e*Way Intelligent Adapter for MQSeries User's Guide

Release 5.0.5 for Schema Run-time Environment (SRE)

Java Version

Contents

Chapter 1

Introduction

This chapter introduces you to the Java™-enabled e*Way Intelligent Adapter for MQSeries™. It includes an overview of this manual and a list of system requirements for installation.

1.1 Overview

MQSeries (WebSphere MQ) from IBM is a client-server message broker supporting an open API (application programming interface), available on a variety of operating systems, including AIX, Solaris, HP-UX, and Windows. MQSeries is “middleware” that provides commercial messaging and queuing services. Messaging enables programs to communicate with each other via messages rather than direct connection. Messages are placed in queues for temporary storage, freeing up programs to continue to work independently. This process also allows communication across a network of dissimilar components, processors, operating systems, and protocols.

The Java-enabled MQSeries e*Way allows the e*Gate system to exchange data with IBM’s MQSeries. The MQSeries e*Way applies business logic within Collaboration Rules to perform any of e*Gate’s range of data identification, manipulation and transformation operations. Messages are tailored to meet the communication requirements of specific applications or protocols. Intelligent Queues (IQs) provide non-volatile storage for data within the e*Gate system allowing applications to run independently of one another at different speeds and times. Applications can freely send messages to a queue or access messages from a queue at any time.

The MQSeries e*Way transparently integrates existing systems and databases to IBM MQSeries through e*Gate. This document explains how to install and configure the Java-enabled MQSeries e*Way.

1.1.1. MQSeries e*Way JMS and ETD

The MQSeries e*Way (Java) is equipped for two different configuration modes, JMS-based and ETD-based. Each provides advantages for different applications.

- The JMS-based MQSeries e*Way schema uses the Java Messaging System (JMS) e*Way connection and offers easy setup and high performance when connecting to a single queue.

- The ETD-based MQSeries e*Way schema relies on a fixed Event Type Definition (ETD) designed to expose various essential portions of the MQSeries Java API, providing a wide range of available methods and properties, as well as access to all message attributes. The ETD-based schema allows the e*Way to connect and switch between multiple queue managers and their queues.

General implementation directions are provided for both in this document. Sections of this user guide that relate specifically to JMS-based or ETD-based MQSeries e*Way configuration and setup are marked with (JMS) or (ETD) in the chapter title.

1.1.2. Intended Reader

The reader of this guide is presumed to be a developer or system administrator with responsibility for maintaining the e*Gate system, to have a working knowledge of Windows or UNIX operations and administration, and to be familiar with MQSeries, Java, and Windows-style GUI operations.

1.2 Supported Operating System

For information about the operating systems supported by the e*Gate Integrator, see the **readme.txt** file provided on the installation CD. The notes below apply to the MQSeries e*Way.

Note: *The MQSeries e*Way is not supported on Solaris 10 (AMD and Intel).*

*For **AIX** operating systems, the environmental variable LDR_CNTRL for JVM may need to be adjusted in order to accommodate MQSeries shared memory. Java uses 8 segments by default (this is the maximum value allowed; each segment is 256 MB). For example, the following setting changes the number of segments to 3:*

```
setenv LDR_CNTRL MAXDATA=0x30000000
```

*This variable only applies to the MQSeries e*Way, Java version. Please consult with your UNIX and MQSeries administrators to see what value is appropriate for your environment.*

*For **HP-UX 11** operating systems, HP-UX Java binding support is only available for systems running the POSIX draft 10 threaded version of MQSeries. The HP-UX Developers Kit for Java 1.6.0_19 is also required.*

1.3 System Requirements

To use the MQSeries e*Way, you need the following:

- An e*Gate Participating Host.
- A TCP/IP network connection.
- Additional disk space for e*Way executable, configuration, library, and script files. The disk space is required on both the Participating and the Registry Host. Additional disk space is required to process and queue the data that this e*Way processes; the amount necessary varies based on the type and size of the data being processed, and any external applications performing the processing.

Note: *Open and review the* ***Readme.txt*** *for the MQSeries e*Way regarding any additional requirements prior to installation. The Readme.txt is located on the Installation CD_ROM at setup\addons\ewmq.*

1.3.1. External System Requirements

The Java-enabled MQSeries e*Way requires the following installed on the participating host:

- IBM MQSeries V5.2 or V5.3 (WebSphere MQ V5.3) with the following exceptions:

Install the following after installing IBM MQSeries V5.2:

- IBM MQSeries classes for Java 5.2.0.
- Classes for Java Message Service 5.2.0.0

MQSeries V5.3 (WebSphere MQ, V5.3) includes the MQSeries classes for Java and JMS. The use of SupportPac MA88 with MQSeries V5.3 product is not supported. MQSeries V5.2 requires the installation of SupportPac MA88 for all supported platforms.

The **MA88 SupportPac** download and installation information can be found at: **http://www-4.ibm.com/software/ts/mqseries/txppacs/ma88.html.**

The MA88 patch includes updates for several jar files and DLL's/shared libraries. Most notably, **com.ibm.mq.jar**, **mqjbnd02.dll** and **mqxai01.dll**. It is important that the patch overwrites the existing versions of these files if they are present on your machine. Alternatively, if they do not overwrite the existing versions, it is important that the new versions of these files exist on your classpath and path before the old versions. Once you have downloaded the SupportPac, make sure that all .jar files installed as part of the SupportPac are included in the classpath.

Requirements for the Topic Publish/Subscribe Connection Type

IBM **SupportPac MAOC** is required by both MQSeries V5.2 and V5.3 to use the Topic Publish/Subscribe Connection Type (see **Connection Type** on page 22). The SupportPac MAOC installation information and download can be found at: **http://www-3.ibm.com/software/ts/mqseries/txppacs/ma0c.html**

Chapter 2

Installation

This chapter explains how to install the Java-enabled MQSeries e*Way.

2.1 Windows Installation

2.1.1. Pre-installation

1 Quit all Windows programs before running the setup program, including any anti-virus applications.

2 You must have Administrator privileges to install this e*Way.

2.1.2. Installation Procedure

To install the MQSeries e*Way on a Windows system

1 Log in as Administrator to the work station on which the e*Way is to be installed.

2 Insert the e*Way installation CD-ROM into the CD-ROM drive.

If Autorun is enabled, the setup program automatically starts. Otherwise:

- On the task bar, click the **Start** button, then click **Run**.
- In the **Open** field, type **D:\setup\setup.exe** where **D:** is your CD-ROM drive.

3 The InstallShield setup application launches. Follow the installation instructions until you come to the **Please choose the product to install** dialog box.

4 Select **e*Gate Integrator**, then click **Next**.

5 Follow the on-screen instructions until you come to the second **Please choose the product to install** dialog box.

6 Clear the check boxes for all selections except **Add-ons**, and then click **Next**.

7 Follow the on-screen instructions until you come to the **Select Components** dialog box.

8 Select (but do not check) **e*Ways**, and then click **Change**. The **Select Sub-components** dialog box appears.

9 Select **MQSeries e*Way** as shown in figure 1. Click **Continue** to return to the **Select Components** dialog box, then click **Next**.

10 Follow the rest of the on-screen instructions to install the MQSeries e*Way. For details of e*Gate installation, refer to the *e*Gate Integrator Suite Installation Guide*. Be sure to install the e*Way files in the suggested client installation directory. The installation utility detects and suggests the appropriate installation directory. Unless you are directed to do so by Oracle support personnel, do not change the suggested installation directory setting.

Note: *Once you have installed and configured this e*Way, you must incorporate it into a schema by defining and associating the appropriate Collaborations, Collaboration Rules, IQs, and Event Types before this e*Way can perform its intended functions. For more information on any of these procedures, see the online Help system.*

2.2 UNIX Installation

2.2.1. Pre-installation

Root privileges are not required when installing the MQSeries e*Way. Log in under the name of the user who will oversee the e*Way files. Be sure that this user has sufficient privilege to create files in the e*Gate directory tree.

2.2.2. Installation Procedure

To install the MQSeries e*Way on a UNIX system

1 Log onto the workstation containing the CD-ROM drive, and insert the CD-ROM into the drive.

2 If necessary, mount the CD-ROM drive.

3 At the shell prompt, type:

```
cd /cdrom/setup
```

4 Start the installation script by typing:

```
setup.sh
```

5 A menu of options appears. Select the **Install e*Ways** option. Then, follow any additional on-screen directions to install the **MQSeries e*Way**.

Note: *Be sure to install all files in the suggested* ***client*** *installation directory. The installation utility detects and suggests the appropriate installation directory. Unless you are directed to do so by Oracle support personnel, do not change the suggested installation directory setting.*

6 After installation is complete, exit the installation utility and launch the Schema Designer.

Note: *Once you have installed and configured this e*Way, you must incorporate it into a schema by defining and associating the appropriate Collaborations, Collaboration Rules, Intelligent Queues (IQs), and Event Types before this e*Way can perform its intended functions. For more information about any of these procedures, please see the online Help system.*

*For more information about configuring e*Ways or how to use the e*Way editors, see the* ***e*Gate Integrator User's Guide****.*

2.3 Files/Directories Created by the Installation

The MQSeries e*Way installation process installs the files shown in Table 1 within the e*Gate **client** directory tree. Files are installed within the **egate\client\** tree on the Participating Host and committed to the **default** schema on the Registry Host.

Table 1 Files Created by the Installation

Install Directory	Files
configs\mqseries	mqseries.def
etd\mqseriesetd\	MQSeriesETD.jar MQSeriesETD.xsc
configs\mqseriesetd	MQSeriesETD.def
etd\	mqseriesetd.ctl
ThirdParty\sun\	jta.jar

Chapter 3

Multi-Mode e*Way Configuration

A Multi-Mode e*Way is a multi-threaded component used to route and transform data within e*Gate. Unlike traditional e*Ways, Multi-Mode e*Ways can use multiple simultaneous e*Way Connections to communicate with several external systems, as well as IQs or JMS IQ Managers. This chapter describes how to configure the Multi-Mode e*Way for the Java-enabled MQSeries e*Way.

3.1 Multi-Mode e*Way

Multi-Mode e*Way properties are set using the Schema Designer.

To create and configure a new Multi-Mode e*Way

1. Select the Navigator's Components tab.
2. From the Navigator pane, select the appropriate host, then select the host's **Control Broker**.
3. On the Palette, click the **Create a New e*Way** button. The New e*Way Component dialog box appears.
4. Enter the name of the new e*Way, then click **OK**.
5. From the Editor pane, Select the new component, then right-click and select **Properties**. The e*Way Properties dialog box appears.
6. The Executable File field defaults to **stceway.exe**. (stceway.exe is located in the "bin\" directory).
7. Under the Configuration File field, click **New**. When the Settings page opens, set the configuration parameters for this configuration file.
8. Configure the parameters appropriate to your specific system and save the configuration file. Close the **.cfg** file and click **OK** to close the e*Way Properties Window.

Multi-Mode e*Way Configuration Parameters

The Multi-Mode e*Way configuration parameters are arranged in the following sections:

- **JVM Settings** on page 16
- **General Settings** on page 19

3.1.1. JVM Settings

The JVM Settings section controls basic Java Virtual Machine (JVM) settings.

JNI DLL Absolute Pathname

Description

Specifies the absolute pathname to where the JNI .dll (installed by the *Java 2 SDK*) is located on the Participating Host. (for example, c:\egate\client\JRE\1.3\bin\client\jvm.dll or C:\jdk\jre\bin\server). This parameter is **mandatory**.

Required Values

A valid pathname.

Additional Information

The JNI .dll name varies on different operating systems.

OS	Java 2 JNI DLL Name
Windows	jvm.dll
Solaris	libjvm.so
HP-UX	libjvm.sl
AIX	libjvm.a

Environment variables may be referenced in this parameter by enclosing the variable name in a pair of % signs. For example:

```
%MY_JNIDLL%
```

This can be used for the purpose of clarity when working with multiple Participating Hosts.

To ensure that the JNI DLL loads successfully, the Dynamic Load Library search path environment variable must be set appropriately to include all the directories under the Java 2 SDK (or JDK) installation directory that contain shared libraries (UNIX) or DLLs.

CLASSPATH Prepend

Description

Specifies the paths to be prepended to the CLASSPATH environment variable for the JVM.

Required Values

An absolute path or an environmental variable. This parameter is optional.

Additional Information

If left unset, no paths are prepended to the CLASSPATH environment variable. Existing environment variables may be referenced in this parameter by enclosing the variable name in a pair of % signs. For example:

```
%MY_PRECLASSPATH%
```

CLASSPATH Override

Description

Specifies the complete CLASSPATH variable to be used by the JVM. This parameter is optional. If left unset, an appropriate CLASSPATH environment variable (consisting of required e*Gate components concatenated with the system version of CLASSPATH) is set.

Note: *All necessary JAR and ZIP files needed by both e*Gate and the JVM must be included. It is recommended that the* ***CLASSPATH Prepend*** *parameter be used.*

Required Values

An absolute path or an environmental variable. This parameter is optional.

Additional Information

Existing environment variables may be referenced in this parameter by enclosing the variable name in a pair of % signs. For example:

```
%MY_CLASSPATH%
```

CLASSPATH Append From Environment Variable

Description

Specifies whether the path is appended for the CLASSPATH environmental variable to jar and zip files needed by the JVM.

Required Values

YES or **NO**. The configured default is YES.

Initial Heap Size

Description

Specifies the value for the initial heap size in bytes. If set to 0 (zero), the preferred value for the initial heap size of the JVM is used.

Required Values

An integer between 0 and 2147483647. This parameter is optional.

Maximum Heap Size

Description

Specifies the value of the maximum heap size in bytes. If set to 0 (zero), the preferred value for the maximum heap size of the JVM is used.

Required Values

An integer between 0 and 2147483647. This parameter is optional.

Maximum Stack Size for Native Threads

Description

Specifies the value of the maximum stack size in bytes for native threads. If set to 0 (zero), the default value is used.

Required Values

An integer between 0 and 2147483647. This parameter is optional.

Maximum Stack Size for JVM Threads

Description

Specifies the value of the maximum stack size in bytes for JVM threads. If set to 0 (zero), the preferred value for the maximum heap size of the JVM is used.

Required Values

An integer between 0 and 2147483647. This parameter is optional.

Disable JIT

Description

Specifies whether the Just-In-Time (JIT) compiler is disabled.

Required Values

YES or **NO**.

Note: *This parameter is not supported for Java Release 1.*

Remote Debugging port number

Description

Specifies the port number by which the e*Gate Java Debugger can connect with the JVM to allow remote debugging.

Required Values

An unused port number in the range 2000 through 65535. If not specified, the e*Gate Java Debugger is not able to connect to this e*Way.

Suspend option for debugging

Description

Allows you to specify that the e*Way should do no processing until an e*Gate Java Debugger has successfully connected to it.

Required Values

YES or **No**. YES suspends e*Way processing until a Debugger connects to it. NO enables e*Way processing immediately upon startup.

Auxiliary JVM Configuration File

Description

Specifies an auxiliary JVM configuration file for additional parameters.

Required Values

The location of the auxiliary JVM configuration file.

3.1.2. General Settings

For more information on the General Settings configuration parameters see the *e*Gate Integrator User's Guide*. The General Settings section contains the following parameters:

- **Rollback Wait Interval** on page 20
- **Standard IQ FIFO** on page 20

Rollback Wait Interval

Description

Specifies the time interval to wait before rolling back the transaction.

Required Values

A number within the range of 0 to 99999999, representing the time interval in milliseconds.

Standard IQ FIFO

Description

Specifies whether the highest priority messages from all STC_Standard IQs will be delivered in first-in-first-out (FIFO) order.

Required Values

Select **YES** or **NO**. YES indicates that the e*Way will retrieve messages from all STC_Standard IQs in first-in-first-out (FIFO) order. NO indicates that this feature is disabled. NO is the configured default.

Chapter 4

e*Way Connection Configuration (JMS)

This chapter defines the configuration options for the Java-enabled MQSeries e*Way Connection using the MQSeries JMS connection type.

4.1 Configuring e*Way Connections

e*Way Connections are set using the Schema Designer.

To create and configure e*Way Connections

1. In the Schema Designer's **Component** editor, select the **e*Way Connections** directory.
2. On the palette, click the **Create a New e*Way Connection** button. The New e*Way Connection Component dialog box appears.
3. Enter a name for the **e*Way Connection**. For the purposes of the sample implementation enter **MQ_conn1** as the name.
4. Double-click the new **e*Way Connection**. The e*Way Connection Properties dialog box appears.
5. From the **e*Way Connection Type** drop-down box, select **MQSeries JMS**.
6. Enter the **Event Type "get" interval** in the provided dialog box. 10000 milliseconds is the configured default. The "get" interval is the intervening period at which, when subscribed to, the e*Way connection is polled.
7. Click the **New** button under the **e*Way Connection Configuration File** field to create a new configuration file for this e*Way Connection. (To use an existing file, click **Find**, and select a file.) The **Configuration Editor** appears.
8. Enter the correct parameters for your e*Way Connection as defined on the following pages. When all parameters have been entered, from the **File** menu, click **Save** and **Promote to Run Time** to move the file to the run time environment.

The MQSeries e*Way Connection configuration parameters are organized in the following sections.

- **General Settings** on page 22
- **MQSeries** on page 24

4.1.1. General Settings

This section contains a set of top level parameters:

- **Connection Type** on page 22
- **Transaction Type** on page 22
- **Delivery Mode** on page 23
- **Maximum Number of Bytes to read** on page 23
- **Default Outgoing Message Type** on page 23
- **Factory Class Name** on page 23

Connection Type

Description

String-set. Specifies the JMS Messaging Model. Two connections types are supported.

- **Queue**: Point-to-point behavior, where each message is delivered to only one recipient in the pool.
- **Topic**: Publish/subscribe behavior, where each message is delivered to all current subscribers to the Topic.

Required Values

Select one of two options, Queue or Topic. Queue is the configured default.

Note: *The **Topic** Publish/Subscribe connection type option requires the installation of the IBM SupportPac MAOC (see* **Requirements for the Topic Publish/Subscribe Connection Type** *on page 11).*

Transaction Type

Description

String-set. Specifies the Transaction Type. There are three transaction types.

- **Internal**: Provides protection for transactions sent internally between IBM MQSeries and e*Way queues. In the event of a system error, messages in transit are rolled back, restoring the message. When the send() method is called the transaction takes place at the end of the Collaboration.
- **Non-Transactional**: Provides the highest level of performance with the minimum level of message protection. No rollback is available during the send and receive period, which may mean the possible loss of data in the case of a system error. When the send() method is called the transaction is immediate.
- **XA-compliant**: (two-phase transactional behavior) Highest level of transaction protection, providing rollback for internal and XA compliant transactions. The transaction is also extended to other XA supported data exchange applications, such as Oracle, DB2, and MQSeries. When the send() method is called the transaction takes place at the end of the Collaboration.

Required Values

A valid transaction type. One of three provided: Internal, Non-Transactional, or XA-compliant. Internal is the configured default.

Note: *Consult the XA Transaction Processing section of the e*Gate Integrator User's Guide for information on XA use and restrictions.*

Delivery Mode

Description

String-set. Specifies the message delivery mode. There are two delivery mode options.

- **Non-Persistent**. Provides the highest performance. The message is cashed in memory during the transaction.
- **Persistent**. Provides the highest level of protection. Ensuring that the message is saved to a reliable persistent store by the Message Server before the **publish** method returns.

This setting must match the setting in the IBM MQSeries queue manager.

Required Values

Non-Persistent or **Persistent**. Persistent is the configured default.

Maximum Number of Bytes to read

Description

Integer-set. Specifies the maximum number of bytes to read at a time from the received Bytes Message.

Required Values

An integer in the range of 1 to 104,857,600. The configured default is 8192.

Default Outgoing Message Type

Description

String-set. Specifies the message type to create during publish/send. The outgoing message type is published within the message header. This is only relevant to sending, providing information for the receiver.

Required Values

Bytes or **Text**. The configured default is Bytes.

Factory Class Name

Description

String-set. Specifies the factory class used to connect to the JMS IQ Manager. This is advanced configuration to be utilized in future development, and should not be changed from the default.

Required Values

The valid factory class name. The configured default is com.stc.common.collabService.MQJMSFactory. Retain the default setting.

4.1.2. MQSeries

This section contains a set of top level parameters:

- **Queue Manager Name** on page 24
- **Transport Type** on page 24
- **Host Name** on page 24
- **Port Number** on page 25
- **Channel** on page 25

Queue Manager Name

Description

String-set. Specifies the name of the queue manager to which the eWay connects.

Required Values

Enter the name of the IBM MQSeries queue manager.

Transport Type

Description

String-set. Specifies the Transport Type:

- Client
- Binding

JMS can communicate with MQSeries using either the client or bindings transports. Use of Java binding requires that the JMS application and the MQSeries queue manager be located on the same machine. Client permits the queue manager to be on a different machine from the application. Binding has a performance advantage but requires a local queue manager.

Required Values

Select Client or Binding. The configured default is Client.

Host Name

Description

String-set. Specifies the name of the host on which the queue manager resides. This option is only applies to the **Client** transport type. Leave the value blank when configuring the eWay for **Binding** mode.

Required Values

Enter the name of the queue manager host.

Port Number

Description

Integer-set. Specifies the number of the port to connect to. This option is only relevant with a transport type 'Client' and is ignored for transport type 'Bindings'. If this option is left empty the default port is used.

Required Values

Enter the port number, in the range of 1000 and 65536. The configured default is 1414.

Channel

Description

String-set. Specifies the name of the channel being used. This option is only relevant with transport type 'Client' and is ignored for transport type 'Bindings'. If no channel is specified the default channel is used.

Required Values

The valid name of the channel.

Note: *On UNIX systems the e*Way may be able to connect to an MQ Series Queue Manager with or without a password. In a UNIX environment, username and password usage is not guaranteed.*

Chapter 5

Implementation (JMS)

This chapter contains basic information for implementing the Java-enabled MQSeries e*Way using MQSeries JMS mode, in a production environment. Examples are given for creating and configuring the necessary components to implement the sample MQSeries schema included on the CD-ROM. For more information on creating and configuring e*Way components see the ***e*Gate Integrator User's Guide***.

5.1 MQSeries e*Way Implementation Overview

The Java enabled MQSeries e*Way is an *application specific* e*Way that enables e*Gate to connect with IBM's MQSeries applications. When the MQSeries e*Way is installed along with the e*Gate Integrator, schema's can be created and configured using the e*Gate Schema Designer. A schema is an organization scheme that contains the parameters of all the components that control, route, and transform data as it moves through e*Gate in a predefined system configuration. To create an e*Gate schema for MQSeries you must do the following:

- **Install IBM's MQSeries Server and MQSeries Queue Manager:** The MQSeries Server and MQSeries Queue Manager are installed on the localhost.
- **Install the MQSeries e*Way:** The MQSeries e*Way is installed as an Add-on to the e*Gate Integrator. For directions on installing the MQSeries e*Way from CD-ROM on your specific operating system. (See **Installation** on page 12.)
- **Create e*Ways:** e*Ways connect with external systems to poll or send data. They also transform and route data. Multi-Mode e*Ways are used to run Java Collaborations that utilize e*Way Connections to send and receive Events to and from multiple external systems.
- **Configure e*Way Connections:** An e*Way Connection is the encoding of access information for a particular external connection. The e*Way Connection configuration file contains the parameters necessary for communicating with IBM's MQSeries and specifying the MQSeries Queue Manager.
- **Create Event Type:** Each packet of data within e*Gate is referred to as an Event. Event Types are data labels that allow e*Gate to process and route specific Events differently. The Event Type specifies the MQSeries Queue (the Event Type must have the same name as the IBM's MQSeries Queue). Data is not routed in e*Gate without an Event Type.

- **Create Intelligent Queues:** Intelligent Queues (IQs) provide non-volatile storage for data traveling through the e*Gate system. The IQ Manager oversees the activities of the individual storage locations. The exact behavior of each IQ is determined by the IQ Service configuration. The MQSeries e*Way uses the MQSeries IQ Service.
- **Create Collaboration Rules:** Collaboration Rules determine how input Event Types are modified for the format of specific output Event Types. A Collaboration Rule defines what type of data is received, how it is transformed and what type of data is published.
- **Create Collaborations:** A Collaboration is a message bus in e*Gate that specifies the name and source of the incoming Event Types, the Collaboration Rules that are applied to the Event, and the name, destination and expiration date of the outgoing Event Types. A Collaboration designates the Subscriber, which “listens” for Events of a known type from a given source, and the Publisher, which distributes the transformed Event to a specified recipient.
- **Set the CLASSPATH Variable:** The Final Step in creating and configuring the MQSeries e*Way is to set the IBM MQSeries Java JAR files in the environment CLASSPATH variable.

5.2 e*Way Concerns

The following is required for e*Gate applications communicating with Mainframe MQ.

Control Broker Startup Script for Mainframe

For mainframe applications, use the following code with your Control Broker startup script. Your environment may differ, so consult with your system developer for more information:

```
export
STEPLIB=$STEPLIB:CSQ530.SCSQAUTH:CSQ530.SCSQANLE:CQS530.SCSQLOAD
export LIBPATH=/usr/lpp/mqm/java/lib:/usr/lpp/java/J1.3/bin:/usr/lpp/
java/J1.3/bin/classic:/u/mlucero/local/egate453/client/bin:/usr/lpp/
mqm/java/lib:$LIBPATH
export LD_LIBRARY_PATH=$LIBPATH
export PATH=/usr/lpp/java/J1.3/bin:/usr/lpp/java/J1.3/bin/classic:/
usr/lpp/mqm/java/lib:$PATH
echo DATE is `date`
export MQ=/usr/lpp/mqm/java/lib
export CLASSPATH=.:$MQ:$MQ/connector.jar:$MQ/com.ibm.mqjms.jar:$MQ/
jta.jar:$MQ/com.ibm.mq.jar:$MQ/jms.jar:$CLASSPATH
```

Commit and Promote Required JAR files to Runtime

The following JAR files must be committed to the Sandbox, and promoted to your Runtime environment before you create your schema. These files are located in the `/usr/lpp/mqm/java/lib` directory of the MQSeries Server to which you are communicating.

