

WebSphere Event Broker



Introduction

Version 6 Release 0

WebSphere Event Broker



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Version 6 Release 0

Note

Before using this information and the product it supports, read the information in the Notices appendix.

First Edition (September 2005)

This edition applies to IBM® WebSphere® Event Broker Version 6.0 and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this topic collection

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Part 1. Product overview

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Product overview

This section provides introductory information to help you get started with WebSphere Event Broker:

- “WebSphere Message Brokers introduction”
 - Quick Tour
 - “What’s new in Version 6.0?” on page 5
- “WebSphere Event Broker Version 6.0 technical overview” on page 10
- “Accessibility” on page 22
- Legal information

WebSphere Message Brokers introduction

WebSphere Message Broker and WebSphere Event Broker belong to a family of business integration products that is available from IBM.

Business integration is the coordination and cooperation of all your business processes and applications. It involves bringing together the data and process intelligence in your enterprise, and harnessing these so that your applications and your users can achieve their business goals.

Business integration means that:

- You can connect customers, suppliers, partners, and service providers, with continuing security and control, to enable newly built and re-engineered applications for more effective business processes (for example, Supply Chain Management).
- You can make mergers and acquisitions a success by integrating dissimilar IT infrastructures from more than one company so that they can work together as a single entity.
- You can react more quickly to market trends and opportunities because your IT systems are flexible and dependable, and no longer constraining.
- You can overcome the barriers of diverse computer systems, geographic boundaries, time differences, language and format differences, and different methods of working.

WebSphere MQ messaging provides a secure and far-reaching communications infrastructure that you can expand with WebSphere Message Broker or WebSphere Event Broker to apply intelligence to your business data as it travels through your network.

Transports

The main components of WebSphere Message Broker and WebSphere Event Broker (the broker, the Configuration Manager, the User Name Server, and the Message Brokers Toolkit) communicate using WebSphere MQ’s communications protocol, WebSphere MQ Enterprise Transport, or, if you implement WebSphere MQ Everywhere, WebSphere MQ Mobile Transport.

Your business applications, which can be on any of more than thirty industry platforms including those from IBM, Microsoft, and Sun Microsystems, Inc., can connect to the broker using WebSphere MQ protocols, or using other protocols,

such as WebSphere MQ Telemetry Transport, WebSphere MQ Real-time Transport, WebSphere MQ Multicast Transport, WebSphere MQ Web Services Transport, or WebSphere Broker JMS Transport.

The benefit of using WebSphere MQ protocols (WebSphere MQ Enterprise Transport or WebSphere MQ Mobile Transport) is that they provide assured, once-only delivery of messages between the components.

WebSphere MQ protocols provide rich support for applications:

- The Message Queue Interface (MQI) and Application Messaging Interface (AMI) are supported in several programming languages.
- The point-to-point (including request/reply and client/server) and publish/subscribe application communication models are supported.
- The complexities of communications programming are handled by the messaging services and are therefore removed from the application logic.
- The applications can access other systems and interfaces through adapters and gateways to products such as Lotus[®] Domino[®], Microsoft Exchange/Outlook, SAP/R3, and CICS[®] and IMS/ESA[®] products.

WebSphere Event Broker

WebSphere Event Broker provides an optimized publish and subscribe function within a limited WebSphere Message Broker framework. It provides high-performance nonpersistent publish and subscribe functionality to clients that are connected using various transports.

WebSphere Message Broker

WebSphere Message Broker incorporates WebSphere Event Broker and extends its function to provide a powerful message broker solution driven by business rules. Messages are formed, routed, and transformed according to the rules defined by an easy-to-use graphical user interface (GUI).

Diverse applications can exchange information in dissimilar forms, with brokers handling the processing required for the information to arrive in the right place in the correct format, according to the rules that you have defined. The applications do not need to know anything except their own conventions and requirements.

Applications also have much greater flexibility in selecting which messages they want to receive, because they can specify a topic filter, or a content-based filter, or both, to control the messages that are made available to them.

WebSphere Message Broker provides a framework that supports supplied, basic, functions along with user-defined enhancements, to enable rapid construction and modification of business processing rules that are applied to messages in the system.

Using WebSphere Message Brokers in your business

WebSphere Event Broker addresses the needs of business and application integration by distributing real-time information from disparate sources of information through a network of access points or a centralized broker. It allows you to:

- Publish a message to make it available to other applications. Other applications can choose to receive publications that relate to specific topics, or that have specific content, or both.
- Create structured topic names, topic-based access control functions, content-based subscriptions, and subscription points.

WebSphere Message Broker addresses the needs of business and application integration by managing the flow of information. In addition to the function of WebSphere Event Broker, it provides services, based on message brokers, to allow you to:

- Route a message to several destinations, using rules that act on the contents of one or more of the fields in the message or message header.
- Transform a message, so that applications using different formats can exchange messages in their own formats.
- Store a message, or part of a message, in a database.
- Retrieve a message, or part of a message, from a database.
- Modify the contents of a message; for example, by adding data extracted from a database.
- Exploit a public interface to develop message processing node types that can be incorporated into the broker framework to complement or replace the supplied nodes, or to incorporate node types developed by Independent Software Vendors (ISVs).
- Enable instrumentation by products such as those developed by Tivoli, using system management hooks.

The benefits of WebSphere Message Broker can be realized both within and outside your enterprise:

- Your processes and applications can be integrated by providing message and data transformations in a single place, the broker. This helps reduce the cost of application upgrades and modifications.
- You can extend your systems to reach your suppliers and customers, by meeting their interface requirements within your brokers. This can help you improve the quality of your interactions, and allow you to respond more quickly to changing or additional requirements.

Further information

For information about WebSphere business integration, see the WebSphere Business Integration Web page.

What's new in Version 6.0?

This topic introduces you to the main new function in WebSphere Event Broker Version 6.0.

- Simplified installation and migration
- Improved Message Brokers Toolkit
- Improved performance and scalability
- Coexistence
- Driving message flows
- Improved management
- Improved security
- Extended platform support

- User-defined nodes
- License management
- Code page conversion

Simplified installation and migration

The installation of WebSphere Event Broker Version 6.0 is easier than the installation of WebSphere Business Integration Event Broker Version 5.0 because the number of prerequisite products has been reduced. For more information on installation, see the Installation Guide.

Configuration Managers no longer require a database.

A Default Configuration wizard is provided to quickly build a full environment for development or other simple configurations on Windows and Linux (x86 platform). For more information on the Default Configuration wizard, see the Installation Guide.

Migration from WebSphere MQ Event Broker Version 2.1 and WebSphere Business Integration Event Broker Version 5.0 are supported. Both Version 2.1 and Version 5.0 can Coexist with WebSphere Event Broker Version 6.0 allowing a phased migration. In addition the command `mqsimigratecomponents` is provided to migrate individual components from one codebase to another. For more information on migration, see Migrating .

The installation of WebSphere Event Broker for z/OS Version 6.0 has been simplified in the following ways:

- A single command can be used to create brokers, Configuration Managers, and User Name Servers.
- All commands are JCL-based, meaning no UNIX shell is required.

For more information, see the Installation Guide.

Improved Message Brokers Toolkit

The Message Brokers Toolkit is based on the latest release of Rational Application Developer, powered by the Eclipse open source platform. The Message Brokers Toolkit includes the following new features:

- Support on Linux (x86 platform) in addition to Windows.
- XML editors.
- Visual debugging is available with Message flows, which reduces the need for Eclipse perspective switching:

For more information about the Message Brokers Toolkit, see “Client environment” on page 12.

Improved performance and scalability

Performance of the broker runtime has been significantly improved by the following enhancements:

- The path lengths of the major broker functions have been shortened.
- The cost of parsing and streaming messages has been reduced.
- Publish/subscribe functions have been improved.
- The storage requirements of the XML parsers have been reduced so that larger messages can be accommodated.

Coexistence

WebSphere Event Broker Version 6.0 can coexist with either a Version 2.1 or a Version 5.0 product on the same computer. You can install WebSphere Event Broker Version 6.0 in a different location on the same computer,

migrate your components and resources to WebSphere Event Broker Version 6.0, and uninstall the Version 2.1 or Version 5.0 product later when you are sure that you no longer need it.

With some restrictions, all Version 5.0 components can participate in a Version 6.0 broker domain, and all Version 6.0 components can participate in a Version 5.0 broker domain. A Version 2.1 broker is the only Version 2.1 component that can take part in a Version 6.0 broker domain.

For more information about coexistence, see Coexistence with previous versions and other products.

Driving message flows

Message flows can be driven by JMS transports. Supported JMS providers include the embedded JMS provider in WebSphere Application Server Version 6.0, see WebSphere Broker JMS Transport.

Improved management

Runtime versioning

The enhanced versioning capabilities introduced to the development environment in the last release have been extended to the runtime environment. All resources deployed can be tagged with version, author, and other useful information in addition to the standard compiled time and deployment time attributes. The new information is displayed in the administration interface making it easy to see which resources have been deployed to production systems.

More automation

New and extended command line utilities are provided to allow full automation of deployment of new resources to production environments.

The Configuration Manager Proxy (CMP) Java API is a new systems management application interface which is provided to allow WebSphere Event Broker to be fully managed by products and utilities besides the Message Brokers Toolkit and the command-line interface. For more information on the CMP, see Developing applications that use the Configuration Manager Proxy Java API.

Improved security

Communication between the Message Brokers Toolkit and a Configuration Manager has been extended to allow the use of SSL for added security.

Extended platform support

The Configuration Manager is supported on all the broker platforms including z/OS, UNIX, Linux, and Windows.

The Message Brokers Toolkit can be installed on Linux (x86 platform) in addition to Windows.

Database support on Linux (x86 platform) is extended to include Oracle in addition to UDB DB2.

For more information, see the Installation Guide.

User-defined nodes

You can deploy user-defined nodes that have been created and supplied by WebSphere Message Broker Version 6.0 users or by independent software

vendors and other companies. Use these nodes in WebSphere Event Broker message flows, to add to the function provided by the supplied or built-in nodes.

