BI03 – WebSphere Message Broker V6 for z/OS Overview

© 2006 IBM Corporation

Notice

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user’s responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to: IBM Director of Licensing, IBM Corporation, North Castle Drive Armonk, NY 10504-1785 USA.

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION “AS IS” WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information contains technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSING:

This information contains sample application programs in source language, which illustrates programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interfaces for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM therefore cannot guarantee or imply reliability, serviceability, or function of these programs. You may copy, modify, and distribute these sample programs in any form without payment to IBM for the purposes of developing, using, marketing, or distributing application programs conforming to IBM application programming interfaces.
Trademarks

The following terms are trademarks of the International Business Machines Corporation in the United States, other countries, or both:

IBM eServer™ Redbooks (logo)™

IBM.com® z/OS® zSeries® DB2® DFS™ AIX® ClearCase® Cloudscape™ CICS® CICSplex® DB2

Connect™ DB2® DB2i® Rational® RACF® IS/390® SAA® IMS™ TME® MVS™

IBM Connect™ Db2® DB2i® Rational® RACF® IS/390® SAA® IMS™ TME® MVS™ WebSphere®

The following terms are trademarks of other companies:

Intel, Intel Inside (logos), MMX, and Pentium are trademarks of Intel Corporation in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

SET, SET Secure Electronic Transaction, and the SET Logo are trademarks owned by SET Secure Electronic Transaction LLC.

Other company, product, and service names may be trademarks or service marks of others.

Agenda

- SOA and Enterprise Service Bus
- WebSphere Message Broker as the Advanced ESB
- V6 Enhancements
A Service Oriented Architecture is Key

The flexibility to treat business processes and the underlying infrastructure as defined components that can be mixed and matched at will

What is SOA?

SOA enables flexible connectivity of applications or resources by:
- Representing every application or resource as a service with a standard interface
- Enabling them to exchange structured information

Why do you care?

SOA helps introduce flexibility in a technology environment. There is growing acceptance of SOA as an approach to integration and to structure collections of interacting applications.
Enterprise Service Bus

- Join together enterprise applications
  - Not application serving
- 4 functions
  - Communications
  - Integration
  - Service Interaction
  - Management
- Other functions…
  - Security
    - can be performed in ESB, but not core functionality

What is an ESB?

- A software infrastructure for SOA which
  - ... comprises a set of interaction points to which services are connected. Services are able to invoke other services which are connected to the bus.
  - ... allows the creation of dynamic and flexible connectivity between services during service invocation without changing service consumers or providers. Interactions can be managed and measured.
  - ... simplifies an SOA by minimizing the explicit connectivity between services.
What are the different kinds of ESB?

- **WebSphere ESB**
  - XML as primary data format
  - Web Services standards supported (TCP/IP, SSL, HTTP, HTTPS, SOAP/HTTP, SOAP/JMS, WSDL 1.1, UDDI 3.0, WS-* Standards)
  - Adapters for everything
    - XML conversion on and off the bus
    - Protocol conversion on and off the bus

- **WebSphere Message Broker**
  - All formats supported natively
    - XML, COBOL, C, SWIFT, SAP, EDI, MIME, Accord, X12
  - Supports complex transformation
  - All protocols supported natively
    - Web Services PLUS MQ, JMS, File, MultiCast, Real-time, SCADA device, user defined…
  - Minimizes need for adapters
    - Improves performance and manageability
WebSphere Message Broker - Directions and key themes

- Improved user experience:
  - Install, migration and co-existence
- Development skills and experience:
  - Mapping, Java support, ESQL, debugging
- Enhanced connectivity options:
  - CICS, VSAM, flat-files, JMS
  - Interoperability, Web Services
- Enhanced performance:
  - Parsers, ESQL, 64-bit support
- Improved manageability:
  - Command scripting, platform and database coverage

