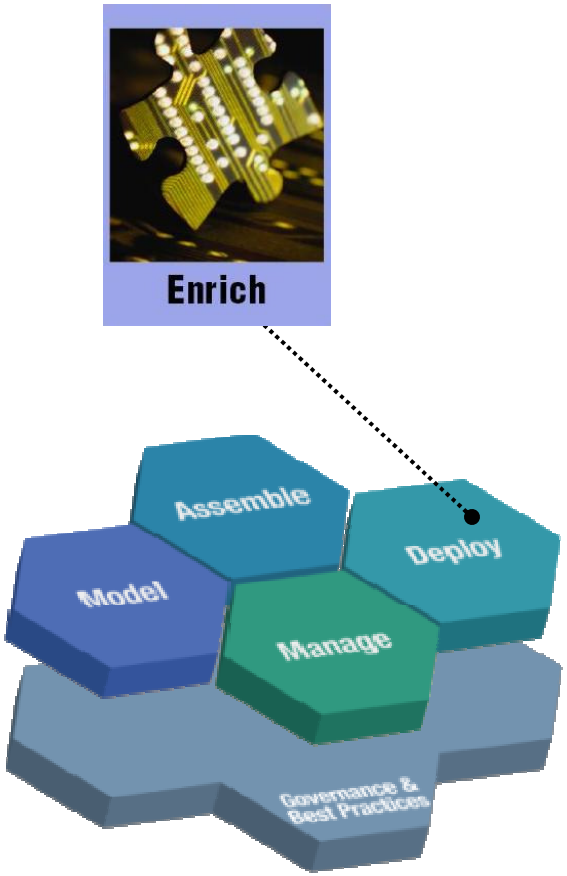
Promote Reuse – Publish and Find Capabilities

Build a catalog of trusted, high quality services

- Multiple methods to publish service
- Customizable ontologies to classify services aligned with your business domain
- Powerful queries to find best-fit services
- Standards based API support to access content including REST interfaces (Web 2.0)
- *Service Discovery* to discover deployed services on .NET and WAS servers
- *Faceted Search* for a natural, user-friendly way to refine search using attributes, document types or classification

Enhance Connectivity – Enrich capability

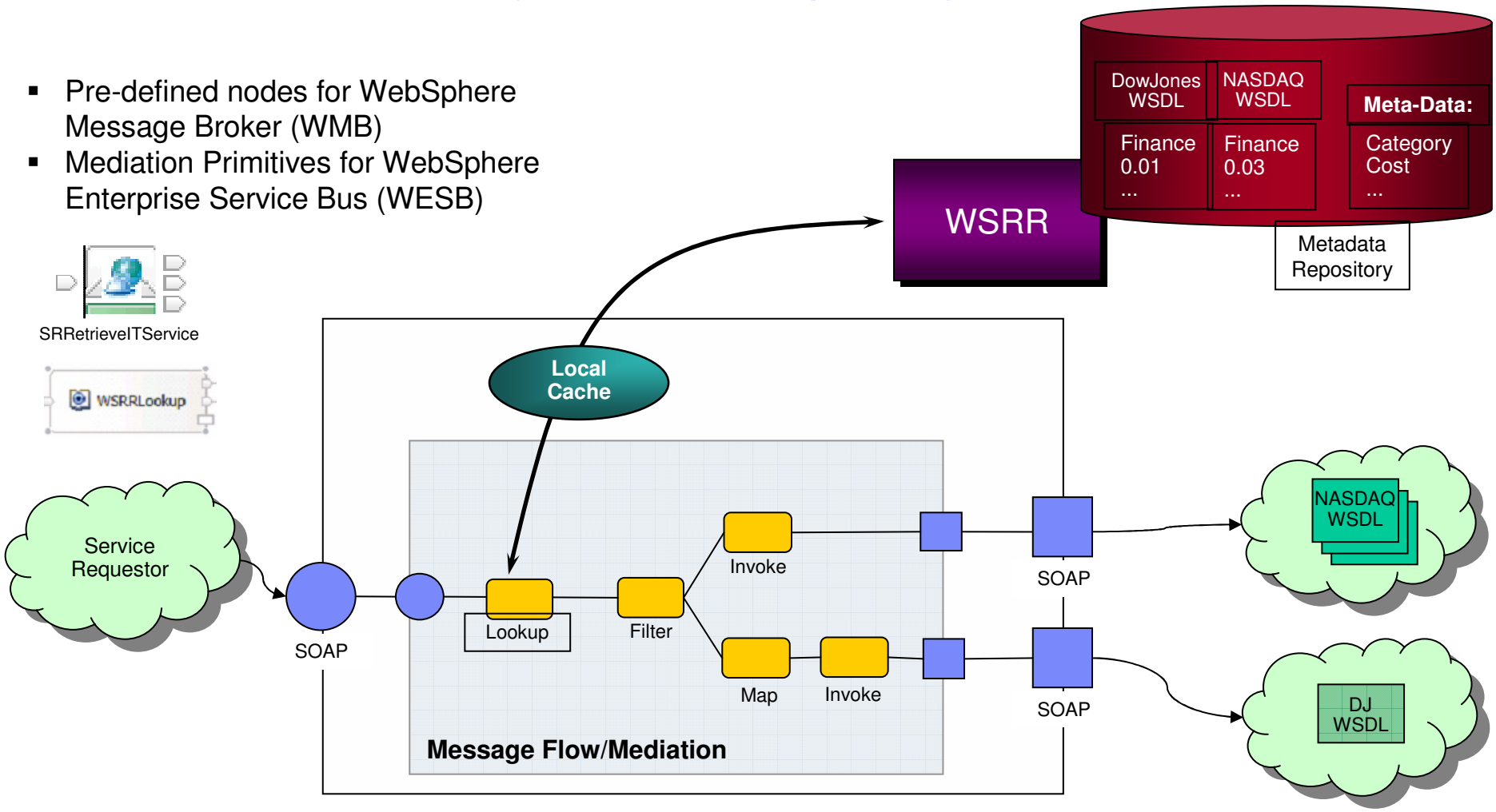
Increase runtime flexibility of applications in your SOA



