WebSphere® Message Broker Overview

Version 6 Introduction

This presentation provides an introduction of the WebSphere Message Broker Version 6.

Agenda

- Broker History

- New Features of WebSphere Message Broker V6

- Platforms and Prerequisites

- Summary and References

This presentation will review the history of message brokers and will discuss the new features of version 6 including prerequisites and platforms supported.

IBM

Section

Broker Background

The first section examines the history of IBM message broker products.

Key themes for the V6 Message Broker

- **Simplify usability and manageability**
  - ▶ Installation, co-existence, command scripting, version control

- **Improve developer productivity**
  - ▶ Mapping, Java™ support, ESQL, debugging

- **Extend connectivity and capability**
  - ▶ CICS®, file (VSAM), JMS interoperability
  - ▶ Replay, event coordination, Web services

- **Improve performance and lower cost of ownership**
  - ▶ Parsers, ESQL, Aggregation

The main objectives for WebSphere Message Broker V6 are to:

•Simplify usability and manageability

•Improve developer productivity

•Extend connectivity and capability

•Improve performance and lower cost of ownership

•Expand platform and database coverage
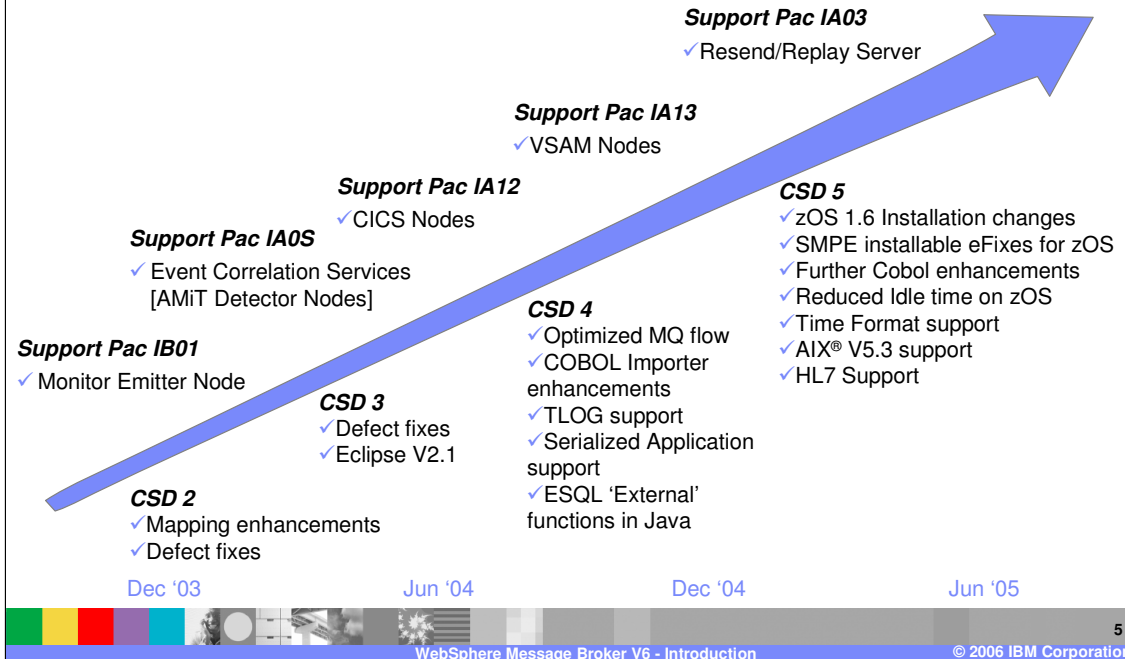
This slide shows the enhancements that have been made to WebSphere Message Broker Version 5, leading up to WebSphere Message Broker Version 6.

Section

New features of
WebSphere Message Broker V6

This section highlights the new features in Version 6. Details of these new features are explained in separate presentations.

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Improved installation experience

- Bound, hardcopy installation guide included in product package

- Fewer prerequisite products

- Simplified launch pad, installation and default configuration

- Improved "Default Configuration Wizard"
  - ▸ Fewer configuration options
  - ▸ Create (or remove) default configuration
  - ▸ Deploys and runs installation verification samples
  - ▸ Launches into samples gallery

An installation guide is included in the product package and there are fewer prerequisite products.

There is a move towards Information Center documentation. However, some hard copy documentation is available.