Getting Started

- **Simplified Launchpad and install**
  - Available as download via Passport Advantage, CDs or on a single DVD per platform
  - Install alongside previous versions (2.1 and 5)
  - Single prerequisite product – WebSphere MQ v5.3.0.1 or later
  - Built-in Cloudscape database, including ODBC drivers; Suitable for development and test
  - Bound, hardcopy install guide included in product package
- **Improved “Default Configuration Wizard”**
  - Fewer configuration options
  - Create (or remove) default configuration
  - Deploys and runs install verification samples
  - Launches into samples gallery
- **Comprehensive Samples Gallery**
  - Get successful experience with MB technologies quickly
  - Technology (e.g. Java Compute Node, JMS nodes)
  - Application oriented samples (e.g. Data Warehouse)
- **Command Assistant**
  - Create Broker components using a Graphical User Interface
Simplified Launchpad

Express Installation

Welcome to the WebSphere Message Broker Launchpad on Windows XP

Express Installation

The Express installation will install all the selected products listed below. Deselect a product if you do not wish it to be installed. Click on the plus (+) buttons below to expand the details on each product.

- WebSphere Eclipse Platform V3.8.1 Installed
- WebSphere MI V6.0 Installed
- ODBC Drivers for Cloudscape Installed
- WebSphere Message Broker, V6.0 Pending
- WebSphere Message Broker Toolkit, V6.0 Installed

Installation Guide

Launch Express Installation for WebSphere Message Broker

Configuration Manager

Broker
Windows XP/2003
z/OS
HP-UX
Solaris
AIX
Linux (Intel, POWER,zSeries)

Configuration Manager
Windows 2000/XP/2003
- z/OS
- HP-UX
- Solaris
- AIX
- Linux (Intel, POWER,zSeries)

Toolkit
Windows 2000/XP
- Linux (Intel)

Platform coverage

* Complete Linux story for all components

* Support for 64-bit Execution Groups (AIX, HP, Solaris)

* Support for Oracle databases on Linux platform
Flexible Migration and Coexistence

- Simplified migration from v2.1 and v5
- Single command to migrate components
- Coexist multiple versions on a single OS image
- Multiple Configuration Managers per OS image
  ... and Configuration Manager supported on all broker platforms
- Domain interoperability between v2.1, v5 and v6 components
- Roll back support

<table>
<thead>
<tr>
<th>Domain compatible?</th>
<th>V6 Tooling</th>
<th>V6 Config</th>
<th>V6 Broker</th>
</tr>
</thead>
<tbody>
<tr>
<td>V5/V5.1 Tooling</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>V5/V5.1 Config</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>V5/V5.1 Broker</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>V2.1 Tooling</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>V2.1 Config</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>V2.1 Broker</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Comprehensive Samples Gallery
Getting Started with Version 6 Samples

Improved Administration

- New command line tools
  - Start/Stop message flows
  - Create/Delete execution groups

- Intelligent Resource Utilization
  - Queue and Database handles released during flow inactivity

- Java administration API ("Configuration Manager Proxy")

- Runtime versioning

- Full JCL customization for z/OS

- Restart database without restarting the broker
Command Line Administration – New and Improved

- `mqsimigratecomponents`
- `mqsimigratemfmaps`
- `mqsicreateexecutiongroup`
- `mqsideleteexecutiongroup`
- `mqsisartmsgflow`
- `mqsisopmsgflow`
- `mqssbackupconfigmgr`
- `mqssirestoreconfigmgr`
- `mqssicreateadb`
- `mqssideletedb`
- `mqssicreateaclentry`
- `mqssideleteaclentry`
- `mqssilistaclentry`
- `mqssideploy`
- `mqssilist`
- `mqssicreatebar`
- `mqssicreatebroker`
- `mqssicreateconfigmgr`
- `mqssicreateusernameserver`
- `mqssisetdbparms`
- `mqssichangebroker`
- `mqssichangeconfigmgr`
- `mqssichangeusernameserver`
- `mqssideleteconfigmgr`

Create your own!

Message Broker High Level Features and Functions

- **Interaction styles**
  - One way, Request response, Aggregation, Publish subscribe, CEP

- **Protocol support**
  - MQ, HTTP(S), JMS, Real-time and Multicast, Sensors & Actuators, File, User Defined

- **Data Formats**
  - Record based (COBOL, C), Industry (SWIFT, TLOG, EDI...), XML, SOAP

- **Routing functions**
  - Filtering, Routing, Content routing, Validation, audit & warehousing...

