

IBM WebSphere Business Integration Server Express and
Express Plus



Adapter for i2 User Guide

Adapter Version 14.x

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Express Plus



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Note!

Before using this information and the product it supports, read the information in Appendix C, "Notices," on page 79.

21September2005

This edition of this document applies to IBM WebSphere Business Integration Server Express adapter for i2 (5724-G91), version 1.4.x.

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About this document

The products IBM^(R) WebSphere^(R) Business Integration Server Express and IBM^(R) WebSphere^(R) Business Integration Server Express are made up of the following components: InterChange Server Express, the associated Toolset Express, CollaborationFoundation, and a set of software integration adapters. The tools in Toolset Express help you to create, modify, and manage business processes. You can choose from among the prepackaged adapters for your business processes that span applications. The standard processes template--CollaborationFoundation--allows you to quickly create customized processes.

The IBM^(R) WebSphere^(R) Business Integration Adapter portfolio supplies integration connectivity for leading e-business technologies, enterprise applications, legacy, and mainframe systems. The product set includes tools and templates for customizing, creating, and managing components for business process integration.

This document describes the installation, configuration, business object development, and troubleshooting for the IBM WebSphere Business Integration Adapter for i2.

What this document includes

This document describes installation, connector property configuration, business object development, and troubleshooting for the IBM WebSphere Business Integration Server Express Adapter for i2.

What this document does not include

This document does not describe deployment metrics and capacity planning issues, such as server load balancing, number of adapter processing threads, maximum and minimum throughputs, and tolerance thresholds.

Such issues are unique to each customer deployment and must be measured within or close to the exact environment where the adapter is to be deployed. You should contact your IBM services representative to discuss the configuration of your deployment site, and for details on planning and evaluating these kinds of metrics, given your specific configuration.

Audience

This document is for consultants, developers, and system administrators who use the connector at customer sites.

Related documents

The complete set of documentation available with this product describes the features and components common to all WebSphere Business Integration Server Express installations, and includes reference material on specific components.

You can download, install, and view the documentation at the following site:
<http://www.ibm.com/websphere/wbiserverexpress/infocenter>

Typographic conventions

This document uses the following conventions:

| | |
|---------------------------------|--|
| <i>ProductDir</i> | Represents the directory where the product is installed. |
| courier font | Indicates a literal value, such as a command name, file name, information that you type, or information that the system prints on the screen. |
| <i>italic, italic</i> | Indicates a new term the first time that it appears, a variable name, or a cross-reference. |
| <i>blue outline</i> | A blue outline, which is visible only when you view the manual online, indicates a cross-reference hyperlink. Click inside the outline to jump to the object of the reference. |
| { } | In a syntax line, curly braces surround a set of options from which you must choose one and only one. |
| | In a syntax line, a pipe separates a set of options from which you must choose one and only one. |
| [] | In a syntax line, square brackets surround an optional parameter. |
| ... | In a syntax line, ellipses indicate a repetition of the previous parameter. For example, <code>option[,...]</code> means that you can enter multiple, comma-separated options. |
| < > | Angle brackets surround individual elements of a name to distinguish them from each other, as in <code><server_name><connector_name>tmp.log</code> . |
| /, \ | In this document, backslashes (\) are used as the convention for directory paths. All product path names are relative to the directory where the connector for i2 is installed on your system. |
| <i>%text%</i> and <i>\$text</i> | Text within percent (%) signs indicates the value of the Windows text system variable or user variable. |

New in this release

This section describes the new and changed features of IBM WebSphere Business Integration Server Express adapter for i2 that are covered in this document.

New in release 1.4.x

- The adapter for i2 now supports i2 Infrastructure Services (CIS) version 6.1.
- Username and password set in the adapter configuration properties are used to authenticate users when JAAS authentication is enabled for i2 CIS Adapters.
- The adapter for i2 now supports durable subscriptions for event notification. The adapter can be configured for durable subscription. The UnregisterOperations and Unregister connector configuration properties and the polling meta-object property define whether or not the adapter should unregister its durable subscription.
- The adapter for i2 can now redeliver messages that fail to reach the integration broker. This is configurable at the polling meta-object level with the new property AutoAcknowledge.
- The adapter for i2 will now clean-up closed connections, removing them from the persistent store.

Chapter 1. Overview of the connector

This chapter describes the connector component of the IBM WebSphere Business Integration Server Express Adapter for i2 and the relevant business integration system architecture.

The i2 connector integrates with i2 application modules through i2's Common Integration Services (CIS) API. CIS API from i2 is an implementation of JCA Common Client Interface. i2 has a suite of application modules that support CIS. The i2 connector is metadata driven, has object discovery capability, and enables integration to any version 6.1 SDK CIS-enabled i2 application. Many i2 modules versions 5.2 and above, support version 6.1 CIS SDK. This connector is available on Windows.

Connectors consist of two parts: the *application-specific component* and the *connector framework*. The application-specific component contains code tailored to a particular application or technology (in this case, i2). The connector framework, whose code is common to all connectors, acts as an intermediary between the integration, InterChange Server Express, and the application-specific component. The connector framework provides the following services between the integration broker and the application-specific component:

- Receives and sends business objects
- Manages the exchange of startup and administrative messages

Note: This document contains information about both the connector framework and the application-specific component. It refers to both of these as the connector.

For more information about the relationship of the integration broker to the connector, see the *System Administration Guide*.

This chapter contains the following sections:

- "Connector architecture" on page 1
- "How the connector works" on page 3

Connector architecture

i2's Common Integration Service (CIS) enables connectivity between external applications and i2 application modules.

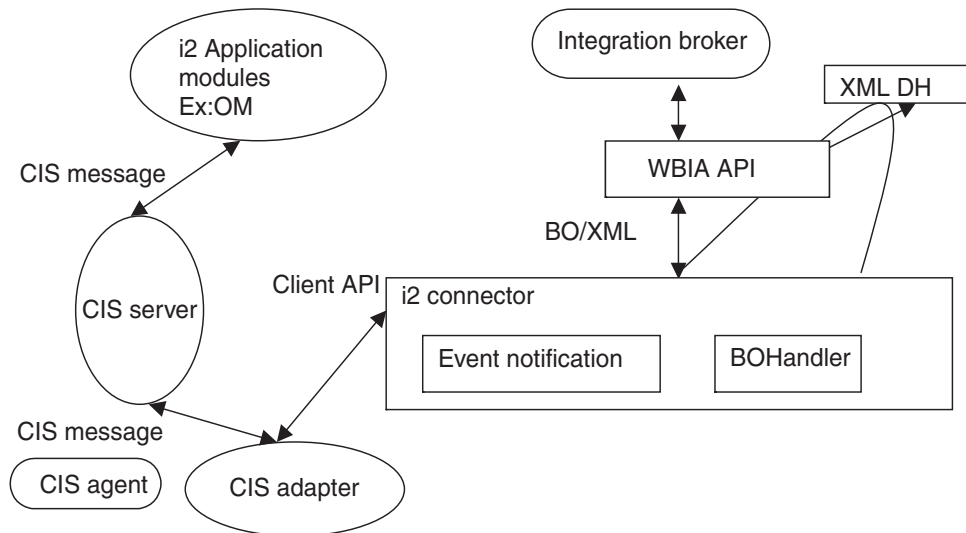
CIS includes three primary components:

- CIS Front Bus--used by applications to specify an XML metadata format interface that details the available functions and their expected input and output data. CIS scripts generate the required representations of input and output data in an XML schema and Java Beans. Product teams implement these functions by writing handlers in Java that implement standard CIS interfaces and perform the required logic. These handlers can deal with data as XML or Java Beans. CIS infrastructure deploys these interfaces so that the client can invoke this functionality from a variety of resources.
- CIS Back Bus--used by applications to create a bulk import/export interface for data transfers.

- CIS Single Sign-On--a standard set of Java interfaces used by Web applications to authenticate users against a central authentication. store.

The i2 connector interacts with the CIS Front Bus using the CIS Client API provided by i2 along with its CIS adapters. The CIS Client API is the implementation of JCA Common Client Interface. CIS adapters operate based on CIS metadata information using the various bindings.

The following diagram shows the i2 connector and components of the i2 framework.



The following table describes the terminology used for the components of the i2 connector and framework.

| Component | Description |
|--------------------|---|
| CIS | Common Integration Services provided by i2 to enable connectivity between the external applications and i2 application modules |
| OM | Order Management, just an example of an i2 application module |
| CIS agent | CIS server application that runs on a central server. It maintains connection information about client applications and manages and monitors all the client applications that are part of the solution. The CIS adapter and i2 application modules register with the CIS agent. |
| JCA CCI | Java Connector Architecture's Common Client Interface |
| CIS adapter | i2's CIS Client API and implementation of JCA-CCI |
| WBIA API | API used by the i2 connector to communicate with the integration broker |
| integration broker | A program that handles the execution of the business object processing logic. The broker is InterChange Server Express. |

| Component | Description |
|------------|--|
| XML DH | IBM's data handler (DH) used to transform XML messages to the IBM business objects and vice versa. You need to configure the XML DH for use with the i2 connector. |
| CIS server | Integration container which handles operation invocations. Integration container and CIS server are used interchangeably in this document. |

How the connector works

The i2 connector is a CIS (Common Integration Services) client. It connects to the CIS client API in a non-managed environment, that is, it connects to the CIS adapter directly without an application server using the application's user name and password for authentication. For added flexibility, authentication is also possible during request service processing using the credential information included in the business object. For more information, see Chapter 3, "Understanding business objects for the connector," on page 15.

At present, the CIS client API does not support any connection pooling mechanism. There is no limitation on the number of connections. The i2 CIS adapter provides guaranteed messaging and delivery and persistent client connections, depending on the configuration settings of the i2 CIS agent. Data which includes double byte characters will remain consistent when used with the i2 connector. It supports the Group 1 Languages.

The i2 connector is bi-directional. It can process events originating from i2 applications, as well as requests sent by the broker to the application.

For event subscriptions, the i2 connector uses the information in the i2 metaobjects. It registers the operations on the types specified in these metaobjects with i2's CIS agent through the CIS adapter. The CIS agent listens to the registered operations and detects event messages only for registered operations. The i2 connector obtains these messages with the poll call.

For request processing, the i2 connector processes the requests coming from the integration broker by transforming incoming business objects into CIS records and using the appropriate CIS Client API calls to execute the operation on the i2 application modules. Request processing for the i2 connector is multi-threaded, it can handle multiple requests.

The i2 connector follows the metadata design principles outlined in the *IBM Connector Developer's Guidelines*. This means new IBM business objects can be defined without additional coding or customization at the i2 connector code level. For more information, see Chapter 3, "Understanding business objects for the connector," on page 15.

Processing subscriptions

The following sections describe how the connector processes application events.