- Pre-built integration points allow applications to query WSRR for service end-points during runtime
- WSRR also provides associated metadata for those services
- Applications can invoke services that best match their needs
- WSRR ensures the currency of service end-points and associated meta-data

Enhance Connectivity – Enrich capability

- Pre-defined nodes for WebSphere Message Broker (WMB)
- Mediation Primitives for WebSphere Enterprise Service Bus (WESB)



Enhance Connectivity – Enrich capability

- Pre-defined nodes for WebSphere Message Broker (WMB)
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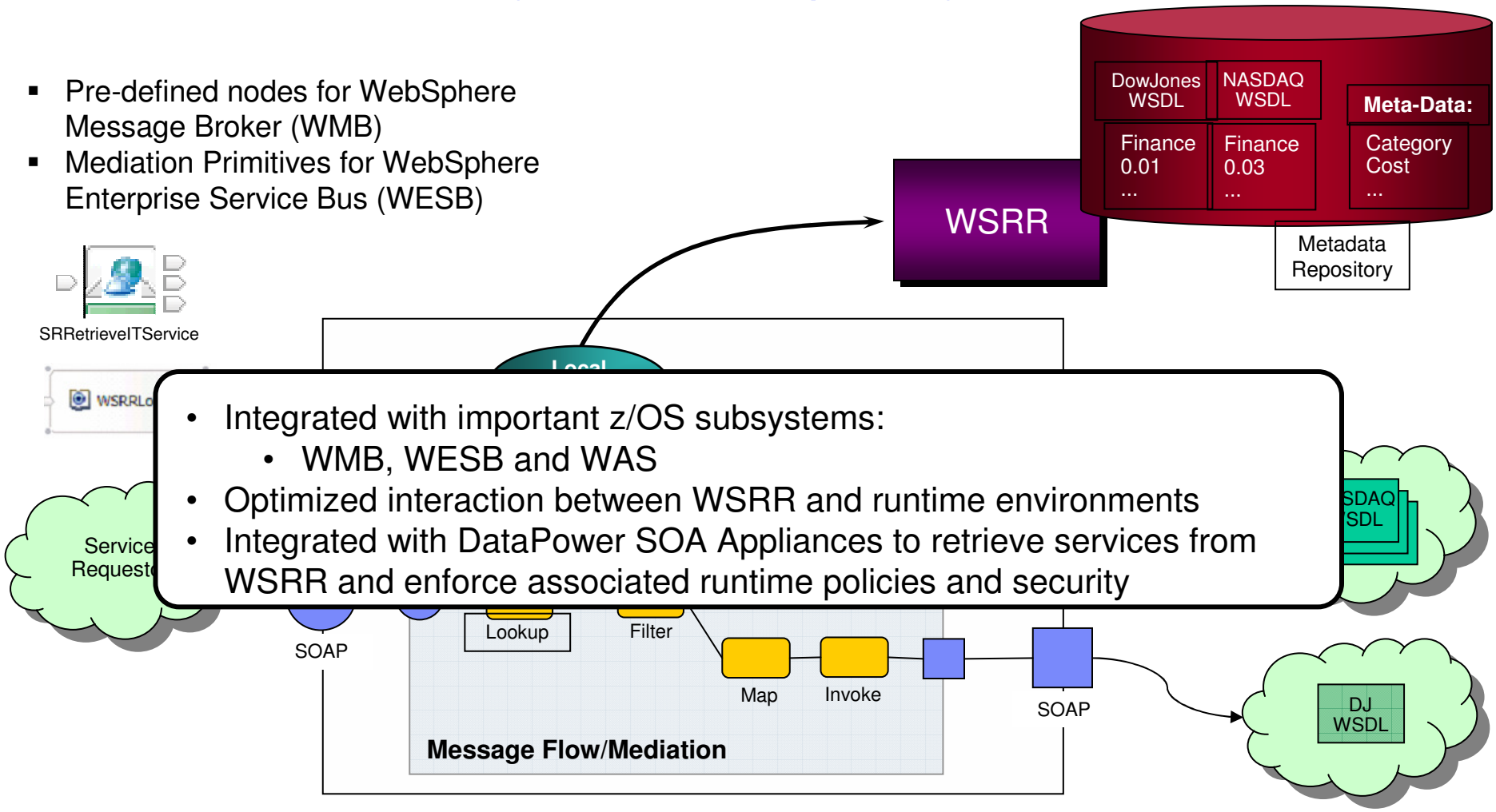
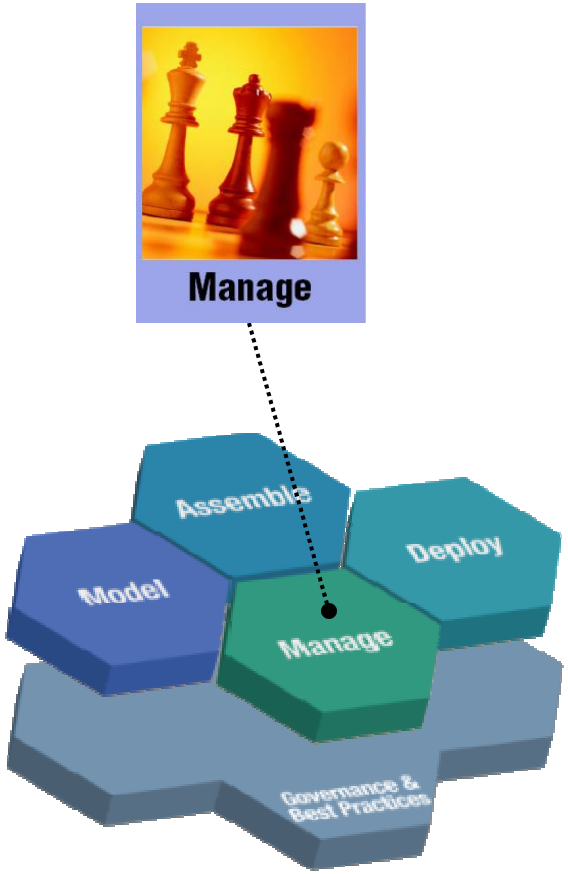


- Integrated with important z/OS subsystems:
  - WMB, WESB and WAS
- Optimized interaction between WSRR and runtime environments
- Integrated with DataPower SOA Appliances to retrieve services from WSRR and enforce associated runtime policies and security