For more information, see User-defined nodes.

License management

WebSphere Event Broker supports a new form of license management using IBM Tivoli License Manager (ITLM), Version 2.1, across all the WebSphere Event Broker platforms, with the exception of z/OS. Implementing ITLM allows sub-capacity pricing for eBusiness On Demand.

For more information on ITLM, see IBM Tivoli License Manager.

Code page conversion

The set of code page converters used by WebSphere Event Broker has been updated and is now comprised of code page converters from the International Components for Unicode (ICU) libraries for Unicode, Version 3.2. For the list of code page converters included in the set, see Supported code pages.

For information on how to add additional code page converters to the set, see Generating a new code page converter.

New inVersion 5.0

This topic introduces you to the main new function in WebSphere Business Integration Event Broker Version 5.0.

- New graphical development environment based on Eclipse
- Publish/subscribe enhancements
- Enhanced initial user experience
- Message flow accounting and statistics
- SSL authentication, QoS, and HTTP tunneling
- New object level security model
- Increased platform support

New graphical development environment based on Eclipse

The Message Brokers Toolkit is an integrated development environment and graphical user interface based on the Eclipse platform. The Message Brokers Toolkit consists of the Eclipse platform and a set of Java plug-ins that enable the creation, maintenance, and deployment of WebSphere Event Broker message flows (including publish/subscribe applications). See the “Client environment” on page 12 topic, and the Eclipse web site.

The Message Brokers Toolkit includes, among other things, the following new features:

- You can control multiple broker domains using a single Message Brokers Toolkit. See “Client environment” on page 12.
- You can use Message Brokers Toolkit with external source repositories, for example with repositories that permit version control of message flow and message set source data. See “Development repository” on page 15.
- Improved editors make it easier for you to build your solution. See “Editors in the Message Brokers Toolkit” on page 29.
- You can configure some message flow properties at deployment time rather than at development time. See Broker archive - configurable properties.

Publish/subscribe enhancements

The following publish/subscribe changes have been made:

- The set of protocols and distribution patterns supported by the broker has been extended to provide reliable, real-time IP multicast distribution of subscriptions over a Local Area Network. This is provided as an extension to the existing JMS IP support in WebSphere Event Broker. For more information, see WebSphere MQ Multicast Transport and Multicast publish/subscribe, and WebSphere MQ Real-time Transport.
- Publish/subscribe capabilities have been consolidated within WebSphere Message Brokers. This rationalizes the product offerings and provides a clear upgrade path from WebSphere Event Broker to WebSphere Message Broker.

Enhanced initial user experience

The **pre-install LaunchPad** is launched from the Windows CD prior to installation. It guides you through the process of checking for, and installing, any necessary prerequisite software before launching the product installation. The installation is now implemented using InstallShield for Multi-Platforms.

The **Welcome** page for the Message Brokers Toolkit, which appears after you launch the Message Brokers Toolkit, provides links to a number of basic tasks, enabling you to configure and exercise a working system as quickly as possible. Supported tasks include:

- Take the Quick Tour.
- Create the Default Configuration.
- Verify your installation with the Soccer Results sample.
- Explore the Samples Gallery.

Message flow accounting and statistics

You can now collect statistics on the behavior of message flows. For example, you can collect data about how many messages are processed and how large those messages are, or about CPU usage and elapsed processing times. For more information, see Message flow accounting and statistics data, and the developerWorks article on message flow performance.

SSL authentication, QoS, and HTTP tunneling

The following Internet-related items have been added:

- SSL authentication provides additional security. See SSL authentication.
- WebSphere MQ Telemetry Transport offers a range of message delivery options. See WebSphere MQ Telemetry Transport Quality of Service levels and flows.
- HTTP tunneling allows applet access through firewalls. See Tunneling.

New object level security model

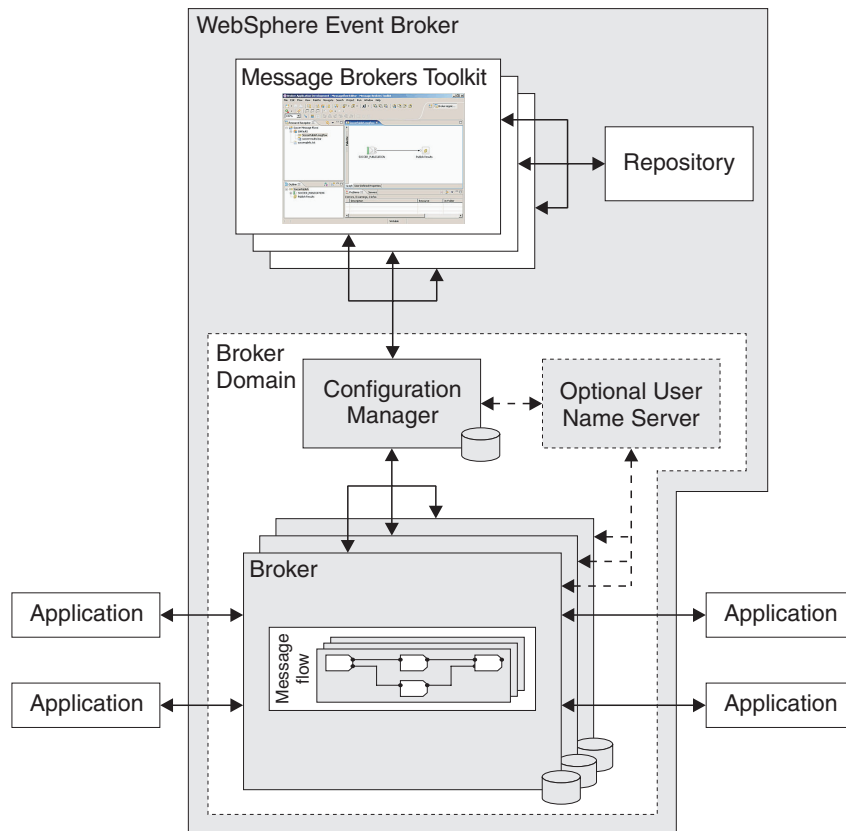
You can now control access to runtime resources by object as opposed to by group. See Security for runtime resources.

Increased platform support

Supported operating environments now include Linux (x86 platform), Linux (zSeries platform), and Windows XP, giving you a wider choice of platforms on which to deploy your solution. For more information, see Operating system requirements.

WebSphere Event Broker Version 6.0 technical overview

WebSphere Event Broker enables information packaged as messages to flow between different business applications, ranging from large legacy systems through to unmanned devices such as sensors on pipelines.



Message routing

Messages can be routed from sender to recipient based on the content of the message.

The message flows that you design control message routing. A message flow describes the operations to be performed on the incoming message, and the sequence in which they are carried out.

Each message flow consists of:

- A series of steps used to process a message. The steps are defined in message flow nodes.
- Connections between the nodes, defining routes through the processing. Connections are made using message flow node connections.

IBM supplies built-in nodes and samples for many common functions. If you require additional functions, you can deploy user-defined nodes that have been created and supplied by WebSphere Message Broker Version 6.0 users or by independent software vendors and other companies.

You create message flows in the Message Brokers Toolkit; an integrated development environment and broker domain administration console.

Create the run time

The work of routing messages takes place in a broker. Brokers contain a number of execution groups; processes in which message flows are run.

Brokers are grouped into broker domains. Each domain is coordinated by a Configuration Manager. There can be many brokers, and each can be running on a different system. This provides protection against failure, and can separate work across different divisions in a business.

The system administrator creates the Configuration Manager with a command line instruction. The Configuration Manager uses an internal repository to store information relating to its broker domain.

The system administrator similarly creates one or more brokers, linking each to a particular Configuration Manager, thus making them part of the domain controlled by that Configuration Manager. Each broker uses a database to store the information it needs to process messages at run time.

The Configuration Manager also displays the users and groups in the Access control lists that you use to set user permissions, see Publish/subscribe below.

Develop applications

After the system administrator has created and connected the components of the broker domain, an application developer creates and modifies message flows using the workbench.

Different perspectives in the workbench are used to develop message flows as well as to administer one or more broker domains.

A repository can be used to provide access control and version control. A repository also allows multiple developers to work on the same resources in parallel.

You can use WebSphere MQ for communication between application and brokers. Other communication protocols you can use are:

- WebSphere MQ Enterprise Transport
- WebSphere MQ Mobile Transport
- WebSphere MQ Multicast Transport
- WebSphere MQ Real-time Transport
- WebSphere MQ Telemetry Transport
- WebSphere Broker JMS Transport

Deploy applications to the run time

When message flows have been created using the workbench, executable data can be deployed (transferred) to one or more brokers.

You can deploy data in one of two ways:

- From the workbench
- Using a shell command

When you deploy message flows, they are compiled and enveloped in a broker archive (bar) file, and sent to the Configuration Manager. The bar file has configurable system properties. You can override properties such as queue names, without the need to change source files or redevelop the message flow. This makes it easier to move definitions between systems.

The Configuration Manager opens the envelope, removes the contents, makes a record of the information that it has received, and routes the information to the appropriate brokers. (The envelope is discarded when the information it contains has been retrieved.) Each broker stores the information in its own local database. This means that, when a broker has sufficient information, it can continue processing messages even if it is no longer connected to its Configuration Manager.

The Configuration Manager coordinates all activity between the workbench and brokers within its domain. WebSphere MQ messaging is used between the workbench, the Configuration Manager, and the brokers.

Publish/subscribe

A publishing application sends a message about a named topic to a broker. The broker passes the published message to those applications that have registered an interest in that topic. The publisher and the subscriber are unaware of the other's existence.

The broker handles the distribution of messages between publishing applications and subscribing applications. Applications can publish on, or subscribe to, many topics as well as apply more sophisticated filtering mechanisms.

An optional User Name Server in the broker domain controls who is authorized to publish or subscribe to topics. You set up and administer topic-based security from the workbench.

You set user permissions at individual or group level using Access control lists.

Client environment

The Message Brokers Toolkit is an integrated development environment and graphical user interface based on the Eclipse platform.