The Default Configuration Wizard provides a jump start for new comers who want to try the product, and The Samples Gallery offers some nice examples.

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Improved installation experience

- Windows® installation procedure
  - ▸ Insert Message Broker DVD (or CD 1)
  - ▸ Launch pad starts automatically
  - ▸ Click 'Launch Express Installation for WebSphere Message Broker'
  - ▸ Insert other CDs as prompted (if necessary)

- Available as download from Passport Advantage, CDs or on a single DVD per platform

- Only prerequisites for development, test, proof of concept and so on are:
  - ▸ WebSphere MQ V5.3.0.1 or later
  - ▸ ODBC drivers for Cloudscape

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Installation materials are available for download from Passport Advantage, on CDs or on a single DVD per platform.   The Launchpad starts automatically on the Windows platform.

In Development, Test, and Proof of Concept the broker does not need a supported database such as DB2. A supported database is required for production support.

The Cloudscape driver is provided in the CD package.

This slide shows the broker Launchpad. The Launchpad allows you to install the components interactively.
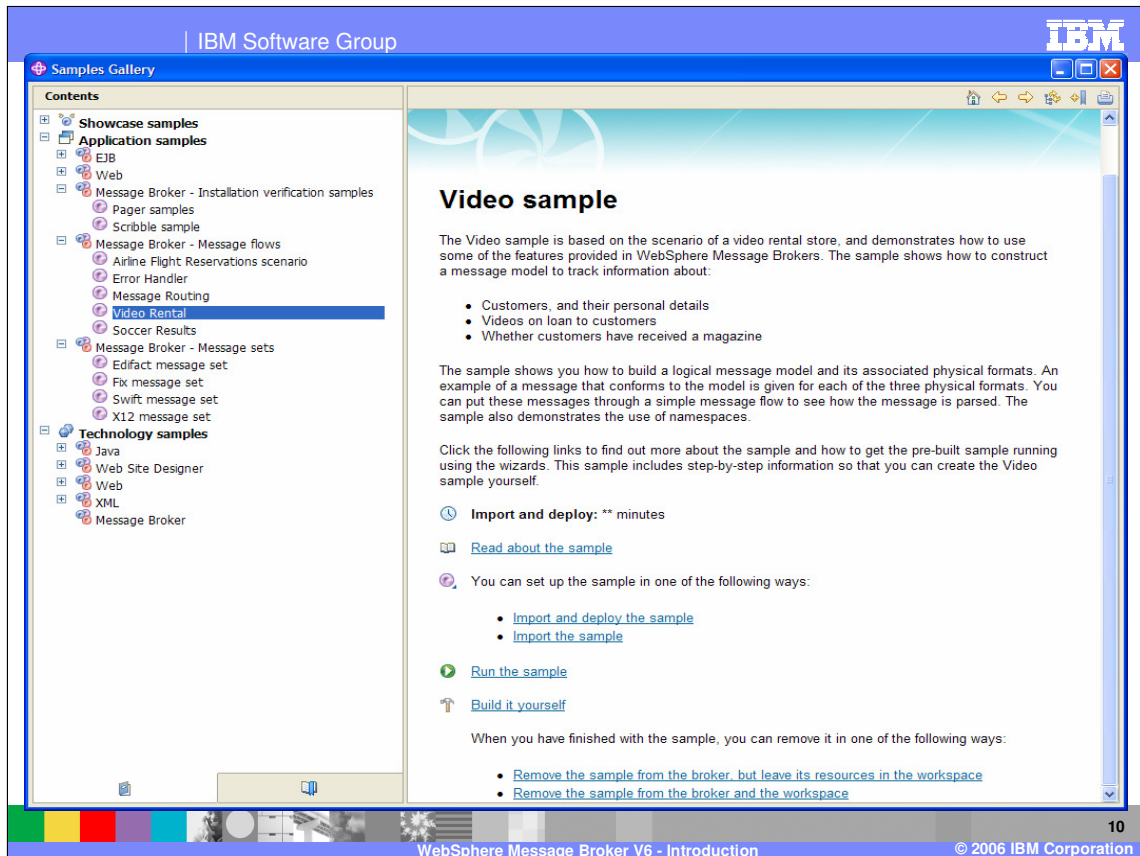
Once the broker is installed, there are sample applications that you can run. On the left side, the Samples Gallery is partially expanded and the selected Video Rental sample shows on the right side of the screen.