- **Transformation Languages**
  - SQL, Java, Graphical Mapping, XSLT, (DSTX)

- **GOAL**: Route and transform service requests from a wide range of sources to destinations where they can be consumed by applications and services in formats and protocols they expect.
Message Broker Development Artifacts

- **Message Flows**
  - Application connectivity
  - Message in, messages out

- **Processing Nodes**
  - Integration building blocks
  - Large built-in set provided
  - User extensible

- **Parsers**
  - Read and write messages
  - Comprehensive built-in capability
  - User extensible

Message Flows

Reusable, Scalable, Transaction
The next generation of the mapping editor

- Adopt a spreadsheet model for creating transformations … … the user concentrates on the structural transformations not the execution logic

1. Source definition
2. Target definition
3. Expression editor
4. Overview and editor

Map expressions use library of built-in functions, and include support for all ESQL features and user defined functions in ESQL or Java

The script editor allows you to fine tune things that lines and expressions can’t — such as mutually exclusive if-conditional expressions

Map ‘Properties and Message’ or ‘Properties, Headers and Message’
Mapping editor: debug view

1. Set break-points
2. Step over
3. Inspect variables
4. Debug subroutines

Message Broker Components

- **Toolkit**
  - Eclipse based Development perspective
  - Eclipse based Administration perspective

- **Broker**
  - Runtime for processing
  - Execution Group address spaces
  - Native z/OS implementation

- **Configuration Manager**
  - Management point
  - Controls broker domain

- **User Name Server**
  - Publish Subscribe Security
Platform Choice for Components

- **Toolkit**
  - Linux & Windows

- **z/OS**
  - Broker, Configuration Manager, User Name Server

- **Domain can be mixed**
  - Multiple Brokers per domain
  - Different platforms
  - Different components

- We’ll now explain why z/OS is excellent platform choice
Message Broker on z/OS Timeline

MQSI v2.1
- Ported to z/OS
- OS390 V2R8 or later
- USS
- ARM
- Java
- DB2
- RRS
- MQ

WMQI v5
- z/OS V1R3 or later
- SMF Stats & Accounting including ENF
- Support for serialization token in MQ
- Performance improvements
- Full joblog support

SupportPacs
- CICS nodes
- VSAM nodes
- QSAM nodes

WMB v6
- z/OS V1R5 or later
- Improved Customization
- ConfigMgr port to z/OS
- Performance Improvement (+50%)

Next release potential themes
- Dump Formatter
- Remove DB2 prereq
- Subsume CICS VSAM nodes
- IMS nodes
- SAF Improvements
- WLM
- SMF Formatter
- Native Registry support

z/OS Capabilities

- **High Availability**
  - Parallel SYSPLEX
  - ARM
  - WebSphere MQ Clustering
  - WebSphere MQ Shared Queues

- **Workload Management**
  - Goal Oriented Resource Allocation
  - Workload Scaling
  - Workload Isolation

- **Reporting and Chargeback**
  - SMF
  - Coordinated reporting (ENF37)

- **Operational Characteristics**
  - Installation and Customization
  - Command and Console Support
  - Problem Determination
  - Coexistence and Migration
  - Security
  - Resource Recovery Services
Message Broker Topologies

- Broker Domain Topology
  - Flexible according to user need
  - Single hub, bus, arbitrary graph
  - Heterogeneous topologies are supported/encouraged

- SYSPLEX synergy
  - Horizontal scaling within broker domain
  - SYSPLEX administered as (part of) broker domain
  - Deployment and architecture decision, not flow design

Disaster Recovery

- Message broker is a work manager, not a resource manager
  - Simplifies disaster recovery procedures
  - No logs to archive, recover etc