Application developers work in separate instances of the Message Brokers Toolkit to develop message flows. The Message Brokers Toolkit also communicates with one or more Configuration Managers, and is used to manage broker domains.

The Message Brokers Toolkit can be installed on Windows and Linux (x86 platform).

The workbench

When you start the Message Brokers Toolkit, a single window is displayed. This is the workbench, which contains one or more perspectives.

A perspective is a collection of views and editors that help you complete a specific task, or work with specific types of resource. The first time that you start the Message Brokers Toolkit, the Broker Application Development perspective is displayed. While you work in the workbench, you will switch perspectives frequently.

Accessing context-sensitive help (infopops)

Infopops are provided throughout the Message Brokers Toolkit. An infopop is a small pop-up window that displays context-sensitive help and provides links to more information in the information center. You can launch an infopop for most aspects of the user interface (for example, on the Resource Navigator, the Message Flow editor, or a properties page) by bringing focus to the object and pressing F1 (on Windows) or SHIFT+F1 (on Linux).

Perspectives

A perspective is a group of views and editors that shows various aspects of the resources in the workbench, and helps you to complete specific tasks.

You can switch perspectives, depending on the task at hand, and customize the layout of views and editors. Switch between perspectives by clicking **Window** → **Open Perspective** → **Other** and clicking the name of the perspective to which you want to switch.

The Message Brokers Toolkit contains the following perspectives:

Broker Application Development perspective

This is the default perspective that is displayed the first time that you start the Message Brokers Toolkit. Application developers work in this perspective to develop and modify message flows.

Broker Administration perspective

This is a broker administration console that communicates with one or more Configuration Managers. Administrators work in this perspective to manage the resources (also referred to as domain objects) in the broker domain that are defined on one or more Configuration Managers.

Data perspective

This is where application developers import relational database schemas for ESQL content assist and validation.

Editors

An editor is a component of the workbench. It is typically used to edit or browse a resource.

When you open a file for editing, for example by double-clicking it in the Resource Navigator view, the default editor associated with that file opens in the editor area of the current perspective. By default, the editor area is in the top-right hand side of the workbench window.

You are advised to open resources with the default editor only, because other editors might not correctly validate the changes you make.

You can open any number of editors at once, but only one editor is active at any one time. The main menu bar and main toolbar display the operations that apply to the active editor. By default, editors are stacked in the editor area, but you can choose to tile them to view source files simultaneously. Tabs in the editor area indicate the names of the resources that are open for editing. An asterisk (*) indicates that an editor has unsaved changes. If you attempt to close the editor or exit the workbench with unsaved changes you are prompted to save the changes.

Resources

The projects, folders and files that exist in the workbench are called resources. They are collectively referred to as the workspace and they reside in your local file system.

By default, resources reside (with their metadata) in the workspace directory. The workspace directory is created the first time that you start the Message Brokers Toolkit. On Windows, the default workspace directory is created at `C:\Documents and Settings\user\IBM\wmbt6.0\workspace`, and on Linux, the default workspace directory is created at `/home/user/IBM/wmqi6.0/workspace`, where *user* is the user name with which you are logged on. You can create projects in other directories as well as in the workspace directory. You can maintain multiple workspaces by specifying a new location when prompted while the Message Brokers Toolkit is starting.

Typically, you open and view for editing any workbench resource in the Resource Navigator view. The exception is a broker domain resource (also referred to as a domain object) which you view and open for editing in the Broker Administration Navigator view in the Broker Administration perspective.

Types of resource: There are three basic types of resource:

Files These are comparable to files in a file system. Different types of resource are maintained in different file types, for example, message flow files, and broker archive files. File types are listed in “Resource types in the Message Brokers Toolkit” on page 28.

Folders

These are comparable to directories in a file system. Folders are contained within projects or other folders. Folders can contain files and other folders.

Projects

Projects contain folders and files. Projects are used for building, version management, sharing, and resource organization. Like folders, projects map to directories in a file system. When you create a project, you specify a location for it in the file system. By default, projects are created in the workspace directory..

A project is either open or closed. You can view and modify an open project in the workbench. You cannot view or modify a closed project. The files and folders of a closed project are not displayed in the workbench, but they still reside on the local file system.

A closed project requires less memory than an open project.

You can:

- Add a project to the workbench.
- Save and version a project in an external repository.
- Copy a project from another user’s workbench.

Project types are listed in “Resource types in the Message Brokers Toolkit” on page 28.

By name linking: Previously, objects such as nodes in a message flow, or an execution group, were identified by a system-generated identifier called a universally unique identifier (uuid). When an object was removed, renamed or deleted, the reference to the object was lost.

In WebSphere Event Broker, users identify objects using a combination of a namespace and a name, referred to as a fully qualified name. The use of fully qualified names makes it easy to identify and locate objects, and to correct broken references. For example, if you rename an object, all references to that object are broken. If you substitute another object with the same name, all the broken references are corrected. This concept, called by name linking, is particularly important when you are working in a team environment. It means that you can share files in a repository and concurrently modify, add, and delete objects in your message flow application. When you integrate the various parts of the application, you can detect and resolve broken references to objects that have been moved, renamed or deleted.

Project references: A project reference is a property that you can set for a project so that it can be referenced by another project. When one project references another, the files in the referenced project are available for reuse.

For example, you might want to create a library of reusable ESQL subroutines in a project. Or you might want to create a similar library of message flows to reuse in other message flows. By adding a project reference to the library project, its subroutines or subflows are available for you to use.

If you subsequently close or delete a referenced project, or delete an object within it, it is no longer available to the referencing project and an error is generated. You can correct the error by opening the closed project or adding the missing object, with the correct name, and saving.

Development repository

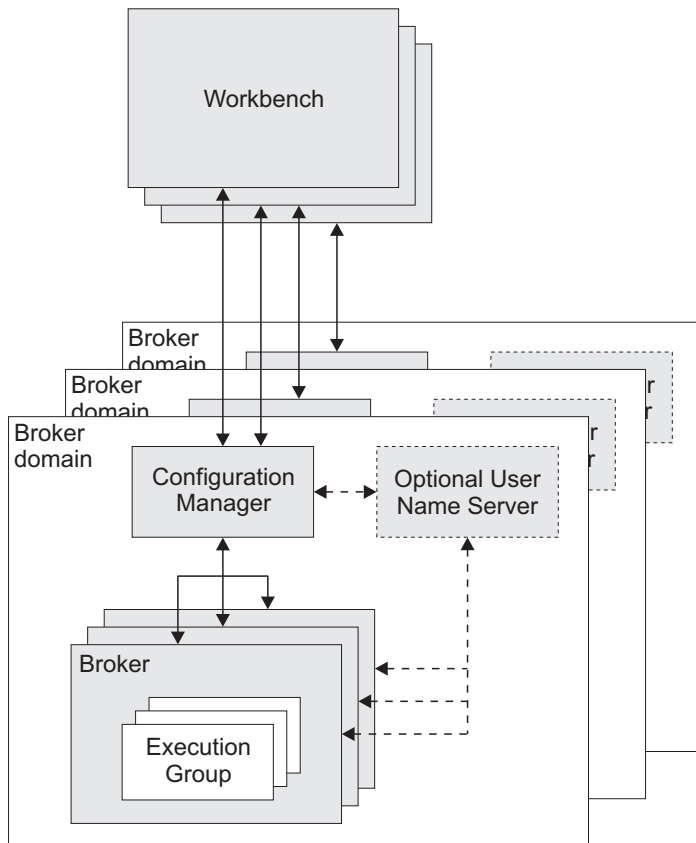
You can use any repository supported by Eclipse with WebSphere Event Broker. Many repositories provide features such as version control and access control of files, and make it easier for teams to work on shared resources. Because the Message Brokers Toolkit is based on the Eclipse platform, you can access Eclipse-supported repositories directly from the Message Brokers Toolkit.

For more information, refer to the section "Team Repository Providers" at Eclipse corner developer community.

Runtime environment

The runtime environment is the set of resources that exist at run time, including the Configuration Manager, brokers, and execution groups.

The following figure shows the relationship between the resources that exist at run time, and how they interact with the workbench.



Follow the links below for more information about each of the runtime components:

- “Brokers” on page 19
- “Execution groups” on page 21
- “Broker domains”
- “Configuration Manager” on page 17
- “User Name Server” on page 21

Broker domains

A broker domain is one or more brokers that share a common configuration, together with the single Configuration Manager that controls them.

You install, create, and start one or more brokers, and an optional User Name Server, in a broker domain. You can configure more than one broker domain, each managed by its own Configuration Manager.

The Configuration Manager uses an internal repository to store and share information about the resources and components in the domain.

You create the physical components of a broker domain using command line instructions, and then configure and administer the broker domain using the Broker Administration perspective in the workbench.

Configuration Manager

The Configuration Manager is the interface between the workbench and an executing set of brokers. It provides brokers with their initial configuration, and updates them with any subsequent changes. It maintains the broker domain configuration.

The Configuration Manager is the central runtime component that manages the components and resources that constitute the broker domain.

The Configuration Manager has four main functions:

- Maintains configuration details in an internal repository. This internal repository provides a central record of the broker domain components.
- Deploys the broker topology and message processing operations in response to actions initiated through the workbench. Broker archive (bar) files are deployed through the Configuration Manager to the execution groups within a broker.
- Reports on the results of deployment and the status of the broker.
- Communicates with other components in the broker domain using WebSphere MQ transport services.

You must install, create, and start a Configuration Manager for each broker domain. You can install, create, and start more than one Configuration Manager on one or more machines.

When you create a Configuration Manager, you must give it a name that is unique within the broker domain; names cannot be shared between Configuration Managers, or between Configuration Managers and brokers.

You can install and configure the Configuration Manager runtime component on AIX, HP-UX, Linux (x86 platform), Linux (zSeries platform), Solaris, Windows, and z/OS. For more information about supported platforms see Operating system requirements.

You administer one or more Configuration Managers in the Broker Administration perspective in the workbench. More than one instance of the workbench can access a Configuration Manager concurrently.