- com.ibm.mq.jar
- com.ibm.mqjms.jar
- connector.jar
- fmcontext.jar
- jms.jar
- jta.jar
- postcard.jar
- providerutil.jar

To commit and promote these files do the following:

1. From the e*Gate Schema Designer's File menu, select **Commit to Sandbox**. The **Select Local File to Commit** dialog box appears.
2. Locate and select the **com.ibm.mq.jar** file and click **Open**. The **Select Directory for Committed File** dialog box appears.
3. Select the following location as the directory for the committed file:

   ```
   /eGate/Server/registry/repository/<SchemaName>/sandbox/<UserName>/
   ThirdParty/mqseries/classes/
   ```

where <*SchemaName*> is the name of the schema and <*UserName*> is the name of the user.

4 Repeat steps 1-3 for each of the above JAR files.

5 From the e*Gate Schema Designer's File menu, select **Promote to Run Time**. The **Select File to Promote to Run Time** dialog box appears.

6 Locate and select committed Jar files at:

```
/ThirdParty/mqseries/classes/
```

Select the **com.ibm.mq.jar** file and click **Promote**. The com.ibm.mq.jar file is promoted.

7 Repeat steps 5 and 6 for each of the committed JAR file.

Add Required JAR Files to the Schema's Java Collaboration Classpath

In addition to promoting the required JAR files to runtime, add the promoted Jar files to your Schema's Java Collaboration Classpath. To add files to a Collaboration Classpath, do the following:

1 Open your schema's Java Collaboration in the Java Collaboration Editor.

2 From the editor's toolbar, select **Tools** > **Options**. The Java Classpaths dialog box appears.

3 Click **Add File**, and from the Open dialog box locate and select the **com.ibm.mq.jar** file (ThirdParty/mqseries/classes/). Repeat this for each of the JAR files you promoted in the previous section. Click **OK**.

4 Compile and Promote the Collaboration, then exit the Collaboration Editor.

Add OutGoing Encoding Business Rule to the Java Collaborations

For the sample schema, add the following Business Rule to the Java Collaborations under the **userInitialize** method:

```
jCollabController.setOutgoingEncoding("outbound","cp037")
```

To add the Business Rule, open the Collaboration in the Java Collaboration Editor and do the following:

1 From the Business Rules pane of the Collaboration Rules Editor, select the **userInitialize** method.

2 From the Business Rules toolbar, click the **rule** button to add a Business Rule under the **userInitialize** method.

3 From the Rule Properties pane, enter the Business Rule, as provided above, into the Rule field.

4 Save, compile, and promote the Collaborations.

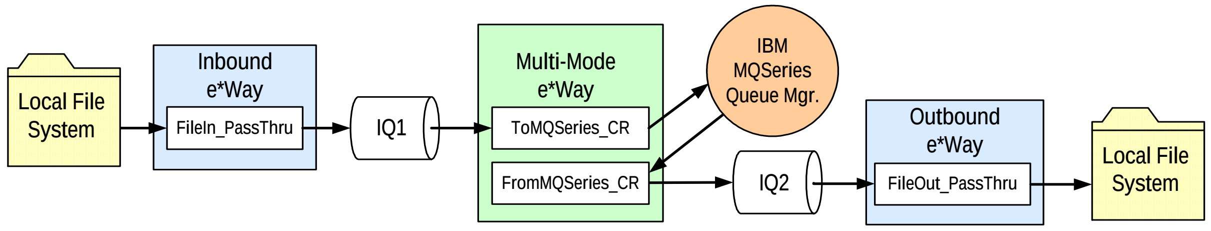
5.3 MQSeries Sample Schema Components

A sample schema for MQSeries is available in the samples folder on the CD-ROM. In addition, the following pages explain how the components for the MQSeries sample schema were created. The Host and Control Broker are automatically created and configured during the e*Gate installation. The default name for each is the name of the host on which you are installing the e*Gate Schema Designer GUI. To complete the sample implementation of the Java-enabled MQSeries e*Way requires the following components:

- IBM MQSeries Server and the MQSeries Queue Manager.
- Java Classes for MQSeries.
- Install the MQSeries e*Way Add-on. Make sure that the Control Broker is activated
- In the e*Gate Schema Designer, define and configure the following as necessary:
  - Inbound e*Way using **stcewfile.exe** as the executable file.
  - Outbound e*Way using **stcewfile.exe** as the executable file.
  - The Multi-Mode e*Way component using **stceway.exe** as the executable file.
  - Event Type Definitions used to package the data to be exchanged with the external system.
  - Intelligent Queues (IQs) to provide non-volatile storage Events
  - Collaboration Rules to process Events.
  - The e*Way Connection to be created as described in **Chapter 4**.
  - Collaborations, to be associated with each e*Way component, to apply the required Collaboration Rules.
  - The destination to which data is published prior to being sent to the external system.

The following sections describe how to define and associate each of the above components. This sample implementation demonstrates how the Java-enabled MQSeries e*Way intercepts, stores, manipulates, and manages data in association with IBM MQSeries.

Figure 1 The MQSeries (JMS) Sample Implementation



5.4 Step One: Create the IBM MQSeries Queue

Step one in creating the MQSeries e*Way is to install and configure **IBM MQSeries** (see **External System Requirements** on page 11) and the **IBM MQSeries Queue Manager** on the localhost. Also install Java Classes for MQSeries. It is assumed that the reader is experienced in the use of IBM MQSeries Queue Manager. For more information on IBM MQSeries Queue Manager, see MQSeries Queue Related Commands, Chapter 9, in the e*Gate Integrator Intelligent Queue Services Reference Guide. For the sample implementation do the following:

1. Open IBM MQSeries Explorer.
2. Create a new queue manager named **Java_On**.
3. From the Java_On Queue Manager create a new queue named **Ev_1**.

Important: *The MQSeries Queue name and the Event Type name must be the same.*

IBM MQSeries Server and Queue Manager Limits and Settings

- When using MQSeries Queue Manager on UNIX, the user must be a member of the mqm group to create and start MQ Series Queue Manager.
- It is essential that the MQSeries Administrator regularly monitor the number of messages in the queue. Message expiration settings should be set to allow for extended storage.
- MQseries is limited in the number of messages that can be sent before a commit is executed, and the number of physical messages that can exist on the queue at any one time. This may result in exception errors when the upper limit for these numbers is exceeded. Memory and performance a the specific server may also effect the results.

Publishing Messages with MQSeriesJMS to a non-JMS conversant e*Way

The JMS standard specifies a header which includes encoding and reply information. This header is prepended to any message published by the IBM JMS classes. Non-JMS subscribers (that is, those using a non JMS API to MQSeries, such as the IBM C API) is not able to separate the JMS header from the body. To remedy this, the user is advised to suppress the publication of the JMS header, if publishing to non-JMS subscribers, using the following mechanism.

To send messages to a non-JMS MQ (Monk MQSeries) e*Way, call send( ) manually from within the Collaboration rules containing the following URI:

"queue://<QMGR_NAME>/<QNAME>?targetClient=1"

For example:

"queue://EMEO2T/QR.EME01?targetClient=1"

If this is not done then a 200+ byte header is pre-appended to the payload and placed in the MQ queue and could easily throw off the non JMS conversant MQ reader.

For more information see the IBM Corp. manual MQSeries Using Java, Chapter 10, at: **http://www-4.ibm.com/software/ts/mqseries/library/manualsa/manuals/crosslatest.html**

5.5 Step Two: Install the MQSeries e*Way and Create a New Schema

Step two is to install the MQSeries e*Way. For directions on installing the MQSeries e*Way on your specific operating system, see **Chapter 2, Installation, on page 12**.

Once the MQSeries e*Way is installed, a new schema must be created. While it is possible to use the default schema for the sample implementation, it is recommended that you create a separate schema for testing purposes. After you install the MQSeries e*Way, do the following:

1. Start the e*Gate Schema Designer GUI.
2. When the Schema Designer prompts you to log in, select the host that you specified during installation and enter your password.
3. You are then prompted to select a schema. Click **New**.
4. Enter a name for the new schema. In this case, for the sample implementation, enter **MQSSample**, or any name as desired.

   The e*Gate Schema Designer opens to your new schema.
5. This is a good point at which to promote the required JAR files to Runtime (see **Commit and Promote Required JAR files to Runtime** on page 28).

   You are now ready to begin creating the necessary components for this schema.

5.5.1. Step Three: Create and Configure the e*Ways

Step three is to create the e*Ways. These are used as components for transporting and transforming data. They always interface with at least one external system, and Multi-Mode e*Ways can use e*Way Connections to interface with many external systems. For the sample implementation three e*Ways are required.

- Inbound_eWay
- Outbound_eWay
- Multi-Mode_eWay

The following sections provide instructions for creating each e*Way.

Inbound e*Way

1. Select the Navigator's **Components** tab.
2. Open the host on which you want to create the e*Ways.
3. Select the **Control Broker** that manages the new e*Ways.

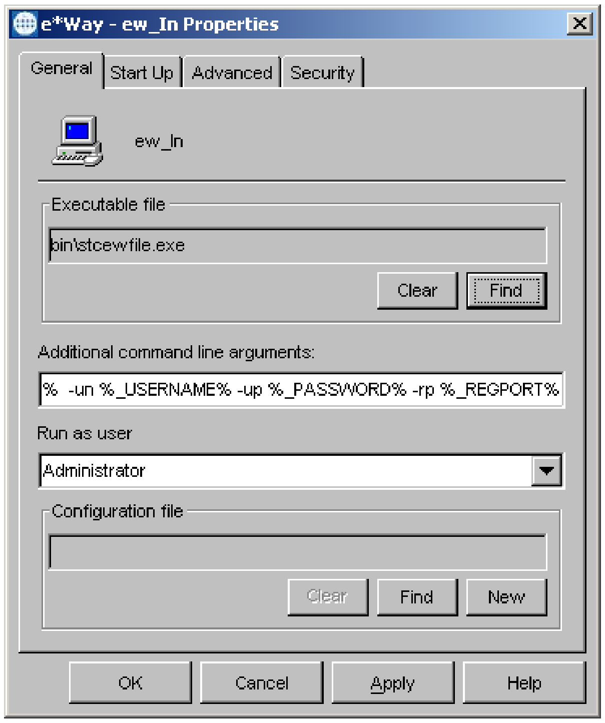
4 On the palette, click the **Create a New e*Way** button.

5 Enter the name of the new e*Way. In this case, **ew_In.** Click **OK**.

6 Right-click **ew_In**, and select **Properties** to edit its properties.

7 When the e*Way Properties window opens, click on the **Find** button beneath the **Executable File** field and select **stcewfile.exe** as the executable file (see Figure 2).

Figure 2 e*Way Sample Implementation



Executable file: bin\stcewfile.exe

Additional command line arguments: % -un %_USERNAME% -up %_PASSWORD% -rp %_REGPORT%

Run as user: Administrator

Configuration file:

8 Under the **Configuration File** field, click on the **New** button. The **Edit Settings** dialog box opens. Set the configuration file as displayed in Table 2.

Table 2 Configuration Parameters for the Inbound e*Way

Parameter	Value
General Settings (unless otherwise stated, leave settings as default)	
AllowIncoming	Yes
AllowOutgoing	No
Outbound Settings	Default
Poller Inbound Settings	
PollDirectory	C:\Indata (input file folder)
InputFileMask	*.fin (input file extension)
PollMilliseconds	Default
Remove EOL	Default
MultipleRecordsPerFile	Yes

Table 2 Configuration Parameters for the Inbound e*Way

Parameter	Value
MaxBytesPerLine	Default
BytesPerLineIsFixed	Default
File Records Per eGate Event	Default
Performance Testing	Default

Note: *For information on configuring the specific parameters of the stcewfile e*Way see the* ***Standard e*Way Intelligent Adapter User's Guide****.*

9 After selecting the desired parameters, save the configuration file (**ew_In.cfg**) and promote to run time. Close the **.cfg** file.

10 Use the Startup, Advanced, and Security tabs to modify the default settings for each e*Way you configure.

A Use the **Startup** tab to specify whether the e*Way starts automatically, or restarts after abnormal termination or due to scheduling and so forth.

B Use the **Advanced** tab to specify or view the activity and error logging levels as well as the Event threshold information.

C Use **Security** to view or set privilege assignments.

11 Select **OK** to close the **e*Way Properties** window.

Outbound e*Way

1 Select the Navigator's **Components** tab.

2 Open the host on which you want to create the e*Ways.

3 Select the **Control Broker** that manages the new e*Ways.

4 On the palette, click the **Create a New e*Way** button.

5 Enter the name of the new e*Way, (in this case, **ew_Out**), then click **OK**.

6 Select **ew_Out**, then right-click and select **Properties** to edit its properties.

7 When the e*Way Properties window opens, click **Find** beneath the **Executable File** field, and select **stcewfile.exe** as the executable file.

8 Under the **Configuration File** field, click **New**. Set the configuration file as displayed in Table 3.

Table 3 Configuration Parameters for the Outbound e*Way

Parameter	Value
General Settings (unless otherwise stated, leave settings as default)	
AllowIncoming	No
AllowOutgoing	Yes
Outbound Settings	

Table 3 Configuration Parameters for the Outbound e*Way

Parameter	Value
OutputDirectory	C:\DATA
OutputFileName	output%d.dat
MultipleRecordsPerFile	No
MaxRecordsPerFile	10000
AddEOL	Yes
Poller Inbound Settings	Default
Performance Testing	Default

9 Save the **.cfg** file (**ew_Out.cfg**), and promote to run time.

10 Click **OK** to close **e*Way Properties** window.

Multi-Mode e*Way

1 Select the **Navigator's Components** tab.

2 Open the host on which you want to create the e*Way.

3 Select the **Control Broker** that manages the new e*Way.

4 On the palette, click the **Create a New e*Way** button.

5 Enter the name of the new e*Way (in this case, **MQ_stceway**), then click **OK**.

6 Right-click the new e*Way and select **Properties** to edit its properties.

7 When the e*Way Properties window opens, click **Find** beneath the **Executable File** field, and select **stceway.exe** as the executable file.

8 To edit the JVM Settings, click **New** under Configuration file. Set the configuration file as displayed in Table 4

See **"Multi-Mode e*Way Configuration" on page 15** for details on the parameters associated with the Multi-Mode e*Way.

Table 4 Configuration Parameters for the MultiMode e*Way

Parameter	Value
JVM Settings (unless otherwise stated, leave settings as default)	
JNI DLL absolute pathname	C:\eGate\client\bin\Jre\jvm.dll (or absolute path to proper JNI DLL)
CLASSPATH Append From Environmental Variable	Yes

9 Save the **.cfg** file (**MQ_stceway**).

10 From the **File** menu, click **Promote to Run Time**.

11 In the **e*Way Properties** window, use the **Startup**, **Advanced**, and **Security** tabs to modify the default settings for each.

D Use the **Startup** tab to specify whether the e*Way starts automatically, restarts after abnormal termination or due to scheduling, etc.

E Use the **Advanced** tab to specify or view the activity and error logging levels, as well as the Event threshold information.

F Use **Security** to view or set privilege assignments.

12 Click **OK** to close **e*Way Properties** window.

5.6 Step Four: Create the e*Way Connection and Specify the Queue Manager

Step four is to create and configure the e*Way Connection. The e*Way Connection configuration file contains the connection settings necessary for communicating with IBM MQSeries and specifying the MQSeries Queue Manager.

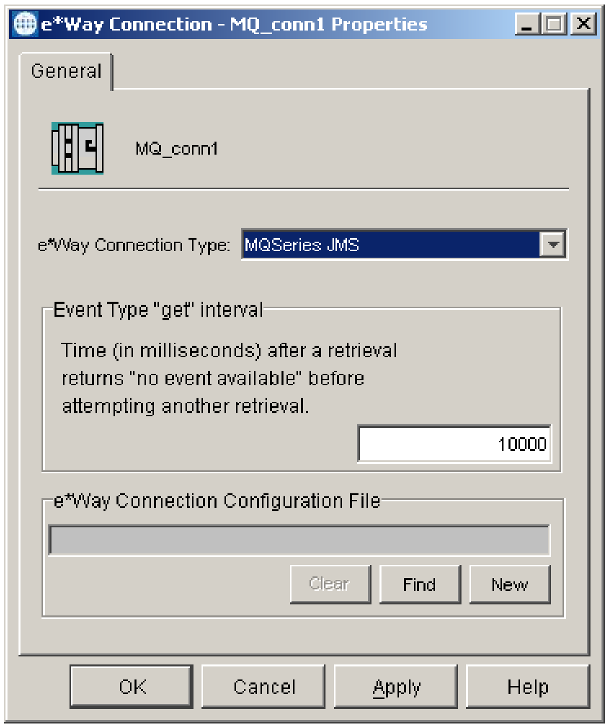
To create and configure a New e*Way Connection

1. Select the **e*Way Connection** folder on the **Components** tab of the e*Gate Navigator.
2. On the palette, click the **Create a New e*Way Connection** button.
3. Enter the name of the **e*Way Connection**, then click **OK.** (For the purpose of this sample, the e*Way Connection is defined as "**MQ_conn1**".)

4 Double-click the new **e*Way Connection** to edit its properties. The e*Way Connection Properties dialog box opens.

5 Select **MQSeries JMS** from the drop-down list box of the e*Way Connection Type field.

Figure 3 e*Way Connection Properties


e*Way Connection - MQ_conn1 Properties
General
MQ_conn1

e*Way Connection Type: MQSeries JMS

Event Type "get" interval

Time (in milliseconds) after a retrieval returns "no event available" before attempting another retrieval. 10000

e*Way Connection Configuration File
Clear
Find
New
OK
Cancel
Apply
Help

6 Enter the **Event Type "get" interval** in the dialog box provided. 10000 milliseconds is the configured default. The "get" interval is the intervening period at which, when subscribed to, the e*Way connection is polled.

7 Under e*Way Connection Configuration File, click **New**.

8 The e*Way Connection editor opens, select the necessary parameters. For more information on the MQSeries e*Way Connection Type parameters, see **"Configuring e*Way Connections" on page 21**.

9 Save the **MQ_conn1.cfg** file.

10 From the **File** menu, select **Promote to Run Time** to promote the file to the e*Way's run time environment.

5.7 Step Five: Create Event Types and Specify the MQSeries Queue

Step five is to create the Event Type. This also specifies the MQSeries queue (the Event Type must have the same name as the IBM MQSeries queue). An Event Type is a class of Events with a common data structure. The e*Gate system packages data within Events and categorizes them into Event Types. What these Events have in common defines the Event Type and comprises the ETD. The following procedures show how to create an **ETD** (Event Type Definition) using the Custom ETD Wizard.

1 Highlight the **Event Types** folder on the **Components** tab of the e*Gate Navigator.

2 On the palette, click the **Create a New Event Type** button.

3 Enter the name of the **Event**, then click **OK.** For the purpose of this sample the first Event Type is defined as **Ev_1**.

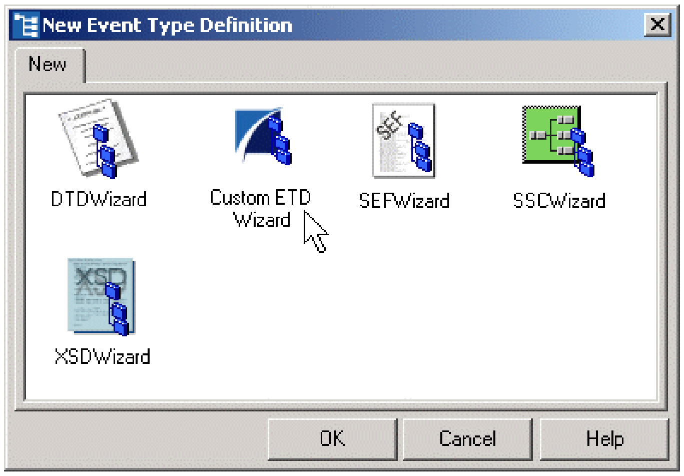
***Important:** The Event Type must have the same name as the IBM MQSeries Queue.*

4 Double-click the new **Event Type** to edit its properties. The **Event Type Properties** dialog box opens.

5 Click **New**. The ETD Editor appears.

6 Click **New** from the **File** menu. The New Event Type Definition window opens (see Figure 4).

Figure 4 Event Type Definition Wizards



7 Select the appropriate wizard. (For this Event Type, select the **Custom ETD** wizard.)

8 Enter the Root Node Name (for this case, "**Record**").

9 Enter a package name where the ETD Editor can place all the generated Java classes associated with the created ETD (for this sample, **com.stc.eway.mqseries**) and click **OK**. The ETD Editor appears (see Figure 5).

10 Right click **Record** in the Event Type Definition pane, and select **Add Field, as Child Node**. Repeat this to create Field1, Field2, and Field3.

11 Triple-click on **Field1**, and rename it **Order**.

12 Select the **Order** node. The properties for the Order node are displayed in the Properties pane. Change the **endDelim** property to "**|**" (pipe, without the quotes).

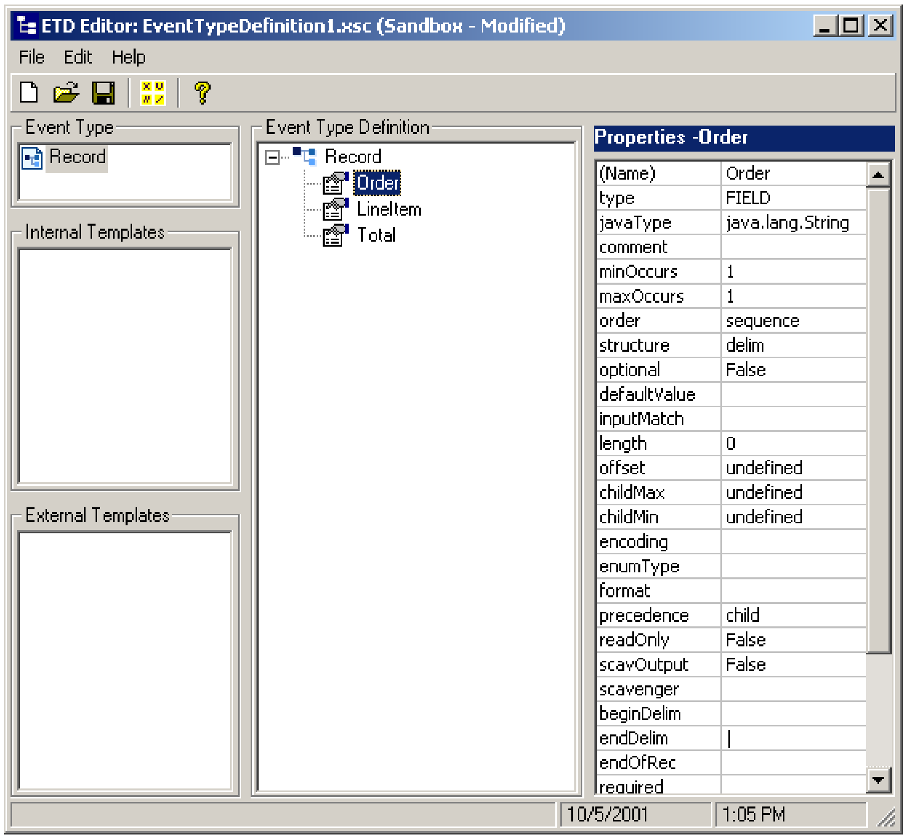
13 Triple-click on **Field2**, and rename it **LineItem**.

14 In the **LineItem** node Properties, **endDelim** field, enter “**|**” (pipe).

15 Triple-click on **Field3**, and rename it **Total**.

16 In the **Total** node Properties, **endDelim** field, enter “**|**” (pipe).

Figure 5 Event Type Definition Editor



(Name)	Order
type	FIELD
javaType	java.lang.String
comment	
minOccurs	1
maxOccurs	1
order	sequence
structure	delim
optional	False
defaultValue	
inputMatch	
length	0
offset	undefined
childMax	undefined
childMin	undefined
encoding	
enumType	
format	
precedence	child
readOnly	False
scavOutput	False
scavenger	
beginDelim	
endDelim	|
endOfRec	
required	

17 From the **File** menu, click **Compile and Save**. Save the .xsc file as **Record.xsc**.

18 From the **File** menu, click **Promote to Run Time** to promote the file to the run time environment.

19 Close the ETD Editor.

5.8 Step Six: Create Intelligent Queues

Step six in configuring the MQSeries e*Way is to create the IQs. IQs manage the exchange of information between components within the e*Gate system, providing non-volatile storage for data as it passes from one component to another. IQs use IQ Services to transport data. IQ Services provide the mechanism for moving Events between IQs, handling the low-level implementation of data exchange (such as system calls to initialize or reorganize a database).

To create and modify an Intelligent Queue for the MQSeries e*Way

1. Select the Navigator's **Components** tab.
2. Open the host on which you want to create the IQ.
3. Open a **Control Broker**.
4. Select an **IQ Manager**.
5. On the palette, click the **Create a New IQ** button.
6. Enter the name of the new IQ (in this case, **iq_1**), then click **OK** (see Figure 6).
7. Double-click the new **IQ** to edit its properties (see Figure 7).
8. On the **General** tab, specify the **Service** and the **Event Type Get Interval**.

   The **STC_Standard** IQ Service provides sufficient functionality for most applications. If specialized services are required, custom IQ Service DLLs may be created.

   The default **Event Type Get Interval** of 100 milliseconds is satisfactory for the purposes of this initial implementation.
9. On the **Advanced** tab, make sure that **Simple publish/subscribe** is checked under the **IQ behavior** section.
10. Click OK to close the **IQ Properties** window.
11. For this schema, repeat steps 1 through 10 to create an additional IQ (**IQ_2**).

5.9 Step Seven: Create Collaboration Rules

Step seven in creating the MQSeries e*Way is to create the Collaboration Rules that extract and process selected information from the source Event Type defined earlier, according to its associated Collaboration Service. The **Default Editor** can be set to either **Monk** or **Java**. From the **Schema Designer Task Bar,** select **Options** and click **Default Editor**. The default should be set to **Java**.