Optimize Service Usage – Manage capability

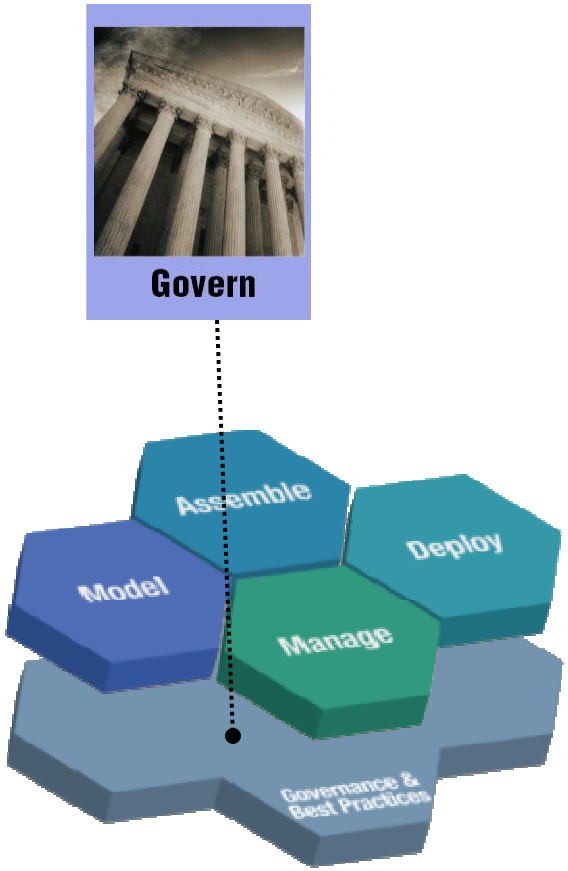
Ensure utilization, health and performance of services



- Impact analysis using intuitive graphical views of service relationships
  - **Change notifications sent using email / JMS**
- Management of multiple service versions
  - **Clients can dynamically select latest version**
- Support for publishing policies (supports WS-Policy) and applying to services
- WSRR provides rich service information to better manage your IT infrastructure
  - **Understand dependencies between applications, processes and services**
- WSRR can associate health and performance information as service metadata

Enable governance – Govern capability

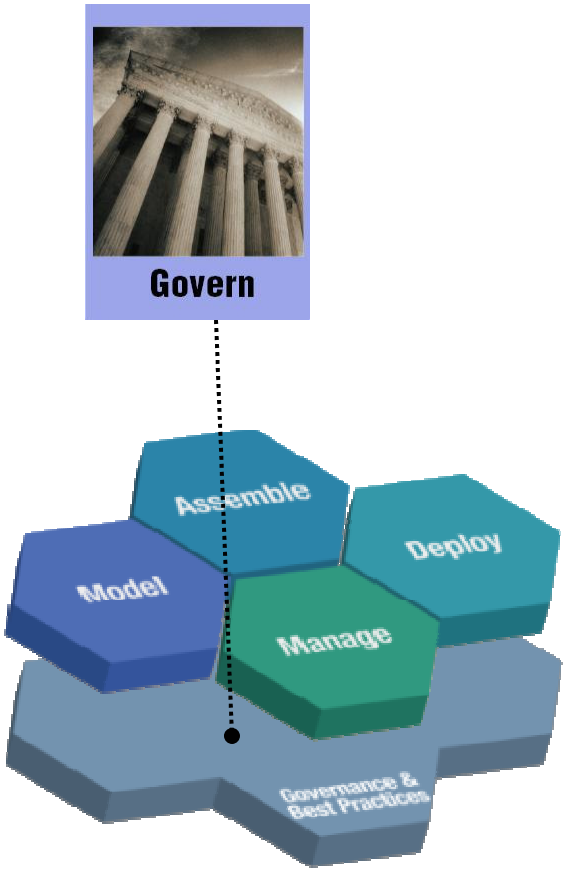
Better control your SOA through governance



- Role based access to services for sharing and reuse
  - **Easy to use access-control editor**
- Complete service life cycle management
  - **User definable collections of service metadata that can be governed together**
- Controlled lifecycle state transitions
  - **Customizable validators**
  - **Subscriber notifications**
- Support for service promotion from one environment to another (e.g. staging to production)

Enable governance – Govern capability (Continued)