The Configuration Manager can share a host queue manager with one broker in the broker domain. To communicate with other brokers in the broker domain, the Configuration Manager requires sender and receiver channels.

Resources associated with a Configuration Manager: When you create the Configuration Manager runtime component, the following resources are also created:

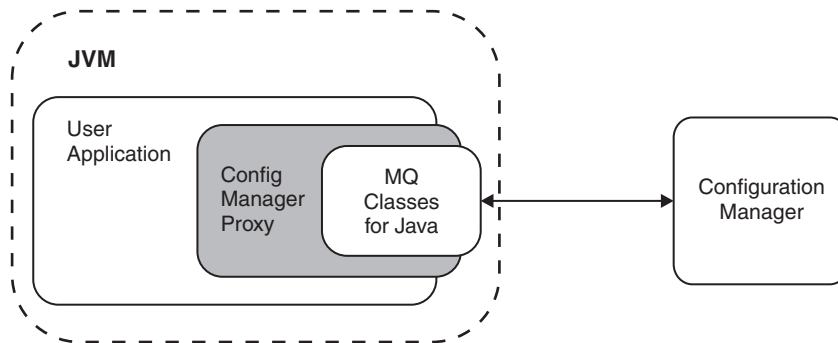
- An internal repository.
- A WebSphere MQ queue manager (unless one exists already) on the same physical system as the Configuration Manager. A queue manager can be shared with a single broker.
- A set of fixed-name queues, defined to the queue manager that hosts the Configuration Manager.

Configuration Manager Proxy: The Configuration Manager Proxy (CMP) is an application programming interface that your applications can use to control broker domains through a remote interface to the Configuration Manager.

Your applications have complete access to the Configuration Manager functions and resources through the set of Java classes that constitute the CMP. For example, you can use the CMP to interact with the Configuration Manager to:

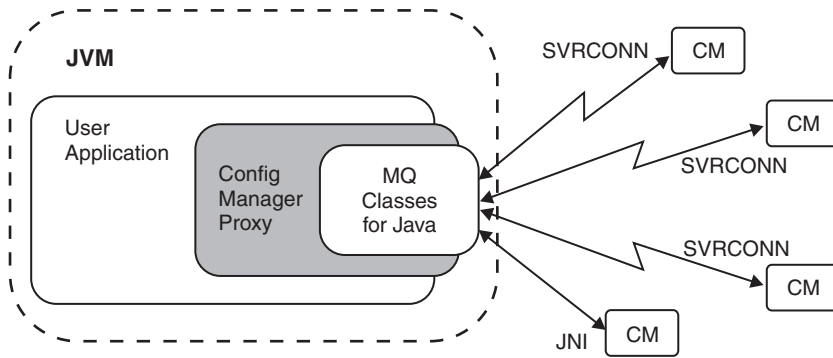
- Deploy BAR files, Publish/Subscribe topology, topic trees and broker configuration.
- Modify the Publish/Subscribe topology; add and remove brokers, broker connections and collectives.
- Create, modify, and delete execution groups
- Enquire and set status of objects in the domain, for example, run state, and be informed if status changes.
- Manipulate the topics hierarchy.
- View the broker event log and active subscriptions table.
- Modify domain Access Control Lists, when connected to Version 6.0 Configuration Managers only.

The CMP is a lightweight set of Java classes that sit logically between the user application and the Configuration Manager, inside the Java Virtual Machine (JVM) of the user application. It requires the WebSphere MQ Classes for Java in order to function, as shown below.



The CMP application can be on the same physical machine as the Configuration Manager (JNI to the queue manager using the WebSphere MQ Java Bindings transport) or distributed over a TCP/IP network (a WebSphere MQ SVRCONN channel using the WebSphere MQ Java Client transport).

It is possible for the CMP to communicate with multiple Configuration Managers from within the same application:



Using the API it is possible to connect to and manipulate Configuration Managers of the following products:

- IBM WebSphere Business Integration Event Broker Version 5.0
- IBM WebSphere Business Integration Message Broker Version 5.0
- IBM WebSphere Business Integration Message Broker Version 5.0 with Rules and Formatter Extension
- WebSphere Event Broker Version 6.0
- WebSphere Message Broker Version 6.0

A domain controlled by a Version 5.0 Configuration Manager can consist of Version 2.1 and Version 5.0 brokers, to which either version can be deployed by the CMP. Note also, that although it is only possible to run one Version 5.0 Configuration Manager on each physical machine, a single CMP application can still connect to multiple Version 5.0 Configuration Managers.

Brokers

A broker is a set of execution processes that hosts one or more message flows to route, transform, and enrich inflight messages.

Applications send messages to the broker using WebSphere MQ queues and connections. The broker routes each message using the rules defined in message flows and message sets, and transforms the data into the structure required by the receiving application.

The broker uses sender and receiver channels to communicate with the Configuration Manager and other brokers in the broker domain.

You install the broker component on the platforms described in Operating system requirements. You create the broker using command line instructions on the machine where the component is installed. You can install and create one or more brokers, on one or more machines.

The broker depends on a broker database to hold broker information. This includes control data for resources defined to the broker, for example deployed message flows. You need to define a database and authorize access for specific users before you create the broker because creating the broker creates tables within the database. The database is also known as the broker's local persistent store.

The broker connects to the database using an ODBC connection.

When you create a broker, you must give it a name that is unique within the broker domain. Broker names are case-sensitive on all supported platforms, except Windows platforms. You must use the same name when you create a reference to the broker in the broker domain topology in the workbench. The reference to the broker is a representation of the physical broker in the configuration repository.

When you have created the broker reference, you deploy the changes to your broker domain. Deployment starts communications between the broker and the Configuration Manager. The broker receives configuration information from the Configuration Manager, and stores it in the configuration repository. Deployment also initializes the broker to make it ready to execute message flows.

Resources associated with a broker: When you create a broker, the following resources are also defined and created:

- A set of database tables for storing the information used by the broker to process messages at run time.

You can use one of a number of database products to create the database tables, depending on which platform the product is installed. See Supported databases for more information.

You must create a DB2 database if you are using WebSphere Event Broker for z/OS.

- A WebSphere MQ queue manager, if one does not already exist.
- A set of fixed-name queues that are defined to the WebSphere MQ queue manager.

System management interfaces:

The brokers provide a service for independent system management agents.

This enables a central management facility to access information about any network that includes a WebSphere Event Broker broker domain.

This support ensures that existing system management agents can be extended to include WebSphere Event Broker resources.

WebSphere Event Broker brokers publish event messages, using fixed topics, in response to configuration changes, state changes, and user actions such as subscription registrations. WebSphere Event Broker also uses architected messages to publish events related to the status, and change in status, of the brokers. These messages are published using the reserved topic root \$SYS in code page 1208.

An example of a fixed topic is:

```
$SYS/Broker/<brokerName>/Status/ExecutionGroup/<executionGroupName>
```

So the topic structure is fixed in this case, but obviously <brokerName> and <executionGroupName> are replaced with the appropriate values.

An example of the actual message data for this publication is:

```
<Broker uuid="12345678-1234-1234-1234-123456789012">
  <ExecutionGroup uuid="12345678-1234-1234-1234-123456789012">
    <Stop>
      <AllMessageFlows/>
    </Stop>
  </ExecutionGroup>
</Broker>
```

A system management agent can subscribe to these topics, or to a subset of these topics, to receive the detailed information about activity and state changes in the WebSphere Event Broker broker domain.

You can develop or purchase system management adapters or customized administrative applications. These subscribe to the system management topics generated by WebSphere Event Broker to receive information on the broker domain activity.

Execution groups: An execution group is a named grouping of message flows that have been assigned to a broker. The broker enforces a degree of isolation between message flows in distinct execution groups by ensuring that they execute in separate address spaces, or as unique processes.

Each execution group is started as a separate operating system process, providing an isolated runtime environment for a set of deployed message flows. A single default execution group is set up ready for use when you create a reference to a broker in the workbench. By setting up additional execution groups, you can isolate message flows that handle sensitive data such as payroll records, or security information, or unannounced product information, from other non-sensitive message flows.

Within an execution group, the assigned message flows run in different thread pools. You can specify the size of the thread pool (that is, the number of threads) that are assigned for each message flow by specifying the number of additional instances of each message flow.

If you create additional execution groups, you must give each group a name that is unique within the broker, and assign and deploy one or more message flows to each one.

Execution groups are created and deployed in the workbench.

User Name Server

The User Name Server is an optional runtime component that provides authentication of users and groups performing publish/subscribe operations.

If you have applications that use the publish/subscribe services of a broker, you can apply an additional level of security to the topics on which messages are published and subscribed. This additional security, known as topic-based security, is managed by the User Name Server. It provides administrative control over who can publish and who can subscribe. For example, if a client application publishes messages containing sensitive company finance information, or personnel details, the User Name Server can be used to restrict access to those messages.

The User Name Server interfaces with operating system facilities to provide information about valid users and groups in a broker domain.

You install, create, and start a User Name Server in any supported operating environment. These are listed in Supported processors and Operating system requirements.

The User Name Server can share a host queue manager with the Configuration Manager and one broker in the broker domain. To communicate with other brokers in the broker domain, the User Name Server requires sender and receiver channels.

Resources associated with a User Name Server: When you create a User Name Server, the following resources are also created:

- A WebSphere MQ queue manager unless one exists already. The queue manager is created on the same physical system as the User Name Server. A queue manager can be shared with the Configuration Manager, a single broker, or both.
- A set of fixed-name queues, defined to the WebSphere MQ queue manager that hosts the User Name Server.

Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. When you use the administrative facilities provided by WebSphere Event Broker, you can use your operating system's accessibility features to modify the behavior of the user interface.

On Windows systems you can change the key behavior, provide a high-contrast display, or control the pointer with keys instead of a mouse. You can enable accessibility features from Accessibility Options within the Control Panel.