Event detection and notification

Events for the purpose of this document are the CIS messages published from the i2 application modules. The i2 application notifies the connector of all the events occurring in the modules for which corresponding operations have been registered with the CIS agent.

The onus of registering the operations of interest lies with the i2 connector.

Example: If the i2 connector is interested in the Bidding type operation addBid, any new Bidding additions to the i2 application module will be queued in the CIS server once the i2 connector registers for the addBid operation.

The i2 connector uses the information in the i2 metaobjects. It registers its intent to listen to some of the operations with the poll call. Effectively, this tells the CIS agent that the i2 connector wants to check for the output of the registered operations.

Status updates

No status updates are made to the i2 applications. Typically, the event status, for example, SUCCESS, FAIL, UNSUBSCRIBED, is written to the application's event store.

Error messages, if any, are logged to the i2 adapter log file. For more information, see Chapter 5, "Troubleshooting and error handling," on page 37.

Event retrieval

For the i2 connector, polling is single threaded. The connector uses i2 metaobjects to register the operations of interest with the CIS agent for polling. These metaobject names have the i2MO prefix and store information about the operation and the corresponding IBM wrapper business object name for the specified operation and type. The attributes for the metaobject are specified as static default values. Default value is an attribute property, which can be set at the business object design time. For information on the wrapper business object structure and attribute properties, see Chapter 3, "Understanding business objects for the connector," on page 15 and Chapter 4, "Generating business objects using the i2 ODA," on page 25.

The steps involved in retrieving a subscription message are as follows:

1. The i2 connector uses a connection that is authenticated using the Application Username and Password connector properties, or the username and password found in the polling metaobject.
2. The i2 connector registers the operations with the CIS agent after reading the i2MO metaobject information. The information in the metaobjects is cached by the i2 connector with the first poll call. The connector allocates a connection for this metaobject using the username, password, instanceId, connectionId, and AutoAcknowledge attributes provided in the metaobject.
3. Each poll call is issued from the integration broker, based on the connector property PollFrequency. In case there were any registration failures in the first poll call, the i2 connector tries to register the same operation with the subsequent poll calls.

Once the i2 connector registers its interest for data using a persistent connection, the i2 connector can reliably retrieve data that was sent out when it was not running (if it did not unregister). This can be referred to as durable subscription. Durable subscription is maintained if the adapter is not configured to unregister for operations at the connector level or at the polling meta-object level.

For information on configuring the CIS agent with persistent storage, see your i2 CIS infrastructure guide. For information on configuring the EventSubscriptionConnectionID property, see Chapter 2, "Installing and configuring the connector," on page 7.

4. With all the poll calls, the i2 connector checks on the output of the operations that it has registered with the CIS agent. If there is any output from any of the operations, it retrieves the output in the form of a CIS record. The i2 connector retrieves the PollQuantity (connector property) number of messages for each poll call for each registered operation.

Example: If the PollQuantity is set to 5 and there are 5 registered operations, each poll call will result in checking the output 25 times. If the PollQuantity is not set, a default of 1 message is retrieved for each poll call for each operation.

5. The retrieved XML message is converted to a business object. The business object is set as the child attribute in the wrapper business object for the operation. The instanceId from which this output was retrieved is set as the instanceId in the metaobject attribute of the wrapper. For more information, see Chapter 3, "Understanding business objects for the connector," on page 15.
6. The connector sends the wrapper business object to the integration broker for further processing.

i2 CIS SDK version 6.1 contains a feature called Interaction Acknowledgement that enables the redelivery of messages that were not confirmed to be delivered to the integration broker. It does this by allowing a client to state whether or not messages are auto-acknowledged and retaining messages on the i2 Message Bus until they have been successfully delivered. This feature can be enabled by setting the AutoAcknowledge property for polling meta-objects to false.

If the delivery of a message fails to be delivered to the broker and the AutoAcknowledge field is set to false, the following happens (depending on the status returned by the `getAppEvents` method:

- Fail - The adapter will leave the message on the bus, to be redelivered at a later time.
- No Subscription Found - The adapter will leave the message on the bus, to be redelivered at a later time.
- Connector Not Active - The adapter will leave the message on the bus, to be redelivered at a later time.

Note: If AutoAcknowledge is set to false, the `connectionId` attribute is mandatory and must not be re-used by any other polling meta-object. The default behavior is AutoAcknowledge true.

Processing verbs (operations)

Operations are i2's equivalent for verbs and are defined by the XML structure provided by i2 for each port. For more information, see Chapter 3, "Understanding business objects for the connector," on page 15, and Chapter 4, "Generating business objects using the i2 ODA," on page 25.

Processing service call requests

When the i2 connector receives a service call request from an integration broker to perform an operation in an application, the request takes the form of a wrapper business object. The wrapper business object encompasses a metaobject, an operation or verb, and input and/or output types or formats for the operation. The metaobject (MO_Instance) and the input and output business objects are the child business objects of the wrapper business object. Enclosed in the MO_Instance object are the attribute values for the instanceId, connectionId, username, and password. The username and password are used for authentication during request processing. The verb for the wrapper business object must be a valid operation for the specified instance.

The information about the child business object, whether it is an input or output type, is obtained from the Application Specific Information (ASI) of the wrapper business object's attributes.

Example: ASI Type=input indicates that the child business object is of input type.

The input child business object is first converted to an XML message by the XML data handler. The business object is then transformed into a CIS record using the CIS utility. Then the operation is executed using the CIS Client API.

If the operation sends some output XML message, it is converted to an output child business object; and the output child business object in the wrapper business object is populated with the appropriate value.

If the i2 CIS agent is running with persistence enabled, the CIS agent can use stateful operations to maintain the session state. The connector can retrieve results of operations that failed to execute within the specified execution time and attempt to resolve the operations. It returns the results to the integration broker.

You can control the number of times that an interaction should be attempted to be resolved by setting the value for the InteractionResolutionAttempts property. A value of zero (0) for the InteractionResolutionAttempts prevents the connector from trying to resolve an interaction. Interaction Resolution attempts are only made on interactions with the CIS adapter state of INDOUBT.

For information on stateful operations, see "Using metaobjects for stateful operations" on page 19. For information on configuring the InteractionResolutionAttempts and ExecutionTimeout properties, see Chapter 2, "Installing and configuring the connector," on page 7.

Status updates

Any error conditions that occur while processing are logged as detailed error messages in the adapter log.

ReturnStatusDescriptor: The connector populates a structure called the ReturnStatusDescriptor with the message and status of the latest error that occurred during the processing of a service call request. You can access the ReturnStatusDescriptor to find the reason for the cause of a failure during a service call request. The adapter framework propagates the structure, as appropriate.

When using persistent connections with the CIS adapter, status values have the range of CREATED, STARTED, UNDELIVERABLE, DELIVERED, SUCCESS, INDOUBT, FAILED to indicate the state of the interaction on a request processing failure.

Chapter 2. Installing and configuring the connector

This chapter describes how to install and configure the connector component of IBM WebSphere Business Integration Server Express Adapter for i2 and how to configure applications to work with the connector. It contains the following sections:

- “Adapter for i2 environment”
- “Installing the adapter and related files” on page 8
- “Configuring the connector” on page 8
- “Creating multiple connector instances” on page 11
- “Starting the connector” on page 12
- “Stopping the connector” on page 14

Adapter for i2 environment

Broker compatibility

This adapter runs with the WebSphere Business Integration Adapter FrameworkV2.6 and requires the integration broker, InterChange Server Express.

Adapter platforms

The adapter for i2 is supported only on the Windows 2000 platform. In addition, the i2 adapter cannot be installed via Adapter Capacity Pack 4.4. because this capacity pack only supports the installation for Windows 2003.

Therefore, to install the i2 adapter from Adapter Capacity Pack 4.4 on Windows 2000, you must use the following command: `setupwin32.exe -W invalidPlatform.active=false`

where `setupwin32.exe` is the Adapter Capacity Pack executable.

At the feature selection panel, select **i2** and proceed with the installation.

Additional requirements

The WebSphere Business Integration Server Express Adapter for i2 also requires the following hardware and software:

- CIS SDK 6.1
- i2 application 5.2 or above
- JDK 1.4.2 compliant connector.jar
- Appropriate CIS adapter (MetadataService adapter is required fo the i2 ODA)
- CIS libraries (cis.jar, cis-ss0.jar, cis-ss0-spi.jar, cis-util.jar, jdom.jar, jmxri.jar, log4j.jar, jaas.jar, connector.jar)
- XML datahandler
- IBM WebSphere Business Integration API (WBIA.jar)
- i2 CIS 6.1 SDK properties directory
- If i2 CIS is running with WebSphere MQ bindings, the .bindings file

Processing locale-dependent data

The connector has been internationalized so that it can support delivery of double-byte character sets (DBCS) going into an interface that also supports double-byte character sets, and deliver message text in the specified language. When the connector transfers data from a location that uses one character code set to a location that uses a different code set, it performs character conversion to preserve the meaning of the data.

The Java run time environment within the Java Virtual Machine (JVM) represents data in the Unicode character set. Unicode contains encodings for characters in most known character code sets (both single-byte and multi-byte). Most components in the WebSphere business integration system are written in java; therefore, when data is transferred between most integration components, there is no need for character conversion.

Installing the adapter and related files

For information on installing WebSphere Business Integration Server Express adapter products, refer to the *WebSphere Business Integration Server Express installation guide for Windows*. The guide is located in the WebSphere Business Integration Server Express Adapters Infocenter at the following site: <http://www.ibm.com/websphere/wbiserverexpress/infocenter>.

Installed file structure

The following table describes the file structure used by the connector and identifies the installed files.

Notes:

1. This document uses (\) backslashes as the convention for directory paths.
2. All product path names are relative to the directory where the product is installed on your system.
3. For Windows, Installer adds an icon for the connector file to the IBM WebSphere Business Integration Server Express adapters menu. For a fast way to start the connector, create a shortcut to this file on the desktop.

| Subdirectory of <i>ProductDir</i> | Description |
|-----------------------------------|--|
| connectors\i2 | Contains the connector CWi2.jar file, which has the connector code and the start_i2.bat files for Windows. |
| connectors\messages | Contains the i2Adapter.txt file for error messages. |
| connectors\i2\Dependencies | Contains sample files for creating business objects, polling meta-objects, and stateful operations meta-objects. |

For more information on installing the connector component, see the following guides:

- *WebSphere Business Integration Server Express Installation Guide for Windows*
- *System Implementation Guide*

Configuring the connector

Connectors have two types of configuration properties: standard configuration properties and connector-specific configuration properties. You must set the values of these properties before running the connector. As you enter the configuration values, they are saved in the repository.

To configure connector properties, use one of the following tools:

- Connector Designer--For the integration broker, InterChange Server Express

Tip: Access this tool from System Manager.

For more information about Connector Configurator Express, see Appendix B, "Connector Configurator Express," on page 63.