Better control your SOA through governance

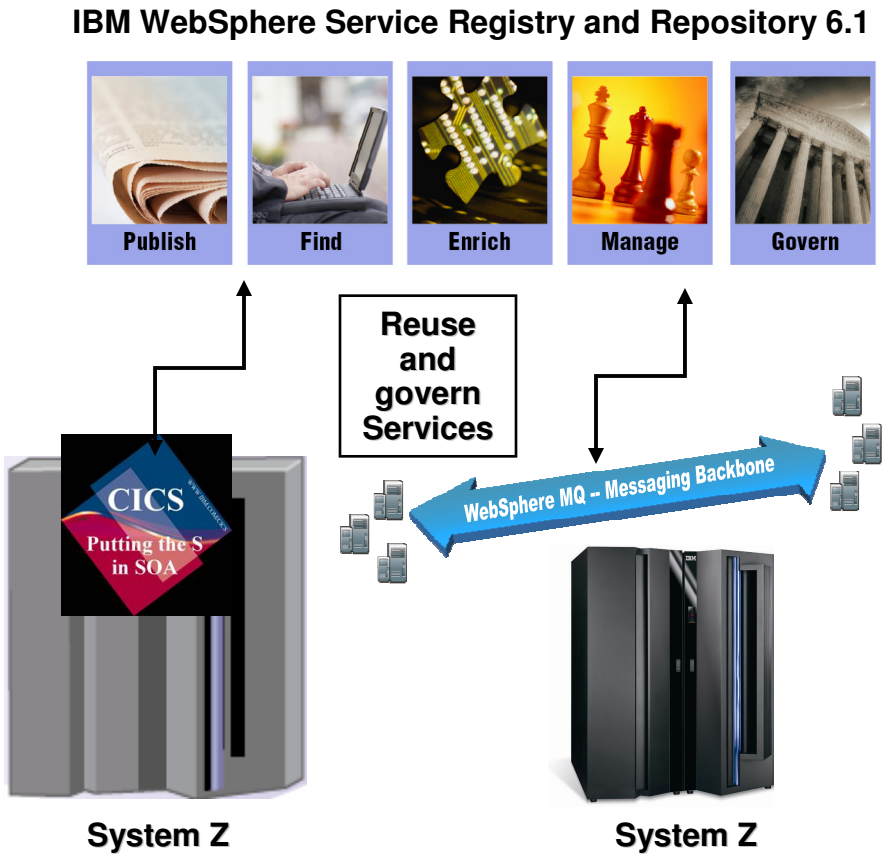


- Governance profile that includes templates, lifecycles, generic validator, classifications and roles to help you get started quickly
- Support for MQ Service definitions allowing governance and lifecycle management service-enabled MQ applications

Enable governance of service-enabled CICS & MQ applications

Help CICS and MQ Applications to participate in Enterprise SOA

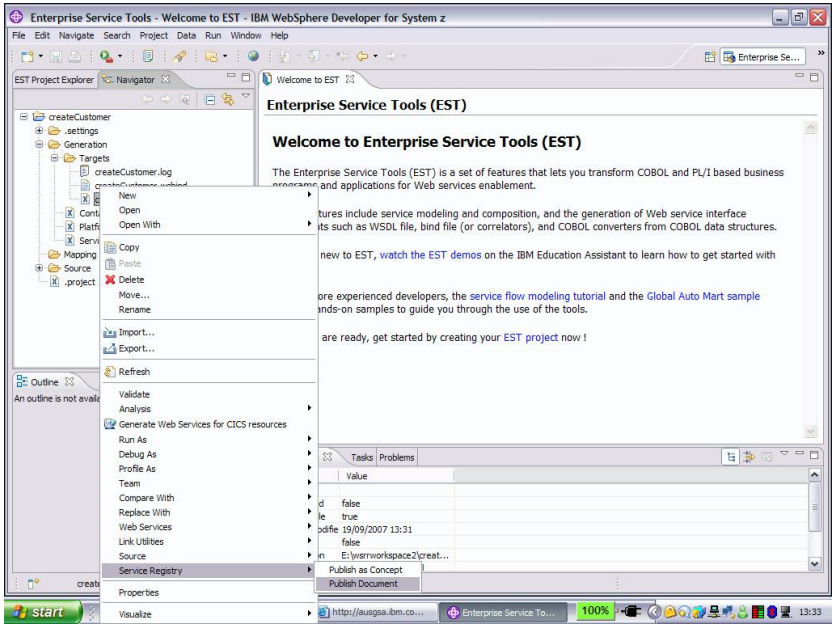
- Raise the visibility of service-enabled CICS or MQ application by publishing it to WSRR
- Classify, describe, govern CICS or MQ service just like any other service in your SOA
- Manage the lifecycle of CICS or MQ services with versioning, approval, promotion, retirement, etc.
- Facilitate selection, invocation and monitoring of CICS or MQ services by other SOA applications