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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

- Configuration Manager supported on all broker platforms

- Domain interoperability between V2.1, V5 and V6 components

- Roll back support

New to the V6 message broker is coexistence with an older version of the broker. You can have V2.1 and V6 on a single machine; and you can have V5 and V6 on a single machine.

V6 provides tools to migrate configuration managers and message flows and message sets.

The configuration manager is now supported on all broker platforms

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Version compatibility

Domain compatible?	V6 Tools	V6 Configuration Manager	V6 Broker
V5/V5.1 Tools	Yes	Yes	Yes
V5/V5.1 Configuration Manager	Yes	n/a	Yes
V5/V5.1 Broker	Yes	Yes	Yes
V2.1 Tools	No	No	No
V2.1 Configuration Manager	No	n/a	No
V2.1 Broker	Yes	Yes	Yes

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There is some domain interoperability between the V2.1, V5 and V6 components. For example, you can manage V5 brokers from a V6 configuration manager. However, you must be careful; a message flow developed in a V6 toolkit will not run in a V2.1 broker if you used any of the new V6 functions in the flow.

This table outlines the compatibility points between the V6 components and earlier version components.

Improved administration

- New command line tools
  - ▶ Start/Stop message flows
  - ▶ Create/Delete execution groups
- Java administration API ("Configuration Manager Proxy")
- Runtime versioning
- Full JCL customization for z/OS®
- Restart database without restarting the broker

There are several new command line tools provided in V6. There is also a Configuration Manager Proxy which provides you the capability to write your own administrative command streams.

Runtime versioning is now available in the toolkit.

Customization on z/OS is provided by JCL rather than USS commands.

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Command line administration – New and improved

New

Improved

- ☑ mqsimigratecomponents
- ☑ mqsimigratemfmaps
- ☑ mqsicreateexecutiongroup
- ☑ mqsideleteexecutiongroup
- ☑ mqsistartmsgflow
- ☑ mqsistopmsgflow
- ☑ mqsibackupconfigmgr
- ☑ mqsirestoreconfigmgr
- ☑ mqsicreatedb
- ☑ mqsideletedb
- ☑ mqsicreateaclentry
- ☑ mqsideleteaclentry
- ☑ mqsilistaclentry
- ★ Create your own!

- ☑ mqsideploy
- ☑ mqsilist
- ☑ mqsicreatebar
- ☑ mqsicreatebroker
- ☑ mqsicreateconfigmgr
- ☑ mqsicreateusernameserver
- ☑ mqsisetdbparms
- ☑ mqsichangebroker
- ☑ mqsichangeconfigmgr
- ☑ mqsichangeusernameserver
- ☑ mqsideleteconfigmgr

Not only were several line commands improved, but there were more added.   For example:

mqsimigratecomponents is a single command to migrate broker and configuration manager.

mqsicreateconfigmgr can automatically reference the prior version database when creating the new configuration manager.

You can also create your own command stream using the Configuration Manager Proxy Java API.

Configuration Manager proxy API

- A complete Java programming interface to the Configuration Manager
- Administer domains programmatically
  - ▶ Brokers
  - ▶ Execution groups
  - ▶ Message flows
  - ▶ Dictionaries
  - ▶ Subscriptions
  - ▶ Topology
  - ▶ Collectives
  - ▶ Event Log
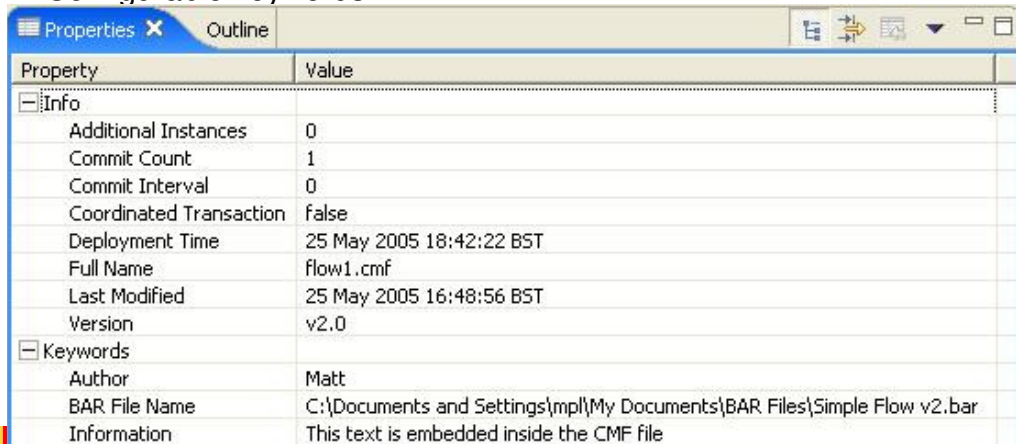 - ▶ Topics
  - ▶ Configuration Manager

```
import com.ibm.broker.config.proxy.*;

public class CreateBroker {
  public static void main(String[] args) {
    ConfigManagerProxy cmp =
             ConfigManagerProxy.getInstance(…);
    TopologyProxy topology = cmp.getTopology();
    topology.createBroker("MYBROKER","QMGR");
  }
}
```