On Linux (x86 platform) systems the way in which you control accessibility features depends on the gtk toolkit which underlies the Gnome windowing system. Under Gnome, you can change the key behavior, or control the pointer with keys instead of a mouse. From the main menu click **Applications** → **Desktop Preferences** → **Control Panel** → **Accessibility**. In addition, there are Screen Reader and Magnifier options available if Assistive Technologies is enabled under Gnome. Alternatively, you can use the tooling under other windowing systems such as KDE, in which case the appropriate look and feel will be seen, however the accessibility features of KDE (primarily key behavior) do not apply.

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Workbench

Follow the links below for reference information about the Message Brokers Toolkit integrated development environment:

- “Perspectives in the Message Brokers Toolkit”
- “Resource types in the Message Brokers Toolkit” on page 28
- “Editors in the Message Brokers Toolkit” on page 29
- “Message Brokers Toolkit keyboard shortcuts” on page 39

A minimum display resolution of at least 1024 x 768 is required for some dialogs (for example, the Preferences dialog).

Perspectives in the Message Brokers Toolkit

Follow the links below for a description of each of the perspectives in the Message Brokers Toolkit:

- “Broker Administration perspective”
- “Broker Application Development perspective” on page 27

Broker Administration perspective

This is where the broker domain resources (also referred to as domain objects) that are defined on one or more Configuration Managers are managed.

Typically, you carry out the following tasks in this perspective:

- Setting up the broker domain, for example creating collectives
 - Creating and removing domain connections.
 - Connecting and removing brokers.
- Adding and removing execution groups.
- Creating and deploying broker archive (bar) files.
- Defining and managing publish/subscribe topic hierarchies.
- Querying, viewing and deleting subscriptions.
- Clearing and filtering deploy event log entries.
- Activating, deactivating, filtering, and clearing alerts.
- Adding, removing, and updating entries in access control lists (ACLs).

The Broker Administration perspective provides several views that allow you to navigate and update your broker domain resources.

Navigator view

This is where you view and work with any of the broker domain resource files. You can also deploy and delete any resource file that has been created in the Broker Application Development perspective.

The broker domain resource files are contained in the following folders:

Domain Connections

Contains the domain connections that are defined to multiple local and remote Configuration Managers.

Broker Archives

Contains the broker archive (bar) files.

Message Flows

Contains the message flow (msgflow) files.

Domains view

This is where you view and work with any of the broker domain objects listed below, when a broker domain is connected to a Configuration Manager:

- Broker Topology
- Topics
- Subscriptions
- Event Log entries

You can manage deployed configurations in this view. Double-clicking an object launches the appropriate editor in the editor view. You can also deploy bar files on execution groups, and start and stop message flows.

By default, an alert icon is displayed for a domain object that is connected to a Configuration Manager but is not in a normal running state. You can choose not to display the alert icon using an option that is available in the Alerts view.

Editor view

You can open any broker domain resource to launch its default editor in the editor view. The following default editors are available:

Broker Topology editor

For administering the brokers and collectives within a broker domain.

Topics Hierarchy editor

For managing topics within a publish/subscribe system.

Subscriptions Query editor

For viewing and deleting subscriptions within a publish/subscribe system. Subscriptions that use the WebSphere MQ Real-time Transport are not displayed in the Subscriptions Query editor.

Event Log editor

For viewing, clearing and filtering event log entries.

Properties view

Displays the property names and values for the domain object selected in the Broker Administration Navigator view.

Alerts view

An alert is displayed in the Alerts view when a domain object is connected to a Configuration Manager but is not in a normal running state. The normal running state for a domain object is started, without a user trace or any other special processing enabled.

The Alerts view is updated continuously whilst the workbench is connected to a Configuration Manager.

You can filter, clear, and remove alerts from this view. You can also quieten alerts. This removes the alert icon from every object in the hierarchy in the Domains view, except for the alerted object and its parent.

Broker Application Development perspective

The Broker Application Development perspective is the default perspective that is displayed when you start the Message Brokers Toolkit.

Typically, you carry out the following tasks in this perspective:

- Develop message flows.

The Broker Application Development perspective provides several views that allow you to navigate, browse, and update your application resources.

Navigator view

This view displays a hierarchy view of the following message flow resource files:

- Message flow projects
- Message flows

You can open any of these resources for editing using specialized editors, except project files.

Editor view

Editors are launched in the editor area when you double-click a resource in the **Resource Navigator** view.

The Message Flow editor is provided by default by Message Brokers Toolkit for working with the content of message flow files.

Outline view






The Outline view provides a summary of the content of the resource that you currently have open in the Editor view.

Tasks view

The Tasks view displays any messages (information and error) that are associated with the resource that you currently have open in the Editor view. For example, if you save a message flow that has an error (such as a mandatory property not set), you can check the content of the Tasks view to determine any corrections that you need to make. When you double-click a Tasks view entry, the appropriate editor opens the resource in error, and positions the cursor at the point of the error (where possible).

Broker Application Development perspective toolbar

The icons in the toolbar and their actions are shown in the table below.

Icon	Label and action
	Get a message from a Queue
	Put a message to a Queue
	Create a New Message Flow Project
	Create a New Broker Schema
	Create a New Message Flow

Resource types in the Message Brokers Toolkit

Follow the links below for reference information about the projects and resource files specific to Message Brokers Toolkit:

- “Message flow projects and files”

Message flow projects and files

You develop message flows in the Broker Application Development perspective. Message flow resources are maintained within message flow projects. A message flow project compiles to one or more deployable flows.

Message flow projects contain the following resource files:

.msgflow files

A message flow file is a graphical representation of a message flow, containing message nodes and connections. It also contains property values and overrides to define, implement and control the behavior of the message flow nodes. The New Message Flow Wizard automatically creates this file.

Default editor: Message Flow editor

You can define more than one message flow, each in a separate .msgflow file, in the same message project.

Rules for naming workspace objects

You can uniquely identify and locate a workspace resource using a namespace and a name. An organization uses its own name to form a namespace, and all resource names within that namespace are safe from clashes with those of another organization. The combination of a user specified namespace and name is often called the “fully qualified name”. The unnamed namespace (name space=”) is supported.

WebSphere Event Broker defines an application symbol space using project references. No fully qualified names may be duplicated across the application

symbol space. A Tasks List error is displayed if duplicate or ambiguous names are detected within an application symbol space.

Editors in the Message Brokers Toolkit

Follow the links below for more information about each of the editors provided by Message Brokers Toolkit:

- “Broker Archive editor” on page 31
- “Broker Topology editor” on page 32
- “Event Log editor” on page 32
- “Message Flow editor” on page 33
- “Subscriptions Query editor” on page 39
- “Topics Hierarchy editor” on page 39

ACL editor

Use the Access Control List (ACL) editor to view and edit the ACL permissions of resources and principals (users and groups) in a selected domain.

All resources supporting ACLs are shown in the editor. These are:

- The Configuration Manager
- The Broker Topology
- The Brokers
- The Execution Groups
- The Subscriptions Root
- The Topics Root

The ACL editor shows ACL permissions on 2 pages; see “Resource/Principals page” and “Principal/Resources page” on page 30.

Starting the editor

In the Domains Navigator view of the Broker Administration perspective, right-click on a domain. In the pop-up menu that appears, select “Edit Access Control”. The ACL editor opens, showing the ACL permissions for the selected domain.

The editor opens irrespective of whether the user is authorized to manage ACL permissions on the Configuration Manager resource. This is because a user might not be allowed to manage ACL permissions on the Configuration Manager Resource but may, for example, be allowed to do so on the Topology resource.

Note: If the selected domain was not already connected when the user clicked on “Edit Access Control”, it is connected now. If the domain cannot be connected, the editor does not open.

ACL editor views Resource/Principals page

The Resource/Principals page shows the ACL permissions of principals to access a selected domain resource. The page is divided into two panes:

1. The Domain Resources pane on the left contains a tree-structure showing the domain resources of the domain for which the editor was opened.

2. The Resource Access Control List pane on the right shows the list of principal-permission pairs defined for the domain resource selected in the Domain Resources pane.

Removing a permission

To remove a principal's permission to access a domain resource:

1. Select the domain resource in the Domain Resources pane.
2. Select the principal in the Resource Access Control List pane.
3. Right-click on the selected row in the Resource Access Control List pane and select **Remove** from the pop-up menu. Alternatively, press the **Delete** key or select **Delete** from the workbench's Edit menu.

Updating a permission

To modify a principal's permission to access a domain resource:

1. Select the domain resource in the Domain Resources pane.
2. Select the principal in the Resource Access Control List pane.
3. Click on the Permission combo-box in the header of the Resource Access Control List pane. The combo-box displays the possible ACL permissions that can be authorized for the resource selected in the left tree.
4. Select the ACL permission.

Principal/Resources page

The Principal/Resources page shows the ACL resource permissions set for a selected principal. The page is divided into two panes:

1. The Principals pane on the left contains a tree-structure showing the principals defined to the domain for which the editor was opened.
2. The Principal Access Control List pane on the right shows the list of resource-permission pairs defined for the principal selected in the Principals pane.

Updating a permission

To modify a principal's permission to access a domain resource:

1. Select the principal in the Principals pane.
2. Select the resource in the Principal Access Control List pane.
3. Click on the Permission combo-box in the header of the Principal Access Control List pane. The combo-box displays the possible ACL permissions that can be authorized for the principal selected in the left tree.
4. Select the ACL permission.

Switching pages

To switch between the Resource/Principals and Principal/Resources pages, select the appropriate tab at the bottom of the left pane of the editor.

The Manage Access Control wizard

The Manage Access Control wizard provides a simple interface for creating, removing, and modifying ACL permissions in a selected domain.

You can access the wizard from:

- The ACL editor menu
- The pop-up menu on a domain resource in the Domain Resources pane of the Resource/Principals page

- The pop-up menu on a domain resource in the Principal Access Control List pane of the Principal/Resources page

Broker Archive editor

The Broker Archive editor is the component you can use to edit and save bar files. It is the mechanism that you use for configuring system object names contained within a bar file without recompiling a message flow. You can also use command line tools to create bar files.

The Broker Archive editor is available in the Broker Application Development perspective and has two sections; one that allows you to add or remove message flows to or from your broker archive, and one that lists the configurable properties within your bar file, and allows you to update them.