The sample schema requires the creation of two Collaboration Rules files

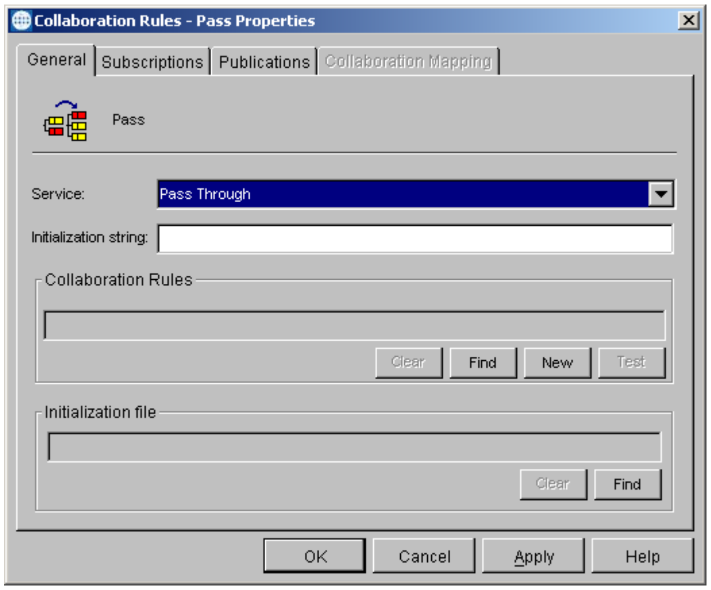
- **"To Create Pass Through Collaboration Rules" on page 40**
- **"To Create Java Collaboration Rules" on page 41**

To Create Pass Through Collaboration Rules

1. Select the Navigator's **Components** tab in the e*Gate Schema Designer.
2. In the **Navigator**, select the **Collaboration Rules** folder.
3. On the palette, click the **Create New Collaboration Rules** button.
4. Enter the name of the new Collaboration Rule Component, then click **OK** (for this case, use **Pass**).
5. Double-click the new Collaboration Rules Component. The **Collaboration Rules Properties** window opens.

6 The **Service** field defaults to **Pass Through**.

Figure 6 Collaboration Properties


Collaboration Rules - Pass Properties

Pass

Service: Pass Through

Initialization string:

7 Go to the **Subscriptions** tab. Select **GenericInEvent** under **Available Input Event Types**, and click the right arrow to move it to **Selected Input Event Types**. The box under **Triggering Event** should be checked.

8 Go to the **Publications** tab. Select **GenericInEvent** under **Available Output Event Types**, and click the right arrow to move it to **Selected Output Event Types**. The Radio button under **Default** is enabled.

9 Click **OK** to close the **Collaboration Rules, Pass Properties** window.

To Create Java Collaboration Rules

1 Select the Navigator's **Components** tab in the e*Gate Schema Designer.

2 In the **Navigator**, select the **Collaboration Rules** folder.

3 On the palette, click the **Create New Collaboration Rules** button.

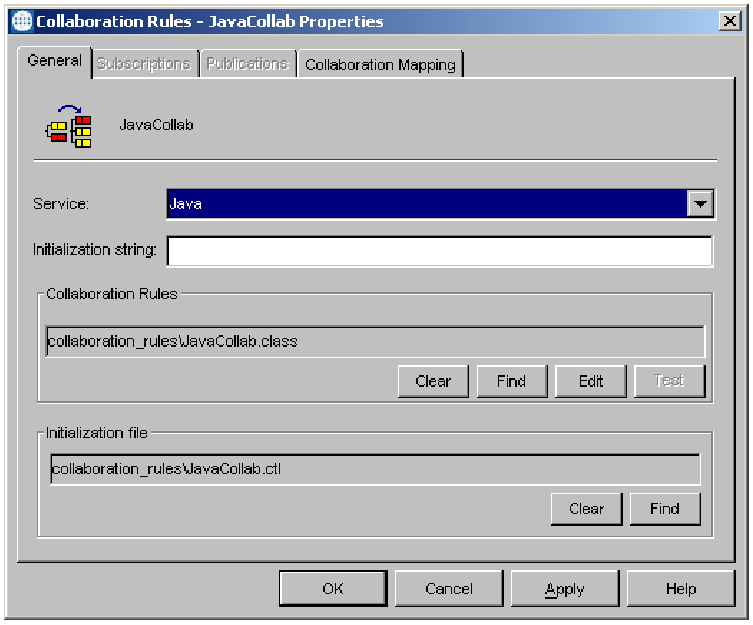
4 Enter the name of the new Collaboration Rule, then click **OK** (for this case, use **JavaCollab**).

5 Double-click the new Collaboration Rules Component to edit its properties. The **Collaboration Rules Properties** window opens (see Figure 7).

6 From the **Service** field drop-down box, select **Java**. The **Collaboration Mapping** tab is now enabled, and the **Subscriptions** and **Publications** tabs are disabled.

7 In the **Initialization string** field, enter any required initialization string for the Collaboration.

Figure 7 Collaboration Rules - JavaCollab Properties



JavaCollab

Service: Java

Initialization string:

Collaboration Rules

collaboration_rules\JavaCollab.class

Initialization file

collaboration_rules\JavaCollab.ctl

8 Select the **Collaboration Mapping** tab (see Figure 8).

9 Using the **Add Instance** button, create instances to coincide with the Event Types.

For this sample, do the following:

10 In the **Instance Name** column, enter **In** for the instance name.

11 Click **Find**, navigate to **etd\Record.xsc**, double-click to select. **Record.xsc** is added to the **ETD** column of the instance row.

12 In the **Mode** column, select **In** from the drop–down menu available.

13 In the **Trigger** column, click the box to enable trigger mechanism.

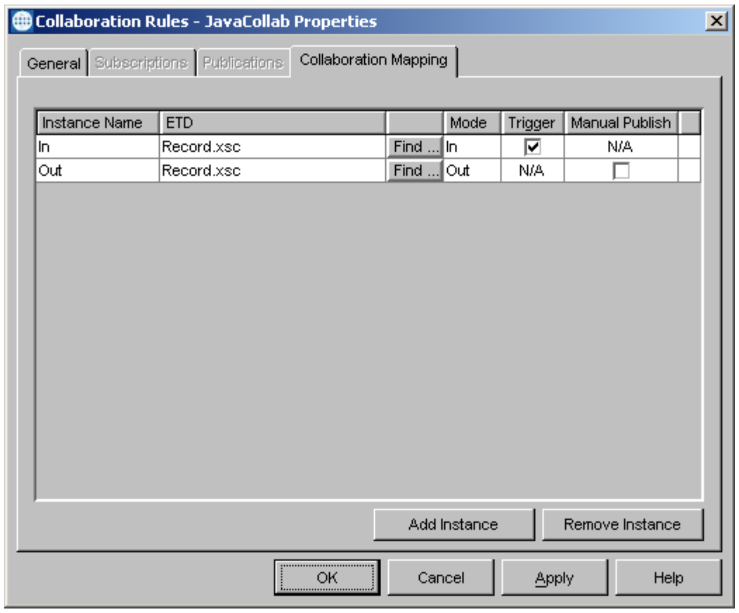
14 Repeat steps 9–13 using the following values:

- Instance Name — **Out**
- ETD — **Record.xsc**
- Mode — **Out**

Note: *At least one of the ETD instances used by the Collaboration must be checked as the trigger.*

*For specific information on creating and configuring Collaboration Rules, see the e*Gate Integrator User's Guide.*

Figure 8 Collaboration Rules - Collaboration Mapping Properties



Instance Name	ETD		Mode	Trigger	Manual Publish
In	Record.xsc	Find ...	In	✓	N/A
Out	Record.xsc	Find ...	Out	N/A	☐

The "Read from MQSeries" is carried out by the following processes.

A The **Event Type "Get" interval** polls for available messages at the prescribed interval.

B The **receive()** method for an ETD associated with an MQSeries e*Way Connection is invoked, initiating a "read" on MQSeries.

15 Select the **General** tab, and under the Collaboration Rule box, click **New**. The **Collaboration Rules Editor** opens.

16 Expand to full size for optimum viewing, expanding the Source and Destination Events as well.

5.9.1. Using the Collaboration Rules Editor

Part two of step seven is to define the business logic using the Collaboration Rules Editor (see Figure 9). The Java Collaboration Rules Editor is the GUI used to create and modify Java Collaboration Rules. A Java Collaboration Rule is created by designating one or more source Events and one or more destination Events and then setting up rules governing the relationship between fields in the Event instances.

Note: *Add the MQSeries required JAR files to your Java Collaborations before running the Sample Schema. For directions see* **Add Required JAR Files to the Schema's Java Collaboration Classpath** *on page 29.*

Add the jCollabController.setOutgoingEncoding Business Rule to both the

To Create the Collaboration Rules Class

1 Highlight **retBoolean** in the **Business Rules** pane.

All of the user–defined business rules are added as part of this method.

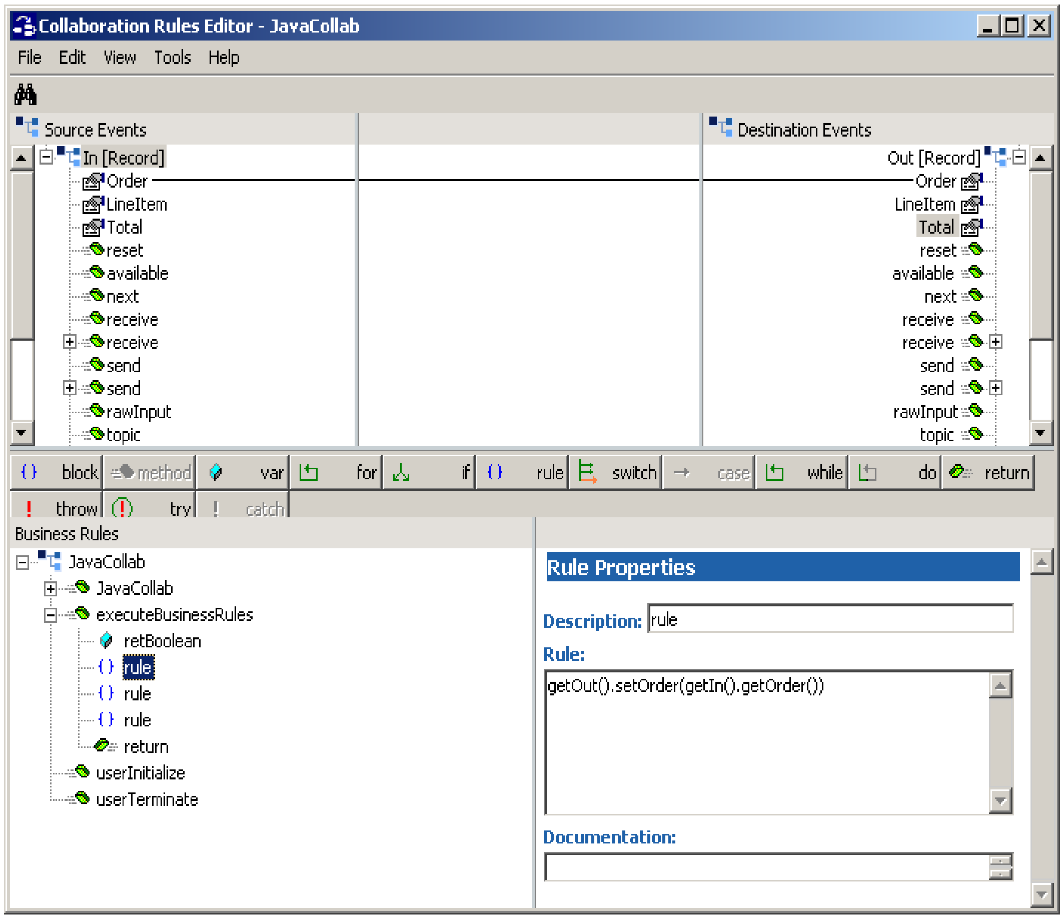
2 Select **Order** from the **Source Events** pane. Drag–and–drop onto **Order** in the **Destination Events** pane. A connecting line appears between the properties objects.

3 In the **Business Rules** pane, a rule expression appears, with the properties of that rule displayed in the **Rule Properties** pane.

4 Select **LineItem** from the **Source Events** pane. Drag–and–drop onto **LineItem** in the **Destination Events** pane.

5 Select **Total** from the **Source Events** pane. Drag–and–drop onto **Total** in the **Destination Events** pane.

Figure 9 Collaboration Rules — Collaboration Rules Editor



Description: rule

Rule:

```
getOut().setOrder(getIn().getOrder())
```

6 When all the business logic has been defined, the code can be compiled by selecting **Compile** from the **File** menu. The **Save** menu opens, provide a name for the **.xpr** file. For the sample, use **MQSSample.xpr**.

If the code compiles successfully, the message **Compile Completed** appears. If the outcome is unsuccessful, a Java Compiler error message appears.

Once the compilation is complete, save the file and exit.

7 Under the **Collaboration Rules**, the path for the created .class file appears (for the sample, the path **"Collaboration_rules\JavaCollab.class "**appears).

8 Under **Initialization** file, the path for the created **.ctl** file appears (for the sample, the path **"Collaboration_rules\JavaCollab.ctl"** appears.)

9 Click **OK** to exit the **Properties** Box.

Note: *For detailed information on creating Collaboration Rules using the Java Collaboration Rules Editor see the e*Gate Integrator User's Guide.*

5.10 Step Eight: Create Collaborations

Step eight in creating the MQSeries e*Way is to create the Collaborations. Collaborations are the components that receive and process Event Types, then forward the output to other e*Gate components or an external component. Collaborations consist of the Subscriber, which "listens" for Events of a known type (sometimes from a given source), and the Publisher, which distributes the transformed Event to a specified recipient.

To Create the Inbound e*Way Collaboration

1 In the e*Gate Schema Designer, select the Navigator's **Components** tab.

2 Open the host on which you want to create the Collaboration.

3 Select a **Control Broker.**

4 Select the **ew_In** e*Way to assign the Collaboration.

5 On the palette, click the **Create a New Collaboration** button.

6 Enter the name of the new Collaboration, then click **OK.** (For the sample, "**In_cr**".)

7 Double-click the new **Collaboration** to edit its properties (see Figure 10).

8 From the **Collaboration Rules** list, select the **Collaboration Rules** file that you created previously (for this sample, "**Pass**").

9 In the **Subscriptions** area, click **Add** to define the input Event Types to which this Collaboration subscribes.

   A From the **Event Type** list, select the **Event Type** that you previously defined **GenericInEvent**.

   B Select the **Source** from the **Source** list. In this case, it should be **<External>**.

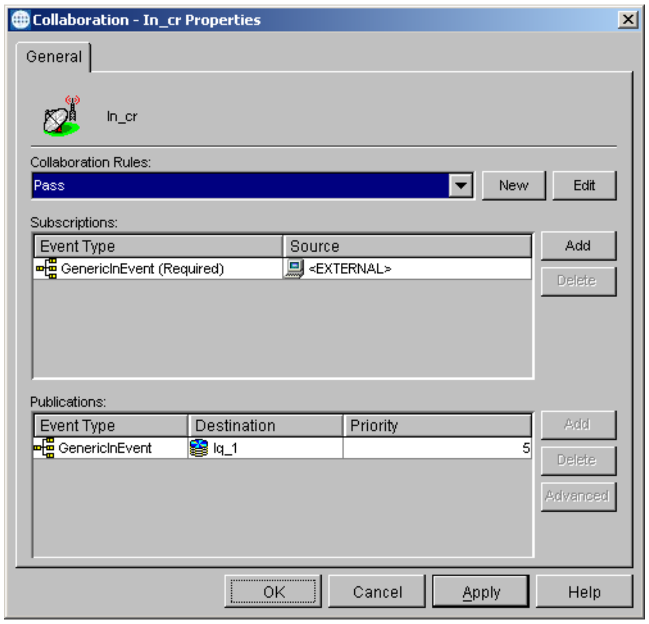
10 In the **Publications** area, click **Add** to define the output **Event Types** that this Collaboration publishes.

   A From the **Event Types** list, select the **Event Type** that you previously defined **GenericInEvent**.

   B Select the publication **Destination** from the **Destination** list. In this case, it should be **iq_1**.

   C The Priority column defaults to **5**.

Figure 10 Collaboration - Inbound e*Way Properties



Subscriptions:

Event Type	Source
GenericInEvent (Required)	<EXTERNAL>

Publications:

Event Type	Destination	Priority
GenericInEvent	lq_1	5

11 Click **OK** to close the **Collaboration Properties** window.

To Create the MQ_stceway Multi Mode e*Way Collaborations

Two Collaborations are created for the Multi-Mode e*Way **MQ_cr_out**, and **MQ_cr_in**.

1 To create the **MQ_cr_out Collaboration**, Select the **MQ_stceway** e*Way to assign another Collaboration.

2 On the palette, click the **Create a New Collaboration** button.

3 Enter the name of the new Collaboration, then click **OK.** (For the sample, “**MQ_cr_out**”.)

4 Double -click the new Collaboration to edit its properties (see Figure 11).

5 From the **Collaboration Rules** list, select the **Collaboration Rules** file that you created previously. For the sample use **JavaCollab.**

6 In the **Subscriptions** field, click **Add** to define the input Event Types to which this Collaboration subscribes.

A From the **Instance Name** list, select the **Instance Name** that you previously defined **In**.

B From the **Event Type** list, select the **Event Type** previously defined **GenericInEvent**.

C Select the **Source** from the **Source** list. In this case, it should be **In_cr**.

7 In the **Publications** area, click **Add** to define the output **Event Types** that this Collaboration publishes.

A From the **Instance Name** list, select the **Instance Name** previously defined **Out**.

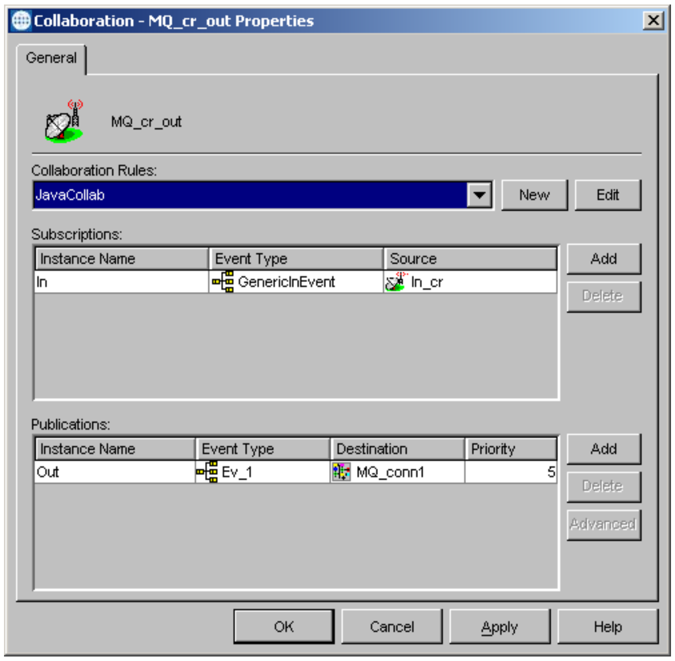
B From the **Event Types** list, select the **Event Type** that you previously defined **Ev_1**.

Important: *The Event Type name must be the same as the IBM MQSeries queue name.*

C Select the **Destination** from the **Destination** list. In this case, it should be **MQ_conn1**.

D The Priority column defaults to **5**.

Figure 11 Collaboration Properties - MQ_cr_out



Collaboration - MQ_cr_out Properties

General

MQ_cr_out

Collaboration Rules: JavaCollab

Subscriptions:

Instance Name	Event Type	Source
In	GenericInEvent	In_cr

Publications:

Instance Name	Event Type	Destination	Priority
Out	Ev_1	MQ_conn1	5

8 Click **OK** to close the Properties window.

9 To create the **MQ_cr_in Collaboration**, select the Navigator's **Components** tabIn the e*Gate Schema Designer.

10 Open the host on which you want to create the Collaboration.

11 Select a **Control Broker.**

12 Select the **MQ_stceway** e*Way to assign the Collaboration.

13 On the palette, click the **Create a New Collaboration** button.

14 Enter the name of the new Collaboration, then click **OK.** (For the sample, "**MQ_cr_in**".)

15 Double-click the new **Collaboration** to edit its properties (seeFigure 12).

16 From the **Collaboration Rules** list, select the **Collaboration Rules** file that you created previously. For the sample use **JavaCollab.**

17 In the **Subscriptions** field, click **Add** to define the input Event Types to which this Collaboration subscribes.

A From the **Instance Name** list, select the Instance Name that you previously defined (**In**).

B From the **Event Type** list, select the **Event Type** previously defined **Ev_1**.

C Select the **Source** from the **Source** list. In this case, it should be **MQ_conn1**.

18 In the **Publications** area, click **Add** to define the output **Event Types** that this Collaboration publishes.

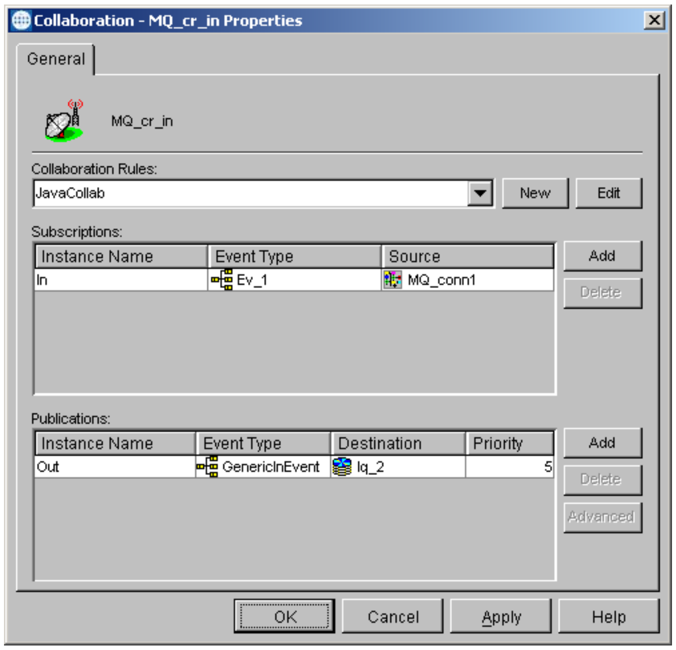
A From the **Instance Name** list, select the **Instance Name** previously defined **Out**.

B From the **Event Types** list, select the **Event Type** that you previously defined (**GenericInEvent**).

C Select the publication destination from the **Destination** list. In this case, it should be **iq2**.

19 Click **OK** to close the Collaboration window.

Figure 12 Collaboration Properties - MQ_cr_in



Collaboration - MQ_cr_in Properties

General

MQ_cr_in

Collaboration Rules: JavaCollab

Subscriptions:

Instance Name	Event Type	Source
In	Ev_1	MQ_conn1

Publications:

Instance Name	Event Type	Destination	Priority
Out	GenericInEvent	Iq_2	5

20 Click **OK** to exit.

to Create the Outbound_eWay Collaboration

1 In the e*Gate Schema Designer, select the Navigator's **Components** tab.

2 Open the host on which you want to create the Collaboration.

3 Select a **Control Broker.**

4 Select the **ew_Out** e*Way to assign the Collaboration.

5 On the palette, click the **Create a New Collaboration** button.

6 Enter the name of the new Collaboration, then click **OK.** (For the sample, “**Out_cr**”.)

7 Double-click the new **Collaboration** to edit its properties.

8 From the **Collaboration Rules** list, select the **Collaboration Rules** file that you previously defined **Pass**.

9 In the **Subscriptions** area, click **Add** to define the input Event Types to which this Collaboration subscribes.

A From the **Event Type** list, select the **Event Type** that you previously defined **GenericInEvent**.

B Select the **Source** from the **Source** list. In this case, it should be **MQ_cr_in**.

10 In the **Publications** area, click **Add** to define the output **Event Types** that this Collaboration publishes.

A From the **Event Types** list, select the **Event Type** that you previously defined **GenericInEvent**.

B Select the publication destination from the **Destination** list. In this case, it should be **<External>**.

C Click **OK** to close the **Collaboration Properties** window.

5.11 Step Nine: Set the CLASSPATH Variable

The final step in creating and configuring the MQSeries e*Way is to set the IBM MQSeries Java JAR files in the environment CLASSPATH variable. This includes the following JAR files.

\MQSeries\Java\lib

\MQSeries\Java\lib\providerutil.jar

\MQSeries\Java\lib\ldap.jar

\MQSeries\Java\lib\jndi.jar

\MQSeries\Java\lib\com.ibm.fscontext.jar

\MQSeries\Java\lib\com.ibm.mqjms.jar

\MQSeries\Java\lib\com.ibm.mqbind.jar

\MQSeries\Java\lib\com.ibm.mq.jar

\MQSeries\Java\lib\com.ibm.mq.iiop.jar (com.ibm.mq.iiop.jar only applies for Windows, not UNIX.)

Also set \MQSeries\Java\lib in your PATH.

For UNIX, include /MQSeries/Java/lib in the library path as follows:

- Solaris: LD_LIBRARY_PATH
- HP-UX: SHLIB_PATH
- AIX: LIBPATH

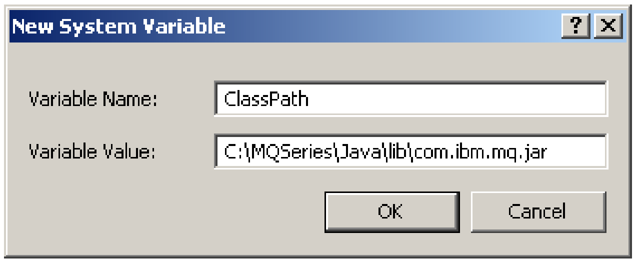
If the CLASSPATH and PATH already exist, add the JAR files to the existing PATH and CLASSPATH.

Setting the CLASSPATH variable on Windows

To set the JAR files from Java classes in classpath do the following:

1. Right-click **My Computer** and select **Properties**. The System Properties window opens.
2. Select the **Advanced** tab and click **Environment Variables**. The Environment Variables window opens.
3. Under System Variables click **New**.
4. In the New System Variable window type **ClassPath** in the **Variable Name** field. In the Variable Value field type the absolute path for the first JAR file (See Figure 13), and click **OK**.

Figure 13 Set Environment Variables


New System Variable

Variable Name: ClassPath

Variable Value: C:\MQSeries\Java\lib\com.ibm.mq.jar

5. Repeat steps 3 and 4 for each of the MQSeries JAR files.
6. Under System Variables click **New**.
7. In the New System Variable window type **Path** in the **Variable Name** field. In the Variable Value field type the absolute path for \MQSeries\Java\lib and click **OK**.
8. Click **OK** to close the Environment Variables window and the System Properties window.

5.12 Execute the Schema

To execute the MQSeries sample schema

1. Go to the command line prompt, and enter the following:

   ```
   stccb -rh hostname -rs schemaname -un username -up user password
   -ln hostname_cb
   ```

   Substitute ***hostname***, ***schemaname***, ***username*** and ***user password*** as appropriate.
2. Exit from the command line prompt, and start the Schema Manager GUI.
3. When prompted, specify the ***hostname*** which contains the Control Broker you started in Step 1 above.
4. Select the MQSeries sample schema.