A connector obtains its configuration values at startup. During a run-time session, you may want to change the values of one or more connector properties. Changes to some connector configuration properties, such as AgentTraceLevel, are dynamic, taking effect immediately. Changes to other connector properties are static, requiring component restart or system restart after a change. To determine whether a property is dynamic or static, refer to the update method column in Connector Designer.

Standard connector properties

Standard configuration properties provide information that all connectors use. For detailed information about these properties, see Appendix A, "Standard configuration properties for connectors," on page 43.

The following supplemental information on standard connector properties applies to i2.

LogAtInterchangeEnd

Tells whether to log errors on InterChange Server Express.

The default value is false.

MessageFileName

Path of the error message file if it is not located in the standard message location *ProductDir*\connectors\messages. If the message file name is not in a fully qualified path, the message file is assumed to be located in the directory specified by the HOME environment variable or the startup parameter user.home. If a connector message file does not exist, the WBIA API message file is used. If that file does not exist, the InterchangeSystem.txt file is used as the message file.

The default value is i2Adapter.txt.

Connector-specific properties

Connector-specific configuration properties provide information needed by the connector at run time. They also provide a way of changing static information or logic within the connector without having to recode and rebuild it.

The following table lists the connector-specific configuration properties for the connector along with their descriptions and possible values.

| Property | Description | Possible values |
|---------------------|--|-----------------|
| ApplicationName | <i>Unique name specified for each connector</i> | i2 adapter |
| ApplicationUserName | <i>User name for the i2 connection used for authentication</i> | i2User |
| ApplicationPassword | <i>Password for the i2 connection used for authentication</i> | i2Password |

| Property | Description | Possible values |
|-------------------------------|--|--|
| CISAgentHostName | Name used when the CIS agent is running on a remote machine. If it is not set, the current local host is assumed to have the CIS agent running. If it is set, the i2 connector establishes a connection with this remote host. | String host name Example: any machine name like California |
| ExecutionTimeout | Time in milliseconds before the call to i2 application terminates. | Default is 30000 |
| EventSubscriptionConnectionId | Default connectionId to be used for request processing | EventConn1 |
| InteractionResolutionAttempts | Number of times that an interaction should be attempted to be resolved | Default is 2 |
| PollQuantity | Number of messages that will be retrieved from the client queue while polling for each registered operation; it will be pollQuantity multiplied by the number of registered operations. | Default is 1 |
| UnregisterOperations | The global value used to determine whether the adapter should unregister its durable subscriptions at shutdown. This can be overridden at the polling meta-object level. | Default is true |
| UseDefaults | Value that the connector checks for to identify the default value of the attributes during request processing. This is not used by the i2 connector. | Not required for this connector |

Configuring start_i2.bat for Windows

You need to add the proper path to the start files for CIS-SDK.

Example: The following path information needs to be added to the start_i2.bat file. These are just examples. You should change the path information depending on your local installation.

```
set I2_CIS_HOME_DIR=C:\i2\CIS\6.0.1\cis-sdk
set i2PROPERTIES="%i2_CIS_HOME_DIR%\properties;
```

(The last line refers to the contents of the "properties" directory of your i2 CIS.)

Note: If your CIS agent is configured for guaranteed messaging and an adapter uses MQ Bindings, you will need to have the .bindings file in the same relative path as your i2 CIS install. This is the jndiProviderURL attribute of your MQ Binding configuration element.

Configuring the data handler

You also need to configure the data handler. Set the following values for the child business object text/xml in MO_DataHandler_Default:

| | |
|-------------------|---------------------------------------|
| Validation | false |
| ClassName | com.crossworlds.DataHandlers.text.xml |
| UseNewLine | false |
| InitialBufferSize | any appropriate value like 2097152 |
| DummyKey | 1 |

Note: The rest of the fields should be blank.

For detailed information about data handler configuration, see the *Data Handler Guide*.

Creating multiple connector instances

Creating multiple instances of a connector is in many ways the same as creating a custom connector. You can set your system up to create and run multiple instances of a connector by following the steps below. You must:

- Create a new directory for the connector instance
- Make sure you have the requisite business object definitions
- Create a new connector definition file
- Create a new start-up script

Create a new directory

Use the menu path, ProductDir\connectors\connectorInstance.

If the connector has any connector-specific meta-objects, you must create a meta-object for the connector instance. If you save the meta-object as a file, create this directory and store the file here:

ProductDir\repository\connectorInstance

where *connectorInstance* uniquely identifies the connector instance.

You can specify the InterChange Server Express server name as a parameter of startup.bat; an example is: start_XML.bat connName serverName.

Create business object definitions

If the business object definitions for each connector instance do not already exist within the project, you must create them.

1. If you need to modify business object definitions that are associated with the initial connector, copy the appropriate files and use Business Object Designer Express to import them. You can copy any of the files for the initial connector. Just rename them if you make changes to them.
2. Files for the initial connector should reside in the following directory:

ProductDir\repository\initialConnectorInstance

Any additional files you create should be in the appropriate connectorInstance subdirectory of ProductDir\repository.

Create a connector definition

Follow these steps to create a configuration file (connector definition) for the connector instance in Connector Configurator Express:

1. Copy the initial connector's configuration file (connector definition) and rename it.
2. Make sure each connector instance correctly lists its supported business objects (and any associated meta-objects).
3. Customize any connector properties as appropriate.

Create a start-up script

To create a startup script:

1. Copy the initial connector's startup script and name it to include the name of the connector directory:
dirname
2. Put this startup script in the connector directory you created in "Create business object definitions" on page 11.
3. Create a startup script shortcut.
4. Copy the initial connector's shortcut text and change the name of the initial connector (in the command line) to match the name of the new connector instance.

Starting the connector

A connector must be explicitly started using its **connector start-up script**. On Windows systems the startup script should reside in the connector's runtime directory:

ProductDir\connectors*connName*

where *connName* identifies the connector.

Table 1. Startup scripts for a connector

| Operating system | Startup script |
|------------------|-----------------------------|
| Windows | start_ <i>connName</i> .bat |

When the startup script runs, it expects by default to find the configuration file in the *ProductDir* folder (see the commands below). This is where you place your configuration file.

Note: You need a local configuration file if the adapter is using JMS transport.

- **Starting the connector on a Windows system:**

- From the **Start** menu, select **Programs>IBM WebSphere Business Integration Server Express>Adapters>Connectors**. By default, the program name is "IBM WebSphere Business Integration Server Express." However, it can be customized. Alternatively, you can create a desktop shortcut to your connector.
- From the Windows command line: start_*connName* *connName* *brokerName* {-configFile}.
- On Windows systems, you can configure the connector to start as a Windows service. In this case, the connector starts when the Windows system boots (for an Auto service) or when you start the service through the Windows Services window (for a Manual service).

For more information on how to start a connector, including the command-line startup options, refer to the *System Administration Guide*.

Start scripts

To start the adapter for i2, you may use the following start scripts:

- @echo off
- set local
- REM Set Adapter Specific Variables
REM set the i2 CIS installation directory here
REM
set I2_CIS_HOME_DIR=
- REM set the name to be the application connector that is starting
set CONNNAME=%1
set CONNPACKAGENAME=com.crossworlds.connectors.i2.i2AdapterAgent
- REM set the server name to be the interchange that is being targeted
setSERVER=%2
- set CW_I2JAR=CWi2.jar
set I2JAR="%I2_CIS_HOME_DIR%\lib\cis.jar;%I2_CIS_HOME_DIR%\lib\jaas.jar;
set I2JAR=%I2JAR%;"%I2_CIS_HOME_DIR%\lib\jmxri.jar;
"%I2_CIS_HOME_DIR%\lib\jaas.jar;
set I2JAR=%I2JAR%;"%I2_CIS_HOME_DIR%\lib\cis-
sso.jar;%I2_CIS_HOME_DIR%\lib\cis-sso-spi.jar;
set I2JAR=%I2JAR%;"%I2_CIS_HOME_DIR%\lib\jdom.jar;
"%I2_CIS_HOME_DIR%\lib\cis-util.jar;
set I2JAR=%I2JAR%;"%I2_CIS_HOME_DIR%\lib\connector.jar
- set I2PROPERTIES="%I2_CIS_HOME_DIR%\properties;
- REM End Adapter Specific Tasks
- REM IF WBIA_RUNTIME is set use start_adapter launcher to run adapter
- if "%WBIA_RUNTIME%"==" goto CROSSWORLDS
- REM Call CWConnEnv
call "%WBIA_RUNTIME%\bin\VWConnEnv
- REM set the directory where the specific connector resides
set CONNDIR="%WBIA_RUNTIME%\connectors\%1
- REM goto the connector specific drive & directory
cd/d%CONNDIR%
- REM Set variables needed for start_adapter callee
- set JVMArgs=
set JCLASSES=.;%CW_I2JAR%;%I2PROPERTIES%;%JCLASSES%
set LibPath=
set ExtDirs
- call "%WBIA_RUNTIME%\bin\start_adapter" -n%CONNNAME% -s%SERVER%
-1%CONNPACKAGENAME%%3%4%5
- pause
goto END
:CROSSWORLDS
- REM call CWConnEnv
call "%CROSSWORLDS%\bin\CWConnEnv

- REM set the directory where the specific connector resides
set CONNDIR="%CROSSWORLDS%"\connectors\%1
- REM goto the connector specific drive & directory
cd/d%CONNDIR%
- set JCLASSES=.;%CW_I2JAR%;%I2JAR;%I2PROPERTIES%;%JCLASSES%
- REM config file location defaults to HOME\InterchangeSystem.cfg on the local machine
- REM start the java connector under the Java Application End
- %CWJAVA% -mx128m %ORB_PROPERTY%
-Djava.ext.dirs="%MQ_LIB%";%JRE_EXT_DIRS%
-Djava.library.path="%CROSSWORLDS%" \bin;%CONNDIR%;
"%MQ_LIB%;%JRE_EXT_DIRS%
-Duser.home="%CROSSWORLDS%" -classpath %JCLASSES% AppEndWrapper
-l%CONNPACKAGENAME% -n%CONNNAME% -s%SERVER% %3 %4 %5
- :END
endlocal
- Pause

Stopping the connector

The way to stop a connector depends on the way that the connector was started, as follows:

- If you started the connector from the command line, with its connector startup script:
 - On Windows systems, invoking the startup script creates a separate “console” window for the connector. In this window, type “Q” and press Enter to stop the connector.
- From (WebSphere Business Integration Server Express Adapters product only), which is launched when you start System Manager
You can load, activate, deactivate, pause, shutdown or delete a connector using this tool.
- From System Monitor (InterChange Server Express product only)
You can load, activate, deactivate, pause, shutdown or delete a connector using this tool.
- On Windows systems, you can configure the connector to start as a Windows service. In this case, the connector stops when the Windows system shuts down.