- Comprehensive samples and documentation provided
- The same interface that is used by the Message Brokers Toolkit and various commands

The Configuration Manager Proxy is a Java programming interface to the configuration manager, allowing you to manage your domains programmatically.

Runtime versioning

- V6 makes it easier to discover what has been deployed to your brokers
- New fields associated with each deployed object
  - Deployment time, Modification time, BAR file name, Version
  - Configurable keywords

Property	Value
Info	
Additional Instances	0
Commit Count	1
Commit Interval	0
Coordinated Transaction	false
Deployment Time	25 May 2005 18:42:22 BST
Full Name	flow1.cmf
Last Modified	25 May 2005 16:48:56 BST
Version	v2.0
Keywords	
Author	Matt
BAR File Name	C:\Documents and Settings\mpl\My Documents\BAR Files\Simple Flow v2.bar
Information	This text is embedded inside the CMF file

Version 6 provides runtime versioning so that you can see what has been deployed to your brokers. This property screen can be seen by checking the Properties of the flow running in a broker from the Domain pane in the toolkit.

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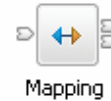# Improved developer productivity

- Next Generation Mapping
  - ▶ Spreadsheet development model
  - ▶ Ability to debug mappings

- Java compute node

- ESQL enhancements

- Increased use of BAR as deployment mechanism

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There have been many improvements in V6 to enhance developer productivity. There are better tools and more capabilities in the area of message mapping. Java language can now be used to transform messages. And the traditional ESQL capabilities have been expanded.

The mapping editor provides significant improvements in message mapping. It

Provides drag and drop for field association,

Supports all the ESQL features,

Supports user defined functions in ESQL and Java,

and includes new functions.

Mapping editor: debug view

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

The mapping editor debugging tool allows you to Set break points, Step over, Inspect variables, and Debug subroutines.

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Java as a first-class transformation language

- General purpose programmable node
  - ▶ Java programming language
  - ▶ Standards based - J2SE 1.4.2
  - ▶ Offloaded processing on z/OS using zAAP
  - ▶ High Performance for processing logic and tree access

- Offers "Compute node" alternative for Java programmers
  - ▶ Similar appearance
  - ▶ No ESQL skill or experience required

- Extra convenience methods have been added
  - ▶ The message tree can be queried and traversed using XPath 1.0 syntax
  - ▶ Extensions to allow new elements to be created in message structure
  - ▶ Also Provides full access to the existing Java plug-in API

- Databases can be accessed by way of two supported routes
  - ▶ JDBC type 4 drivers - standard Java, non-transactional
  - ▶ MbSQLStatement - uses broker's ESQL syntax, fully transactional

The Java Compute Node provides a development option for Java programmers.   The functions are equivalent to the ESQL compute node. XPath 1.0 syntax is supported.

Using the Java compute node

- Full Eclipse Java experience
  - Eclipse Java editor provides built-in syntax assists
  - Incremental compilation...
- Select which template to use:
  - Read-only messages
  - Transforming messages (read/write)
- Java class is a property of the node
  - Equivalent to the ESQL module in a compute node

```
public class jcn2 extends MbJavaComputeNode {
  public void evaluate(MbMessageAssembly assembly)
          throws    MbException
  {
    MbOutputTerminal out = getOutputTerminal("out");
    MbOutputTerminal alt = getOutputTerminal("alternate");
    MbMessage message = assembly.getMessage();
    // Add user code below

    // End of user code
    out.propagate(assembly);
  }
```

Undo Rename
Redo

Create Connection

Open Java

Cut
Copy
Delete

Snap to grid
Rotate
Rename...
Promote Property...