5 After you verify that the Control Broker is connected (the message in the Control tab of the console indicates command as *succeeded* and status as *up*), select the IQ Manager, ***hostname***_igmgr, then right-click and select **Start**.

6 Highlight each of the e*Ways, right-click the mouse, and select **Start**.

5.13 Error Messages

If there is an error, such as a failed connection, an exception is thrown by the module and logged to error log file at egate/client/logs. The error log appears similar to the following:

```
11:59:34.091 EWY I 11 (initialize.cxx:1035): Exception thrown: Failed to access queue:
MQRC_UNKNOWN_OBJECT_NAMEc
om.ibm.mq.MQException: MQJE001: Completion Code 2, Reason 2085
      at com.ibm.mq.MQQueueManager.accessQueue(MQQueueManager.java:1151)
      at com.ibm.mq.MQQueueManager.accessQueue(MQQueueManager.java:1196)
      at com.stc.eways.MQSeriesETD.MQSeriesConnector.accessQueue(MQSeriesConnector.java:395)
      at com.stc.eways.MQSeriesETD.MQSeriesETD.accessQueue(MQSeriesETD.java:291)
      at MQ_EMECollab.executeBusinessRules(MQ_EMECollab.java:106)
      at com.stc.jcsre.JCollaboration.translate(JCollaboration.java:97)
      at com.stc.common.collabService.JCCollabControllerImpl.
translate(JCCollabControllerImpl.java:1096
```

The reason code parameter or MQRC, in this case Reason 2085, appears in the first few lines of the error log. This reason code can be used in conjunction with IBMs online document, **MQSeries Messages**, Chapter 9 at:

http://www-903.ibm.com/board/attach_files/mqseries/k1005706457257_messages.pdf

The chapter lists reason codes, exceptions, the associated errors and the corrective actions to take. For the above example, the MQRC appears as follows:

2085	X'0825'	MQRC_UNKNOWN_OBJECT_NAME An MQOPEN or MQPUT1 call was issued, but the object identified by the ObjectName and ObjectQMgrName fields in the object descriptor MQOD cannot be found. One of the following applies: ▪ The ObjectQMgrName field is one of the following: ♦ Blank ♦ The name of the local queue manager ♦ The name of a local definition of a remote queue (a queue-manager alias) in which the RemoteQMgrName attribute is the name of the local queue manager but no object with the specified ObjectName and ObjectType exists on the local queue manager. ▪ The object being opened is a cluster queue that is hosted on a remote queue manager, but the local queue manager does not have a defined route to the remote queue manager. ▪ The object being opened is a queue definition that has QSGDISP(GROUP). Such definitions cannot be used with the MQOPEN and MQPUT1 calls. Corrective action: Specify a valid object name. Ensure that the name is padded to the right with blanks if necessary. If this is correct, check the queue definitions.

Chapter 6

e*Way Connection Configuration (ETD)

This chapter defines the configuration options for the Java-enabled MQSeries *Way Connection using the MQSeriesETD connection type.

6.1 Configuring e*Way Connections

e*Way Connections are set using the Schema Designer.

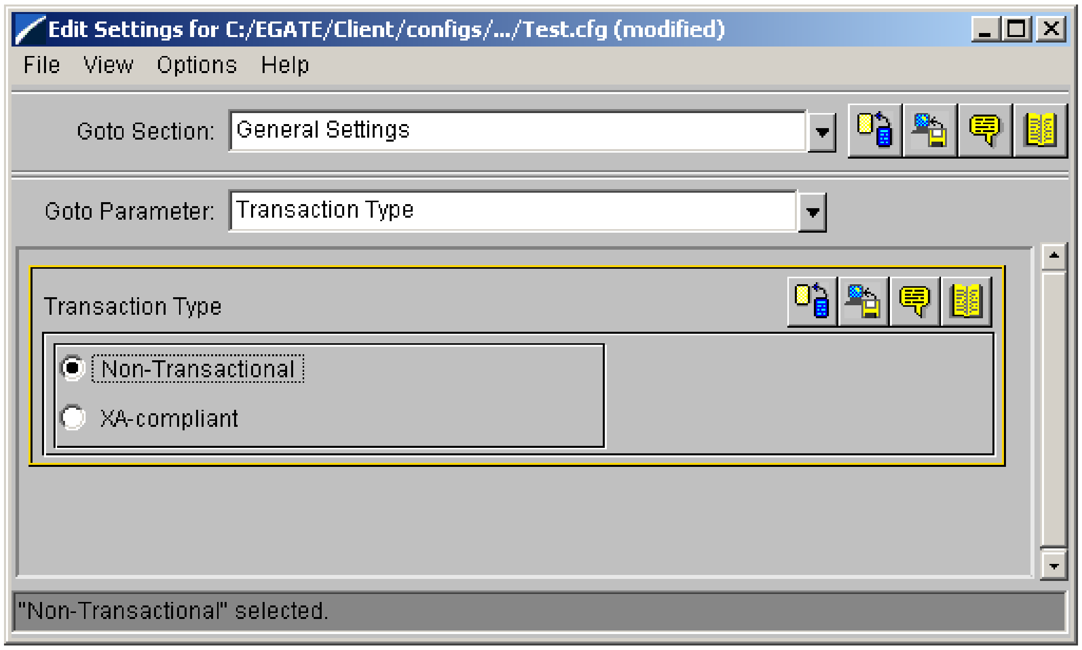
To create and configure e*Way Connections

1. In the Schema Designer's **Component** editor, select the **e*Way Connections** folder.
2. On the palette, click on the **Create a New e*Way Connection** button. The New e*Way Connection Component dialog box appears.
3. Enter a name for the new **e*Way Connection** and click **OK**.
4. Double-click the new **e*Way Connection**. The e*Way Connection Properties dialog box appears.
5. From the **e*Way Connection Type** drop-down box, select **MQSeriesETD**.
6. Enter the **Event Type "get" interval** in the dialog box provided. 100 milliseconds is the configured default. The "get" interval is the intervening period at which, when subscribed to, the e*Way connection is polled.
7. Click the **New** button under the **e*Way Connection Configuration File** field to create a new configuration file for this e*Way Connection. (To use an existing file, click **Find**, and select a file.) The **Configuration Editor** appears (see Figure 14).
8. Enter the correct parameters for your e*Way Connection as defined on the following pages. When all parameters have been entered, from the **File** menu, click **Save** and **Promote to Run Time** to move the file to the run time environment.

Note: *For z/OS some of the eWay connection MQ configuration parameters must be left blank. Refer to the MQSeriesETDSample_os390 sample schema for the only configuration which is supported.*

Note: *On UNIX systems the e*Way may be able to connect to an MQ Series Queue Manager with or without a password. In a UNIX environment, username and password usage is not guaranteed.*

Figure 14 Configuration Editor


Edit Settings for C:/EGATE/Client/configs/.../Test.cfg (modified)
File
View
Options
Help

Goto Section: General Settings

Goto Parameter: Transaction Type

Transaction Type

● Non-Transactional

○ XA-compliant

"Non-Transactional" selected.

The MQSeries e*Way Connection configuration parameters are organized into the following sections.

- **General Settings**
- **MQSeries**
- **Connector**
- **Default GetMessageOptions**

6.1.1. General Settings

This section contains the following parameters:

- **Transaction Type**

Transaction Type

Description

String-set. Specifies the Transaction Type. There are two transaction types.

- **Non-Transactional**. Provides the highest level of performance, with the minimum level of message protection. No rollback is available during the send and receive period, causing the possible loss of data in the case of a system error. When the send( ) method is called the transaction is immediate. Non-Transactional (single-phase transaction) rely on the user to call the commit and backout methods.
- **XA-compliant**. (two-phase transactional behavior) Highest level of transaction protection, providing rollback for internal and XA compliant transactions. The transaction is also extended to other XA supported data exchange applications,

such as Oracle, DB2, and MQSeries. When the send( ) method is called the transaction takes place at the end of the Collaboration.

XA can only be used in Binding mode. This means that a Host Name is not entered in the configuration parameters. A Host Name in the configuration parameters implies that the API is setup in Client mode. XA cannot be used in Client mode. In addition, when using XA:

- There must be only one queue manager.
- The method **connectToQueueManager** cannot be called.
- The methods **commit** and **backout** cannot be called. In Bindings mode, e*Gate is the transaction coordinator and is in control of these methods.

Note: *Consult the XA Transaction Processing section of the e*Gate Integrator User's Guide for information on XA use and restrictions.*

Required Values

Select Non-Transactional or XA-compliant. Non-Transactional is the configured default.

6.1.2. MQSeries

This section contains the following top level parameters:

- **Queue Manager Name**
- **Host Name**
- **Port Number**
- **CCSID**
- **Channel**

Note: *For z/OS some of the eWay connection MQ configuration parameters must be left blank. Refer to the MQSeriesETDSample_os390 sample schema for the only configuration which is supported.*

Queue Manager Name

Description

String-set. Specifies the name of the IBM MQSeries queue manager to which the e*Way is to connect.

Required Values

Enter the name of the valid IBM MQSeries queue manager.

Host Name

Description

String-set. Specifies the name of the host on which the queue manager resides.

Note: *If the Host Name field is left blank, the e*Way attempts to connect to MQSeries in Binding mode. The queue manager must be on the local machine.*

Required Values

A valid host name.

Port Number

Description

Integer-set. Specifies the port number to which the queue manager is set to listen.

Required Values

An integer in the range of 1000 to 65536. The configured default is 1414.

CCSID

Description

Int-set. Specifies the character set to be used when connecting to the queue manager.

The default value (819) is recommended for most situations.

Required Values

An integer in the range of 1 to 65536. The configured default is 819.

Channel

Description

String-set. Specifies the name of the channel being used.

Required Values

The valid name of the channel.

6.1.3. Connector

This section contains the following top level parameters:

- **type**
- **Connection Establishment Mode**
- **class**
- **Property.Tag**

Note: *These parameters are used internally by the e*Way and are for future expansion potentialities. The default values should always be used.*

type

Description

String-set. Specifies the connector type for MQSeriesETD. The default value should always be used.

Required Values

A valid connector type. The default value should always be used. The configured default is **MQSeriesETD**.

Connection Establishment Mode

Description

String-set. Specifies how connection with the database server is established and closed. The options are as follows:

- **Automatic**: indicates that the connection is automatically established when the Collaboration is started. The connection is kept alive as needed.
- **Manual**: indicates that the user will explicitly call the connection connect and disconnect methods in their Collaboration as Business Rules.

Required Values

Select **Automatic** or **Manual**. The configured default is **Automatic**.

class

Description

String-set. Specifies the connector class for MQSeriesETD. The default value should always be used.

Required Values

The configured default is **com.stc.eways.MQSeriesETD.MQSeriesConnector**.

Property.Tag

Description

Specifies the data source identity. This parameter is required by the current EBobConnectorFactory.

Required Values

A valid data source package name.

6.1.4. Default GetMessageOptions

This section contains the following top level parameters:

- **Wait Timeout**
- **Wait Interval**

Wait Timeout

Description

String-set. Specifies the time to wait for a message to arrive on the queue when calling getWithOptions.

- **Unlimited**. Wait forever.
- **No-Wait**. Return immediately if no message is available.
- **Wait-Timed**. Wait for specified number of milliseconds (see Wait Interval).

Though the Wait Timeout can also be set through the Collaboration, the advantage to setting it as a parameter is that the setting becomes the default. The default parameter value can still be overridden in the Collaboration. This parameter is only in effect when the **getWithOptions** method (not the **get** method) is used.

Required Values

Select either Unlimited, No-Wait, or Wait-Timed. No-Wait is the configured default.

Wait Interval

Description

Integer-set. Specifies the number of milliseconds to wait for a message to arrive on the queue when calling getWithOptions. This option only applies when the Wait-Timed option has been selected for the Wait Timeout. If this is left blank, and Wait-Timed is chosen, a value of 0 (zero) is used.

Though the Wait Interval can also be set through the Collaboration, the advantage to setting it as a parameter is that the setting becomes the default. The default parameter value can still be overridden in the Collaboration. This parameter is only in effect when the **getWithOptions** method (not the **get** method) is used.

Required Values

An integer in the range of 0 to 200000000. The configured default is 0.

Chapter 7

ETD Overview

This chapter gives an overall view of the MQSeriesETD hierarchy structure, including available methods and properties, and their application. For a more detailed description of each method see **Java Methods (ETD)** on page 97

7.1 The MQSeriesETD

The following is the general outline of the ETD and the methods and properties exposed on each node. Any methods noted with *, are methods or properties above and beyond the exposed base MQSeries java API. Ellipses for the parameters indicate one or more arguments for the method. The purpose of each is explained below.

```
+ QueueManager
    void connectToQueueManager(...)*
    void selectQueueManager(String name)*
    boolean isQueueMgrConnected()
    int getCharacterSet()
    int getMaximumPriority()
    void commit()
    void backout()
    queueAccessOptions*
    accessQueue(name)*
    + Queue
        + GMO *
        + PMO *
        selectQueue(name)*
        void get()
        void getWithOptions()*
        void put()
        void putWithOptions()*
        int getCurrentDepth()
        int getMaximumDepth()
        int getMaximumMessageLength()
        void newMessage()*
        + Message
            + MsgHeader*
                all properties
            + MsgBody*
```

byte[] Data*
readData()*
writeData()*
all the methods on MQMessage

7.1.1. The QueueManager Node

QueueManager is the root node and represents the interface to the MQQueueManager object in the MQSeries API. The name of the node, **QueueManager** as opposed to **MQSeriesETD** is used as a descriptive way of conveying the exposed hierarchy. Internally, it is actually implemented in the ETD implementation class com.stc.eways.MQSeriesETD.

The ETD implementation class holds a collection of queue manager objects that allow the user to connect to more than one queue manager and, once connections have been established, to switch between them. An exception to this is when the e*Way is configured as XA compliant. In this case, there can be exactly one queue manager which is the one specified in the configuration.

Current Queue Manager

Connecting to a queue manager automatically selects it as the current queue manager. If you have connected to more than one queue manager, you can switch between them using the **selectQueueManager** method. Each queue manager is accessible via its name. When the Collaboration is initialized, it automatically connects to the queue manager specified in the configuration (which, again, selects it as the current queue manager). Thus, if you do not connect to another queue manager in the Collaboration, you need not ever call the **selectQueueManager** method.

The queueAccessOptions Node

The **queueAccessOptions** node and the **accessQueue** method are used to access a queue on the current queue manager. First the desired queue access options are entered (such as open for input or open for output, and so forth), and then the **accessQueue** method is called. This method accesses the named queue on the current queue manager and selects that queue as the current queue.

The remaining methods exposed on the queue manager route directly to the similarly named method on the queue manager in the underlying MQSeries API.

Methods Under the QueueManager Node

Name	Description
connectToQueueManager on page 98	Create a connection to the another queue manager using the specified parameters. A connection to the queue manager specified in the configuration is automatically done. You need only call this method when connecting to another queue manager in the Collaboration.
selectQueueManager on page 98	Select from one of the connected queue managers.

Name	Description
isQueueMgrConnected on page 99	Determine if the current queue manager is still connected.
getCharacterSet on page 99	Returns CCSID of the queue managers codeset for the currently selected queue manager.
getMaximumPriority on page 100	Returns maximum message priority that can be handled by the queue manager.
commit on page 100	Commit the operations on the currently selected queue manager. Should only be called in Non-XA mode.
backout on page 100	Roll back the operations on the currently selected queue manager. Should only be called in Non-XA mode.
queueAccessOptionsClearAll on page 101	Clear all flags.
accessQueue on page 101	Access a queue on the current queue manager.

Note: *It is important that all queue access options be set before attempting to access the queue. The MQ Java code throws an exception if the options are not set first. You can liken this to pressing the gas pedal in a car before putting it in a gear; it does not go anywhere.*

7.1.2. The Queue Node

The Queue node corresponds to operations that are performed on the MQQueue object in the MQSeries API. In the ETD, it is shown as a child of the QueueManager node. This is to enforce the concept that you access a queue from a queue manager. As in the QueueManager node, the node name of Queue is a notational convenience for the user. Internally, it is implemented in the MQSeriesETD class.

Current Queue

The ETD uses the concept of a **current queue**. This is not the same as the current queue manager concept noted earlier. The ETD supports accessing one or more queues from the current queue manager via the **accessQueue** function on the **QueueManager** node. Calling this also selects that queue as the current queue. The user can also select different queues (which have already been accessed from the queue manager) by using the **selectQueue** function. Selecting a queue sets it as the current queue. Early in the Collaboration code, it is typical for the user to call **accessQueue** to access the queue that is used in the Collaboration. The ETD does not automatically access a queue at initialization time as it does for the queue manager. It is important to remember that all the methods take effect on whichever queue or queue manager is current. For example, calling the put method to put a message on the queue takes effect on the current queue.

Get and Put Methods

There are two versions of the **get** and **put** methods. Each operates on the message object exposed in the ETD. Each routes directly to the corresponding underlying method on the queue in the MQSeries API. One of the **get** and **put** methods take no arguments; they use the default options in MQSeries, whatever these may be. The other uses the **GetMessageOptions** (the **GMO**) or the **PutMessageOptions** (the **PMO**). These options allow the user to set whatever options they wish (for example, the SET_ALL_ CONTEXT flag).

These classes contain options that control the action of the getWithOptions and putWithOptions methods. The options are mostly bitfields in the MQSeries API. For example, the MQC.MQGMO_WAIT and the MQC.MQGMO_SYNCPOINT are two bitfields that can be set for the "options" member variable in the MQGetMessageOptions class. To make it easier for the user, these bitfields have been expanded into callable methods that take a Boolean parameter to set or clear the particular option. For example, if you want to set a wait timeout value in the GetMessageOptions, you call setMQGMO_WAIT(true) and then call the setWaitValue method. If you want this message to be a syncpoint, call setMQGMO_SYNCPOINT(true). Correspondingly, if you want to clear the syncpoint flag, you call setMQGMO_SYNCPOINT(false) then call setMQGMO_NO_SYNCPOINT(true).

The optionsClearAll (and matchOptionsClearAll and so forth) allows the user to clear all previously set options with one method.

Whatever values are set in the GMO and PMO nodes remain in effect for the duration of the Collaboration. That is, if you are putting more than one message, and they both take the same PutMessageOptions, you only need to set the options once.

Notice, too, that some of these flags may be required in certain contexts. An example is the SYNCPOINT flag when using transactions. In this case, calling commit in the ETD (or when the XA transaction is committed by e*Gate) the SYNCPOINT flag MUST be set.

Note: *Some of the members of these classes may be shown as output fields in the API documentation. In such cases, you should not attempt to set a value on them as they are populated by the underlying API method.*

Important: *Some of the attributes of the message header, such as userId, are affected by the **SET_ALL_CONTEXT** flag in the **PutMessageOptions**. Without SET_ALL_ CONTEXT set, MQSeries overwrites whatever value you might put in. If the flag is set, however, MQSeries passes on the value you entered untouched.*

The newMessage Method

The **newMessage** method allows the user to destroy and recreate a new Message object. This is required when you want to call **get** multiple times in the Collaboration (such as in a loop). If **get** is called again, passing a “dirty” message, the API throws an exception indicating no message is available.

The remaining methods on the queue route directly to the similarly named method on the underlying queue object in the MQSeries API. As a application note, be careful with the "interrogative" type methods on the queue such as **getCurrentDepth**. In order to call this, the queue must be accessed with **MQOO_INQUIRE** set.

Methods Under the Queue Node

Name	Description
optionsClearAll on page 105	Clears all option flags.
setWaitValue on page 106	Specifies a specific number of milliseconds to wait.
setUnlimitedWait on page 106	Sets the wait time to MQWI_UNLIMITED.
matchOptionsClearAll on page 107	Clears all match options flags set so far and sets match options to MQMO_NONE.
get on page 102	Gets a message off the queue using the default options.
getWithOptions on page 102	Gets a message off the queue using the GetMesageOptions (GMO).
put on page 103	Puts a message on the queue using the default options.
putWithOptions on page 103	Puts a message on the queue using the PutMesageOptions (PMO).
getCurrentDepth on page 104	Gets the number of messages currently in the queue.
getMaximumDepth on page 104	Gets the maximum number of messages that can exist on the current queue.
getMaximumMessageLength on page 104	Gets the maximum length of data that can exist in any one message on the current queue.
newMessage on page 105	Destroys then recreates the Message object. After doing a get, this must be called before doing another get.

7.1.3. The Message Node

The Message node corresponds to methods that are called on the message object in the MQSeries API. It is shown as a child of the Queue node in the ETD to enforce the concept that it is rather subservient to the queue. That is, you get and put messages from and to a queue.

The MsgHeader Child Node

The MsgHeader child node of the Message wraps the concept of the attributes of the **MQMessage**. There is no concept of a message header in the MQSeries API per se. Rather, this is a notational convenience in the ETD. By using the nodes of the **MsgHeader**, you can gain access to the attributes of the message (that is **userId**, **msgId**, and so forth).

The MsgBody Child Node

The **MsgBody** child node of the Message wraps the concept of exposing the message data as a byte array. There is no corresponding "body" concept in the MQSeries API. That is, the only way to gain access to the data in the message is by calling one of the read methods. MsgBody is a notational convenience for the user to allow them to access the entire data of the message as a blob and have that blob stored in a node in the ETD. To access the message data after doing a get, the **readData** method is called. This routes down to the **readFully** method on the message. The **Data** node is then populated with the entire contents of the message. The data is now available from the **Data** node so you can drag it to somewhere else in the Collaboration. To put a blob on the queue, data is “dragged and dropped” to the Data node and the **writeData** method on the MsgBody is called. The **writeData** method on the **MsgData** node routes down to the write method on the message.

Calling Read Methods

There are some important application caveats when dealing with the MQSeries API when it comes to calling the read methods. As you call a read method (for example. **readUTF**, **readInt**, and so forth) you are "consuming" the message data. Should you continue to call them, you eventually exhaust the available data of the message and you ultimately get an **EOFException**. This indicates you have reached the end of the data. This exception is caught in the underlying implementation code of the e*Way and is re-thrown as a **CollabConnException** but the **EOFException** is still available. The reason for the exception is logged. Therefore, if you want to re-read a portion of the data you need to call seek to put the current data offset back. For example, if **readFully** is called, all data is consumed. If you want to call **readFully** again you need to do a **seek(0)**.

The MQMessage Class

The remaining methods on the Message node all route down to the similarly named methods on the MQMessage class. A brief description of each method is available in the Properties field of the ETD Editor when the method is selected.

Methods Under the Message Node

Name	Description
getTotalMessageLength on page 108	If MQQueue.get() fails with a message-truncated error code, report the total number of bytes in the stored message on the queue.
getMessageLength on page 109	Reports the total number of bytes in the stored message on the queue.
getDataLength on page 109	Reports the number of bytes of data remaining to be read in the message.
seek on page 110	Relocates the cursor to the absolute position in the message buffer given by pos.

Name	Description
setDataOffset on page 110	Relocates the cursor to the absolute position in the message buffer. setDataOffset ( ) is equivalent to seek(), allowing for cross-language compatibility with the other MQSeries APIs.
getDataOffset on page 111	Returns the current position of the cursor within the message, that is the point at which read and write operations take effect.
clearMessage on page 111	Discards data in the message buffer and resets the data offset to zero.
getVersion on page 111	Return the version of the current structure.
resizeBuffer on page 112	Clues the MQMessage object as to the size of buffer that may be necessary for subsequent get operations. When a message contains message data, and the new size is less than the current size, the message data is truncated.
readBoolean on page 112	Reads a (signed) byte from the present position in the message buffer.
readChar on page 113	Reads a Unicode character from the present position in the message buffer.
readDouble on page 113	Reads a double from the present position in the message buffer.
readFloat on page 113	Reads a float from the present position in the message buffer.
readFully on page 114	Fills the byte array b with data from the message buffer. Fills len elements of the byte array b with data from the message buffer, starting at offset off.
readInt on page 115	Reads an integer from the present position in the message buffer.
readInt4 on page 115	Equivalent to readInt(), provided for cross-language MQSeries API compatibility.
readLine on page 115	Converts from the codeset defined in the characterSet member variable to Unicode, then reads in a line that has been terminated by \n, \r, \r\n, or EOF.
readLong on page 116	Reads a long from the present position in the message buffer.
readInt8 on page 116	Equivalent to readlong(), provided for cross-language MQSeries API compatibility.
readObject on page 117	Reads an object, its class, class signature, and the value of the non-transient and non-static fields of the class.
readShort on page 117	Reads a short from the present position in the message buffer.

Name	Description
readInt2 on page 118	Equivalent to readshort(), provided for cross-language MQSeries API compatibility.
readUTF on page 118	Reads a UTF string, prefixed by a 2-byte length field, from the present position in the message buffer.
readUnsignedByte on page 118	Reads an unsigned byte from the present position in the message buffer.
readUnsignedShort on page 119	Reads an unsigned short from the present position in the message buffer.
readUInt2 on page 119	Equivalent to readUnsignedShort(), provided for cross-language MQSeries API compatibility.
readString on page 120	Reads a string in the codeset defined by the characterSet member variable. Convert the string into Unicode.
readDecimal2 on page 120	Reads a 2-byte packed decimal number.
readDecimal4 on page 121	Reads a 4-byte packed decimal number.
readDecimal8 on page 121	Reads a 8-byte packed decimal number.
setVersion on page 122	Sets the version of the structure to be used.
skipBytes on page 122	Advances n bytes in the message buffer. Blocks until all the bytes are skipped, the end of message buffer is detected, or an exception is thrown.
write on page 123	Writes a byte, an array of bytes, or a series of bytes into the message buffer at the present position. len bytes are written, taken from offset off in the array b.
writeBoolean on page 123	Writes a Boolean into the message buffer at the present position.
writeByte on page 124	Writes a byte into the message buffer at the present position.
writeBytes on page 124	Writes the string to the message buffer as a sequence of bytes. Each character is written out in sequence by discarding its high eight bits.
writeChar on page 125	Writes a Unicode character into the message buffer at the present position.
writeChars on page 125	Writes a string as a sequence of Unicode characters into the message buffer at the current position.
writeDouble on page 126	Writes a double into the message buffer at the present position.
writeFloat on page 126	Writes a float into the message buffer at the present position.
writeInt on page 127	Writes an integer into the message buffer at the present position.
writeLong on page 127	Writes a long into the message buffer at the present position.