Chapter 3. Understanding business objects for the connector

This chapter describes the structure of i2 business objects, how the connector processes the business objects, and the assumptions the connector makes about them. Use this information as a guide to modifying existing business objects for i2 or as suggestions for implementing new business objects.

The chapter contains the following sections:

- “Defining connector metadata” on page 15
- “Overview of business object structure” on page 15
- “i2 business object structure” on page 16
- “Specifying business object attribute properties” on page 22
- “Identifying business object application-specific information” on page 23

For information on the Object Discovery Agent (ODA) utility that automates the creation of business objects for the IBM WebSphere Business Integration Server Express adapter for i2, see Chapter 4, “Generating business objects using the i2 ODA,” on page 25.

Defining connector metadata

The i2 connector is metadata-driven. In the WebSphere business integration system, metadata is application-specific information that is stored in a business object and that helps the connector interact with the application. A metadata-driven connector handles each business object that it supports based on the metadata encoded in the business object definition rather than on instructions hardcoded in the connector. Business object metadata includes the structure of the business object, the settings of its attribute properties, and the content of its application-specific information. Because the connector is metadata-driven, it can handle new or modified business objects without requiring modifications to the connector code.

The connector makes assumptions about the structure of its supported business objects, the relationships between parent and child business objects, and the format of the application-specific information.

Therefore, when you create or modify a business object, your modifications must conform to the rules the connector is designed to follow, or the connector will not be able to process new or modified business objects correctly.

Overview of business object structure

In the WebSphere business integration system, a business object definition consists of a type name, supported verbs, and attributes. An application business object is an instance of a business object definition. It reflects a specific application’s data structure and attribute properties.

Some attributes, instead of containing data pointing to child business objects or arrays of child business objects, contain the data for these objects. Keys relate the data between the parent record and child records.

Business objects can be flat or hierarchical. A flat business object only contains simple attributes, that is, attributes that represent a single value (such as a String)

and do not point to child business objects. A hierarchical business object contains both simple attributes and child business objects or arrays of child business objects that contain the values.

A cardinality 1 container object, or single-cardinality relationship, occurs when an attribute in a parent business object contains a single child business object. In this case, the child business object represents a collection that can contain only one record. The type of the attribute is the same as that of the child business object.

A cardinality n container object, or multiple-cardinality relationship, occurs when an attribute in the parent business object contains an array of child business objects. In this case, the child business object represents a collection that can contain multiple records. The type of the attribute is the same as the type of the array of child business objects.

A hierarchical business object can have simple attributes and can also have attributes that represent a single-cardinality child business object or an array of child business objects. In turn, each of these business objects can contain single-cardinality child business objects and arrays of business objects, and so on.

In each type of cardinality, the relationship between the parent and child business objects is described by the application-specific text of the key attribute of the child object.

i2 business object structure

The i2 IBM business object is the IBM representation of the i2 message. Each type of message has a corresponding IBM business object.

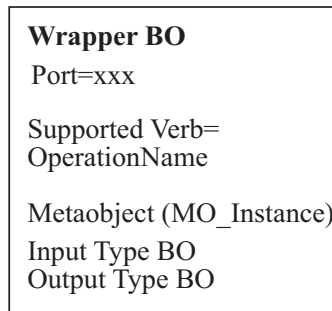
The business objects are generated using the adapter utility XML ODA, which reads the XML schema files for these types and generates the corresponding IBM business object. (See Chapter 4, "Generating business objects using the i2 ODA," on page 25 and Chapter 3, "XML data handler" in the *Data Handler Guide*.)

The i2 business object is a wrapper business object that encapsulates a metaobject, an operation, and input and/or output data (one or the other, both, or none) types or formats for the operation. The Top Level Object Wrapper includes in the metaobject (MO_Instance) the attribute values for the instanceId, connectionId, username, and password. The username and password are provided for authenticating with a different user during request processing.

Note: This business object credential information is in addition to the Application Username and Password connector configuration properties provided for authentication at the global level. If the values at the metaobject (MO_Instance) level are left blank, the adapter will use the global credentials found at the Connector Configurator Express level.

There is one wrapper business object for each operation. For more information, see Chapter 4, "Generating business objects using the i2 ODA," on page 25.

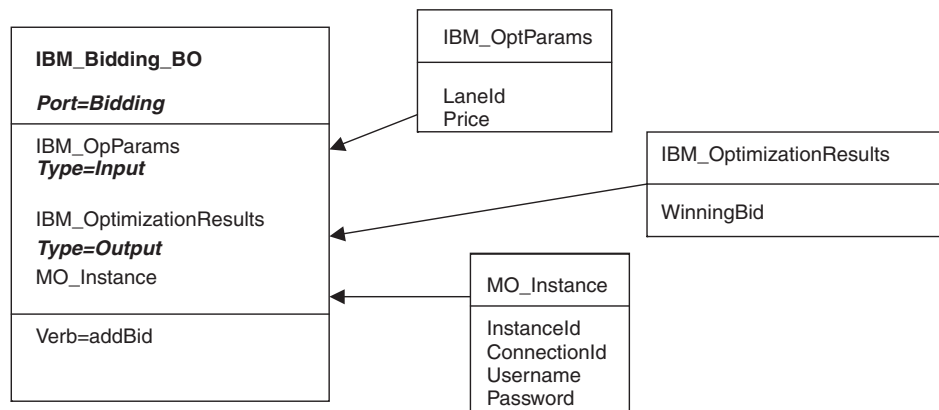
The following diagram shows the parts of a wrapper business object. A description of each part follows the diagram.



- The *metaobject* embedded within the wrapper is used to configure the MO_Instance, which contains values for the attributes *instanceId*, *connectionId*, *username*, and *password*. For more information, see “Configuring meta-objects for polling” on page 18.
- The *operation* is set as the verb on the wrapper business object and is associated with a port. i2 does not have standard verbs. Operations take input and output. If multiple operations have the same set of input and output types, but are supported on different ports, there will be two different wrapper business objects for the different ports.
- The *port* is the name of the i2 port type for the operation.
- The *types*, or alternatively, *formats* are business object attributes which represent data types or formats for an operation.

The following diagram illustrates a sample business object IBM_Bidding_BO, which has three child business objects. In the diagram:

- IBM_OptParams and IBM_OptimizationResults represent the top level business object generated by the XML ODA.
- The application-specific information for the business object is in the *Port* (Bidding) and *Types* (input--IBM_OptParams and output--IBM_OptimizationResults) attributes.
- The operation is addBid.
- The child business objects are:
 - IBM_OptParams, which has two attributes--LaneId and Price
 - IBM_OptimizationResults, which has one attribute--WinningBid
 - MO_Instance, which has four attributes--InstanceId, ConnectionId, Username, and Password



Configuring meta-objects for polling

The connector uses i2 metaobjects to register its interest in specific operations with the CIS agent so that polling can take place. You need to configure one metaobject for each operation of interest.

The metaobject name always starts with i2MO. Each metaobject holds information about the instance that supports the operation and the wrapper business object name for the operation. You need to add a dummy verb to all the metaobjects.

All of the attributes within the meta-object require a static default value. The attributes within the metaobjects have a static default value.

- `instanceId`- The i2 CIS instance associated with the polling subscription.
- `connectionId`- ID used for the persistent connection (during event retrieval).
- `username`- The user used to create the connection for event retrieval.
- `password`- The user password.
- `OperationName`- The operation to execute when retrieving the event from the i2 CIS.
- `WrapperBOName`- The name of the wrapper business object which provides containment for the event business object for the operation.
- `Unregister`- The boolean value used to determine whether the adapter should unregister its durable subscription when terminating.
- `AutoAcknowledge`- The boolean value used to determine whether the adapter should enable redelivery of failed events.

The polling meta-object has the following business object level application specific information:

- `Port`- Used to determine which i2 CIS port or i2 CIS adapter this polling subscription should be registered.

For registering the same operation on a different instance, you either have to change the default value and restart the i2 instance or configure another metaobject for the new instance.

Unregistering polling subscriptions

Polling subscriptions can be unregistered by altering the polling meta-object property. A new attribute `unregister` that accepts Boolean values is used to determine whether the adapter should unregister for this operation when the adapter is shut down. Connections created with the `unregister` operations value set to `false` will not be destroyed.

Event redelivery

Events can be redelivered when the `AutoAcknowledge` property is set to `false`. This allows for the adapter to enable the i2 message bus to retain the event until it is successfully sent to the integration broker. This, in conjunction with enabling the adapter to keep its registration for events, will provide guaranteed message delivery.

Note: If `AutoAcknowledge` is set to `false`, the `connectionId` attribute is mandatory and must not be reused by any other polling meta-object. The default behavior is `AutoAcknowledge true`.

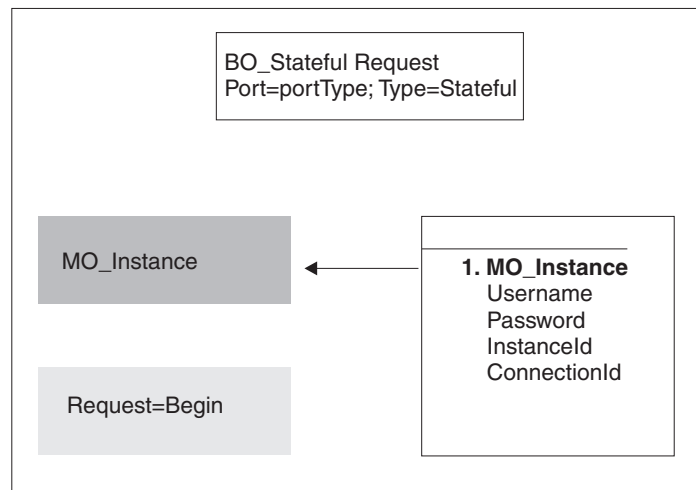
Using metaobjects for stateful operations

Stateful operations allow the i2 connector to maintain the session state throughout a series of operations. These grouped operations are treated as multiple service calls or requests from the perspective of the i2 connector.

To use a stateful operation with the i2 connector, the integration broker requests a stateful connection using the metaobject `BO_StatefulRequest` that indicates the start and end of a series of stateful operations. The connection is maintained for the stateful operations by associating the connection with a `connectionId`. This connection is managed for all requests made with the aforementioned `connectionId`.

Note: While a series of stateful operations are being processed, if the i2 connector crashes the state of these operations is not maintained.

The following diagram shows the metaobject `BO_StatefulRequest`.



The valid values for the *Request* attribute are "Begin" and "End," signaling to the i2 connector to begin a series of stateful operations with the credential information provided in the `MO_Instance`. The `connectionId` can be provided or be generated by the i2 CIS agent. Using the `connectionId` that is returned from this request, the business processes making subsequent calls to the i2 connector can make stateful operation calls. The application-specific information "Type=Stateful" allows the i2 connector to determine that this business object is a request to start or end the series of stateful operations associated with the enclosed `connectionId`.