Properties...
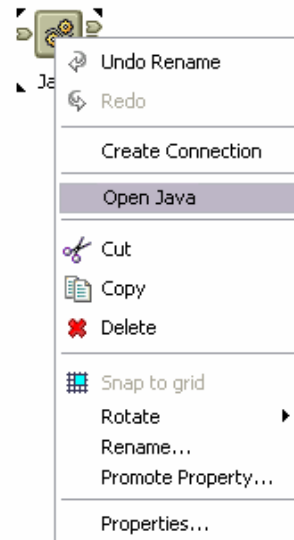
In the Java compute node, there are Java templates for creating messages, modifying messages, and filtering messages, which is read only.

Messaging processing nodes: new and updated

New

- Java Compute node
  - ▶ Provide existing Compute node capability for Java programmers
  - ▶ Deploy Java jars
- Timer Control Node
  - ▶ One shot, Periodic, N shot (persistent and non persistent)
- MQGET node
  - ▶ Support for SOAP/JMS (MQ)
  - ▶ Simple aggregation or mechanism (or both) to hold state
- JMS Input/Output
  - ▶ Native JMS Interoperability

Updated

- Web Services
  - ▶ HTTPS support
- Aggregation
  - ▶ MQ based implementation
  - ▶ Delivers improved performance
- XSLT
  - ▶ Deployed style sheets
  - ▶ Compiled style sheets
- Publication
  - ▶ Support for Multicast PGM

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In addition to the new Java compute node, there are some additional new nodes.

Timeout Nodes are useful when you need to start a flow at a specific time or at regular intervals.

The MQGET node permits getting a message from a queue mid-flow as opposed to only an MQInput node at beginning of a flow. This subsumes IA09 support Pac, but is not the same code as IA09.

There is now a true JMS node, not MQ or IP transport with different formats. JMSInput node creates a special JMS Message Tree that includes the JMS Transport branch, that is, no MQRFH2 header.

The Web Services node now supports HTTPS, and Aggregation no longer uses a database; instead it uses WebSphere MQ and is much faster. The underlying principle is that writing and reading once is MQ oriented, so there is no need for a database.

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ESQL enhancements – 1 (of 2)

- **External variables**

- **Flexible type formatting**
  - ▸ For example, formatted CAST from DATE to CHARACTER
    - DECLARE now CHARACTER = CAST(CURRENT_TIMESTAMP AS CHARACTER FORMAT "yyyyMMdd-HHmmss")
  - ▸ Remove existing restrictions on CARDINALITY and EXISTS
  - ▸ Add new SINGULAR function

- **Dynamic database schema names**

- **Multiple database support**

In V6, a number of ESQL enhancements provide the opportunity to streamline code and at the same time facilitate coding.

External variables (defined with the EXTERNAL keyword of the DECLARE statement), also known as *user-defined properties* (UDPs), are new in V6. They exist for the entire lifetime of a message flow and are visible to all messages passing through the flow. Their initial values (optionally set by the DECLARE statement) can be modified at design time by the Message Flow editor, or, at deployment time, by the BAR editor. Their values cannot be modified by ESQL.

DATETIME variables are now easier to construct and you can specify a FORMAT expression when casting, providing greater flexibility working with DATETIME and string variables.

EXISTS and SINGULAR functions provide efficient methods of querying cardinality and analyzing lists.

You can exploit user defined attributes to allow schema and table names on a database to be specified at deployment time.

Compute, Database, and Filter nodes can now access multiple databases.

ESQL enhancements – 2 (of 2)

- Broker Attributes
  - ▶ Allows flow designer to determine state
    - DECLARE myFlow CHARACTER MessageFlowName;
    - DECLARE myProcess CHARACTER ProcessId;
    - DECLARE brokerPlatform CHARACTER Family; -- "UNIX";
    - DECLARE brokerQueueManager CHARACTER QueueManagerName;
  - ▶ Matches attributes available in Java
- User Defined Attributes
  - ▶ You can define and give values to the attributes of a node
  - ▶ Can be accessed by ESQL of a node (treated as constants)
    - DECLARE COLOUR EXTERNAL CHARACTER;
- ESQL Handlers
  - ▶ Run when error condition is detected
  - ▶ Provides more flexible and improved support for handling of errors
- Stored Procedure enhancements
  - ▶ Single scalar return value
    - CALL myProc1(inVar1,intVar2) INTO intReturnVar;
  - ▶ Single/Multiple Result sets
    - CALL
      myProc1(intVar1,intVar2,Environment.RetVal[],OutputRoot.XML.A[]);

Broker properties are available to be accessed from ESQL.   The names can be qualified by the schema SQL to prevent name clashes with user variables.