Name	Description
writeObject on page 128	Writes the specified object, object class, class signature, and the values of the non-transient and non-static fields of the class and all its supertypes.
writeShort on page 128	Writes a short into the message buffer at the present position.
writeDecimal2 on page 129	Writes a 2-byte packed decimal format number into the message buffer at the present position.
writeDecimal4 on page 129	Writes a 4-byte packed decimal format number into the message buffer at the present position.
writeDecimal8 on page 130	Writes an 8-byte packed decimal format number into the message buffer at the present position.
writeUTF on page 130	Writes a UTF string, prefixed by a 2-byte length field, into the message buffer at the present position.
writeString on page 131	Writes a string into the message buffer at the present position, converting it to the codeset identified by the characterSet member variable.

7.1.4. Exception Handling

A general note on exception handling when using the ETD in a Collaboration: Internally, the e*Way catches *all* of the **MQExceptions** thrown from the underlying MQSeries API. It also catches all other possible exception types that can be thrown from the MQSeries API methods (for instance, the **EOFException** on the message readXXX methods). The reason for this is to prevent users from having to do multiple catch clauses in their Collaboration. It is only necessary to catch a total of two possible types of exceptions from the e*Way; the **CollabConnException** or the **EBobConnectionException**. The only time the **EBobConnectionException** is thrown by the eWay is in the initialization and shutdown phase of the eWay.

While the e*Way catches all **MQExceptions** internally, the original exception is still available from the **CollabConnException**. Further, the MQExceptions "**reasonCode**" is logged in a human readable format. That is, instead of a cryptic numeric ID, it logs MQRC_NO_MESSAGE_AVAILABLE.

Chapter 8

Implementation (ETD)

This chapter contains basic information for implementing the ETD-based Java-enabled MQSeries e*Way in a production environment. A sample schema is included on the installation CD-ROM for the ETD-based implementation of the e*Way. In addition, examples are provided detailing how the various components of the sample schema were created. For more information on creating and configuring e*Way components see the *e*Gate Integrator User's Guide.*

8.1 MQSeries (ETD) Sample Implementation Components

The Java ETD-based e*Way Intelligent Adapter for MQSeries is an *application specific* e*Way which allows e*Gate to connect with IBM's MQSeries applications. The e*Gate Schema Designer and MQSeries e*Way are used to create schema's to receive, transform and route data through e*Gate in a predefined system configuration.

The following pages contain a sample implementation which serves to explain how the components for an ETD-based MQSeries sample schema are created. The host and Control Broker are automatically created and configured during the e*Gate installation. The default name for each is the name of the host on which the e*Gate Schema Designer GUI is installed. To create an e*Gate schema for MQSeries you must do the following:

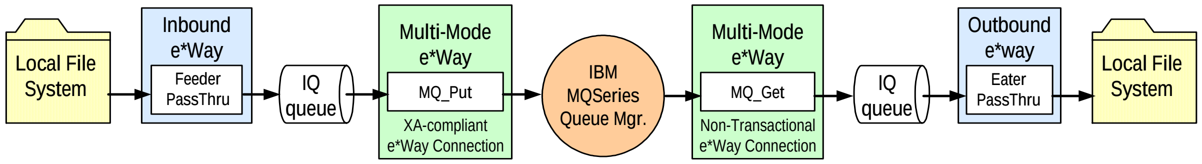
- **Install IBM's MQSeries** (See **External System Requirements** on page 11) and **MQSeries Queue Manager:** The MQSeries Server and MQSeries Queue Manager are installed on the localhost.
- **Install the MQSeries e*Way:** The MQSeries e*Way is installed as an Add-on to the e*Gate Integrator. For directions on installing the MQSeries e*Way from the CD-ROM to your specific operating system, see **Installation** on page 12.
- **Create e*Ways:** e*Ways connect with external systems to poll or send data. They also transform and route data. Multi-Mode e*Ways are used to run Java Collaborations that utilize e*Way Connections to send and receive Events to and from multiple external systems.
- **Configure e*Way Connections:** An e*Way Connection is the encoding of access information for a specific external connection. The e*Way Connection configuration file contains the parameters necessary for communicating with IBM's MQSeries and specifying the MQSeries Queue Manager.

- **Create Event Types:** Each packet of data within e*Gate is referred to as an Event. Event Types are data labels that allow e*Gate to process and route specific Events differently. Data is not routed in e*Gate without an Event Type.
- **Create Intelligent Queues:** Non-volatile storage for data traveling through the e*Gate system is provided by creating Intelligent Queues (IQs). The IQ Manager oversees the activities of the individual storage locations. The exact behavior of each IQ is determined by the IQ Service configuration. The MQSeries e*Way uses the MQSeries IQ Service.
- **Create Collaboration Rules:** Collaboration Rules determine how input Event Types are modified to the format of specific output Event Types. A Collaboration Rule defines what type of data is received, how it is transformed and what type of data is published.
- **Create Collaborations:** A Collaboration is a message bus in e*Gate that specifies the name and source of the incoming Event Types, the Collaboration Rules that are applied to the Event, and the name, destination and expiration date of the outgoing Event Types. A Collaboration designates the Subscriber, which "listens" for Events of a known type from a given source, and the Publisher, which distributes the transformed Event to a specified recipient.
- **Set the CLASSPATH Variable:** The Final Step in creating and configuring the MQSeries e*Way is to set the IBM MQSeries Java .jar files and the com.ibm.m9.jar files in the environment CLASSPATH variable.

8.1.1. The MQSeries (ETD) Sample Schema

The following sections describe how to define and associate each of the above components for the MQSeries ETD Sample (see Figure 15). This sample implementation demonstrates how the Java-enabled MQSeries e*Way intercepts, stores, manipulates, and manages data in association with IBM MQSeries.

Figure 15 The MQSeries (ETD) Sample Implementation.



8.2 e*Way Concerns

8.2.1. Requirements for Communicating with Mainframe MQ

The following is required for e*Gate applications communicating with Mainframe MQ.

Control Broker Startup Script for Mainframe

For mainframe applications, use the following code with your Control Broker startup script. Your environment may vary. Consult with your system developer for more information:

```
export
STEPLIB=$STEPLIB:CSQ530.SCSQAUTH:CSQ530.SCSQANLE:CQS530.SCSQLOAD
export LIBPATH=/usr/lpp/mqm/java/lib:/usr/lpp/java/J1.3/bin:/usr/lpp/
java/J1.3/bin/classic:/u/mlucero/local/egate453/client/bin:/usr/lpp/
mqm/java/lib:$LIBPATH
export LD_LIBRARY_PATH=$LIBPATH
export PATH=/usr/lpp/java/J1.3/bin:/usr/lpp/java/J1.3/bin/classic:/
usr/lpp/mqm/java/lib:$PATH
echo DATE is `date`
export MQ=/usr/lpp/mqm/java/lib
export CLASSPATH=.:$MQ:$MQ/connector.jar:$MQ/com.ibm.mqjms.jar:$MQ/
jta.jar:$MQ/com.ibm.mq.jar:$MQ/jms.jar:$CLASSPATH
```

Commit and Promote Required JAR files to Runtime

The following JAR files must be committed to the Sandbox and promoted to your Runtime environment before you create your schema. These files are located in the `/usr/lpp/mqm/java/lib` directory of the MQSeries Server to which you are communicating.

- com.ibm.mq.jar
- com.ibm.mqjms.jar
- connector.jar
- fmcontext.jar
- jms.jar
- jta.jar
- postcard.jar
- providerutil.jar

To commit and promote these files do the following:

1. From the e*Gate Schema Designer’s File menu, select **Commit to Sandbox**. The **Select Local File to Commit** dialog box appears.
2. Locate and select the **com.ibm.mq.jar** file and click **Open**. The **Select Directory for Committed File** dialog box appears.
3. Select the following location as the directory for the committed file:

```
/eGate/Server/registry/repository/<SchemaName>/sandbox/<UserName>/
ThirdParty/mqseries/classes/
```

where <*SchemaName*> is the name of the schema and <*UserName*> is the name of the user.

4 Repeat steps 1-3 for each of the above JAR files.

5 From the e*Gate Schema Designer's File menu, select **Promote to Run Time**. The **Select File to Promote to Run Time** dialog box appears.

6 Locate and select committed Jar files at:

```
/ThirdParty/mqseries/classes/
```

Select the **com.ibm.mq.jar** file and click **Promote**. The com.ibm.mq.jar file is promoted.

7 Repeat steps 5 and 6 for each of the committed JAR file.

Add Required JAR Files to the Schema's Java Collaboration Classpath

In addition to promoting the required JAR files to runtime, add the promoted Jar files to your Schema's Java Collaboration Classpath. To add files to a Collaboration Classpath, do the following:

1 Open your schema's Java Collaboration in the Java Collaboration Editor.

2 From the editor's toolbar, select **Tools** > **Options**. The Java Classpaths dialog box appears.

3 Click **Add File**, and from the Open dialog box locate and select the **com.ibm.mq.jar** file (ThirdParty/mqseries/classes/). Repeat this for each of the JAR files you promoted in the previous section. Click **OK**.

4 Compile and Promote the Collaboration, then exit the Collaboration Editor.

Add OutGoing Encoding Business Rule to the Java Collaborations

For the sample schema, add the following Business Rule to the Java Collaborations under the **userInitialize** method:

```
jCollabController.setOutgoingEncoding("outbound","cp037")
```

To add the Business Rule, open the Collaboration in the Java Collaboration Editor and do the following:

1 From the Business Rules pane of the Collaboration Rules Editor, select the **userInitialize** method.

2 From the Business Rules toolbar, click the **rule** button to add a Business Rule under the **userInitialize** method.

3 From the Rule Properties pane, enter the Business Rule, as provided above, into the Rule field.

4 Save, compile, and promote the Collaborations.

8.3 Step One: Create the IBM MQSeries Queue

Step one in creating the MQSeries e*Way is to install and configure **IBM MQSeries Server** and the **IBM MQSeries Queue Manager** on the localhost.

It is assumed that the reader is experienced in the use of IBM MQSeries Queue Manager. For more information on IBM MQSeries Queue Manager please see MQSeries Queue Related Commands, Chapter 9, in the e*Gate Integrator Intelligent Queue Services Reference Guide. For the sample implementation do the following:

1. Open IBM MQSeries Explorer.
2. Create a new Queue Manager.
3. From the IBM MQSeries Queue Manager create a new queue.

Note: *Unlike the JMS-based MQSeries e*Way schema, the ETD-based schema does not require the MQSeries Queue name and the Event Type name to be the same.*

Regarding IBM MQSeries Server and Queue Manager Limits and Settings

- When using MQSeries Queue Manager on UNIX, the user must be a member of the mqm group to create and start MQ Series Queue Manager.
- It is essential that the MQSeries Administrator regularly monitor the number of messages in the queue. Message expiration settings should be set to allow for extended storage.
- MQseries is limited in the number of messages that can be sent before a commit is executed, and the number of physical messages that can exist on the queue at any one time. This can result in exception errors when upper limits for these numbers are exceeded. Memory and performance of the specific server may also effect the results.

Publishing Messages with MQSeriesJMS to a non-JMS conversant e*Way

The JMS standard specifies a header which includes encoding and reply information. This header is prepended to any message published by the IBM JMS classes. Non-JMS subscribers (that is, those using a non JMS API to MQSeries, such as the IBM C API) are not able to separate the JMS header from the body. To remedy this, the user is advised to suppress the publication of the JMS header, if publishing to non-JMS subscribers, using the following mechanism.

To send messages to a non-JMS MQ (Monk MQSeries) e*Way, call send() manually from within the Collaboration rules containing the following URI:

```
"queue://<QMGR_NAME>/<QNAME>?targetClient=1"
```

For example:

```
"queue://EMEO2T/QR.EME01?targetClient=1"
```

If this is not done then a 200+ byte header is pre-appended to the payload and placed in the MQ queue and could easily throw off the non JMS conversant MQ reader.

For further information see the IBM manual **MQSeries**, **Using Java**, Chapter 10, at: **http://www-4.ibm.com/software/ts/mqseries/library/manualsa/manuals/crosslatest.html**

8.4 Step Two: Install the MQSeries e*Way and Create a New Schema

Step two is to install the MQSeries e*Way. For directions on installing the MQSeries e*Way on your specific operating system, see **Chapter 2, Installation, on page 12**.

Importing the Sample Schema

Once the MQSeries e*Way is installed, a new schema must be created. While it is possible to use the default schema, it is recommended that you create a separate schema for testing purposes. A sample schema, **MQSeriesETDSample.zip**, is included on the CD-ROM. To import the sample schema once the MQSeries e*Way is installed, do the following:

1. Start the e*Gate Schema Designer GUI.
2. When the Schema Designer prompts you to log in, select the host that you specified during installation and enter your password.
3. You are then prompted to select a schema. Click **New**.
4. Enter a name for the new Schema. In this case, for the sample, enter **MQSeriesETDSample**, or any name as desired.
5. Select **Create from export**. Click **Find** and navigate to following folder on the CD-ROM **\eGate\samples\ewmq** and select **MQSeriesETD.zip**.
6. Click open to import the sample schema.

The e*Gate Schema Designer opens to the new schema. The schema must be configured to match the specific system before it can run. See **Multi-Mode e*Way Configuration** on page 15 and **e*Way Connection Configuration (ETD)** on page 52 for directions on configuring the schema components for your system. Further information on importing and configuring the sample schema is available on the Readme file included with the sample

The following steps are included to demonstrate how the components of the sample schema are created.

8.5 Step Three: Create and Configure the e*Ways

Step three is to create the e*Ways. e*Ways are components used for transporting and transforming data. They always interface with at least one external system, and Multi-

Mode e*Ways can use e*Way Connections to interface with many external systems. For the sample implementation four e*Ways are required.

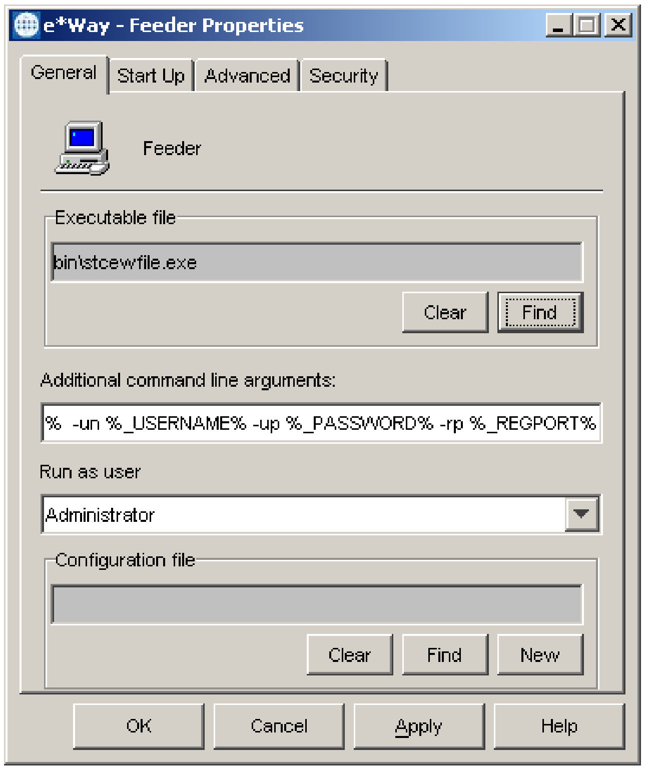
- Inbound (Feeder)
- Outbound (Eater)
- Multi-Mode (MQ_Get)
- Multi-Mode (MQ_Put)

The following sections provide instructions for creating each e*Way.

To Create the Inbound e*Way (Feeder)

1. Select the Navigator's **Components** tab.
2. Open the host on which you want to create the e*Ways.
3. Select the **Control Broker** that manages the new e*Ways.
4. On the palette, click the **Create a New e*Way** button.
5. Enter the name of the new e*Way (in this case, **Feeder**). Click **OK**.
6. Right-click the **Feeder** e*Way, and select **Properties** to edit its properties.
7. When the e*Way Properties window appears, click **Find** beneath the **Executable File** field and select **stcewfile.exe** as the executable file (see Figure 16).

Figure 16 Inbound e*Way Properties


e*Way - Feeder Properties

Feeder

Executable file: bin\stcewfile.exe

Additional command line arguments: % -un %_USERNAME% -up %_PASSWORD% -rp %_REGPORT%

Run as user: Administrator

Configuration file:

8. Under the **Configuration File** field, click on the **New** button. The **Edit Settings** dialog box appears. Set the following for this configuration file (see Table 5).

Table 5 Configuration Parameters for the Inbound e*Way

Parameter	Value
General Settings (unless otherwise stated, leave settings as default)	
AllowIncoming	YES
AllowOutgoing	NO
PerformanceTesting	NO
Outbound Settings	Default
Poller Inbound Settings	
PollDirectory	C:\INDATA
InputFileExtension	*.fin (input file extension)
PollMilliseconds	1000
Remove EOL	YES
MultipleRecordsPerFile	YES
MaxBytesPerLine	4096
BytesPerLineIsFixed	NO
File Records Per eGate Event	1
Performance Testing	Default

Note: *For information on configuring the specific parameters of the stcewfile e*Way see the* ***Standard e*Way Intelligent Adapter User's Guide****.*

9 Use the **Startup**, **Advanced**, and **Security** tabs to modify the default settings for each e*Way configured.

D Use the **Startup** tab to specify whether the e*Way starts automatically, or restarts after abnormal termination or due to scheduling and so forth.

E Use the **Advanced** tab to specify or view the activity and error logging levels as well as the Event threshold information.

F Use **Security** to view or set privilege assignments.

10 After selecting the desired parameters, save the configuration file (**Feeder.cfg**) and promote to run time.

11 Select **OK** to close the **e*Way Properties** window.

To Create the Outbound e*Way (Eater)

1 Repeat step 1-9 above to create the Outbound e*Way changing the name in steps 5 and 6 to **Eater**.

2 Replace the following parameters (see Table 6) for those in step 8.

Table 6 Configuration Parameters for the Inbound e*Way

Parameter	Value
General Settings (unless otherwise stated, leave settings as default)	
AllowIncoming	NO
AllowOutgoing	YES
PerformanceTesting	NO
Poller Outbound Settings	
OutputDirectory	C:\DATA
OutputFileName	output%d.dat
MultipleRecordsPerFile	YES
MaxRecordsPerFile	10000
AddEOL	YES
Poller Inbound Settings	Default
Performance Testing	Default

3 After selecting the desired parameters, save the configuration file (**Eater.cfg**) and promote to run time.

4 Click **OK** to close the **e*Way Properties** window.

To Create the Multi-Mode e*Way (MQ_Get)

1 Select the **Navigator's Components** tab.

2 Open the host on which you want to create the e*Way.

3 Select the **Control Broker** that manages the new e*Way.

4 On the palette, click the **Create a New e*Way** button.

5 Enter the name of the new e*Way (in this case, **MQ_Get**), then click **OK**.

6 Right-click the **MQ_Get** e*Way and select **Properties** to edit its properties.

7 When the e*Way Properties window opens, click the **Find** button beneath the **Executable File** field, and select **stceway.exe** as the executable file.

8 To configure the Multi-Mode e*Way's parameters, click **New** under the **Configuration File** field and enter the parameters as displayed in Table 7.

Table 7 Configuration Parameters for the MQ_Get MultiMode e*Way

Parameter	Value
JVM Settings (unless otherwise stated, leave settings as default)	
JNI DLL absolute pathname	C:\eGate\client\bin\Jre\jvm.dll (or absolute path to proper JNI DLL)
CLASSPATH Append From Environmental Variable	YES

See **Multi-Mode e*Way Configuration** on page 15 for more information on Multi-Mode e*Way parameters.

9. In the **e*Way Properties** window, use the **Startup**, **Advanced**, and **Security** tabs to modify the default settings for each.
   - G Use the **Startup** tab to specify whether the e*Way starts automatically, restarts after abnormal termination or due to scheduling, etc.
   - H Use the **Advanced** tab to specify or view the activity and error logging levels, as well as the Event threshold information.
   - I Use **Security** to view or set privilege assignments.
10. After selecting the desired parameters, save the configuration file (**MQ_Get.cfg**) and promote to run time.
11. Click **OK** to close **e*Way Properties** window.

To Create the Multi-Mode e*Way (MQ_Put)

1. Repeat step 1-9 above to create the MQ_Put Multi-Mode e*Way changing the name in steps 5 and 6 to **MQ_Put**.
2. After selecting the desired parameters, **Save** the configuration file (**MQ_Put.cfg**) and promote to run time.
3. Click **OK** to close **e*Way Properties** window.

8.6 Step Four: Create the e*Way Connection

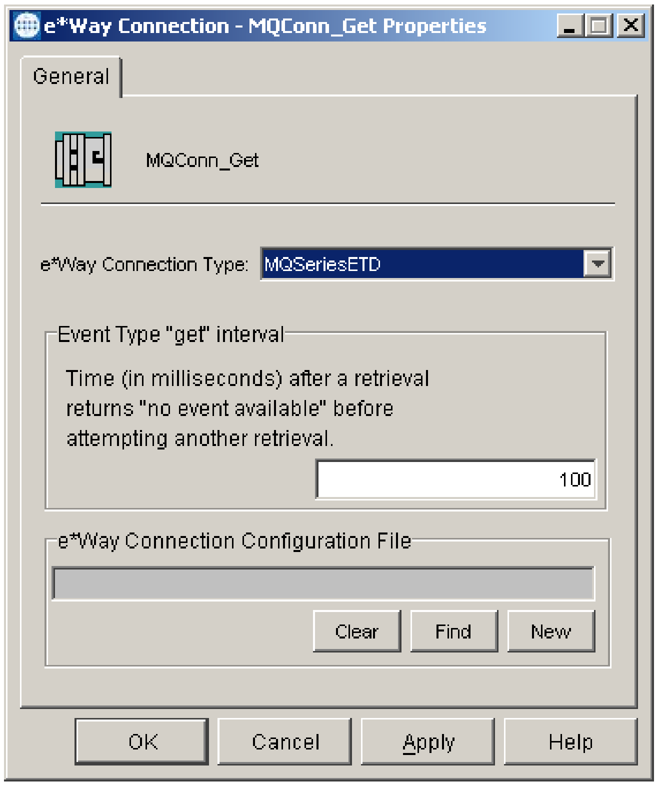
Step four is to create and configure the e*Way Connections. The e*Way Connection configuration file contains the settings necessary for communicating with IBM MQSeries and specifying the MQSeries Queue Manager. For this sample two e*Way Connections are created.

To Create the MQConn_Get e*Way Connection

1. Select the **e*Way Connection** folder on the **Components** tab of the e*Gate Navigator.
2. On the palette, click the **Create a New e*Way Connection** button.
3. Enter the name of the **e*Way Connection**, then click **OK.** (For the purpose of this sample, the e*Way Connection is defined as “**MQconn_Get**”.)
4. Double-click the new **e*Way Connection** to edit its properties. The **e*Way Connection Properties** dialog box appears.

5 In the e*Way Connection Type field, select **MQSeriesETD** from the drop-down list box (see Figure 17).

Figure 17 e*Way Connection Properties



e*Way Connection Type: MQSeriesETD

Event Type "get" interval

Time (in milliseconds) after a retrieval returns "no event available" before attempting another retrieval.

100

e*Way Connection Configuration File

6 Enter the **Event Type "get" Interval** in the dialog box provided. 10000 milliseconds (or 10 seconds) is the configured default. The "get interval is the intervening period at which, when subscribed to, the e*Way connection is polled. For the purpose of this sample set the "get interval to 100.

7 To configure the e*Way Connection parameters, click the **New** button under the e*Way Connection Configuration File field.

8 The e*Way Connection editor appears, select the parameters as displayed in Table 8.

Table 8 Configuration Parameters for the MQConn_Get e*Way Connection

Parameter	Value
General Settings (unless otherwise stated, leave settings as default)	
Transaction Type	Non-Transactional
MQSeries	
Queue Manager Name	MQ_mgr (a valid queue manager)
Port Number	1414 (a valid port number)
connector	Default
Default GetMessageOptions	

Table 8 Configuration Parameters for the MQConn_Get e*Way Connection

Parameter	Value
Wait Timeout	Wait-Timed
Wait Interval	10000

For more information on the MQSeries e*Way Connection Type parameters, see **e*Way Connection Configuration (ETD)** on page 52.

9 Save the **MQConn_Get.cfg** file.

10 From the File menu select **Promote to Run Time** to move the file to the e*Way's run time environment.

11 Click **OK** to close the Properties dialog box.

To Create the MQConn_PutXA e*Way Connection

1 Repeat step 1-8 above to create the **MQConn_PutXA** e*Way Connection changing the name in step 3 to **MQConn_PutXA**.

2 Replace the following parameters displayed in Table 9 for those in step 8.

Table 9 Configuration Parameters for the MQConn_PutXA e*Way Connection

Parameter	Value
General Settings (unless otherwise stated, leave settings as default)	
Transaction Type	XA-compliant
MQSeries	
Queue Manager Name	MQ_mgr (a valid queue manager)
Port Number	1415 (a valid port number)
Channel	Channel2Test
connector	Default
Default GetMessageOptions	
Wait Timeout	No-Wait
Wait Interval	0

3 Save the **MQConn_PutXA.cfg** file.

4 From the **File** menu select **Promote to Run Time** to move the file to the e*Way's run time environment.

5 Click **OK** to close the Properties dialog box.

8.7 Step Five: Create Event Types

Step five is to create the Event Types. An Event Type is a class of Events with a common data structure. The e*Gate system packages data within Events and categorizes them into Event Types. What these Events have in common defines the Event Type and comprises the ETD.

Creating an Event Types Using the Custom ETD Wizard

The following procedures show how to create an ETD (Event Type Definition) using the Custom ETD Wizard.