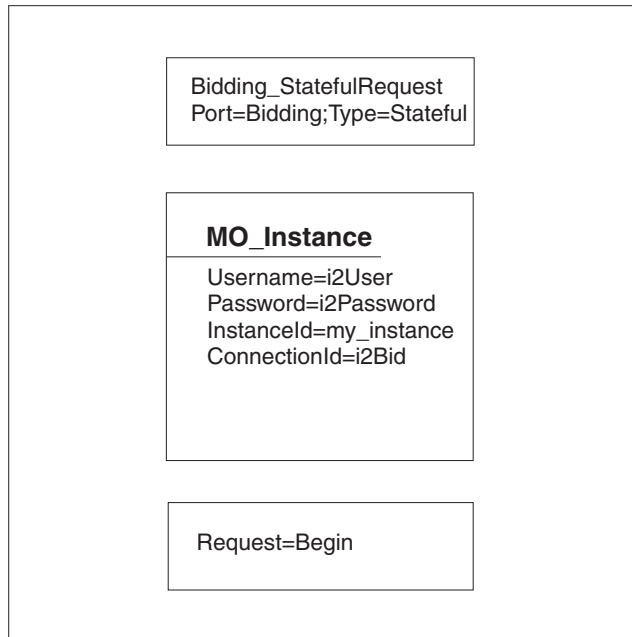
The following examples illustrate using metaobjects for stateful operations.

Example 1 of stateful operations

An auction application has a bidding system that uses an i2 CIS adapter to perform some of its auction services. The i2 CIS adapter has stateful operations to keep track of each bid by different users and also return the current winning bid at any time during the bidding process.

To use the i2 connector to make stateful calls and return the winning bid, the integration broker needs a business object to signal the beginning and end of the series of stateful operations (bids). It also needs a business object to submit a bid and another to return the winning bid.

Within the broker the integrator can create a business object based on the metaobject "BO_StatefulRequest", called Bidding_StatefulRequest. The following diagram shows this metaobject.



Here is an example of how these requests could be made using a broker's business process flow:

A bid has a "LaneId" and a "BiddingAmount", represented by the business object BO_Bid. A call is made to request the current winning bid using the "BO_optimizeBids" business object, which has the "LaneId" as an input business object and the winning bid as the output or returned business object. The returned business object has the "LaneId" and "WinningAmount".

Note: Lines beginning with -->Request processing, indicate how to make the request.

1. Start Bidding--Based on the LaneId, start a series of stateful operations:
-->Request processing, using Bidding_StatefulRequest with "Begin" and connectionId i2Bid.
2. Send Bid1--Send a bid for the LaneId with the BiddingAmount (8):
-->Request processing, using BO_Bid with BiddingAmount.
3. Send Bid2--Send a bid for the LaneId with the BiddingAmount (35):
-->Request processing using BO_Bid with BiddingAmount.
4. Send Bid3--Send a bid for the LaneId with the BiddingAmount (20):
-->Request processing using BO_Bid with BiddingAmount.
5. Send OptimizeBids--Send a request to get the current winning bid:
-->Request processing using BO_OptimizeBids.
Result: The request is processed and the winning bid business object is returned (35).
6. Send Bid4--Send a bid for the LaneId with the BiddingAmount (40):
-->Request processing using BO_Bid with BiddingAmount.
7. Send OptimizeBids--Send a request to get the current winning bid:

-->Request processing using BO_OptimizeBids.

Result: The request is processed and the winning bid business object is returned (40).

8. End Bidding--Send Bidding_StatefulRequest with connectionId "i2Bid" requesting the end of this series of stateful operations:

-->Request processing on Bidding_StatefulRequest with "Request=End".

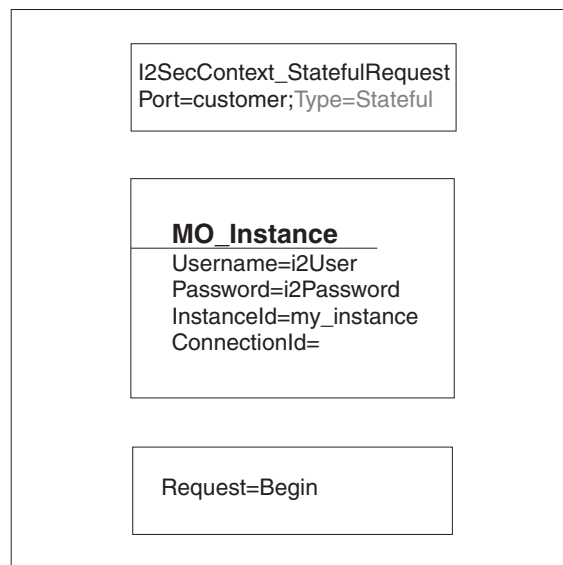
Note: The connectionId is what associates a series of stateful operations with each other; therefore, for each series of bids a different connectionId should be provided. The broker can also allow the i2 CIS agent to generate the connectionId, which will be returned on the "Request=Begin" request call on the i2 connector. Using the returned connectionId, the broker can request a series of stateful operations.

Example 2 of stateful operations

An application requires a special security context to be used by calling clients of the customer configuration processes. An i2 CIS adapter provides a stateful operation that creates and stores the security context for later use by a subsequent call.

The integrator can use the i2 connector to help process these stateful operations using the security context created and provided by the i2 CIS adapter.

A business object called "i2SecContext_StatefulRequest" is created based on the metaobject "BO_StatefulRequest". The following diagram shows the i2SecContext_StatefulRequest metaobject.



Here is an example of how these requests could be made using the broker's business process flow:

Note: Lines beginning with -->Request processing, indicate how to make the request.

1. Start Customer Add--Start a series of stateful operations using i2SecContext_StatefulRequest:

-->Request processing using i2SecContext_StatefulRequest with "Begin".

Result: Since the connectionId was not set in this business object, after the request call, the returned object will contain the connectionId for which these stateful operations need to be associated.

2. Send Security Context--Send the business object with the security context credential information, with the connectionId being the same as returned from the stateful operation. This is set in the MO_Instance of this business object:
-->Request processing using Security_Context business object
3. Send Customer Add--Send the business object to add a customer using the same connectionId:
-->Request processing using Customer_Add business object, using the same connectionId provided by the stateful operation request.
4. End Customer Add--End this series of stateful operations using i2SecContext_StatefulRequest by submitting the business object with "Request=End" and the same connectionid.

Specifying business object attribute properties

The i2 connector has various properties that you can set on its business object attributes. This section describes how the connector interprets several of these properties and describes how to set them when modifying a business object.

The following table shows the properties for simple attributes.

| Attribute | Description |
|--------------|---|
| Name | Unique name of the attribute |
| Type | All simple attributes should be of type String. |
| MaxLength | Not used |
| IsKey | Each business object must have at least one key attribute, which you specify by setting the key property to true for an attribute. The i2 connector does not check for this property. |
| IsForeignKey | Not used. |
| Is Required | Set to true if the attribute must have a value in the outgoing XML message. |
| AppSpecInfo | Not used |
| DefaultValue | Specifies a default value that the connector uses for a simple attribute in the inbound business object if the attribute is not set and is a required attribute. Rule: You must set and use the default value for the attributes of the polling metaobjects and MO_Instance metaobject. If the default value is set for the instanceId, and no value is set in the incoming business object, the connector takes the default value and tries to connect with this instance. |

The following table shows the properties for child object attributes.

| Attribute | Description |
|-------------------------|---|
| Name | Name of the child object. |
| Type | Business object type for the child. |
| Contained ObjectVersion | For all attributes that represent child business objects, this property specifies the child's business object version number. |

| Attribute | Description |
|--------------|---|
| Relationship | If the child is a container attribute, this is set to Containment. |
| IsKey | Not used |
| IsForeignKey | Not used. |
| Is Required | For relationship details between XML elements and requiredness, see Chapter 3, "XML data handler," in the <i>Data Handler Guide</i> . |
| AppSpecInfo | For information on this property, see "Identifying business object application-specific information" on page 23, |
| Cardinality | For relationship details between XML elements and cardinality, see Chapter 3, "XML data handler," in the <i>Data Handler Guide</i> . |

Special attribute values

Simple attributes in business objects can have the special value, `CxIgnore`. When it receives a business object from the integration broker, the connector ignores all attributes with a value of `CxIgnore`. It is as if those attributes were invisible to the connector. No XML is generated for them.

Because the i2 connector requires at least one primary key attribute to create a business object, you need to ensure that business objects passed in to the connector should have at least one primary key that is not set to `CxIgnore`.

Additionally, The i2 connector assumes that no attribute of business object *type* has a value of `CxB1ank`. Simple (String) attributes with a value of `CxB1ank` are included in an XML document. Empty double quotation marks ("") in an XML document are used as the PCDATA equivalent of `CxB1ank`.

Identifying business object application-specific information

Application-specific information provides the connector with application-dependent instructions on how to process business objects. If you extend or modify an application-specific business object, you must make sure that the application-specific information in the business object definition matches the syntax that the connector expects.

Application-specific information at the business object- level

The following table provides application-specific information at the business object-level for the wrapper business object supported by the i2 connector.

| Parameter | Description |
|---------------|--|
| Port= | The name of the i2 port type for the operation. |
| Type=Stateful | A metaobject that signals the beginning or end of a series of stateful requests. |

Application-specific information at the attribute level

The following table provides application-specific information at the attribute level for the wrapper business object supported by the i2 connector.

| Parameter | Description |
|-----------|--|
| Type= | The type represented by the attribute at the wrapper business object attribute level. The type could be input or output representing the input and output for the operation. |

Chapter 4. Generating business objects using the i2 ODA

This chapter describes the i2 ODA, an object discovery agent (ODA), which, working with the XML schema ODA, generates business objects for the IBM WebSphere Business Integration Adapter for i2.

This chapter contains the following sections:

- “Overview of the i2 ODA” on page 25
- “Installing the i2 ODA” on page 25
- “Using the i2 ODA in Business Object Designer Express” on page 27

Overview of the i2 ODA

The i2 Object Discovery Agent (ODA) is a utility to use to obtain the specifications for the i2 business object from the metadata information in i2’s CIS registry. The Business Object Development wizard automates the process. You can view or make modifications to the business object before saving it to the server.

The process for generating an i2 business object has three distinct stages:

1. Identifying the ports, operations, and types for which the i2 ODA generates the schema files; generating the XML schema for the types; and generating the wrapper business object representing the operations with the types as attributes.
2. Processing the i2 generated XML schema files and converting the XML schema to the actual business object for the type.
3. Prior to saving the wrapper business object, saving to the repository the MO_Instance business object and the business objects that were generated for the types using the XML ODA.