The Broker Archive editor only allows you to add message flows that are syntactically complete, that is, it will not allow you to add any flows that do not contain an Input node, or that contain errors such as mandatory properties not set correctly.

Broker Archive editor views

The Broker Archive editor includes these views:

Content view



The Content view displays the files that are currently in the broker archive file.

Configure view

The Configure view displays the configurable properties of your broker archive file deployment descriptor. To edit a property, replace the current value with a new value.

Broker Archive editor toolbar

The icons in the toolbar and their actions are shown in the table below.

Icon	Label	Action
	Add	To add message flows or message sets to this archive.
	Remove	To remove message flows or message sets from this archive.

A column in the bar editor called *Version* displays the version tag for all objects that have a defined version. These are:

- .cmf files

You can not edit the *Version* column.

You can use the `mqswireadbar` command to list the keywords defined for each deployable file within a deployable archive file.

Broker Topology editor

The Broker Topology editor is the default editor that is provided by the Broker Administration perspective for managing brokers and collectives, and for saving topology changes to the Configuration Manager in a single step.

The Broker Topology editor is launched in the editor area of the Broker Administration perspective when you double-click Broker Topology in the Domains view.

If you click **Cancel**, the connection that is in progress stops and the domain returns to its initial unconnected state.

When the editor is launched, an overview pane is displayed in the Outline view that is located in the same place as the Properties view. Use the Properties tab or the Outline tab to select which of these two views is displayed.

Use the Broker Topology editor to do any of the following:

- Create, rename, or delete brokers, or change broker properties.

In the workbench, a broker is a representation of a physical broker that exists in the configuration repository. When you create or rename a broker in the Broker Topology editor, you must use the name of the physical broker that exists in the configuration repository.

- Connect brokers to collectives, remove connections between brokers and collectives, or delete collectives.

The rules for creating a broker topology are given in the Broker Networks section of Publish/subscribe topologies.

When you save topology changes to the Configuration Manager, the topology information in the Domains view on every workbench that is connected to the Configuration Manager is refreshed automatically.

For information about changing the palette preferences in Message Brokers Toolkit, see Changing palette preferences.

By default, the Broker Topology editor has a background image of a world map. You can change the background image, and modify its scale factor, or choose not to display an image.

Event Log editor

The Event Log editor is launched in the editor area of the Broker Administration perspective when you double-click the Event Log in the Domains view.

If you click **Cancel**, the connection that is in progress stops and the domain returns to its initial unconnected state.

The event messages are stored and managed by the Configuration Manager. You can view the messages in the Event Log editor following configuration deploys.

The Event Log editor has two panes called Logs and Details. You can maximize and minimize each pane, and toggle between them.

Event Log editor views

Logs pane

The Logs pane displays a summary of each event in the Event Log editor, comprising a message identifier, the source of the message, for example the Configuration Manager or a broker, and the date and time the message was generated.

Right-clicking in the Logs pane displays the following menu items:

- **Clear Log**

Clears all log entries from the Event Log editor and deletes the log entries from the configuration repository. You cannot retrieve a message that has been cleared.

Messages are automatically cleared after 72 hours.

- **Filter Log**

Displays the Log Filter. You can filter on the type of message and the source of the message to restrict the number of log entries that are displayed in the Event Log editor. You can also mask events in the Event log editor, to make the other entries easier to view. The mask settings you use are kept for your next session.

- **Revert**

Refreshes the Event Log editor with the most recent log entries from the Configuration Manager. You only need to use this option if the workbench is not synchronized with the Configuration Manager.

- **Save Log As**

Saves the messages to a filename and path of your choice. **Save Log As** does not remove messages from the Event Log editor or the configuration repository.

Details pane

The Details pane displays the complete message, and any corrective action, for the log entry selected in the Logs pane.

Preferences

You can change the preferences for the Event Log editor. For example, you can customize the colors used for each type of event message.

Message Flow editor

The Message Flow editor is the default editor provided by the Broker Application Development perspective for defining a graphical representation of a message flow in the workbench, and for setting properties for individual message flow nodes.

The editor is launched in the editor area of the workbench window when you open a message flow (.msgflow) file in the Resource Navigator view. The editor area is where you select built-in and user-defined nodes, and the connections between them, to define a message flow.

For information about changing the palette preferences in Message Brokers Toolkit Version 6.0, see Changing palette preferences.

Message Flow editor views

The Message Flow editor has the following views:

Resource Navigator view

The navigator view shows all the resources in your workspace, that is all message flow resources.

Editor view

The editor view shows the contents of the resource that is currently open. It also shows tabs for each of the resource that you have open so that you can quickly switch between them. When you have a message flow open in the editor view, a palette bar, containing all the available nodes you can include in your message flow, is shown in the Editor view. By default, the palette bar is shown in collapsed mode when you open a message flow. To open the palette, use one of the following methods:

- Hover the mouse over the palette bar while it is in collapsed mode. The palette bar expands. When you move the mouse away from the palette bar, it collapses again.
- Click the **Show Palette** icon at the top of the palette bar. Clicking this icon expands the palette bar, and it remains expanded when the mouse is moved away from the palette bar. To collapse the palette bar again, click the hide palette icon at the top of the palette bar while it is in expanded mode.

By default, the palette bar is docked to the left-side of the Editor view. You can move it to the right-side of the Editor view by clicking on the Palette bar while it is in collapsed mode, and dragging the bar to the right-side of the Editor view.

Outline view

The Outline view enables you to navigate to a particular node in a message flow and edit its properties.

Palette view

The Palette view lists the available nodes that you can select and include in the message flow. When the Palette view is not open the palette is available in the Flow Editor as a pinnable and dockable element.

Overview view











The Overview tab provides a useful summary for large, complex message flows because it shows a small-scale version of the flow. Click the tab to show or hide the outline view.


Tasks view

The tasks view displays the warning and error messages that are generated by the editor's validation when you save the message flow file. If you double click an error, the editor indicates where it is located (for example, if you have not set a mandatory property in a node, it opens the properties dialog for that node on the right page).

Message Flow editor toolbar

The icons in the toolbar and their actions are shown in the table below.

Icon	Label	Action
	Manhattan	Displays all node connections as a series of horizontal and vertical lines
	Show grid	Displays a grid of horizontal and vertical dotted lines in the background of the editor area.
	Grid properties	Defines the horizontal and vertical spacing of the grid markers, and the gap between the borders of the editor area and the start of the grid markers.
	Align left	Lines up the left edge of the currently selected nodes. Enabled only when more than one node is selected.
	Align center	Lines up the horizontal center point (between left and right) of the currently selected nodes. Enabled only when more than one node is selected.
	Align right	Lines up the right edge of all the currently selected nodes. Enabled only when more than one node is selected.
	Align top	Lines up the top edge of the currently selected nodes. Enabled only when more than one node is selected.
	Align middle	Lines up the vertical center point (between top and bottom) of the currently selected nodes. Enabled only when more than one node is selected.
	Align bottom	Lines up the bottom edge of the currently selected nodes. Enabled only when more than one node is selected.
	Show distribute box	Displays a rectangular box around the currently selected nodes.
	Distribute horizontally	Aligns the currently selected nodes with the nearest right or left edge within the distribute box.

Icon	Label	Action
	Distribute vertically	Aligns the currently selected nodes with the nearest top or bottom edge within the distribute box.

Message Flow editor hover-feedback

In the Message flow editor you can display node and connection metadata by hovering the mouse over a node or subflow in a message flow. To view metadata information for a node, subflow or connection:

1. Open the Broker Application Development Perspective
2. Open a message flow
3. In the Editor view, hover the mouse over a node, a subflow, or a node connection in the open message flow by placing the mouse over the element.

A custom tooltip is displayed below the element.

To turn the pop-up into a focusable, scrollable window, press **F2**.

To hide the pop-up or window, choose one of the following methods:

- Press **Esc**
- Move the mouse away from the node.

Node and subflow feedback

When you hover the mouse over a node or subflow in the Editor view, the pop-up contains the following metadata information:

- The first line of text contains the the node-type and the display name of the node-instance. This line appears as **bold text**.
- The line below the node-type and display name contains the node's short description
- The final line contains the node's long description

If the node or subflow has no short or long description associated with it, only the first line of text is displayed.

If the task-list contains errors or warnings associated with the node or subflow, then that error or warning information is displayed instead of the metadata information.

Connection feedback

When you hover the mouse over a connection in the Editor view, hover-help is displayed containing the names of the output and input terminals that are connected.

Message Flow editor menus

All the actions that you can perform in the Editor view of the Message Flow editor are also available from a series of drop-down menus in WebSphere Event Broker. When the Message Flow editor is open, the following menus appear in the Workbench:

Menu	Keyboard shortcut
Flow	Alt + O
View	Alt + V
Palette	Alt + L
Run	Alt + R

The Navigate menu also contains actions specific to the Message Flow editor.

Flow menu

The flow menu contains all the actions that address editing of the flow model. Actions are statically positioned on the menu, and are enabled or disabled when nodes or connections are selected in the editor.

The following actions are available:

Menu item	Keyboard shortcut
Create Connection	C
Add subflow...	A
Rename...	N
Locate Subflow...	L
Promote Property	P
Properties...	R

View menu

The View menu contains all actions specific to the visual presentation of the flow model.

Menu item	Keyboard shortcut
Zoom In	I
Zoom Out	O
Manhattan Layout	M
Show Grid	G
Snap to Grid	G
Grid Properties...	P
Align	A
Distribute	D
Layout	L
Rotate	R

Palette menu

The Palette menu contains all actions specific to the Message Flow editor Palette.

Menu item	Keyboard shortcut
Add Node to Canvas	N
Customize	T
Settings...	S
Revert Palette to Defaults	T

Run menu

The Run menu contains the flow debug actions.