1 Highlight the **Event Types** folder on the **Components** tab of the e*Gate Navigator.

2 On the palette, click the **Create a New Event Type** button.

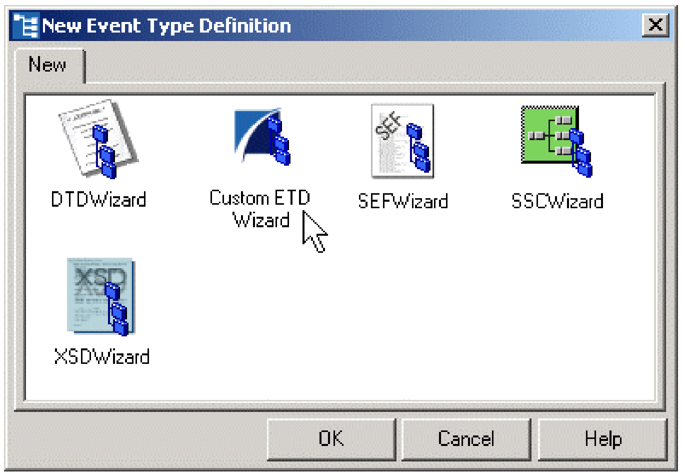
3 Enter the name of the **Event**, then click **OK.** For the purpose of this sample the Event Type is defined as **DummyTrigger**.

4 Double-click the new **Event Type** to edit its properties. The **Event Type Properties** dialog box appears.

5 Click the **New** button. The ETD Editor appears.

6 Click **New** from the File menu. The New Event Type Definition window appears (see Figure 18).

Figure 18 Event Type Definition Wizards



7 Select the **Custom ETD** wizard.

8 Enter the Root Node Name (for this case, “**Blob**”).

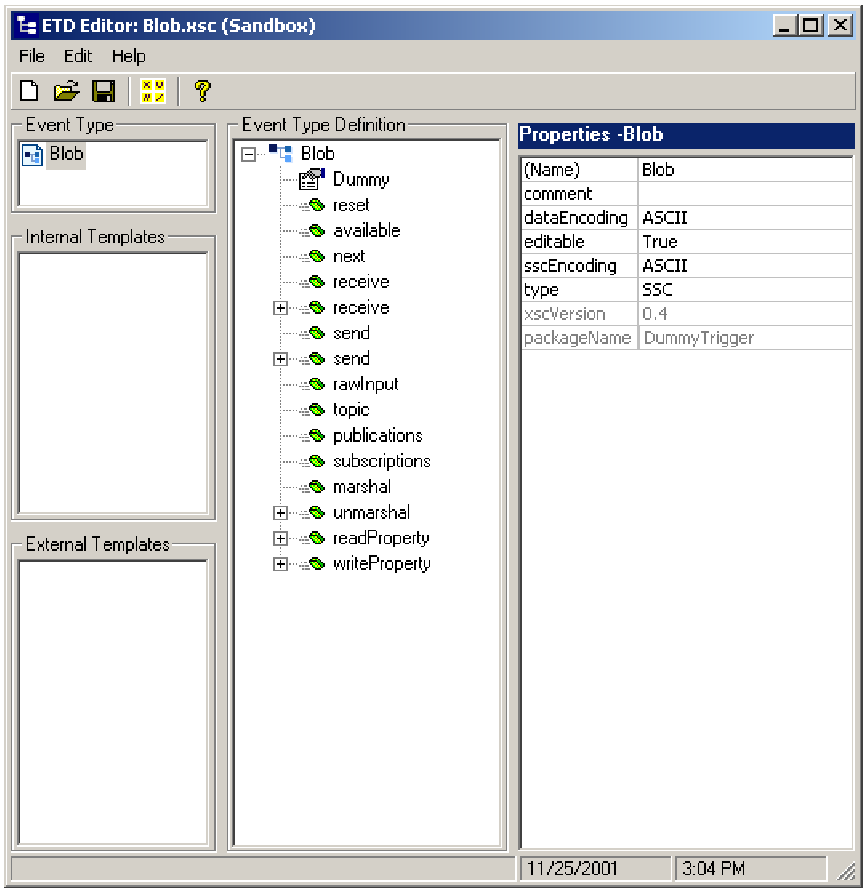
9 Enter a package name where the ETD Editor can place all the generated Java classes associated with the created ETD. (For this sample, use **DummyTrigger** as the package name.) Click **Next** and **Finish.** The ETD Editor appears (see Figure 19).

10 Right click **Blob** in the Event Type Definition pane of the ETD Editor, and select **Add Field, as Child Node**.

11 Triple-click on **Field1**, and rename it **Dummy**.

12 Select the **Dummy** node. The properties for the Dummy node are displayed in the Properties pane. Change the **endDelim** property to “**|**” (pipe).

Figure 19 Event Type Definition Editor



```
Blob
  Dummy
  reset
  available
  next
  receive
+ receive
  send
+ send
  rawInput
  topic
  publications
  subscriptions
  marshal
+ unmarshal
+ readProperty
+ writeProperty
```

(Name)	Blob
comment	
dataEncoding	ASCII
editable	True
sscEncoding	ASCII
type	SSC
xscVersion	0.4
packageName	DummyTrigger

13 From the **File** menu, click **Compile and Save**. Save the .xsc file as **DummyTrigger.xsc**.

14 From the **File** menu, click **Promote to Run Time** to move the file to the run time environment.

Creating Event Types From an Existing XSC

The following procedure shows how to create an Event Type Definition (ETD) from an existing .xsc file.

1 Select the **Event Types** folder on the **Components** tab of the e*Gate Navigator.

2 On the palette, click the **Create a New Event Type** button.

3 Enter the name of the **Event Type** in the **New Event Type Component** window, then click **OK**. (For this sample, the Event Type is defined as “**fromMQ**.”)

4 Double-click the new **Event Type** to edit its properties. The **Event Type Properties** dialog box appears.

5 Click **Find** under the **Event Type Definition** field.

6 Browse to and select **DummyTrigger.xsc**.

7 Click **OK** to close the Event Type Properties dialog box.

8.8 Step Six: Create Intelligent Queues

Step Six in configuring the MQSeries e*Way is to create the Intelligent Queues (IQs). IQs manage the exchange of information between components within the e*Gate system, providing non-volatile storage for data as it passes from one component to another. IQs use IQ Services to transport data. IQ Services provide the mechanism for moving Events between IQs, handling the low-level implementation of data exchange (such as system calls to initialize or reorganize a database).

To create and modify an Intelligent Queue for the MQSeries e*Way

1. Select the Navigator's **Components** tab.
2. Open the host on which you want to create the IQ.
3. Open a **Control Broker**.
4. Select an **IQ Manager**.
5. On the palette, click the **Create a New IQ** button.
6. Enter the name of the new IQ, then click **OK.** (For this case, **queue**.)
7. Double-click the new **IQ** to edit its properties.
8. On the **General** tab, specify the **Service** (for this sample, **STC_Standard**). The **STC_Standard** IQ Service provides sufficient functionality for most applications. If specialized services are required, custom IQ Service DLLs may be created.
9. Specify and the **Event Type Get Interval**. The default **Event Type Get Interval** of 100 Milliseconds is satisfactory for the purposes of this initial implementation.
10. On the **Advanced** tab, make sure that **Simple publish/subscribe** is checked under the **IQ behavior** section.
11. Click **OK** to close the **IQ Properties** window

8.9 Step Seven: Create Collaboration Rules

Step seven in creating the ETD-based MQSeries e*Way is to create the Collaboration Rules that extract and process selected information from the source Event Type defined earlier, according to its associated Collaboration Service. The **Default Editor** can be set to either **Monk** or **Java**. From the **Schema Designer Task Bar,** From the **Options** menu, click **Default Editor**. Make sure that the default is set to **Java**.

Creating Pass Through Collaboration Rules

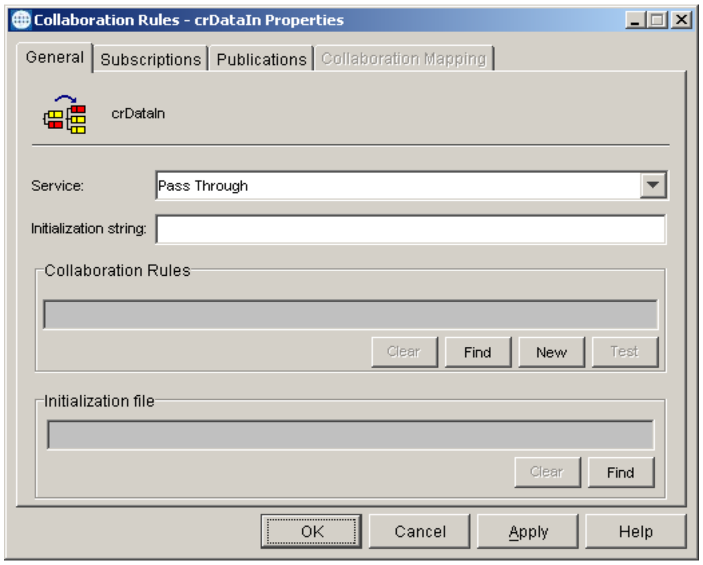
1. Select the Navigator's **Components** tab in the e*Gate Schema Designer.
2. In the **Navigator**, select the **Collaboration Rules** folder.
3. On the palette, click the **Create New Collaboration Rules** button.

4 Enter the name of the new Collaboration Rule Component, then click **OK** (in this case, use **crDataIn**).

5 Double-click the new Collaboration Rules Component. The **Collaboration Rules Properties** window appears (see Figure 20).

6 Select **Pass Through** from the drop-down box for the **Service** field.

Figure 20 Pass Through Collaboration Properties



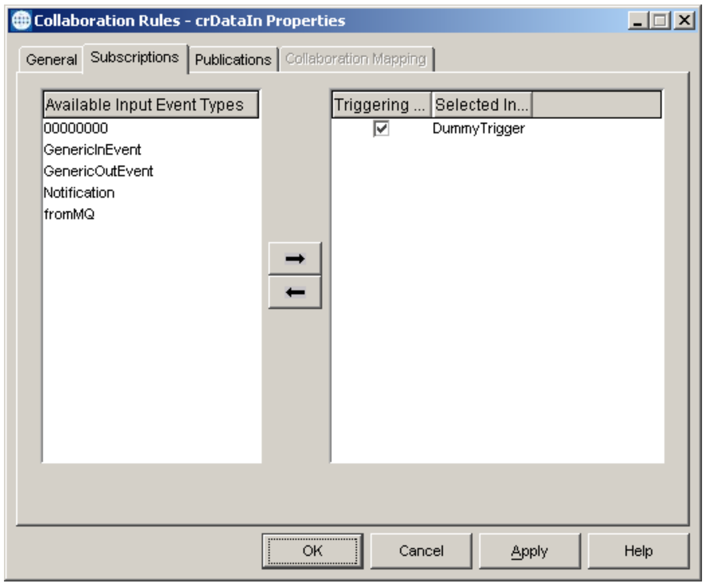
crDataIn

Service: Pass Through

Initialization string:

7 Go to the **Subscriptions** tab (seeFigure 21). Select **DummyTrigger** under **Available Input Event Types**, and click the right arrow to move it to **Selected Input Event Types**. The box under **Triggering Event** should be checked.

Figure 21 Pass Through Collaboration Properties, Subscriptions Tab



Available Input Event Types
00000000
GenericInEvent
GenericOutEvent
Notification
fromMQ

Triggering ...	Selected In...
✓	DummyTrigger

8 Go to the **Publications** tab. Select **DummyTrigger** under **Available Output Event Types**, and click the right arrow to move it to **Selected Output Event Types**. The Radio button under **Default** is enabled.

9 Click **OK** to close the **Collaboration Rules, Pass Properties** window.

10 Repeat steps 1-9 above to create the **crDataOut** Collaboration Rules, changing the name in step 4 to **crDataOut** and the selected Input and Output Event Types in steps 7 and 8 to **fromMQ.**

Creating Java Collaboration Rules

For the purpose of the sample schema two Java Collaboration Rules files are created.

To Create the MQCollab Collaboration Rules

1 Select the Navigator's **Components** tab in the e*Gate Schema Designer.

2 In the **Navigator**, select the **Collaboration Rules** folder.

3 On the palette, click the **Create New Collaboration Rules** button.

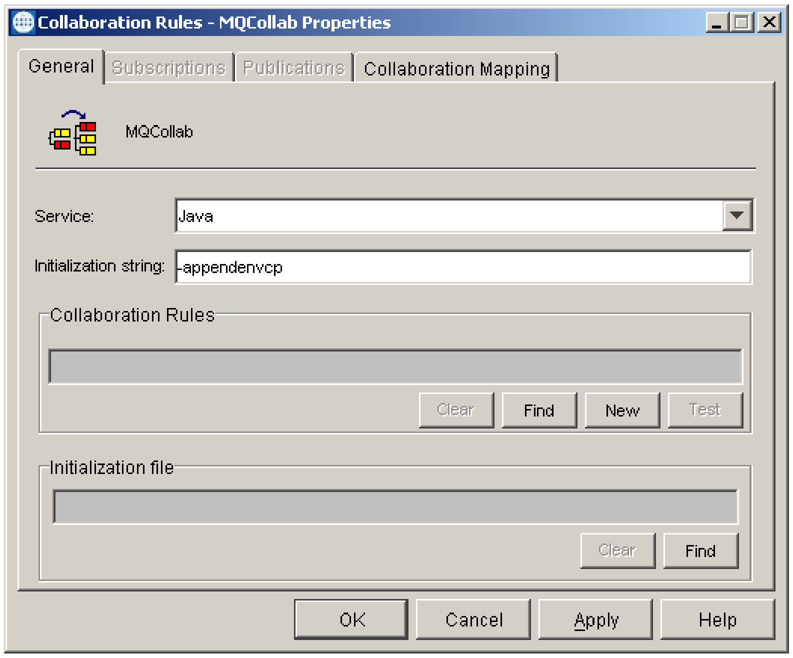
4 Enter the name of the new Collaboration Rule, then click **OK** (for this case, use **MQCollab**).

5 Double-click the new Collaboration Rules Component to edit its properties. The **Collaboration Rules Properties** window appears (see Figure 22).

6 The **Service** field defaults to **Java**. The **Collaboration Mapping** tab is enabled, and the **Subscriptions** and **Publications** tabs are disabled.

7 In the **Initialization string** field, enter any required initialization string for the Collaboration.

Figure 22 Collaboration Rules - Properties


Collaboration Rules - MQCollab Properties

MQCollab

Service: Java

Initialization string: -appendenvcp

8 Select the **Collaboration Mapping** tab (see Figure 23).

9 Using the **Add Instance** button, create instances to coincide with the Event Types.

For this sample, do the following:

10 In the **Instance Name** column, enter **outbound** for the instance name.

11 Click **Find**, navigate to **etd\MQSeriesETD.xsc**, double-click to select. **MQSeriesETD.xsc** is added to the **ETD** column of the instance row.

12 In the **Mode** column, select **Out** from the drop–down menu available.

13 The **Trigger** setting defaults to **N/A**.

14 The **Manual Publish** setting is clear.

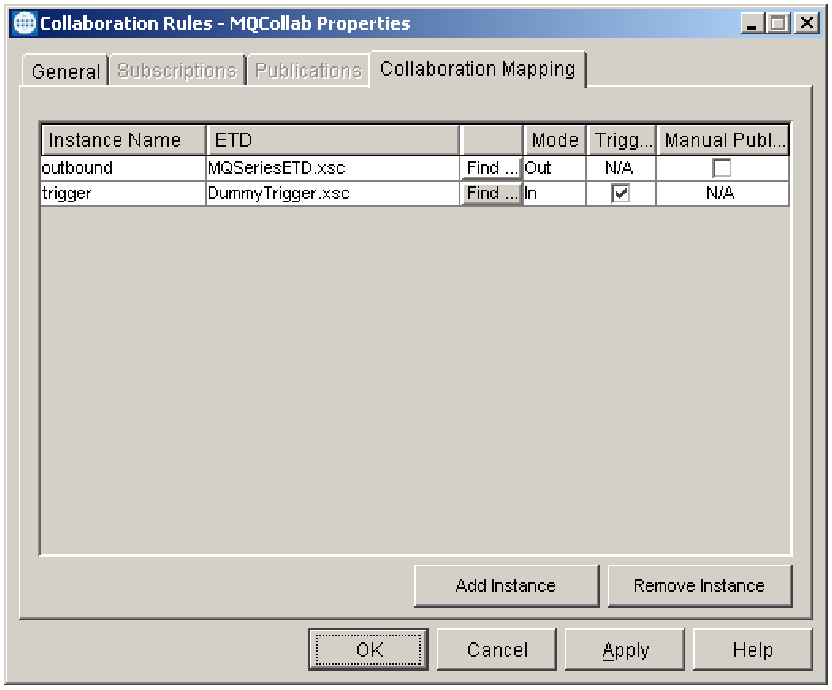
15 Repeat steps 9–13 using the following values:

- Instance Name: **trigger**
- ETD: **DummyTrigger.xsc**
- Mode: **In**
- Trigger: **select**
- Manual Publish: **N/A**

Note: *At least one of the ETD instances used by the Collaboration must be checked as the trigger.*

*For specific information on creating and configuring Collaboration Rules, see the e*Gate Integrator User's Guide.*

Figure 23 Collaboration Rules - Collaboration Mapping Properties



Instance Name	ETD		Mode	Trigg...	Manual Publ...
outbound	MQSeriesETD.xsc	Find ...	Out	N/A	☐
trigger	DummyTrigger.xsc	Find ...	In	☑	N/A

16 Select the **General** tab. Under the Collaboration Rule field, select **New**. The **Collaboration Rules Editor** appears.

17 Expand to full size for optimum viewing, expanding the Source and Destination Events as well.

8.9.1. Using the Collaboration Rules Editor

Part two of step seven is to define the business logic using the Collaboration Rules Editor. The Java Collaboration Rules Editor is the GUI used to create and modify Java Collaboration Rules. A Java Collaboration Rule is created by designating one or more source Events and one or more destination Events and then setting up rules governing the relationship between fields in the Event instances.

Note: *In order to compile the Collaboration that uses MQSeriesETD.xsc, first add com.ibm.mq.jar to the User Classpath from Tools, Options in the Collaboration Rules editor.*

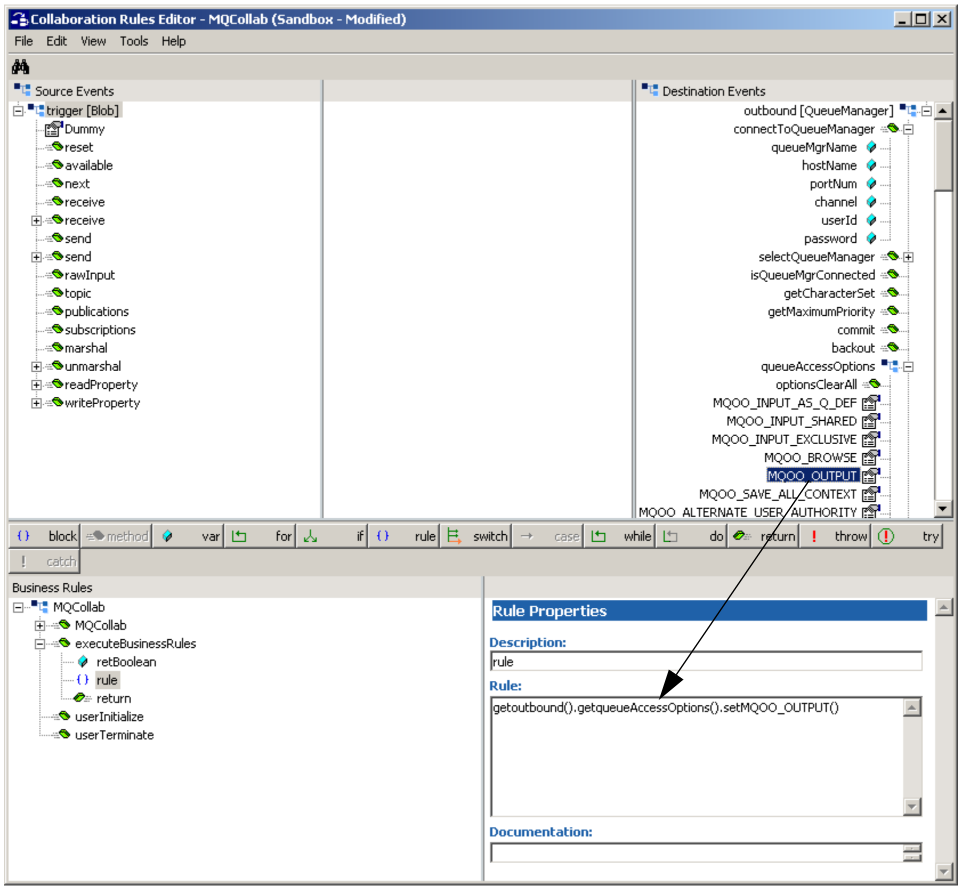
1 Highlight **retBoolean** in the **Business Rules** pane.

All of the user–defined business rules are added as part of this method.

2 Click the **rule** button on the Business Rules tool bar. A rule expression is added to the business rules.

3 From the Destination Events pane, drag-and-drop **MQOO_OUTPUT** into the Business Rules pane, Rules field. When prompted for ***type of function for this node*** select **set**. Place the cursor between the last set of parentheses and type **true**.

Figure 24 Collaboration Rules Editor - Drag and Drop



Description: rule

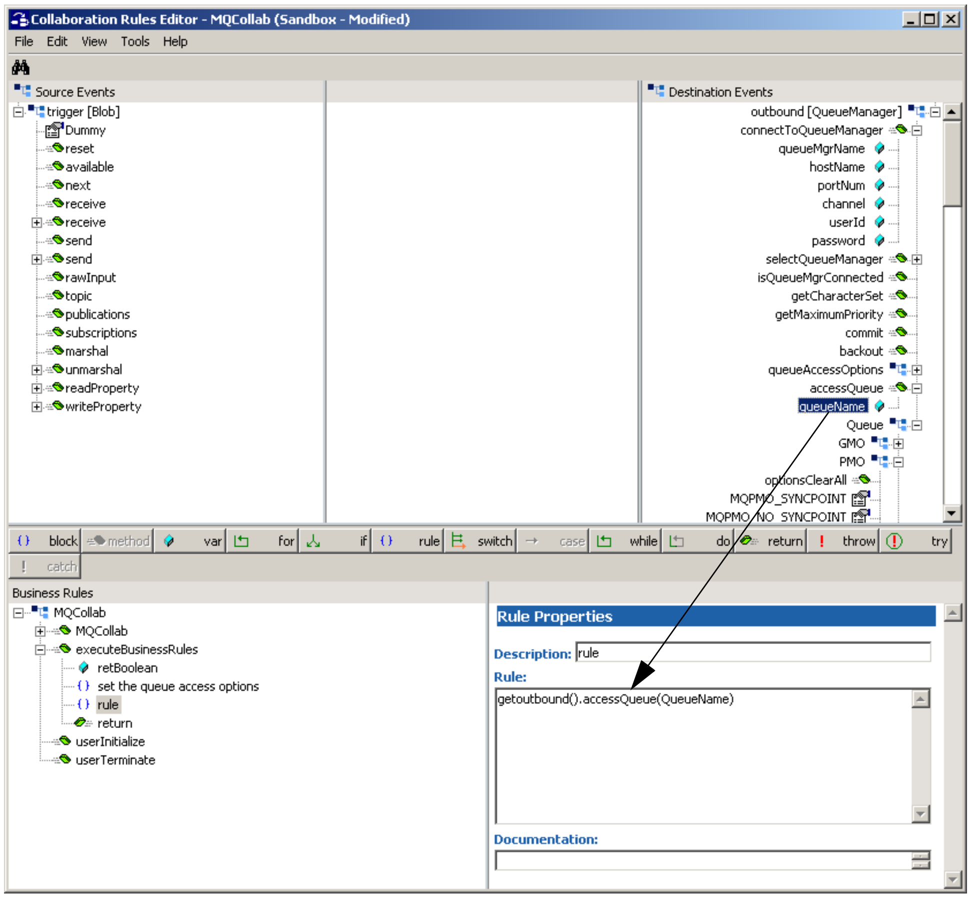
Rule:
```
getoutbound().getqueueAccessOptions().setMQOO_OUTPUT()
```

4 In the Description field type **set the queue access options**. This description now displays as the rule tag in the Business Rules pane.

5 Click the **rule** button on the Business Rules tool bar again. A rule expression is added to the Business Rules pane under the previous rule.

6 From the Destination Events pane, drag-and-drop the **accessQueue** method into the Business Rules pane, Rules field (see Figure 25). When prompted for the **queueName** type in the name of the queue to which you have access.

Figure 25 Collaboration Rules Editor – accessQueue



Description: rule

Rule:

```
getoutbound().accessQueue(QueueName)
```

Documentation:

7 In the Description field type **access the queue**. This description now displays as the rule tag in the Business Rules pane.

8 Click the **rule** button to add another rule expression.

9 From the Destination Events pane, drag-and-drop **MQPMO_NO_SYNCPOINT** under PMO into the Business Rules pane, Rules field. When prompted for ***type of function to insert for this node*** select **set**. Place the cursor between the last set of parentheses and type **true**.

10 In the Description field type **set the PutMessageOptions**. This description now displays as the rule tag in the Business Rules pane.

11 Click the **rule** button to add another rule expression.

12 From the Destination Events pane, drag-and-drop the **writeString** method under Message, MsgBody into the Business Rules pane, Rules field. When prompted for ***a stringValue*** type your message into the field. The value (message) can also be dragged and dropped to the **write** calls as appropriate, or to the MsgBody data node and call **writeData**.

13 In the Description field type **write a string to the message**.

14 Once more, click the **rule** button to add another rule expression.

15 From the Destination Events pane, drag-and-drop the **putWithOptions** method into the Business Rules pane, Rules field.

16 In the Description field type **put the message on the queue**.

17 When all the business logic has been defined, the code can be compiled by selecting **Compile** from the **File** menu. In order to compile the Collaboration that uses MQSeriesETD.xsc, first add com.ibm.mq.jar to the User Classpath from Tools, Options in the Collaboration Rules editor. The **Save** menu appears, provide a name for the **.xpr** file. For the sample, use **MQCollab.xpr**. If the code compiles successfully, the message **Compile Completed** appears. If the outcome is unsuccessful, a Java Compiler error message appears. Once the compilation is complete, save the file and exit the Collaboration Rules editor.

18 Under the **Collaboration Rules** field in the Collaboration Rules Properties dialog box, the path for the created .class file appears.

19 Under the **Initialization file** field, the path for the created **.ctl** file appears.

20 Click **OK** to close the **Properties** dialog box.

Note: *For detailed information on creating Collaboration Rules using the Java Collaboration Rules Editor see the e*Gate Integrator User's Guide.*

To Create the MQGetCollab Collaboration Rules

1 Click on the **Create New Collaboration Rules** button again. Name the new Collaboration Rules **MQGetCollab** for this sample.