Use regular mainframe tooling to interact with WSRR

Rational Developer for System Z Example

- Generate the WSDL from high level language structures and *publish* the WSDL to WSRR
- *Update* the CICS Web service in WSRR with meta-data to facilitate Web service selections (e.g. search and runtime selection)
- *Retrieve* the WSDL from WSRR and generate high level structures to invoke it from a CICS application
- Option to just use JCL to interact with WSRR



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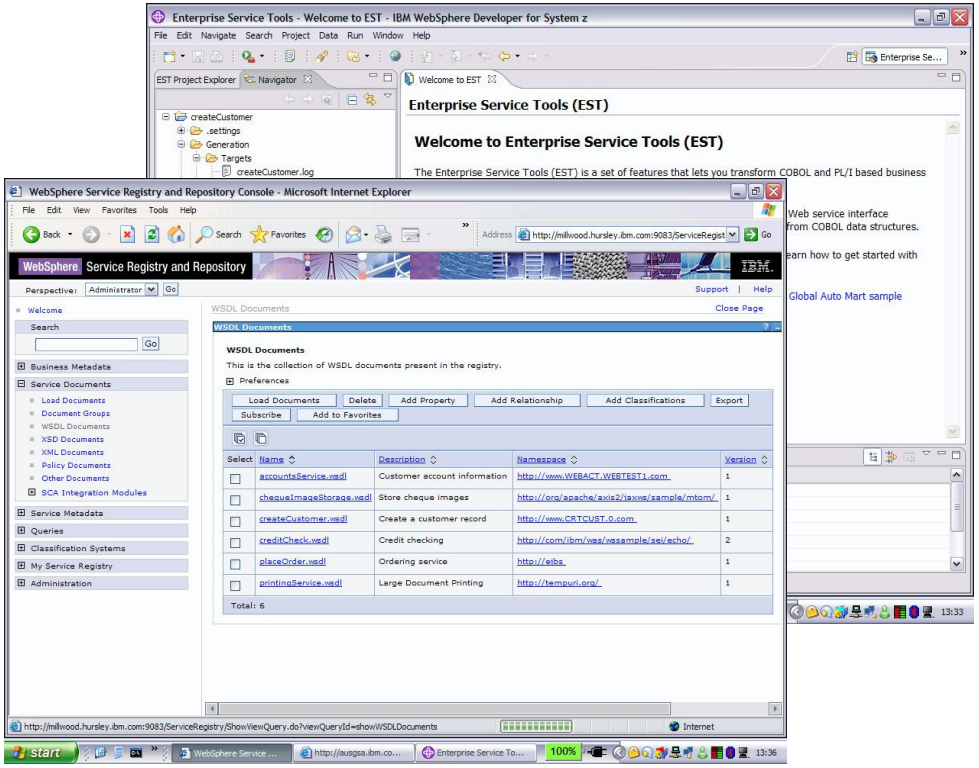