Menu item	Keyboard shortcut
Add Breakpoint	A
Remove Breakpoint	E
Add Breakpoints After Node	A
Add Breakpoints Before Node	B

Navigate menu

The Navigate menu contains the following actions specific to the Message Flow editor:

Menu item	Keyboard shortcut
Open Subflow	O
Open Source	S

Adding a node using the keyboard

Before you start

To complete this task, you must have completed the following task:

- Creating a message flow

You can use the Message Flow editor to perform tasks using the keyboard, such as adding a node to a message flow.

Complete the following steps to add a node to the canvas:

1. Open the message flow you want to add a node to by double-clicking the message flow in the Navigator view. You can also open the message flow by right-clicking it in the Navigator view and clicking **Open**. The message flow contents are displayed in the editor view.
2. Open the Palette view or the Palette bar.
3. Select a node in the Palette view or Palette bar using the up and down arrows to highlight the node you want to add to the canvas.
4. Add the Node to the canvas using one of the following methods:
 - Select **Palette** → **Add Node to Canvas** by pressing **Alt + L** and then pressing **N**.

- Press **Shift + F10** to open the context-sensitive menu for the Palette, and Press **N**.

The node that you selected in the Palette bar or Palette view is placed on the canvas in the Editor view.

You can move the node that you have placed on the canvas using the keyboard controls described in “Message Brokers Toolkit keyboard shortcuts”

Subscriptions Query editor

The Subscriptions Query editor is the default editor that is provided by the Broker Administration perspective for managing subscriptions. Use this editor to view and delete subscriptions in your publish/subscribe system. The editor allows you to set query parameters, submit subscription queries, and delete subscriptions.

You can use wildcard characters in subscription names so that you can manage a specified range of subscriptions.

The Subscriptions Query editor is launched in the editor area of the Broker Administration perspective when you double-click Subscriptions in the Domains view.

If you click **Cancel**, the connection that is in progress stops and the domain returns to its initial unconnected state.

Topics Hierarchy editor

The Topics Hierarchy editor is the default editor that is provided by the Broker Administration perspective for managing the publish/subscribe topic hierarchy. Use this editor to create, modify, and delete topics, or to define or modify your topic Access Control Lists (ACLs).

The Topics Hierarchy editor is launched in the editor area of the Broker Administration perspective when you double-click Topics in the Domains view.

If you click **Cancel**, the connection that is in progress stops and the domain returns to its initial unconnected state.

Message Brokers Toolkit keyboard shortcuts

You can navigate the user interface using the keyboard. The following table shows the general shortcut keys provided in the workbench:

Use...	To....
Left, right, up, and down arrows	Move in the direction shown on the key.
Tab	Move the focus forward through the workbench.
Shift+Tab	Move the focus backward through the workbench.
Esc	Cancel the action.
Enter	Commit the action.
Spacebar	Select the object which currently has the focus.
Shift+F10	Open a pop-up menu.

Message Flow editor keyboard shortcuts

The following table shows keyboard shortcuts that are specific to the Message Flow editor:

Use...	When the Selection tool is active	When the Connection tool is active
Left, right, up, and down arrows	Select a node on the palette or on the canvas. Use with Shift, or Ctrl+Spacebar, to select multiple nodes.	Select a node's terminal.
/ and \	Cycle forward (press /) or backward (press \) through the selected node's connections. Use with Shift, or Ctrl+Spacebar, to select multiple connections.	
. (decimal key) and Shift + . (decimal key)	Cycle forward (press the decimal key) or backward (press Shift and the decimal key) through the move handles or the resize handles of the currently selected object on the canvas. When a node is selected, use this to activate the move handles, and then use the arrow keys to move the node. Press Enter to confirm the move. When a connection is selected, use this to activate its resize handles, and then use the arrow keys to create bend points in the connection. Press Enter to confirm the move.	
Esc		In general, pressing Esc cancels the previous action. When there is no previous action to cancel, and the Connection tool is selected, pressing Esc activates the Selection tool.

Here are some examples of how to use the Message Flow editor keyboard shortcuts:

Adding nodes from the palette to the canvas:

1. Give focus to the palette, and use the up and down arrows to highlight a node.
2. Press Alt+l (Alt+lowercase 'L') to open the Palette menu, and select **Add Node to Canvas**.

Moving nodes on the canvas:

1. Select a node on the canvas.
2. Press . (decimal key) to select one of the move handles around the node.
3. Use the left, right, up, and down arrows to move the node to a new location, and press Enter to confirm the move.

Connecting nodes:

1. Give focus to the palette, and use the arrow keys to highlight the Connection tool, and then press spacebar to activate the Connection tool.

2. Give focus to the canvas. Use the arrow keys to select a source (output) terminal, and press Enter to confirm your selection.
3. Use the arrow keys to select a target (input) terminal, and press Enter to confirm your selection.
4. Optional: Press Esc to deactivate the Connection tool and activate the Selection tool.

Selecting a node connection:

1. Give focus to the canvas, and use the arrow keys to select a node that has a connection you want to select.
2. Use the / and \ keys to cycle through the connections.

Creating a bend point:

1. Select a connection, and press . (decimal key) until the midpoint of the connection is selected.
2. Use the arrow keys to move the midpoint to a new location, and press Enter to confirm the move.

Reconnecting an existing connection to a new terminal:

1. Select a connection, and press . (decimal key) until the end of the connection that you want to modify is selected.
2. Use the arrow keys to select a new source (input) terminal, and Press Enter to confirm your selection.

Glossary of terms and abbreviations

This glossary defines WebSphere Event Broker terms and abbreviations used in this online information.

A

access control list (ACL)

In computer security, a list associated with an object that identifies all the subjects that can access the object and their access rights. Subjects are principals that have explicit permissions (to publish, to subscribe to, and to request persistent delivery of, a publication message) against a topic in the topic tree. The ACLs define the implementation of topic-based security.

ACL See access control list.

AMI See Application Messaging Interface.

Application Messaging Interface (AMI)

The programming interface provided by WebSphere MQ that defines a high level interface to message queuing services. See also Message Queue Interface (MQI) and Java Message Service (JMS). Applications that use the AMI connect to the broker using WebSphere MQ Enterprise Transport.

B

bar file

See broker archive file.

bend point

A point that is introduced in a connection between two message flow nodes at which the line that represents the connection changes direction. A bend point can be used to make node alignment and processing logic clearer and more effectively displayed.

binary large object (BLOB)

A block of bytes of data (for example, the body of a message) that has no discernible meaning, but is treated as one solid entity that cannot be interpreted.

BLOB See binary large object.

broker

A set of execution processes that host one or more message flows. Also known as message broker.

broker archive file

The unit of deployment to the broker; also known as a bar file. It contains any number of compiled message flows (.cmf) and a single deployment descriptor. It can also contain any additional files you might need as long as the extension does not overlap the .cmf extensions.

broker domain

A collection of brokers that share a common configuration, together with the Configuration Manager that controls them.

broker schema

A symbol space that defines the scope of uniqueness of the names of resources (message flows) defined within it.

built-in node

A message flow node that is supplied by the product. A number of supplied nodes provide basic processing such as input and output.

C

cmf See compiled message flow.

collective

A set of brokers that are fully interconnected and form part of a multi-broker network for publish/subscribe applications.

compiled message flow (cmf)

A message flow that has been compiled to prepare it for transmission to the broker. A cmf is sent to the broker within a bar file.

component

A set of runtime processes that perform a specific set of functions. A component is a broker, a Configuration Manager, or a User Name Server.

component directory

In z/OS, the root directory of the component's runtime environment.

component name

The external name of a component. It is used, for example, in the workbench and in commands. Each component requires a name.

component PDSE

In a z/OS environment, a PDSE that contains jobs to define resources to DB2, WebSphere MQ, and the WebSphere Event Broker started task. See partitioned data set

configuration

In a broker domain, the brokers, execution groups, deployed and deployed message flows, and the defined topics and access control lists.

Configuration Manager

The component that provides an interface between the workbench and a set of runtime brokers. It provides brokers with their initial configuration, and updates them with any subsequent changes. It maintains the broker domain configuration.

Configuration Manager Proxy

An application programming interface that your applications can use to control broker domains through a remote interface to the Configuration Manager.

connection

See message flow node connection.

content-based filter

In publish/subscribe, an expression that is included as part of a subscription to determine whether a publication message is received based on its content. The expression can include wild cards.

D**datagram**

A form of asynchronous messaging in which an application sends a message, but does not want a response. Also known as send-and-forget. See also request/reply.

deploy

The process of transferring data to an execution group on a broker so that it can take effect in the broker domain. For deploying message flows and associated resources, the data is packaged in a broker archive (bar) file before being sent to the Configuration Manager, from where it is unpackaged and distributed appropriately.

Derby Derby refers to IBM Cloudscape Version 10.0, a database product that is built on the Derby database from the Apache Software Foundation. Cloudscape does not modify Derby in any way, but provides additional function including installers. Derby database support is embedded in the broker component on Windows only.

distribution list

A list of WebSphere MQ queues to which a message can be put with a single statement.

E**editor area**

The area in the workbench window where files are opened for editing.

ESM See external security manager.

execution group

A named process or set of processes within a broker in which message flows are executed. The broker is guaranteed to enforce some degree of isolation between message flows in distinct execution groups because it ensures that they execute in separate address spaces, or as unique processes.

extensible markup language (XML)

A standard metalanguage for defining markup languages that was derived from and is a subset of Standard Generalized Markup Language (SGML).

external security manager (ESM)

In a z/OS environment, a security product that performs security checking on users and resources. RACF is an example of an ESM.

G**graphical user interface (GUI)**

A type of computer interface that presents a visual metaphor of a real-world scene, often of a desktop, by combining high-resolution graphics, pointing devices, menu bars and other menus, overlapping windows, icons, and the object-action relationship.

GUI See graphical user interface.

I**IBM Runtime Environment for Java**

A subset of the IBM Developer Kit for the Java Platform that contains the core executable files and other files that constitute the standard Java platform. The IBM Runtime Environment includes the Java virtual machine (JVM), core classes, and supporting files.

IBM Software Developer Kit for Java

A software package that can be used to write, compile, debug, and run Java applets and applications.

input node

A message flow node that represents a source of messages for a message flow or subflow. See also output node.

installation directory

In a z/OS environment, a Hierarchical File System (HFS) into which all product data is installed, and from which it is referenced and retrieved during the customization phase.