2 Double-click the new Collaboration Rules. The Services field defaults to Java. Enter any required initialization string in the **Initialization string** field.

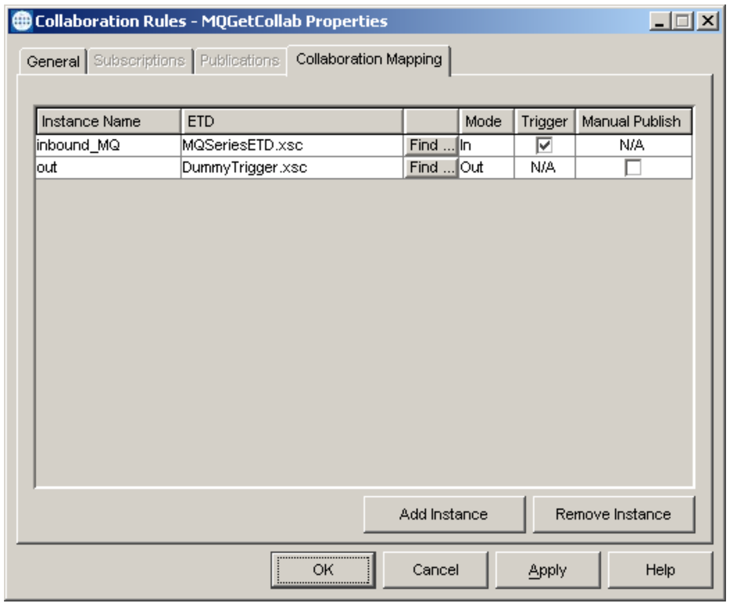
3 Select the **Collaboration Mapping** tab (see Figure 26) and create an instance and settings for the following;

- Instance Name — **inbound_MQ**
- ETD — **MQSeriesETD.xsc**
- Mode — **In**
- Trigger – **select**
- Manual Publish — **N/A**

4 Create another instance and settings for the following:

- Instance Name — **out**
- ETD — **DummyTrigger.xsc**
- Mode — **Out**
- Trigger – **N/A**
- Manual Publish — **Clear**

Figure 26 Collaboration Rules - Collaboration Mapping Properties



Instance Name	ETD		Mode	Trigger	Manual Publish
inbound_MQ	MQSeriesETD.xsc	Find ...	In	✓	N/A
out	DummyTrigger.xsc	Find ...	Out	N/A	☐

5 Select the **General** tab. Under the Collaboration Rule field, select **New**. The **Collaboration Rules Editor** appears. Expand to full size for optimum viewing, expanding the Source and Destination Events as well.

6 Highlight **retBoolean** in the **Business Rules** pane.

7 Click the **rule** button on the Business Rules tool bar. A rule expression is added to the business rules.

8 From the Source Events pane, drag-and-drop **MQOO_INPUT_AS_Q_DEF** into the Business Rules pane, Rules field. When prompted for ***type of function for this node*** select **set**. Place the cursor between the last set of parentheses and type **true**.

9 In the Description field type **set the queue access options**. This description now displays as the rule tag in the Business Rules pane.

10 Click the **rule** button on the Business Rules tool bar again. A rule expression is added to the Business Rules pane under the previous rule.

11 From the Source Events pane, drag-and-drop the **accessQueue** method into the Business Rules pane, Rules field. When prompted for the **queueName** type in the name of the queue to which you have access.

12 In the Description field type **access the queue**. This description now displays as the rule tag in the Business Rules pane.

13 Click the **rule** button to add another rule expression.

14 From the Source Events pane, drag-and-drop **MQPMO_NO_SYNCPOINT** under PMO into the Business Rules pane, Rules field. When prompted for ***type of function to insert for this node*** select **set**. Place the cursor between the last set of parentheses and type **true**.

15 In the Description field type **set the PutMessageOptions if any**. This description now displays as the rule tag in the Business Rules pane.

16 Click the **rule** button to add another rule expression.

17 From the Source Events pane, drag-and-drop the **getWithOptions** method into the Business Rules pane, Rules field.

18 In the Description field type **Calling getWithOptions()**.

19 Click the **rule** button to add another rule expression.

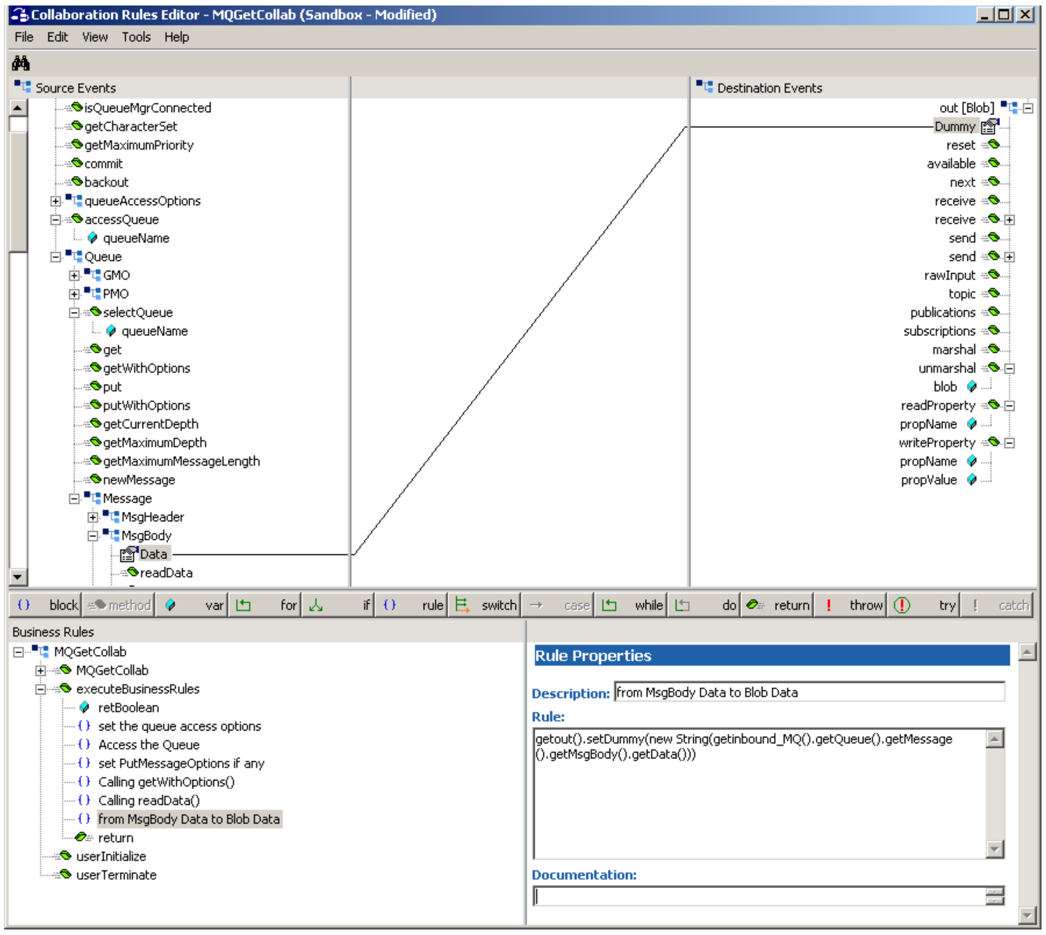
20 From the Source Events pane, drag-and-drop the **readData** method under Message, MsgBody into the Business Rules pane, Rules field.

21 In the Description field type **Calling readData()**.

22 From the Source Events pane, drag-and-drop the **Data** method under Message, MsgBody to **Dummy** in the Destination Events pane. A line appears between **Data** and **Dummy**, and the created code appears in the Rule Properties, Rules field (see Figure 27). If necessary, edit the code in the Rule Properties, Rules field to appear as follows:

```
getout().setDummy(newString(getinbound_MQ().getQueue()
.getMessage().getMsgBody().getData()))
```

Figure 27 Collaboration Rules — Collaboration Rules Editor



Description: from MsgBody Data to Blob Data

Rule:
```
getout().setDummy(new String(getinbound_MQ().getQueue().getMessage
().getMsgBody().getData()))
```

Documentation:

23 When all the business logic has been defined, the code can be compiled by selecting **Compile** from the **File** menu. In order to compile the Collaboration that uses MQSeriesETD.xsc, first add com.ibm.mq.jar to the User Classpath from Tools, Options in the Collaboration Rules editor. The **Save** menu appears, provide a name for the **.xpr** file. For the sample, use **MQGetCollab.xpr**. If the code compiles successfully, the message **Compile Completed** appears. If the outcome is unsuccessful, a Java Compiler error message appears. Once the compilation is complete, save the file and exit the Collaboration Rules Editor.

24 Click **OK** to close the **Properties** dialog box.

Note: *For detailed information on creating Collaboration Rules using the Java Collaboration Rules Editor see the e*Gate Integrator User's Guide.*

8.10 Step Eight: Create Collaborations

Step eight in creating the ETD-based MQSeries e*Way is to create the Collaborations. Collaborations are the components that receive and process Event Types, then forward the output to other e*Gate components or an external component. Collaborations consist of the Subscriber, which “listens” for Events of a known type (sometimes from a given source), and the Publisher, which distributes the transformed Event to a specified recipient.

Creating the Inbound_eWay Collaboration

1 Create another new Collaboration in the e*Gate Schema Designer, select the Navigator's **Components** tab.

2 Open the host on which you want to create the Collaboration.

3 Select a **Control Broker.**

4 Select the **Feeder** e*Way to assign the Collaboration.

5 On the palette, click the **Create New Collaboration** button.

6 Enter the name of the new Collaboration, then click **OK.** (For the sample, “**FeederCollab**”.)

7 Double-click the new **Collaboration** to edit its properties. The Collaboration Properties dialog box appears (see Figure 28).

8 From the **Collaboration Rules** list, select the **Collaboration Rules** file that you created previously. (For the sample, “**crDataIn**”.)

9 In the **Subscriptions** area, click **Add** to define the input Event Types to which this Collaboration subscribes.

A From the **Event Type** list, select the **Event Type** that you previously defined **DummyTrigger**.

B Select the **Source** from the **Source** list. In this case, it should be **<External>**.

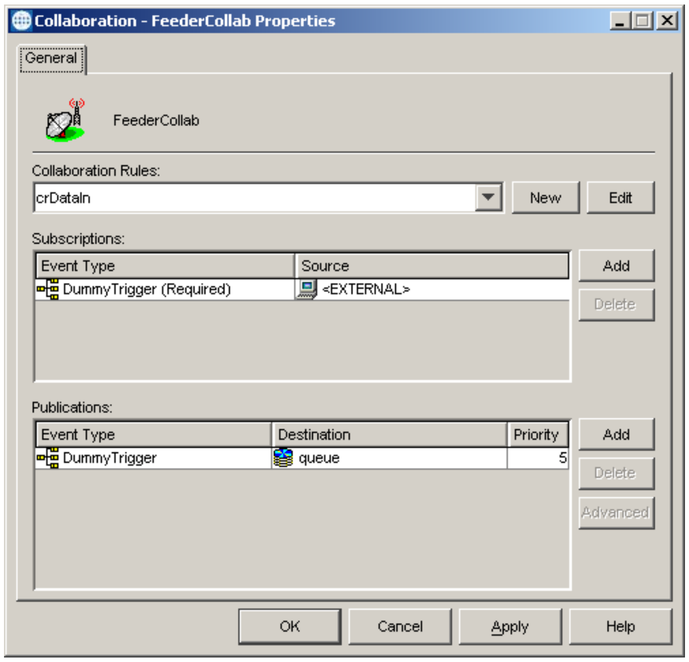
10 In the **Publications** area, click **Add** to define the output **Event Types** that this Collaboration publishes.

A From the **Event Types** list, select the **Event Type** that you previously defined **DummyTrigger**.

B Select the publication **Destination** from the **Destination** list. In this case, it should be **queue**.

C The Priority column defaults to **5**.

Figure 28 Inbound e*Way Collaboration Properties



FeederCollab

Collaboration Rules: crDataIn (New, Edit)

Subscriptions: (Add, Delete)

Event Type	Source
DummyTrigger (Required)	<EXTERNAL>

Publications: (Add, Delete, Advanced)

Event Type	Destination	Priority
DummyTrigger	queue	5

11 Click **OK** to close the **Collaboration Properties** window.

Creating the Multi Mode e*Way Collaboration

Two Collaboration are created for the Multi-Mode e*Way **MQGetCollab**, and **colMQPutCollab**.

To Create the MQGetCollab Collaboration

1 To create the **MQGetCollab** Collaboration, select the **MQ_Get** e*Way.

2 On the palette, click the **Create a New Collaboration** button.

3 Enter the name of the new Collaboration, then click **OK.** (For this sample, “**MQGetCollab**”.)

4 Double-click the new Collaboration to edit its properties. The **Collaboration Properties** dialog box appears (seeFigure 29).

5 From the **Collaboration Rules** drop-down list box, select the Collaboration Rules file that you created previously. For the sample use **MQGetCollab.**

6 In the **Subscriptions** field, click **Add** to define the input Event Types to which this Collaboration subscribes.

   A From the **Instance Name** list, select the **Instance Name** that you previously defined **inbound_MQ**.

   B From the **Event Type** list, select the **Event Type** previously defined **GenericOutEvent**.

   C Select the **Source** from the **Source** list. In this case, it should be **MQConn_Get**.

7 In the **Publications** area, click **Add** to define the output **Event Types** that this Collaboration publishes.

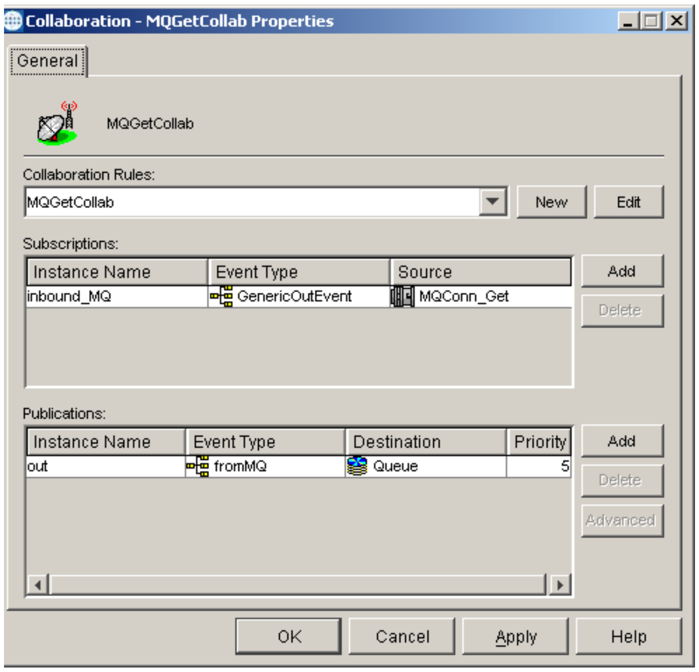
   A From the **Instance Name** list, select the **Instance Name** previously defined **out**.

   B From the **Event Types** list, select the **Event Type** named **GenericOutEvent**.

   C Select the **Destination** from the **Destination** list. In this case, it should be **Queue**.

   D The Priority column defaults to **5**.

Figure 29 Collaboration Properties - MQGetCollab



Collaboration Rules: MQGetCollab

Subscriptions:

Instance Name	Event Type	Source
inbound_MQ	GenericOutEvent	MQConn_Get

Publications:

Instance Name	Event Type	Destination	Priority
out	fromMQ	Queue	5

8 Click **OK** to close the Properties window.

To Create the MQPutCollab Collaboration

1 To create the **MQPutCollab**, repeat steps 1-6 above substituting the Collaboration name to **MQPutCollab**.

2 In the **Subscriptions** field, click **Add** to define the input Event Types to which this Collaboration subscribes.

   A From the **Instance Name** list, select the **Instance Name** that you previously defined **trigger**.

B From the **Event Type** list, select the **Event Type** previously defined **DummyTrigger**.

C Select the **Source** from the **Source** list. In this case, it should be **FeederCollab**.

3 In the **Publications** area, click **Add** to define the output **Event Types** that this Collaboration publishes.

A From the **Instance Name** list, select the **Instance Name** previously defined **outbound**.

B From the **Event Types** list, select the **Event Type** named **GenericOutEvent**.

C Select the **Destination** from the **Destination** list. In this case, it should be **MQConn_PutXA**.

4 The Priority column defaults to **5**.

5 Click **OK** to close the Properties window.

8.11 Step Nine: Set the CLASSPATH Variable

The final step in creating and configuring the MQSeries e*Way is to set the IBM MQSeries Java .jar files in the environment CLASSPATH variable. This includes the following .jar files.

\MQSeries\Java\lib

\MQSeries\Java\lib\com.ibm.mq.jar

Also set the \MQSeries\Java\lib in your PATH.

For UNIX, include /MQSeries/Java/lib in the library path as follows:

- Solaris: LD_LIBRARY_PATH
- HP-UX: SHLIB_PATH
- AIX: LIBPATH

If the CLASSPATH and PATH already exist, add the .jar files to the existing PATH and CLASSPATH.

Setting the CLASSPATH variable on Windows

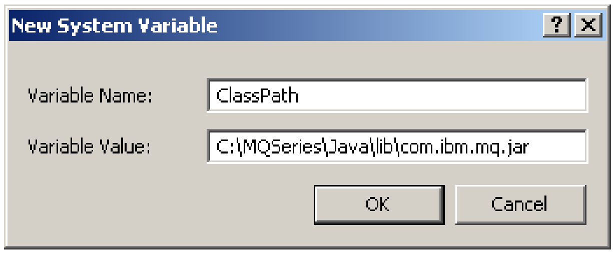
1 Right-click **My Computer** and select **Properties**. The System Properties window appears.

2 Select the **Advanced** tab and Click on **Environment Variables**. The Environment Variables window appears.

3 Under **System Variables** click **New**.

4 In the New System Variable window type **ClassPath** in the **Variable Name** field. In the Variable Value field type the absolute path for the first .jar file (See Figure 30), and click **OK**.

Figure 30 Setting Environment Variables



Variable Name: ClassPath
Variable Value: C:\MQSeries\Java\lib\com.ibm.mq.jar

5. Repeat steps 3 and 4 for each of the MQSeries .jar files.
6. Under System Variables click **New**.
7. In the New System Variable window type **Path** in the **Variable Name** field. In the Variable Value field type the absolute path for \MQSeries\Java\lib and click **OK**.
8. Click **OK** to close the Environment Variables window and the System Properties window.

8.12 Execute the Schema

To execute the schema

1. Go to the command line prompt, and enter the following:

   ```
   stccb -rh hostname -rs schemaname -un username -up user password
   -ln hostname_cb
   ```

   Substitute ***hostname***, schemaname, ***username*** and ***user password*** as appropriate.
2. Exit from the command line prompt, and start the Schema Manager GUI.
3. When prompted, specify the ***hostname*** which contains the Control Broker you started in Step 1 above.
4. Select the schema.
5. After you verify that the Control Broker is connected (the message in the Control tab of the console indicates command as *succeeded* and status as *up*), highlight the IQ Manager, ***hostname***_igmgr, then right-click and select **Start**.
6. Highlight each of the e*Ways, right-click the mouse, and select **Start**.

8.13 Error Messages

If there is an error, such as a failed connection, an exception is thrown by the module and logged to the error log file at egate/client/logs. The error log appears similar to the following:

```
11:59:34.091 EWY I 11 (initialize.cxx:1035): Exception thrown: Failed to access queue:
MQRC_UNKNOWN_OBJECT_NAMEc
om.ibm.mq.MQException: MQJE001: Completion Code 2, Reason 2085
```

```
        at com.ibm.mq.MQQueueManager.accessQueue(MQQueueManager.java:1151)
        at com.ibm.mq.MQQueueManager.accessQueue(MQQueueManager.java:1196)
        at com.stc.eways.MQSeriesETD.MQSeriesConnector.accessQueue(MQSeriesConnector.java:395)
        at com.stc.eways.MQSeriesETD.MQSeriesETD.accessQueue(MQSeriesETD.java:291)
        at MQ_EMECollab.executeBusinessRules(MQ_EMECollab.java:106)
        at com.stc.jcsre.JCollaboration.translate(JCollaboration.java:97)
        at com.stc.common.collabService.JCCollabControllerImpl.
  translate(JCCollabControllerImpl.java:1096
```

The reason code parameter or MQRC, in this case Reason 2085, appears in the first few lines of the error log. This reason code can be used in conjunction with IBMs online document, **MQSeries Messages**, Chapter 9 at:

http://www-903.ibm.com/board/attach_files/mqseries/k1005706457257_messages.pdf

The chapter lists reason codes, exceptions, the associated errors and the corrective actions to take. For the above example, the MQRC appears as follows:

2085	X'0825'	MQRC_UNKNOWN_OBJECT_NAME An MQOPEN or MQPUT1 call was issued, but the object identified by the ObjectName and ObjectQMgrName fields in the object descriptor MQOD cannot be found. One of the following applies: ▪ The ObjectQMgrName field is one of the following: ♦ Blank ♦ The name of the local queue manager ♦ The name of a local definition of a remote queue (a queue-manager alias) in which the RemoteQMgrName attribute is the name of the local queue manager but no object with the specified ObjectName and ObjectType exists on the local queue manager. ▪ The object being opened is a cluster queue that is hosted on a remote queue manager, but the local queue manager does not have a defined route to the remote queue manager. ▪ The object being opened is a queue definition that has QSGDISP(GROUP). Such definitions cannot be used with the MQOPEN and MQPUT1 calls. Corrective action: Specify a valid object name. Ensure that the name is padded to the right with blanks if necessary. If this is correct, check the queue definitions.

Chapter 9

Java Methods (ETD)

The MQSeries e*Way contains Java methods that are used to extend the functionality of the e*Way. These methods are contained in the following classes:

- **MQSeriesETD Class** on page 97
- **GMO Class** on page 105 (GetMessageOptions)
- **PMO Class** on page 107 (PutMessageOptions)
- **Message Class** on page 107

9.1 MQSeriesETD Class

MQSeriesETD class methods are located under the **QueueManager node** and **Queue node.**

The MQSeriesETD class is defined as:

```
public class MQSeriesETD
```

The MQSeriesETD class extends **com.stc.jcsre.SimpleETDImpl** and implements **com.stc.jcsre.ETD** and **com.stc.jcsre.ETDConstants**.

Methods of the MQSeriesETD class

These methods are described in detail on the following pages

connectToQueueManager

Description

Creates a connection to the queue manager using the specified parameters. As a by-product it also selects as the current queue manager. This should only be called in Non-Transactional mode.

Note: *A connection to the queue manager specified in the configuration is automatically done. You need not call this method unless you want to connect to another Queue manager in the Collaboration.*

Syntax

```
public void connectToQueueManager(java.lang.String sQueueMgrName,
java.lang.String Host,int Port, java.lang.String Channel, java.lang.String
UserID, java.lang.String Pwd)
```

Parameters

Name	Type	Description
sQueueMgrName	java.lang.String	The queue manager name.
Host	java.lang.String	The host on which the QM resides.
Port	int	The port to which the host system QM is listening.
Channel	java.lang.String	The channel to use.
UserID	java.lang.String	The user's ID - if no ID is needed, leave blank.
Pwd	java.lang.String	The user password - if no password is needed, leave blank.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

selectQueueManager

Description

Selects from one of the connected queue managers.

Syntax

```
public void selectQueueManager(java.lang.String queueMgrName)
```

Parameters

Name	Type	Description
queueMgrName	java.lang.String	The name of the queue manager to select.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

isQueueMgrConnected

Description

Determines if the current queue manager is still connected.

Syntax

```
public boolean isQueueMgrConnected()
```

Parameters

None

Return Values

Boolean
Returns true if still connected; otherwise false.

Throws

com.stc.jcsre.EBobConnectionException

getCharacterSet

Description

Returns CCSID of the queue manager's codeset for the currently selected queue manager.

Syntax

```
public int getCharacterSet()
```

Parameters

None

Return Values

int
Returns the CCSID of the queue manager's codeset

Throws

com.stc.common.collabService.CollabConnException

---

getMaximumPriority

Description

Returns the maximum message priority that can be handled by the queue manager.

Syntax

```
public int getMaximumPriority()
```

Parameters

None

Return Values

int
Returns the maximum message priority.

Throws

com.stc.common.collabService.CollabConnException

---

commit

Description

Commits the operations on the currently selected queue manager. It should only be called in Non-XA mode.

Syntax

```
public void commit()
```

Parameters

None

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

---

backout

Description

Rolls back the operations on the currently selected queue manager. It should only be called in Non-XA mode.

Syntax

```
public void backout()
```

Parameters

None

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

queueAccessOptionsClearAll

Description

Clears all flags

Syntax

```
public queueAccessOptionsClearAll()
```

Parameters

None

Return Values

None

Throws

None

accessQueue

Description

Accesses a queue on the current queue manager. This routes down to the accessQueue method on the queue manager. The user can access more than one queue on the current queue manager. For each new queue accessed, add the queue to an internal collection so they can be selected by name later (see **selectQueue( )**). In addition, this method also sets that queue as the "current queue". This is similar to the concept of the current queue manager.

Syntax

```
public void accessQueue(java.lang.String queueName)
```

Parameters

Name	Type	Description
queueName	java.lang.String	The name of the queue to access on the current queue manager

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

selectQueue

Description

Selects from one of the previously accessed queues.

Syntax

```
public void selectQueue(java.lang.String queueName)
```

Parameters

Name	Type	Description
queueName	java.lang.String	The name of the queue to select

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

get

Description

Gets a message off the queue using the default options.

Syntax

```
public void get()
```

Parameters

None

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

getWithOptions

Description

Gets a message off the queue using the GetMesageOptions (GMO).

Syntax

```
public void getWithOptions()
```

Parameters

None

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

put

Description

Puts a message on the queue using the default options.

Syntax

```
public void put()
```

Parameters

None

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

putWithOptions

Description

Puts a message on the queue using the PutMesageOptions (PMO).

Syntax

```
public void putWithOptions()
```

Parameters

None

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

getCurrentDepth

Description

Gets the number of messages currently in the queue.

Syntax

```
public int getCurrentDepth()
```

Parameters

None

Return Values

int
Returns the number of messages currently in the queue.