- Disaster Recovery
  - Restore
    - Backup/Restore broker database (as documented)
    - Backup/Restore broker queues (as documented)
    - Backup/Restore file system artifacts (as documented)
  - Recreate
    - Recreate clean brokers, execution groups
    - Recreate broker attributes
    - Redeploy broker artifacts from Broker Archive (BAR) files
      - Remake durable subscriptions
      - All scripted, so can be rehearsed
    - Configuration manager can be explicitly backed up/restored
z/OS Specific Nodes

- **VSAM nodes**
  - 5 nodes to support different processing scenarios
    - Batch Input Processing
    - Data Enrichment and Routing from VSAM
    - Data Logging to VSAM
    - Deletion of VSAM data
    - Remove VSAM file records on the basis of message processing

- **QSAM nodes**
  - Similar in concept to VSAM nodes, but sequential file oriented

- **CICS**
  - Fully transactional, high performance EXCI CICS interaction direct from a z/OS message flow

**V6 Enhancements**
Improvement of Existing Features

- **Parser improvements**
  - Industry based (e.g. SWIFT) and record based (COBOL/C) parsers have seen improvements by up to a factor of four

- **ESQL improvements**
  - Implementation has been thoroughly analysed and their implementation improved by an average factor of two

- **Locking and scalability**
  - A significant reduction in CPU cost and wait times in multiprocessing environments

- **Aggregation implementation**
  - MQ based implementation rather than database to give up to four times improvement in throughput

z/OS Capabilities

- **Reduced Cost of Ownership**
  - zAAP
    - Java Compute Node, XSLT, Real-time/Multicast, Configuration Manager exploitation
  - 50% performance improvement over V5
  - Real world scenarios, protocols, formats

- **New Features**
  - Aimed at improving performance

- **New Pricing**
  - Price reduction
  - “Start small and grow” option
Many z/OS Technology Improvements

- **zSeries and z/OS technology exploitation**
  - XML Toolkit
    - Exploitation of Unicode conversion services and native hardware features
  - IEE754
    - Exploitation of native hardware IEE754 floating point operations
  - New Compiler algorithms
    - Generation of machine instructions for latest hardware ARCH(3) and above
    - Aggressive compiler optimization OPT(3)
    - 64 bit multiply and divide algorithm enhancements
    - Native Unicode string generation
  - z/OS 1.5 or above
    - Complete XPLINK exploitation of LE, Broker, JVM and ODBC
  - New customization
    - TSO based

New Features to Help Performance

- Java Compute Node to enable zAAP offload
- DATETIME and field formatting enhancements to simplify the most common transformation operations and reduced their CPU cost
- Semi persistent environment to improve message routing and counting scenarios
- MQGET node to maintain, where appropriate, processing context; and improve request response processing performance
- Compact parsers for XML to reduce the CPU to read, write and navigate XML documents, reducing storage requirements for these messages by up to 66%
- Unicode database support to efficiently store data from worldwide sources without loss
Significant Performance Improvements

- GA published reports will show at least 50% average improvements on all platforms.
- Lab Performance results show 53% to 73% increase in message throughput (GA GOLD drivers).
- Highlights are:
  - Parser: up to 3x increase
  - Aggregation Node: up to 10x increase
  - ESQL functions: avg. of 2x increase
  - Request/Reply: up to 2x increase
- Beta feedback has validated improvements.
- Migrated, unchanged V2.1, 5 flows show expected gains.
- Performance report for each sample.
- Enables customers to validate tuning to match Lab results, e.g., Message Routing Sample can run at 1700 messages a second using a 1k message on Windows.

Conclusion

- Version 6 of Message Broker on z/OS performs a key role in creating a functionally rich, high performance, highly available, scalable and manageable Enterprise Service Bus.
- Version 6 of Message Broker provides a first class z/OS subsystem implementation. It is very well integrated with the key characteristics of the z/OS platform which its users expect for their business processing. These include:
  - Availability
  - Reliability
  - Scalability
  - Workload Management
  - Operational control
  - Comprehensive reporting
  - Security
  - Disaster Recovery
- Version 6 of Message Broker and z/OS combine to form a powerful application and service integration platform.
Reference Material

- Developer Works article

“The Value of WebSphere Message Broker Version 6 on z/OS”