For details, see “Steps for using the i2 ODA” on page 27.

Installing the i2 ODA

This section describes how to install and launch the i2 ODA, run multiple instances of the i2 ODA, and work with error and trace message files.

Steps for installing the i2 ODA

Before you begin: This chapter assumes you have already installed the i2 connector, as well as the required software for using the connector (see Chapter 2, “Installing and configuring the connector,” on page 7). Be sure you are using the i2 application version 6.0.1 and the i2 ODA 1.2.x.

To install the i2 ODA, use the Installer for IBM WebSphere Business Integration Server Express adapters. Follow the instructions in the *WebSphere Business Integration Server Express Installation Guide for Windows*. When the installation is complete, the following files are installed in the directory on your system where you have installed the product:

- ODA\i2\i2ODA.jar
- ODA\messages\i2ODAAgent.txt
- ODA\i2\start_i2ODA.bat (Windows only)

Notes:

1. Except as otherwise noted, this document uses backslashes (\) as the convention for directory paths.
2. All product path names are relative to the directory where the product is installed on your system.

Other installation requirements

- i2 provides the MetadataService adapter to obtain the metadata information from the registry. You need to install this adapter on an instance of the i2 application. Be sure to start the adapter prior to using the MetadataService.
- The bindings file for the port MetadataService, for example, TDMMetadata.xml, which contains the port, operation, and type information, needs to be in the i2 configuration directory.

Launching the i2 ODA

Before you begin: Ensure that the i2 ODA and XML schema ODA are installed on your system.

To launch the i2 ODA, run this file:

- **Windows:** start_i2ODA.bat

You have to add the proper path to the start files for CIS-SDK. You need to point to the exact location of connector jar as found in the i2 lib directory.

Example: The following path information needs to be added to the start_i2.bat file:

```
set I2_CIS_HOME_DIR=C:\i2\CIS\6.0\cis-sdk
set CONNECTORJAR=
```

Note: These are just examples. You should change the path information depending on your local installation.

You configure and run the i2 ODA using Business Object Designer Express. Business Object Designer Express locates each ODA by the name specified in the *AGENTNAME* variable of each script or batch file. The default ODA name for this connector is *i2ODA*.

Working with error and trace message files

Error and trace message files (the default is *i2ODAAgent.txt*) are located in *\ODA\messages*, which is under the product directory. These files use the following naming convention:

AgentNameAgent.txt

Example: If the *AGENTNAME* variable specifies *i2ODA1*, the tool assumes that the name of the associated message file is *i2ODA1Agent.txt*

You can have a message file for each ODA instance or have differently named ODAs use the same message file. The name of the message file is specified in Business Object Designer Express as part of the ODA configuration.

Note: Failing to correctly specify the message file's name when you configure the ODA causes it to run without messages. For more information on specifying the message file name, see "Configure agent properties" on page 28.

During the configuration process, you specify:

- The name of the file into which the i2 ODA writes error and trace information
- The level of tracing, which ranges from 0 to 5

The following table describes the tracing levels.

| Trace Level | Description |
|-------------|---|
| 0 | <ul style="list-style-type: none"> • Logs errors and fatal errors from the i2 ODA application • Logs warnings that require a system administrator's attention |
| 1 | Traces all entering and exiting messages for method |
| 2 | Traces the ODA's properties and their values |
| 3 | Traces the names of all business objects |
| 4 | Traces business object properties and the values received |
| 5 | <ul style="list-style-type: none"> • Indicates the ODA initialization values for all of its properties • Traces the business object definition dump |

For information on where to configure these values, see "Configure agent properties" on page 28.

Using the i2 ODA in Business Object Designer Express

This section describes how to use the i2 ODA in Business Object Designer Express to generate business objects. For information on launching Business Object Designer Express, see the *Business Object Development Guide*.

After you launch an ODA, you must launch Business Object Designer Express to configure and run it. Business Object Designer Express provides a wizard that guides you through six steps to generate a business object definition using an ODA. The six steps are as follows:

1. Select the agent.
2. Configure the agent properties.
3. Expand the nodes and select the port types, operations, and input/output types.
4. Confirm the selection, generate the wrapper business objects, and save.
5. Complete the business object and generate the business objects for the types.
6. Save the business object files.

Details for each step follow.

Steps for using the i2 ODA

Before you begin: You need to start the i2 Business Object Designer Express wizard.

1. Open Business Object Designer Express.
2. From the File menu, select New Using ODA....

Result: Business Object Designer Express displays the first window in the wizard, named Select Agent.

Perform the following steps:

Select the agent

To select the ODA:

1. Click Find Agents to display all registered or currently running ODAs in the Located agents field.

Note: You can also find the agent using the host name and port number

2. Select the desired ODA from the displayed list.

Note: The ODA for i2 has a default name of *i2ODA*. The agent name depends on the value of the *i2* variable in the *start_i2ODA.bat* or *start_i2ODA.sh* file.

Recommendation: When you run multiple instances of the ODA utility, you should change the default name by creating a separate batch file for each instance or by specifying a unique name in the *AGENTNAME* variable of each batch file.

You can run multiple instances of the i2 ODA on either the local host or the remote host in the network. Each instance runs on a unique port. When multiple instances of the ODA are running on different machines, they are visible in the Business Object Designer Express by their i2 ODA values. If two ODAs have the same i2 value, then either of the ODAs can be used, with possibly undesirable results. You can assign unique names to such ODAs by prefixing the i2 name with the host machine name, or by using an ORB finder (for example, *osfind*) to locate existing CORBA object names on your network.

Result: Business Object Designer Express displays your selected agent in the **Agent's name** field.

Configure agent properties

The first time Business Object Designer Express communicates with the i2 ODA, it prompts you to enter a set of initialization properties. You can save these properties in a named profile so that you do not need to re-enter them each time you use the i2 ODA. For information on specifying an ODA profile, see the *Business Object Development Guide*.

In addition to configuring these one-time properties, you need to configure properties to connect to the CIS agent and to define the tree nodes.

The following table describes the properties to configure.

| Row number | Property name | Property type | Description |
|------------|--------------------|---------------|---|
| 1 | DefaultBOPrefix | String | Text that is prepended to the name of the business object to make it unique. |
| 2 | SchemaFileLocation | String | Example: <i>i2_BO</i> Path where the generated.xsd files are stored. This is mandatory; you must specify the path to store the schema files. |
| 3 | MessageFile | String | Path to the error and message file. If the file is not specified, the error messages from the ODA are not displayed. The i2 ODA displays the file name according to the naming convention. Example: If the agent is named <i>i2ODA</i> , the value of the message file property displays as <i>i2ODAAgent.txt</i> . |

| Row number | Property name | Property type | Description |
|------------|--------------------|---------------|--|
| 4 | CISAgentHostName | String | Host name of the CIS agent, it is specified if the CIS agent is running on a remote machine. |
| 5 | MetadataService | String | Name of the i2 CIS port where the MetadataService is located. The default is MetadataService. |
| 6 | PortTypesOperation | String | Name of the operation to get the port types through metadata introspection. The default is getPortTypes. |
| 7 | SchemasOperation | String | Name of the operation to get the schemas for the selected operations. The default is getSchemasForOperation. |

You can also configure several optional parameters for the agent when it starts up.

- **TraceFileName**--File into which the i2 ODA writes trace information. The command line option for this parameter is `-t`. The i2ODA names the file according to the naming convention.

Example: If the agent is named `i20DA`, it generates a trace file named `i20DAtrace.txt`.

- **TraceLevel**--Level of tracing enabled for the i2 ODA. For more information, see "Working with error and trace message files" on page 26.

Expand nodes and select port types, operations, and input/output types/formats

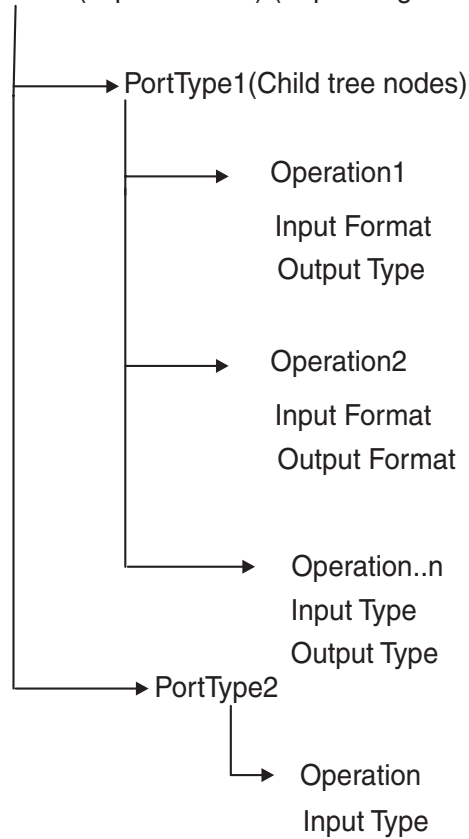
The i2 ODA uses the properties you configured in the preceding step to connect to the specified i2 application. Business Object Designer Express displays the metadata information about the registered ports, operations for each port, and the input and output types for each operation as a tree structure. You can expand the tree nodes for the ports and operations by right-clicking on a node. The *type* node is the leaf node of the tree, so it is not expandable.

A distinction is made between "Types" and "Formats" when dealing with the input and output values for an operation. When displaying the input and output business objects for an operation, if it is a "Format" that will be displayed instead of a "Type," it will display as "Output Format" instead of "Output Type".

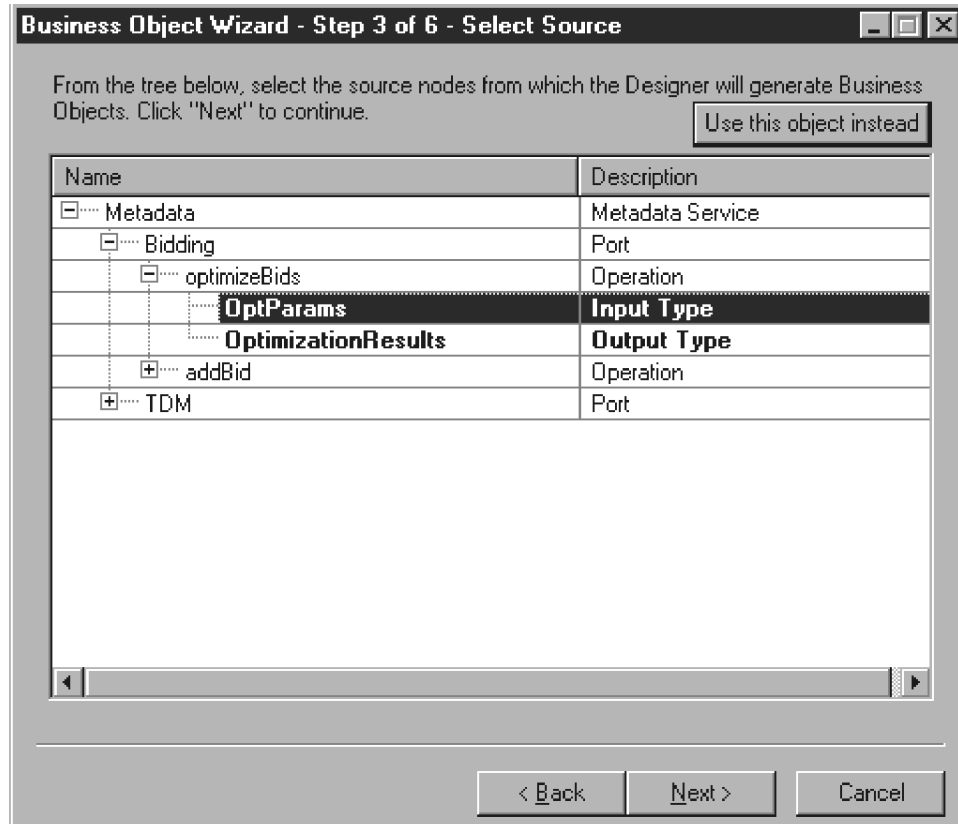
Note: In this document, when we say "Type" we mean "Type" or "Format".