Customized exception handlers can be coded in ESQL.

ESQL stored procedures have been enhanced to allow multiple result sets.

Increased standards support

- Improved support for modeling and working with SOAP messages
  - ▸ Pre-defined message definitions for SOAP
  - ▸ Support for SOAP with Attachments using the new MIME parser
- Greater flexibility in generating WSDL
  - ▸ Single/multi-file formats, RPC and document styles, SOAP and literal encoding
- A mechanism for importing an existing WSDL definition
- A new WSDL importer wizard, accepting a variety of WSDL styles as above
- More flexible HTTP support
  - ▸ Support for SOAP 1.1 and SOAP 1.2, and for HTTP 1.1
- Built-in WS-I Compliance checking
  - ▸ Automatically validates WSDL against the WS-I Basic Profile

Broker V6 has increased the standards support, especially in the Web services area.   It is now easier to work with SOAP and HTTP. It is now possible to import an existing WSDL definition and there is greater flexibility in generating WSDL.

Message Modeling 1(of 2)

- XML and XML Schema
  - ▶ Support more XML schema features (xsi:type, xsi:list, xsi:union)
  - ▶ New XMLNSC 'compact tree' parser for XML
    - Tree size reduced by up to 66%
- MIME parser
  - ▶ Emphasis on multipart MIME messages
  - ▶ SOAP with Attachments
  - ▶ RosettaNet
  - ▶ TLOG
- COBOL and C
  - ▶ COBOL and C importer enhancements
  - ▶ Better support for COBOL OCCURS DEPENDING ON
  - ▶ Unbounded repetitions

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Message modeling capabilities are enhanced with the broker Version 6. There is increased support for modeling XML schema, and performance enhancements in the reduced tree size for XML.

The WSDL Importer can model all messages that can appear inside the SOAP envelope.

Large message support using FolderBitStream mode is now supported by Custom Wire Frame (CWF), Tagged/Delimited String (TDS) and XML Wire Format.

Multipart message support is consistent across CWF, TDS, and XML for styles: Message Path and Message Alias.

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Message Modeling 2 (of 2)

- Messaging standards
  - ▶ Better integration of SAP/IDoc parser
  - ▶ Toleration of white space in EDI messages

- Validation
  - ▶ Validate Node for point in time validation
  - ▶ More nodes with validation options
  - ▶ New options to **ThrowException** after **all** validation failures detected

- Performance
  - ▶ Improved by implementation without user changes

V6 provides better integration of SAP and IDoc parsers.

There are additional validation options.

Additional enhancements include:

•Ability to force a complete parse of a message

•Unbounded repetitions for all varieties of text message

•Message definitions can be pre-defined

•Embedded messages can be defined in a separate message set, for example

  •SOAP enveloper/encoding, Timeout request, MIME, SAP IDoc

Miscellaneous changes

- Real Time/Multicast
  - PGM
- z/OS
  - Full use of JES spool for consolidated message output
  - z/OS 1.5 and XML Toolkit
  - Deployment audit trail messages
- Database
  - Unicode support
- Publish Subscribe
  - Performance
  - Literal topic '+' '#' support
- Internal runtime changes
  - Overall performance improvement

There are additional enhancements to the V6 broker.

V6 adds Pragmatic General Multicast (PGM) option for multicast, both IP and UDP. There is backwards compatibility with V5, where Packet Transfer Layer (PTL) is the only multicast protocol supported.

z/OS now uses JES spool for consolidated message output; you no longer need to use USS to see the outputs.

There is now Unicode support for the database, and there is an overall performance improvement at runtime.

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Section

Platforms and prerequisites

This section addresses hardware and software prerequisites.

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Platform coverage

Broker	Configuration Manager	Toolkit
Windows XP/2003	Windows XP/2003	Windows XP/2003
z/OS	***z/OS**	***Linux® (Intel™)**
HP-UX	***HP-UX**	
Solaris	***Solaris**	
AIX	***AIX**	
Linux (Intel+)	***Linux (Intel+)**	

* New in WebSphere Message Broker V6   *

- Complete Linux story for all components

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

- Support for Oracle databases on Linux platform

In WebSphere Message Broker V6, the toolkit now runs in Linux on Intel hardware in addition to Windows. Additionally the Configuration Manager now runs on all the same platforms as the broker.