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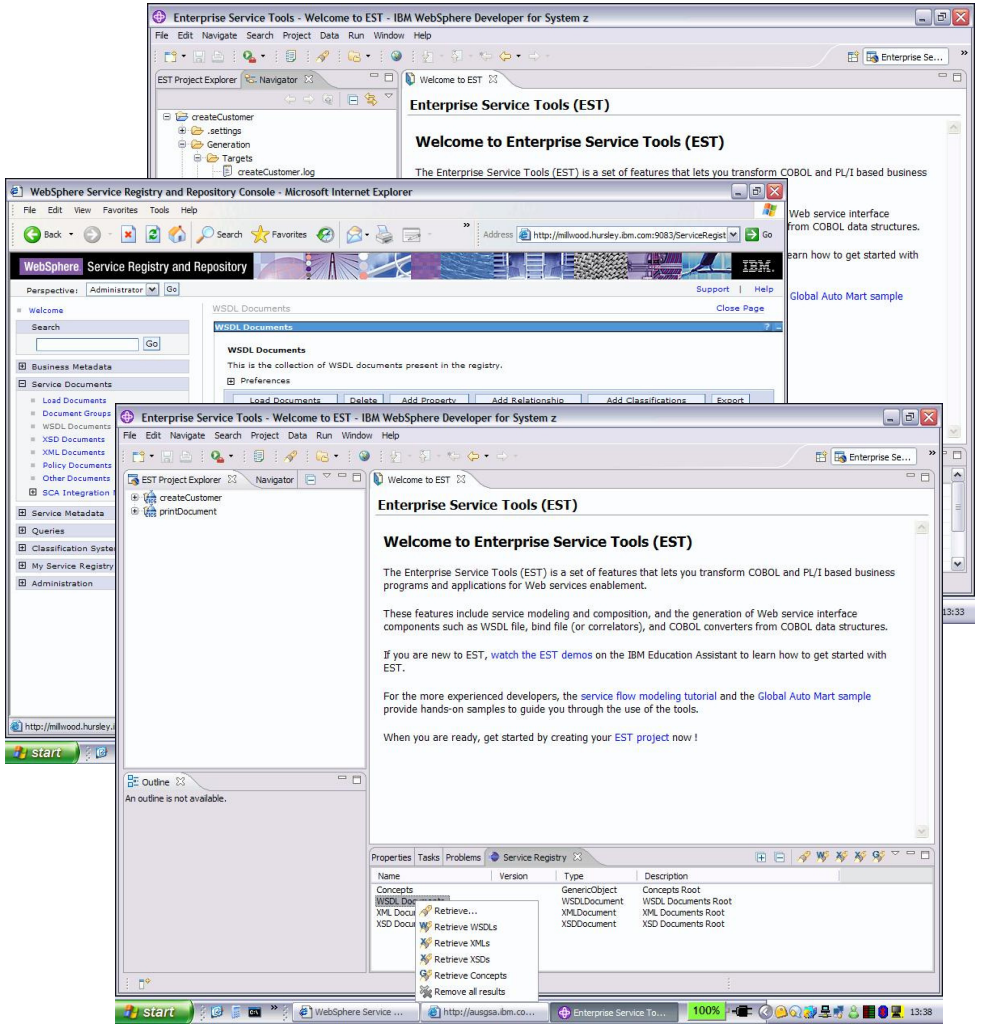
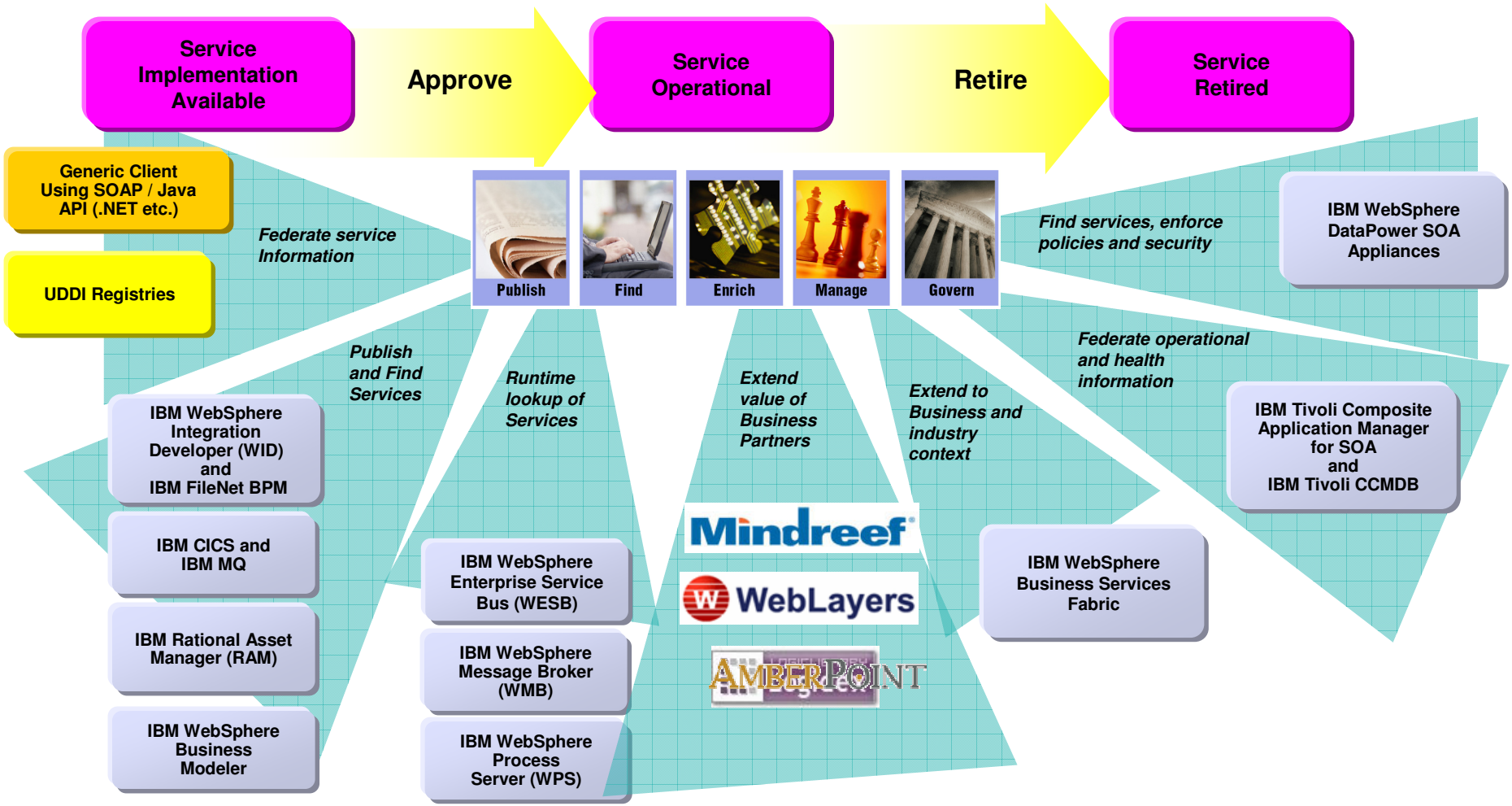