The following diagram shows a tree view with expanded nodes.

Metadata (Top tree node) (Expanding Metadata lists all the port types)



- Select the port, operation, and type for generating the business object. Each operation has an input and output type on a port, and each of these types needs to have a corresponding business object.



Result: The i2 ODA will create the schema file for the chosen type. The schema files form the input for the XML schema ODA to generate the corresponding business objects. The XML schema file name follows the naming convention, input/output_operation_type.

Example: For the persistOrder operation, both the input type and output type is Order, but the formats for the two are different. The i2 ODA validates these and generates different schema files for the input and output types:

- i2BO_in_persistorder_Order.xsd (input)
- i2BO_out_persistorder_Order.xsd (output)

The schema files are stored in the directory specified by the SchemaFileLocation property for the ODA. The i2 ODA checks the schema location for the existence of the schema prior to creating the new one. If there already exists an xsd for the type, the i2 ODA does not duplicate the schema.

Confirm selection, generate wrapper business object, and save

1. Confirm the operations you have selected for the i2 ODA to generate wrapper business objects.

Result: The i2 ODA creates a wrapper business object to represent the operation with the chosen port type. Each operation has one wrapper business object. The input and output types of the operation form the attributes of this wrapper business object, with the operation as the verb. The port type becomes the application-specific information for this business object.

The name of the wrapper business object is DefaultBOPrefix_operation. The wrapper business object contains:

- Port information

- MO_instance containing:
 - InstanceId
 - ConnectionId
 - Username
 - Password
- Dummy key (as the business object creation will fail without a key)
- Two single cardinality attributes representing the input and output types for the operation. The attributes are named as BOPrefix_in_operation_type and BOPrefix_out_operation_type.

Example: The wrapper BO for the operation persistOrder is i2BO_persistOrder.

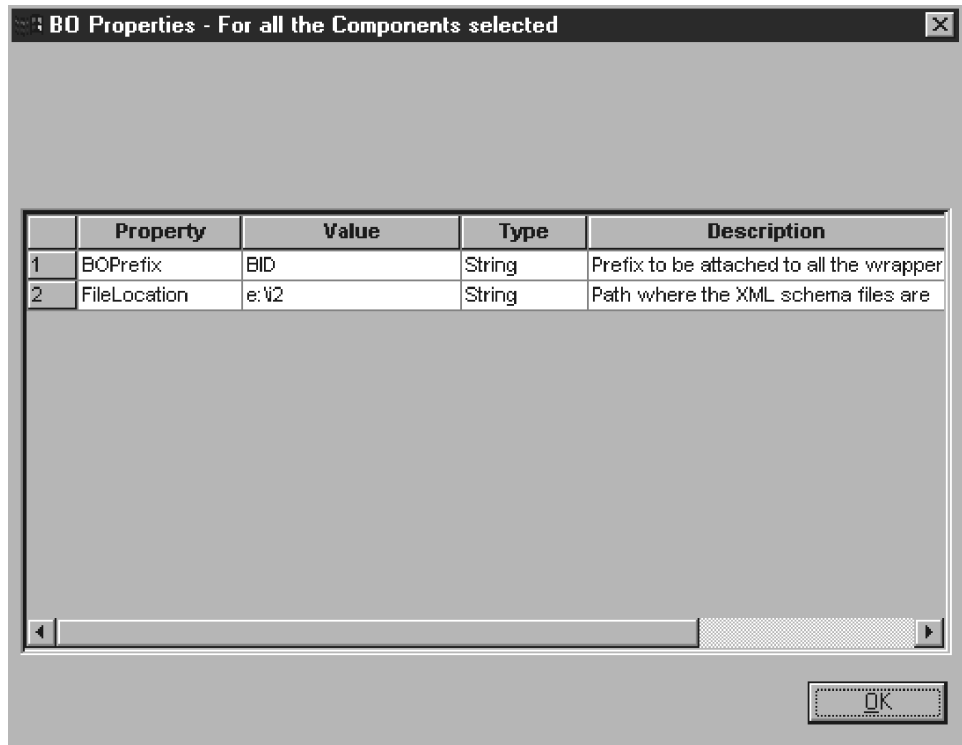
| |
|---|
| i2bo_persistorder Port=TDM |
| MO_Instance InstanceId=prapulla2k ConnectorId=i2Connector Username=i2User Password=i2Password |
| DummyKey |
| i2bo_in_persistorder_order Type=Input |
| i2bo_out_persistorder_order Type=Output |

2. Save the wrapper business object to a file. Saving it to the InterChange Server Express will fail because the corresponding dependent attribute business objects have not yet been created by the XML ODA schema.

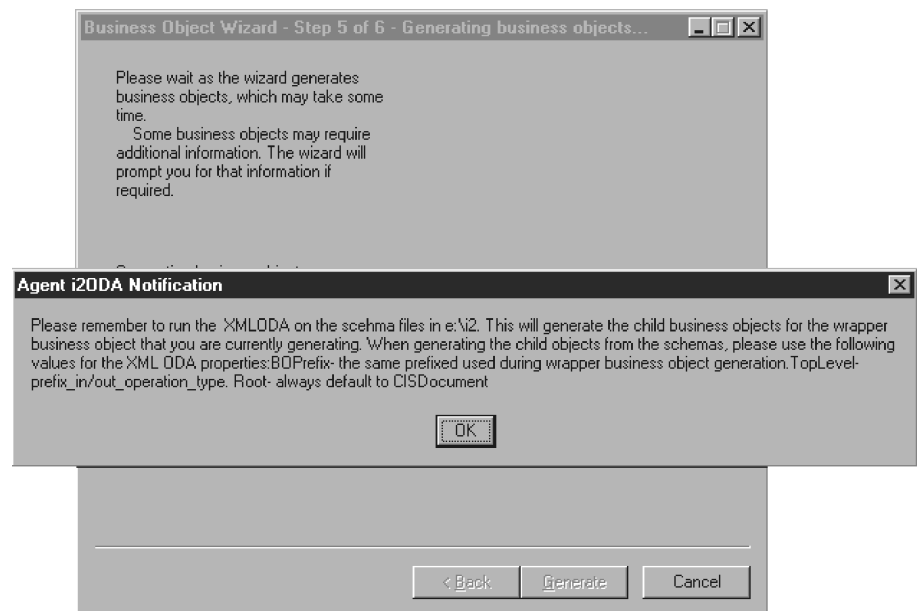
Guideline: When you save the business objects into a file in this step, the current Business Object Designer Express wizard looks at the machine where the agent is running. Another pop-up window prompts you for a location to save the generated wrapper business objects.

Complete the business object and generate the business objects for the types

1. Check the property values that Business Object Designer Express displays in the BO Properties window. If you are satisfied with the value you previously entered in the Configure Agent window (for example, for DefaultBOPrefix), you do not need to change the value here.



2. Be sure the XML schema ODA agent is running.
 - a. The XML schema ODA reads the schema files previously saved to the SchemaFileLocation and generates the business objects for the input and output types.



- b. Save these business objects to the same directory as the wrapper business objects.

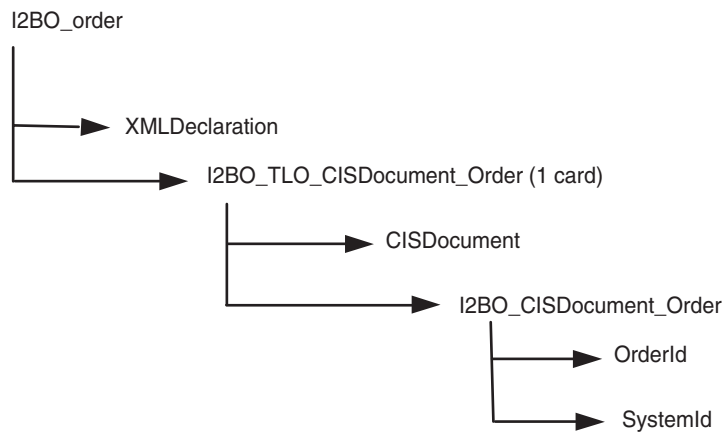
Guideline: Remember to run the XML ODA on the schema files in the directory you specified when running the ODA. This will generate the child

business objects for the wrapper business object that you generated. When generating child objects from the schema, use the following values for the XML ODA properties:

- BOPrefix--This should be the same prefix used during the wrapper business object generation.
- TopLevel--This should be prefix_in/out_operation_type.
- Root--This should always default to CISDocument.

BOPrefix for the XML schema ODA should be the same as the BOPrefix for the i2 ODA.

The following diagram shows the business object that the XML schema ODA generates for i2_order.xsd. The XML data handler uses the combination of the element next to CISDocument and BOPrefix to get the business object name.



Note: The inclusion of an `<xsd:any minOccurs="0" maxOccurs="unbounded" namespace="##any" processContents="skip"/>` tag, will no longer cause the business object generation to fail. For more information see the *Data Handler Guide*.

Save the business object files

Now that all the required business objects are generated, you need to save them to the InterChange Server Express for use by the collaborations. Use the Business Object Designer Express utility to copy the business objects to the server. You can concatenate the files together into a single file and copy them to the server.

Guideline: Be sure to run the XML schema ODA prior to saving the wrapper business objects to the server.