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Supported operating systems for broker, CM, UNS

- Windows XP Professional – development and test only
- Windows Server 2003 Standard Edition
- Windows Server 2003 Enterprise Edition
- AIX 5.2 (plus Maintenance Level 3)
- AIX 5.3 (plus Maintenance Level 1)
- HP-UX 11i v1 (B.11.11) (plus Dec. 2003 QPK)
- Solaris 8 (plus SunSolve recommended Patch Cluster level and patch 111308)
- Solaris 9 (plus SunSolve recommended Patch Cluster level)
- Linux Intel (IA32) Red Hat Enterprise Linux AS 3.0 (plus Update 2)
- Linux Intel (IA32) SuSE Linux Enterprise Server (SLES) 9
- Linux zSeries (31-bit) Red Hat Enterprise Linux AS 3.0 (plus Update 2)
- Linux zSeries (31-bit) SuSE Linux Enterprise Server (SLES) 9
- z/OS 1.5
- z/OS 1.6

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This slide lists the supported operating system levels for brokers, configuration managers and user name servers.

Supported databases for broker

- Distributed
  - DB2® UDB 8.2
  - DB2 Runtime Client 8.2 (Windows development and test only)
  - SQL Server 2000 (SP3a)
  - Sybase Adaptive Server Enterprise (ASE) 12.5
  - Oracle 9i Release 2 Patch Set 4 (9.2.0.5) with Oracle Patch 3501955
  - Oracle 10g
- z/OS
  - DB2 V7.1 or later

These are the databases that can be used for the broker database.

Supported environments for toolkit

- Based on the Eclipse SDK V3.0.2 (formerly known as the WebSphere Studio Workbench) and Rational® Application Developer V6.0.0.1

- Windows
  - ▸ Windows XP Professional
  - ▸ Windows Server 2003 Standard Edition
  - ▸ Windows Server 2003 Enterprise Edition

- Linux Intel (IA32)
  - ▸ Red Hat Enterprise Linux Advanced Server V3.0 (Update 2)
  - ▸ SUSE Linux Enterprise Server (SLES) 9
  - ▸ GTK version 2.2.4 or later
  - ▸ Mozilla version 1.4.2 or later

These are the supported environments for the broker toolkit.

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Other requirements

- WebSphere MQ V5.3.0.1 or later
  - ▸ CSD04 required for JMS Real-time support
  - ▸ CSD08 required for JMS MQ Optimized node

- IBM JRE 1.4.2 fp2 required for UNIX® and z/OS platforms

- Latest broker CSDs required for migration and coexistence

- For the most up-to-date requirements, see:
  http://www.ibm.com/software/integration/wbimessagebroke r/requirements/

Additionally, WebSphere Message Broker V6 requires WebSphere MQ V5.3.0.1 or later.   IBM Runtime Environment for Java 1.4.2 with fix pack 2 is required for UNIX and z/OS platforms.   If migrating from broker V2.1 or V5, the latest maintenance is required for migration and coexistence.

The URL on this slide links to the official system requirements list.

Supported Environment Information

For the latest information about supported environments, always check the WebSphere Message Broker home page:

http://www-306.ibm.com/software/integration/wbimessagebroker/

or the Information Center:

http://publib.boulder.ibm.com/infocenter/wmbhelp/v6r0m0/index.jsp

Always check for the WebSphere Message Broker V6 websites for the latest information on hardware platforms, software prerequisites, and software levels supported.

Section

Summary and references

The last portion of the presentation contains a summary and references.

Summary

- Background of IBM broker products

- New features of WebSphere Message Broker V6

- Supported hardware and software

This presentation has reviewed some of the history of IBM broker products, given a brief overview of the new features of WebSphere Message Broker V6, and summarized the supported hardware and software levels.

References

- WebSphere Message Broker library:

http://www-306.ibm.com/software/integration/wbimessagebroker/library/

- WebSphere Message Broker Information Center:

http://publib.boulder.ibm.com/infocenter/wmbhelp/v6r0m0/index.jsp

- WebSphere Message Broker home page:

http://www-306.ibm.com/software/integration/wbimessagebroker/

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