Summarizing Value of WSRR to z/OS Environments

- WSDL contains the definitions of services for the mainframe
  - **Not restricted to HTTP**
  - **Stores MQ, CICS service end-points**
- Co-location of WSRR and other z/OS subsystems
  - **WebSphere Enterprise Service Bus, WebSphere Message Broker, CICS**
- Integrates with DataPower SOA Appliances to invoke services, enforcing runtime policies and security
- Runs on WAS … exploits zAAP
- Enables governance of z/OS environment
- z/OS provides a highly available and scalable environment to host WSRR for all systems

WSRR integrates with many SOA products to extend the value throughout a Globally Integrated Enterprise



Resources

- WSRR on the web - http://www-306.ibm.com/software/integration/wsrr/
- Redbook - http://www.redbooks.ibm.com/abstracts/SG247386.html?Open
- SOA Governance - http://www.ibm.com/soa/gov
- WSRR on System Z brochure - ftp://ftp.software.ibm.com/software/websphere/integration/wsrr/070905_WSB11350-USEN-00_wssr_0905_BR.pdf
- Application Integration Software On System Z White Paper - ftp://ftp.software.ibm.com/software/integration/wmq/WSB11353-USEN-00.pdf
- WSRR V6.1 Datasheet - ftp://ftp.software.ibm.com/software/websphere/integration/wsrr/WSD11284-USEN-01_DS_wsrr.pdf
- WebSphere MQ - http://www-306.ibm.com/software/integration/wmq/
- CICS - http://www.ibm.com/cics
- Rational Developer for System Z - http://www-306.ibm.com/software/awdtools/rdz/

Agenda

- Introduction
- Business and IT challenges
- WebSphere Application Infrastructure and SOA on System z
  - WebSphere Application Server on System z (WASz)
  - WebSphere Extended Deployment (WSXD)
  - WebSphere Service Registry and Repository (WSRR)
- Conclusion

Three Main Points

1. You are facing extraordinary business and IT challenges

2. You expect IBM to provide responsive solutions and leadership to help you meet those challenges

3. The demonstrated business and industry successes, as well as exponential market growth, confirm the value of WebSphere Application Infrastructure as the foundation of your SOA on System z

Questions
and
Answers

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