Throws

com.stc.common.collabService.CollabConnException

getMaximumDepth

Description

Gets the maximum number of messages that can exist on the current queue.

Syntax

```
public int getMaximumDepth()
```

Parameters

None

Return Values

int
Returns the number of messages that can exist on the queue.

Throws

com.stc.common.collabService.CollabConnException

getMaximumMessageLength

Description

Gets the maximum length of data that can exist in any one message on the current queue

Syntax

```
public int getMaximumMessageLength()
```

Parameters

None

Return Values

int

Returns the maximum data limit for one message on the queue.

Throws

com.stc.common.collabService.CollabConnException

newMessage

Description

Destroys and then recreate the message object. After doing a get, this must be called first, before doing another get. (See **The newMessage Method** on page 61.)

Syntax

```
public void newMessage()
```

Parameters

None

Return Values

None

Throws

None

9.2 GMO Class

GMO class methods are located under the **Queue node**.

The GMO class is defined as:

```
public class GMO
```

com.stc.eways.MQSeriesETD.GMO

Methods of the GMO class

These methods are described in detail on the following pages:

optionsClearAll on page 105	**setUnlimitedWait** on page 106
setWaitValue on page 106	**matchOptionsClearAll** on page 107

optionsClearAll

Description

Clears all option flags.

Syntax

```
public void optionsClearAll()
```

Parameters

None

Return Values

None

Throws

None

setWaitValue

Description

Specifies a specific number of milliseconds to wait.

Syntax

```
public void setWaitValue(int v)
```

Parameters

Name	Type	Description
v	int	The number of milliseconds.

Return Values

None

Throws

None

setUnlimitedWait

Description

Sets the wait time to MQWI_UNLIMITED.

Syntax

```
public void setUnlimitedWait()
```

Parameters

None

Return Values

None

Throws

None

matchOptionsClearAll

Description

Clears all match options flags set so far and set match options to MQMO_NONE.

Syntax

```
public void matchOptionsClearAll()
```

Parameters

None

Return Values

None

Throws

None

9.3 PMO Class

PMO class methods are located under the **Queue node**

The PMO class is defined as:

```
public class GMO
```

com.stc.eways.MQSeriesETD.PMO

Methods of the PMO class

These methods are described in detail on the following pages:

optionsClearAll on page 105

9.4 Message Class

Message class methods are located under the **Message node**.

The Message class is defined as:

```
public class Message
```

com.stc.eways.MQSeriesETD.Message

Methods of the Message class

These methods are described in detail on the following pages:

getTotalMessageLength on page 108	**readUInt2** on page 119

getTotalMessageLength

Description

If MQQueue.get() fails with a message-truncated error code, getTotalMessageLength( ) reports the total number of bytes in the stored message on the queue.

Syntax

```
public int getTotalMessageLength()
```

Parameters

None

Return Values

int

Returns the number of bytes of the message as stored on the message queue.

Throws

None

getMessageLength

Description

Reports the total number of bytes in the stored message on the queue.

Syntax

```
public int getMessageLength()
```

Parameters

None

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

getDataLength

Description

Reports the number of bytes of data remaining to be read in the message.

Syntax

```
public int getDataLength()
```

Parameters

None

Return Values

int

Returns the number, in bytes, of message data remaining to be read.

Throws

com.stc.common.collabService.CollabConnException

seek

Description

Relocates the cursor to the absolute position in the message buffer given by *pos*. Following reads and writes act at this position in the buffer.

Syntax

```
public void seek(int pos)
```

Parameters

Name	Type	Description
pos	int	Gives the absolute position in the message buffer.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

setDataOffset

Description

Relocates the cursor to the absolute position in the message buffer. setDataOffset ( ) is equivalent to seek(), allowing for cross-language compatibility with the other MQSeries APIs.

Syntax

```
public void setDataOffset(int offset)
```

Parameters

Name	Type	Description
offset	int	Gives the absolute position in the message buffer.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

getDataOffset

Description

Returns the current position of the cursor within the message, that is the point at which read and write operations take effect.

Syntax

```
public int getDataOffset()
```

Parameters

None

Return Values

int
Returns the current cursor position.

Throws

com.stc.common.collabService.CollabConnException

clearMessage

Description

Discards data in the message buffer and reset the data offset to zero.

Syntax

```
public void clearMessage()
```

Parameters

None

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

getVersion

Description

Returns the version of the current structure.

Syntax

```
public int getVersion()
```

Parameters

None

Return Values

int

Returns the version of the structure in use.

Throws

None

resizeBuffer

Description

Clues the MQMessage object as to the size of buffer that may be necessary for subsequent get operations. When a message contains message data, and the new size is less than the current size, the message data is truncated.

Syntax

```
public void resizeBuffer(int size)
```

Parameters

Name	Type	Description
size	int	The size of the buffer

Return Values

int

Returns the new message size.

Throws

com.stc.common.collabService.CollabConnException

readBoolean

Description

Reads a (signed) byte from the present position in the message buffer.

Syntax

```
public boolean readBoolean()
```

Parameters

None

Return Values

Boolean

A byte from the current position in the message buffer

Throws

com.stc.common.collabService.CollabConnException

readChar

Description

Reads a Unicode character from the present position in the message buffer.

Syntax

```
public char readChar()
```

Parameters

None

Return Values

character
Returns a unicode character from the current position in the message buffer.

Throws

com.stc.common.collabService.CollabConnException

readDouble

Description

Reads a double from the present position in the message buffer. Actions are determined by the value of the encoding member variable. MQC.MQENC_FLOAT_S390 reads a System/390 format floating point number. MQC.MQENC_FLOAT_IEEE_NORMAL and MQC.MQENC_FLOAT_IEEE_REVERSED read IEEE standard doubles in big-endian and little-endian formats respectively.

Syntax

```
public double readDouble()
```

Parameters

None

Return Values

double
Returns a double from the present position in the message buffer.

Throws

com.stc.common.collabService.CollabConnException

readFloat

Description

Reads a float from the present position in the message buffer. Actions are determined by the value of the encoding member variable. MQC.MQENC_FLOAT_S390 reads a System/390 format floating point number. MQC.MQENC_FLOAT_IEEE_NORMAL and MQC.MQENC_FLOAT_IEEE_REVERSED read IEEE standard floats in big-endian and little-endian formats respectively.

Syntax

```
public float readFloat()
```

Parameters

None

Return Values

float
Returns a float from the present position in the message buffer.

Throws

com.stc.common.collabService.CollabConnException

readFully

Description

Fills the byte array `b` with data from the message buffer.

Fills the *len* elements of the byte array b with data from the message buffer, starting at offset *off*.

Syntax

```
public void readFully(byte b[])
public void readFully(byte b[], int off, int len)
```

Parameters

Name	Type	Description
b []	byte	Fills the byte array b with data from the message buffer.

Name	Type	Description
b []	byte	Fills the byte array b with data from the message buffer.
off	int	The offset at which the fill starts.
len	int	Fills *len* elements of the byte array b with data from the message buffer.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

readInt

Description

Reads an integer from the present position in the message buffer. Actions are determined by the value of the encoding member variable. A value of MQC.MQENC_INTEGER_NORMAL reads a big-endian integer, a value of MQC.MQENC_INTEGER_REVERSED reads a little-endian integer.

Syntax

```
public int readInt()
```

Parameters

None

Return Values

int
Returns an integer from the current position in the message buffer

Throws

com.stc.common.collabService.CollabConnException

readInt4

Description

Equivalent to readInt(), readInt4 is provided for cross-language MQSeries API compatibility.

Syntax

public int **readInt4**()

Parameters

None

Return Values

int
Returns an integer from the current position in the message buffer

Throws

com.stc.common.collabService.CollabConnException

readLine

Description

Converts from the codeset defined in the characterSet member variable to Unicode, then reads in a line that has been terminated by \n, \r, \r\n, or EOF.

Syntax

```
public java.lang.String readLine()
```

Parameters

None

Return Values

java.lang.String
Returns the unicode characterSet.

Throws

com.stc.common.collabService.CollabConnException

readLong

Description

Reads a long from the present position in the message buffer. Actions are determined by the value of the encoding member variable. A value of MQC.MQENC_INTEGER_NORMAL reads a big-endian long, a value of MQC.MQENC_INTEGER_REVERSED reads a little-endian long.

Syntax

```
public long readLong()
```

Parameters

None

Return Values

long
Returns a long from the present position in the message buffer.

Throws

com.stc.common.collabService.CollabConnException

readInt8

Description

Equivalent to readlong(), readInt8 is provided for cross-language MQSeries API compatibility.

Syntax

```
public int readInt8()
```

Parameters

None

Return Values

long
Returns an int from the present position in the message buffer.

Throws

com.stc.common.collabService.CollabConnException

readObject

Description

Reads an object, its class, class signature, and the value of the non-transient and non-static fields of the class.

Syntax

```
public object readObject()
```

Parameters

None

Return Values

object
Returns an object, its class, class signature, and field value.

Throws

com.stc.common.collabService.CollabConnException

readShort

Description

Reads a short from the present position in the message buffer. Actions are determined by the value of the encoding member variable. A value of MQC.MQENC_INTEGER_NORMAL reads a big-endian short, a value of MQC.MQENC_INTEGER_REVERSED reads a little-endian short.

Syntax

```
public short readShort()
```

Parameters

None

Return Values

short
Returns a short from the present position in the message buffer

Throws

com.stc.common.collabService.CollabConnException

readInt2

Description

Equivalent to readshort(), readInt2 is provided for cross-language MQSeries API compatibility.

Syntax

```
public short readInt2()
```

Parameters

None

Return Values

short
Returns an int from the present position in the message buffer

Throws

com.stc.common.collabService.CollabConnException

readUTF

Description

Reads a UTF string, prefixed by a 2-byte length field, from the present position in the message buffer.

Syntax

```
public String readUTF()
```

Parameters

None

Return Values

java.lang.String
Returns a UTF String, beginning with a 2-byte length field, from the present position in the message buffer.

Throws

com.stc.common.collabService.CollabConnException

readUnsignedByte

Description

Reads an unsigned byte from the present position in the message buffer.

Syntax

```
public int readUnsignedByte()
```

Parameters

None

Return Values

int

Returns an unsigned byte from the present position in the message buffer.

Throws

com.stc.common.collabService.CollabConnException

---

readUnsignedShort

Description

Reads an unsigned short from the present position in the message buffer. Actions are determined by the value of the encoding member variable. A value of MQC.MQENC_INTEGER_NORMAL reads a big-endian unsigned short, a value of MQC.MQENC_INTEGER_REVERSED reads a little-endian unsigned short.

Syntax

```
public int readUnsignedShort()
```

Parameters

None

Return Values

int

Returns an unsigned short from the present position in the message buffer.

Throws

com.stc.common.collabService.CollabConnException

---

readUInt2

Description

Equivalent to **readUnsignedShort()**, readUInt2 is provided for cross-language MQSeries API compatibility.

Syntax

```
public int readUInt2()
```

Parameters

None

Return Values

int

Returns an unsigned int from the present position in the message buffer.

Throws

com.stc.common.collabService.CollabConnException

readString

Description

Reads a string in the codeset defined by the characterSet member variable. Convert the string into Unicode.

Syntax

```
public java.lang.String readString(int length)
```

Parameters

Name	Type	Description
length	int	The number of characters to read (not the same as the number of bytes)

Return Values

java.lang.String

Throws

com.stc.common.collabService.CollabConnException

readDecimal2

Description

Reads a 2-byte packed decimal number (-999 to 999). Actions are determined by the value of the encoding member variable. A value of MQC.MQENC_DECIMAL_NORMAL reads a big-endian packed decimal number, and a value of MQC.MQENC_DECIMAL_REVERSED reads a little-endian packed decimal number.

Syntax

```
public short readDecimal2()
```

Parameters

None

Return Values

short
Returns a 2-byte packed decimal number.

Throws

com.stc.common.collabService.CollabConnException

readDecimal4

Description

Reads a 4-byte packed decimal number (-9999999 to 9999999). Actions are determined by the value of the encoding member variable. A value of MQC.MQENC_DECIMAL_NORMAL reads a big-endian packed decimal number, and a value of MQC.MQENC_DECIMAL_REVERSED reads a little-endian packed decimal number.

Syntax

```
public int readDecimal4()
```

Parameters

None

Return Values

int
Returns a 4-byte packed decimal number.

Throws

com.stc.common.collabService.CollabConnException

readDecimal8

Description

Reads an 8-byte packed decimal number (-999999999999999 to 999999999999999). Actions are determined by the value of the encoding member variable. A value of MQC.MQENC_DECIMAL_NORMAL reads a big-endian packed decimal number, and a value of MQC.MQENC_DECIMAL_REVERSED reads a little-endian packed decimal number.

Syntax

```
public long readDecimal8()
```

Parameters

None

Return Values

long
Returns an 8-byte packed decimal number.

Throws

com.stc.common.collabService.CollabConnException

setVersion

Description

Sets the version of the structure to be used. Values may include MQC.MQMD_VERSION_1 or MQC.MQMD_VERSION_2. This method is used when it is necessary to force a client to use a version 1 structure when connected to a queue manager that is able to handling version 2 structures. In all other situations, the client determines the correct version by querying the queue manager's capabilities.

Syntax

```
public void setVersion(int version)
```

Parameters

Name	Type	Description
version	int	The version number

Return Values

None

Throws

None

skipBytes

Description

Advances n bytes in the message buffer. Block until all the bytes are skipped, the end of message buffer is detected, or an exception is thrown.

Syntax

```
public int skipBytes(int n)
```

Parameters

Name	Type	Description
n	int	Move forward n bytes in the message buffer.

Return Values

int

Returns the number of bytes skipped, which is always n.

Throws

com.stc.common.collabService.CollabConnException

write

Description

Writes a byte, an array of bytes, or a series of bytes into the message buffer at the present position. *len* bytes are written, taken from offset *off* in the array b.

Syntax

```
public void write(int b)
public void write(byte b[])
public void write(byte b[], int off, int len)
```

Parameters

Name	Type	Description
b	int	The number of characters to read (not the same as the number of bytes)

Name	Type	Description
b[]	byte	The number of characters to read (not the same as the number of bytes)

Name	Type	Description
b[]	byte	The number of characters to read (not the same as the number of bytes)
off	int	The offset in the array
len	int	The number of bytes to be written

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeBoolean

Description

Writes a Boolean into the message buffer at the present position.

Syntax

```
public void writeBoolean(boolean v)
```

Parameters

Name	Type	Description
v	Boolean	The Boolean value.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeByte

Description

Writes a byte into the message buffer at the present position.

Syntax

```
public void writeByte(int v)
```

Parameters

Name	Type	Description
v	int	The number of characters to read (not the same as the number of bytes).

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeBytes

Description

Writes the string to the message buffer as a sequence of bytes. Each character is written out in sequence by discarding its high eight bits.

Syntax

```
public void writeBytes(java.lang.String s)
```

Parameters

Name	Type	Description
s	java.lang.String	The string of bytes.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeChar

Description

Writes a Unicode character into the message buffer at the present position.

Syntax

```
public void writeChar(int v)
```

Parameters

Name	Type	Description
v	int	The unicode value.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeChars

Description

Writes a string as a sequence of Unicode characters into the message buffer at the current position.

Syntax

```
public void writeChars(java.lang.String s)
```

Parameters

Name	Type	Description
s	java.lang.String	The string value.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeDouble

Description

Writes a double into the message buffer at the present position. The actions of this method are determined by the value of the encoding member variable.

A Value of MQC.MQENC_FLOAT_IEEE_NORMAL or MQC.MQENC_FLOAT_IEEE_REVERSED write IEEE standard floats in big-endian and little-endian formats respectively.

A value of MQC.MQENC_FLOAT_S390 writes a System/390 format floating point number. The range of IEEE doubles is greater than the range of S/390 double precision floating point numbers. Very large numbers cannot be converted.

Syntax

```
public void writeDouble(double v)
```

Parameters

Name	Type	Description
v	double	The number of characters to read (not the same as the number of bytes).

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeFloat

Description

Writes a float into the message buffer at the present position. The actions of this method are determined by the value of the encoding member variable.

A Value of MQC.MQENC_FLOAT_IEEE_NORMAL or MQC.MQENC_FLOAT_IEEE_REVERSED write IEEE standard floats in big-endian and little-endian formats respectively.

A value of MQC.MQENC_FLOAT_S390 writes a System/390 format floating point number.

Syntax

```
public void writeFloat(float v)
```

Parameters

Name	Type	Description
length	int	The float value.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeInt

Description

Writes an integer into the message buffer at the present position. The actions of this method are determined by the value of the encoding member variable.

A value of MQC.MQENC_INTEGER_NORMAL writes a big-endian integer. A value of MQC.MQENC_INTEGER_REVERSED writes a little-endian integer.

Syntax

```
public void writeInt(int v)
```

Parameters

Name	Type	Description
v	int	The float value.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeLong

Description

Writes a long into the message buffer at the present position. The actions of this method are determined by the value of the encoding member variable.

A value of MQC.MQENC_INTEGER_NORMAL writes a big-endian long. A value of MQC.MQENC_INTEGER_REVERSED writes a little-endian long.

Syntax

```
public void writeLong(long v)
```

Parameters

Name	Type	Description
v	long	The long value.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeObject

Description

Writes the specified object, object class, class signature, and the values of the non-transient and non-static fields of the class and all its supertypes.

Syntax

```
public void writeObject(Object obj)
```

Parameters

Name	Type	Description
obj	object	The object value.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeShort

Description

Writes a short into the message buffer at the present position. The actions of this method are determined by the value of the encoding member variable.

A value of MQC.MQENC_INTEGER_NORMAL writes a big-endian short. A value of MQC.MQENC_INTEGER_REVERSED writes a little-endian short.

Syntax

```
public void writeShort(int v)
```

Parameters

Name	Type	Description
v	int	The integer value.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeDecimal2

Description

Writes a 2-byte packed decimal format number into the message buffer at the present position. The actions of this method are determined by the value of the encoding member variable.

A value of MQC.MQENC_DECIMAL_NORMAL writes a big-endian packed decimal. A value of MQC.MQENC_DECIMAL_REVERSED writes a little-endian packed decimal.

Syntax

```
public void writeDecimal2(short v)
```

Parameters

Name	Type	Description
v	short	The 2-byte decimal value.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeDecimal4

Description

Writes a 4-byte packed decimal format number into the message buffer at the present position. The actions of this method are determined by the value of the encoding member variable.

A value of MQC.MQENC_DECIMAL_NORMAL writes a big-endian packed decimal. A value of MQC.MQENC_DECIMAL_REVERSED writes a little-endian packed decimal.

Syntax

```
public void writeDecimal4(int v)
```

Parameters

Name	Type	Description
v	int	The 4-byte decimal value.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeDecimal8

Description

Writes an 8-byte packed decimal format number into the message buffer at the present position. The actions of this method are determined by the value of the encoding member variable.

A value of MQC.MQENC_DECIMAL_NORMAL writes a big-endian packed decimal. A value of MQC.MQENC_DECIMAL_REVERSED writes a little-endian packed decimal.

Syntax

```
public void writeDecimal8(long v)
```

Parameters

Name	Type	Description
v	long	The 8-byte decimal value.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeUTF

Description

Writes a UTF string, prefixed by a 2-byte length field, into the message buffer at the present position.

Syntax

```
public void writeUTF(java.lang.String str)
```

Parameters

Name	Type	Description
str	java.lang.String	The string value.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

writeString

Description

Writes a string into the message buffer at the present position, converting it to the codeset identified by the characterSet member variable.

Syntax

```
public void writeString(java.lang.String str)
```

Parameters

Name	Type	Description
str	java.lang.String	The string value.

Return Values

None

Throws

com.stc.common.collabService.CollabConnException

Appendix A (JMS)

10.5 Mapping Between JMS Standard Header Items and MQSeries Header Fields

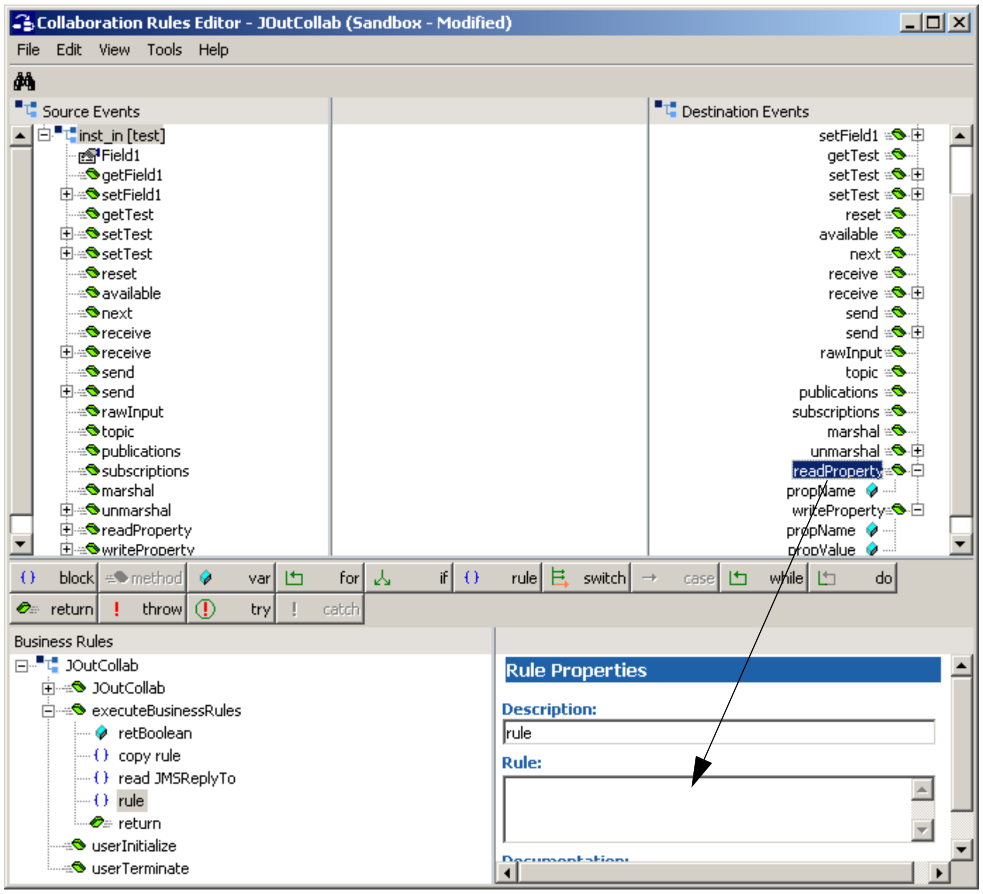
JMS Standard header items and their equivalent MQSeries header fields can be set using the Collaboration Rules Editor. For information on mapping between JMS header items and MQSeries header fields see IBM MQSeries online documentation at:

http://www-4.ibm.com/software/ts/mqseries/library/manual01/csqzaw07/csqzaw07tfrm.htm

Table 20, at the above Web site shows how JMS header fields are used to set or get MQSeries header fields (only some of which are available using this procedure). The Collaboration Rules Editor sets the header properties by calling **readProperty()** or **writeProperty()**. To map these properties do the following:

1. In the Collaboration Rules Editor, click **rule** on the Business Rules toolbar to create a rule at the appropriate place. Select the new rule.
2. Form the Source Events or Destination Events panes, drag-and-drop **readProperty** into the Rule Properties, Rules field (seeFigure 31).

Figure 31 Collaboration Rules Editor



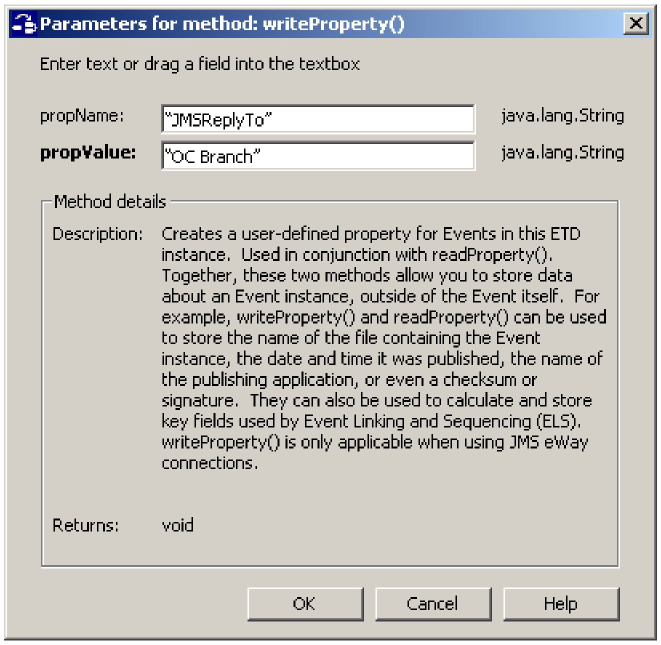
3 A dialog box opens prompting for the **property name**. Enter the property as a string with quotes. For example, **“JMSDeliveryMode”**. The following code displays in the Rule Properties, Rule window:

```
getinst_out().readProperty("JMSDeliveryMode")
```

4 Click **rule** on the toolbar. A new rule expression appears in the Business Rules pane.

5 Form the Source Events or Destination Events panes, drag-and-drop **writeProperty** into the Rule Properties, Rules field. A dialog box opens prompting for the **property name** and the **property value** (see Figure 32).

Figure 32 Parameters for writeProperty()



Enter text or drag a field into the textbox

propName:	"JMSReplyTo"	java.lang.String
propValue:	"OC Branch"	java.lang.String

Method details

Description: Creates a user-defined property for Events in this ETD instance. Used in conjunction with readProperty(). Together, these two methods allow you to store data about an Event instance, outside of the Event itself. For example, writeProperty() and readProperty() can be used to store the name of the file containing the Event instance, the date and time it was published, the name of the publishing application, or even a checksum or signature. They can also be used to calculate and store key fields used by Event Linking and Sequencing (ELS). writeProperty() is only applicable when using JMS eWay connections.

Returns: void

6 Enter the property as a string with quotes. For example, **"JMSReplyTo"** as the **property name**, and **"OC Branch"** as the **property value**. The following code appears in the Rule window:

```
getinst_out().writeProperty("JMSReplyTo","OC Branch")
```

7 A description stating the purpose of this rule can be added in the Rule Properties, Description field and displays in the Business Rules pane

Note: *For detailed information on creating Collaboration Rules using the Java Collaboration Rules Editor see the **e*Gate Integrator User's Guide**.*

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