J**Java Database Connectivity (JDBC)**

An industry standard for database-independent connectivity between the Java platform and a wide range of databases. The JDBC interface provides a call-level API for SQL-based database access. See also Open Database Connectivity.

Java Message Service (JMS)

An application programming interface that provides Java language functions for handling messages. See also Application Messaging Interface (AMI) and Message Queue Interface (MQI). Applications using JMS connect to the broker using either WebSphere MQ Real-time Transport or WebSphere MQ Multicast Transport.

JDBC See Java Database Connectivity.

JMS See Java Message Service.

L**local error log**

A generic term that refers to the logs to which WebSphere Event Broker writes records on the local system. Also known as system log.

M**message**

A communication sent from a person or program to another person or program. In WebSphere Event Broker, messages must have a structure and format which is agreed by the sending and receiving applications.

message broker

See broker.

Message Brokers Toolkit

The WebSphere Event Broker development environment that integrates with IBM Rational Application Developer which is based on the IBM WebSphere Eclipse Platform. Also known as the workbench.

message flow

A sequence of processing steps that execute in the broker when an input message is received. A message flow is created in the workbench by including a number of message flow nodes that each represents a set of actions that define a processing step. The connections in the flow determine which processing steps are carried out, in which order, and under which conditions. A message flow must include an input node that provides the source of the messages that are processed. Message flows are then ready to deploy to a broker for execution. See also subflow.

message flow node

A processing step in a message flow. A message flow node can be either a built-in node, a user-defined node, or a subflow node. Also called message processing node.

message flow node connection

An entity that connects the output terminal of one message flow node to the input terminal of another. A message flow node connection represents the flow of control and data between two message flow nodes.

message parser

A program that interprets the bit stream of an incoming message and creates an internal representation of the message in a tree structure, and that regenerates a bit stream for an outgoing message from the internal representation.

message processing node

See message flow node.

Message Queue Interface (MQI)

The programming interface provided by WebSphere MQ queue managers. The programming interface allows application programs to access message queuing services. See also Application Messaging Interface (AMI) and Java Message Service (JMS). Applications using the MQI connect to the broker using WebSphere MQ Enterprise Transport.

metadata

The data that describes the characteristic of stored data.

MQI See Message Queue Interface.

MQIsdp

See SCADA device protocol.

MQRFH

An architected message header that is used to provide metadata for the processing of a message. This header is supported by the MQSeries Publish/Subscribe SupportPac.

MQRFH2

An extended version of MQRFH, providing enhanced function in message processing.

multilevel wild card

A wild card that can be specified in subscriptions to match any number of levels in a topic.

N

node See message flow node.

O**ODBC**

See Open Database Connectivity.

Open Database Connectivity (ODBC)

A standard application programming interface (API) for accessing data in both relational and non-relational database management systems. Using this API, database applications can access data stored in database management systems on a variety of computers even if each database

management system uses a different data storage format and programming interface. ODBC is based on the call level interface (CLI) specification of the X/Open SQL Access Group.

output node

A message flow node that represents a point at which messages leave the message flow or subflow. See also input node.

P

parser See message parser.

partitioned data set (PDS, PDSE)

In a z/OS environment, a data set in direct-access storage that is divided into partitions, which are called members. A partitioned data set (extended) (PDSE) is an extension to a PDS that contains an indexed directory in addition to the members.

PDS, PDSE

See partitioned data set.

perspective

A group of views that show various aspects of the resources in the workbench. The user can switch perspectives, depending on the task at hand, and customize the layout of views and editors within the perspective. See also view.

point-to-point

A style of messaging application in which the sending application knows the destination of the message. Contrast with publish/subscribe.

principal

An individual user ID (for example, a login ID) or a group. A group can contain individual user IDs and other groups, to the level of nesting supported by the underlying facility.

property

A characteristic that, as one of a set of characteristics, defines the values and behaviors of objects in the workbench. For example, message flow nodes and deployed message flows have properties.

publication

A piece of information about a specified topic that is available to a broker in a publish/subscribe system.

publication node

An end point of a specific path through a message flow to which a client application subscribes, identified to the client by its subscription point.

publisher

An application that makes information about a specified topic available to a broker in a publish/subscribe system.

publish/subscribe

A style of messaging application in which the providers of information (publishers) are decoupled from the consumers of that information (subscribers) using a broker. See also topic. Contrast with point-to-point messaging.

publish/subscribe topology

The brokers, the collectives, and the connections between them, that support publish/subscribe applications in the broker domain.

Q

queue A WebSphere MQ object to which message queuing applications can put messages, and from which they can get messages.

queue manager

A system program that provides queuing services to applications. It provides an application programming interface (the MQI) to enable programs to access messages on the queues that the queue manager owns.

R

request/reply

A type of messaging application in which a request message is used to request a reply from another application. See also datagram.

resource

A file of any type that exists in the workbench. You can view and edit a resource in the Resource Navigator view in the workbench.

Resource Recovery Services (RRS)

A z/OS facility that provides two-phase sync point support across participating resource managers.

retained publication

A published message that is kept at the broker for propagation to clients that subscribe at some point in the future.

RRS See Resource Recovery Services.

S

SCADA

See Supervisory, Control, And Data Acquisition.

SCADA device protocol (MQIsdp)

A protocol that implements the WebSphere MQ Telemetry Transport to connect SCADA devices to the broker.

send-and-forget

See datagram.

single-level wild card

A wild card that can be specified in subscriptions to match a single level in a topic.

stream

A method of topic partitioning that is used by applications that connect to MQSeries Publish/Subscribe SupportPac brokers.

subflow

A sequence of processing steps, implemented by message flow nodes, that is designed to be embedded in a message flow or in another subflow. A subflow must include at least one Input or Output node. A subflow can be executed by a broker only as part of the message flow in which it is embedded, and therefore cannot be deployed.

subflow node

A message flow node that represents a subflow.

subscriber

An application that requests information about a specified topic from a publish/subscribe broker.

subscription

A record that contains the information that a subscriber passes to its local broker to describe the publications that it wants to receive.

subscription filter

A predicate that specifies a subset of messages that are to be delivered to a particular subscriber.

subscription point

The name that a subscriber uses to request publications from a particular set of publication nodes. It is the property of a publication node that differentiates that publication node from other publication nodes in the same message flow.

Supervisory, Control, And Data Acquisition (SCADA)

A term used to describe any form of remote telemetry system that is used to gather data from remote sensor devices (for example, flow rate meters on an oil pipeline) and for the near real time control of remote equipment (for example, pipeline valves). These devices communicate with the broker using the SCADA device protocol (MQIsdp).

system log

See local error log.

T**terminal**

The point at which one node in a message flow is connected to another node. You can connect terminals to control the route that a message takes, dependent on the outcome of the operation performed by the node on that message.

topic A character string that describes the nature of the data that is published in a publish/subscribe system.

topic based subscription

A subscription specified by a subscribing application that includes a topic for filtering of publications.

topic security

The application of ACLs to one or more topics to control subscriber access to published messages.

topology

See publish/subscribe topology.

U**Unicode Transformation Format, 8-bit encoding form (UTF-8)**

A transformation format that is designed for ease of use with existing ASCII-based systems. UTF-8 is an encoding of Unicode character strings that optimizes the encoding of ASCII characters in support of text-based communication.

uniform resource identifier (URI)

An encoded address that represents any resource, such as an HTML document, image, video clip, or program, on the Web. As opposed to a Uniform resource locator or a Uniform resource name, which are concrete entities, a URI is an abstract superclass.

uniform resource locator (URL)

A sequence of characters that represent information resources on a

computer or in a network such as the Internet. This sequence of characters includes (a) the abbreviated name of the protocol used to access the information resource and (b) the information used by the protocol to locate the information resource. A Web server typically maps the request portion of the URL to a path and file name. Also known as universal resource locator.

uniform resource name (URN)

A name that uniquely identifies a Web service to a client.

URI See Uniform resource identifier.

URL See Uniform resource locator.

URN See Uniform resource name.

user-defined node

An extension to the broker that provides a new message flow node in addition to those supplied with the product. A user-defined node cannot be developed in WebSphere Event Broker, but can be imported and deployed.

User Name Server

A component that interfaces with operating system facilities to determine valid users and groups.

UTF-8 See Unicode Transformation Format.

V

view A display area in the workbench in which you can navigate and edit your information and resources. For example, the Resource Navigator view enables you to view and edit your project files. See also perspective.

W

WebSphere MQ Enterprise Transport

A transport protocol supported by WebSphere Event Broker that enables WebSphere MQ application clients to connect to brokers.

WebSphere MQ Everyplace

A generally available WebSphere MQ product that provides proven WebSphere MQ reliability and security for mobile and wireless devices. WebSphere MQ Everyplace applications connect to the broker using WebSphere MQ Mobile Transport.

WebSphere MQ Mobile Transport

A transport protocol supported by WebSphere Event Broker that enables WebSphere MQ Everyplace application clients to connect to brokers.

WebSphere MQ Multicast Transport

A transport protocol supported by WebSphere Event Broker that enables dedicated JMS application clients to connect to brokers. This protocol is optimized for high volume, one-to-many publish/subscribe topologies.

WebSphere MQ Real-time Transport

A transport protocol supported by WebSphere Event Broker that enables dedicated JMS application clients to connect to brokers.

WebSphere MQ Telemetry Transport

A transport protocol supported by WebSphere Event Broker that enables

SCADA devices to connect to brokers. This protocol is a lightweight publish/subscribe protocol that flows over TCP/IP that uses a subset of UTF-8.

wild card

A character that can be specified in subscriptions to match a range of topics. See also multilevel wild card and single-level wild card.

workbench

See Message Brokers Toolkit

World Wide Web Consortium (W3C)

An international industry consortium set up to develop common protocols to promote evolution and interoperability of the World Wide Web.

W3C See World Wide Web Consortium.

X

XML See extensible markup language.

Part 3. Appendixes

Appendix. Notices

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