Example:

| Property | Value |
|-------------|---|
| FileName | D:\i2\odaschema\i2persist_in_persistOrder_Order_Order.xsd |
| Root | CISDocument |
| TopLevel | in_persistOrder_Order |
| BOSelection | false |
| BOPrefix | i2persist |

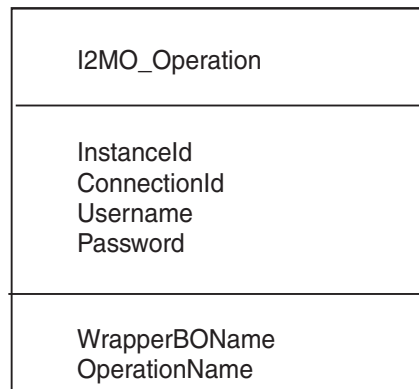
| Property | Value |
|-----------------------------|-----------------|
| Doctypeor SchemaLocation | true |
| TraceFileName | XMLODAtrace.txt |
| TraceLevel | 5 |
| MessageFile | XMLODAAgent.txt |

At this stage, you can decide whether to run different operations on different instances. You can clone the MO_Instance and set a default value for the instanceId on these. You will need to replace the default MO_Instance with the newly created ones in the wrapper business objects for the operations.

Creating the metaobject for polling

Once the business objects are created, you need to create the metaobjects for polling using System Manager. These objects shall have the i2MO prefix followed by the operation. The attributes need to have a default value. This information is used during polling to register the specific operation and check the output from the i2 applications for the registered operation.

The following diagram shows the structure of the i2 metaobject for i2 MO_Operation. The diagram shows the attributes of the metaobject--the instanceId, connectionId, username, and password--and the operation name and business object wrapper name.



For more information on configuring metaobjects, see Chapter 3, “Understanding business objects for the connector,” on page 15.

Chapter 5. Troubleshooting and error handling

This chapter describes how the i2 connector for i2. handles errors. The connector generates logging and tracing messages. The chapter contains the following sections:

- “Logging error messages” on page 37
- “Tracing messages” on page 40
- “Running the adapter against a CIS on a different subnet” on page 41
- “Tips for troubleshooting” on page 42

Logging error messages

The connector logs an error message whenever it encounters an abnormal condition during processing, regardless of the trace level. When such an error occurs, the connector also prints a textual representation of the failed business object as it was received. It writes the text to the i2 Adapter log file, whose file name corresponds to the connector property `LogFileName`.

The message contains a detailed description of the condition and the outcome and may also include extra information that may aid in debugging, such as business object dumps or stack traces (for exceptions).

Error types: Error messages are of two types:

- Errors--conditions that the connector can recover from, usually by abandoning the current processing.
- Fatal errors--unrecoverable error conditions. See the following sections on polling-related and request processing errors.

Structure of error messages

All the error messages that the connector generates are stored in a message file named `i2Adapter.txt`. Each error message typically has a message ID, the error message, and an explanation section for a detailed description and tips to rectify the problem.

Message ID

Message

[EXPL]

The message IDs for the i2 connector range from 90000 to 92000, with 90000 to 91000 set aside for polling-related error messages, and 91000 to 92000 set aside for request processing error messages.

Example: The following exemplifies the message structure, where `nnnnn` represents the message ID.

```
nnnnn
Not able to get a connection for this instance {1}.
[EXPL]
Please ensure that the instance specified is up.
{1}--Parameter to the error message, in this case the instance id.
```

Polling-related error messages

The following table describes polling-related error messages. These are logged in the i2 Adapter log file.

Notes:

1. In some cases, the connector logs a fatal error (log message type of XRD_FATAL) so that e-mail notification can be triggered. For logging this error with the integration broker, you need to set the connector property LogAtInterchangeEnd to true.
2. E-mail notification will be sent only if the e-mail connector is configured.

| Error description | Error type | Handling by i2 connector |
|--|-------------|---|
| Connection lost while polling | Fatal error | The connector detects the connection error at the time of a poll call. It logs a fatal error (log message type of XRD_FATAL) and dumps the XML message. Fatal error can trigger e-mail notification. For logging this error with the integration broker, you need to set the connector property LogAtInterchange to true and continue with polling on other operations that might be running on instances that are active. |
| Not able to register an operation with the CIS Agent | Fatal error | The connector logs a fatal error (log message type of XRD_FATAL) and dumps the XML message. Fatal error can trigger e-mail notification. For logging this error with the integration broker, you need to set the connector property LogAtInterchange to true. With subsequent poll calls, the i2 connector tries to re-register the operations that could not be registered with the previous poll call. In case registering all the operations fail, we assume that the CIS agent is down; the connector returns APPRESPONSETIMEOUT, which shuts down the i2 connector. |
| No metaobjects configured for polling | Error | The i2 connector always returns a FAIL after logging that the metaobjects are not configured for polling. |
| Default value for the metadata object attributes not set | Error | For details on the default value attribute property, see Chapter 3, "Understanding business objects for the connector," on page 15. The error "required information for polling was not found for the specified metaobject" is logged and the processing continues for other messages. |

| Error description | Error type | Handling by i2 connector |
|--|---------------|---|
| Not able to fetch the message from CIS Agent | Error/SUCCESS | In case the poll call to the i2 application returns a null, or there are no events for the operation, the connector continues to poll for other operations. In case an exception is caught from any CIS Client API, an error message containing the word ERROR_PROCESSING_EVENT is logged. The connector continues to poll for other operations. |
| Fail to convert XML message to IBM business object | Error | The error that the XML message has a syntax error is logged for the message, The XML message gets dumped to the log file, and the processing continues for other messages. |
| Any error when posting event to the broker | Error/Fatal | In case of a return code of CONNECTOR_NOT_ACTIVE, the connector logs a fatal error and returns APPRESPONSETIMEOUT which shuts down the connector. The error is logged with the status of ERROR_POSTING_EVENT. In case of a return code of NO_SUBSCRIPTION_FOUND, the error is logged with the status of UNSUBSCRIBED and polling continues. For a return code of FAIL, the error is logged with the status of ERROR_POSTING_EVENT for the business object, and the polling continues for the other messages. |
| Event not subscribed to | Error | The error is logged with the status of UNSUBSCRIBED for the business object, the XML message is dumped to the log file, and the polling continues for the other messages. |

Service call request processing error messages

The following table describes service call request processing error messages. These are logged in the i2 Adapter log file.

| Error description | Error type | Handling by i2 connector |
|--|-------------|--|
| Not able to get a connection for the specified port type and instance. | Fatal error | The connector detects the connection error at the time of a service request processing call. It logs a fatal error with the status of FAIL in the exception and a detailed exception message stating the cause of the exception set on the exception object. |

| Error description | Error type | Handling by i2 connector |
|---|---------------|---|
| No instanceId found in the metadata object within the incoming business object | Error | The connector checks for the default value setting for the instanceId attribute of the metaobject within the wrapper business object. If set, the connector tries to connect to this instance and execute the operation. If there is no default value, it logs the error message with the status of FAIL and a detailed exception message stating the cause of the exception set on the exception object. |
| Not able to convert the incoming child business object attributes to XML. | Error | The i2 connector logs the message to the adapter log and sets the status on the exception to FAIL. |
| Failure executing the operation on the i2 side. | Error | The i2 connector logs the message from the Resource Exception to the adapter log and sets the status on the exception to FAIL. |
| Not able to convert the returned CIS Record if the operation was SUCCESSFUL to XML. | Error | The i2 connector logs the message to the adapter log and sets the status on the exception to FAIL. |
| Not able to convert the XML message to the business object. | Error | The i2 connector logs the message to the adapter log and sets the status on the exception to FAIL. It also dumps the XML message to the log file along with the error message. |
| Execute method returns null output | Error/Success | In case the operation does not have an output type, the execute method execution is considered a SUCCESS. If an output is expected, the execute method issues an exception which is caught by the connector. |

Tracing messages

Tracing is an optional debugging feature you can turn on to closely follow a connector's behavior. Tracing messages are configurable and can be changed dynamically. You set various levels depending on the desired detail. Trace messages, by default, are written to STDOUT (screen). You can also configure tracing to write to a file.

Recommendation: Tracing should be turned off on a production system or set to the lowest possible level to improve performance and decrease file size.

The following table describes the types of tracing messages that the i2 connector outputs at each trace level. All the trace messages appear in the file specified by the connector property TraceFileName. These messages are in addition to any tracing messages output by the adapter architecture.

| Tracing Level | Tracing Messages |
|---------------|---|
| Level 0 | Message that identifies the connector version. No other tracing is done at this level. This message is always displayed. Example: '2002/07/10 15:01:46.812: This is version 1.0 of the i2 Adapter'. |
| Level 1 | Messages delivered each time the pollForEvents method is executed. |
| Level 2 | <ul style="list-style-type: none"> • Messages logged each time a business object is posted to the integration broker from gotAppEvent. • Messages that indicate each time a business object request is received. |
| Level 3 | Not applicable |
| Level 4 | <ul style="list-style-type: none"> • Application-specific information messages, for example, messages showing the values returned by the functions that parse the business object's application-specific information fields. • Messages that identify when the connector enters or exits a function, which helps trace the process flow of the connector. |
| Level 5 | <ul style="list-style-type: none"> • Messages that indicate connector initialization, for example, messages showing the value of each configuration property retrieved from the integration broker. • Messages that comprise a business object dump. At this trace level, the connector outputs a textual representation of the business object it is processing before it begins processing the object (showing the object the connector receives from the collaboration), and after it is done processing the object (showing the object the connector returns to the collaboration). |

Running the adapter against a CIS on a different subnet

When the CIS agent and CIS adapters are running on a different subnet from the Adapter for i2, you need to tell the CIS agent and CIS adapter the fully qualified name or IP address that the RMI Server Hostname is using.

You will need to set the JVM argument when starting the CIS agent and any installed adapter.

Perform the following steps to set the instance ID and RMI Server Hostname.

Note: Henceforth, Hostname is the machine name or the IP address of the machine that the CIS agent and CIS adapters are running. You can use the IP address if it will not change.

1. If you have installed the adapter, uninstall it by running `uninstallAdapter.py`.
2. Change the Metadata file `Bindings.xml` for the CIS adapter by inserting `<bindings instanceID=Hostname>` as an attribute to the `Bindings` element.
3. Reinstall the adapter with this JVM argument:

```
installAdapter.py -Djava.rmi.server.hostname=<hostname> -m
<metadatabinding file>
```
4. Start the CIS agent giving the same JVM argument:

```
-Djava.rmi.server.hostname=<hostname>
```
5. Restart the CIS agent stating the RMI Server Hostname as a JVM argument property.

6. Start the newly configured adapter stating the RMI Server Hostname as a JVM argument property.
7. To enable the CIS agent to send event notifications to the machine that the Adapter for i2 is running, you need to tell it the fully qualified hostname of the machine where the Adapter for i2 is running. To do this, add the line:
`MACHINE_NAME=mymachine.company.com`

to the file `[i2_CIS_install]/{cis-sdk}/properties/cisclient.properties` where, `mymachine.company.com` is the fully qualified name of the machine where the Adapter for i2 is running. This tells the CIS Client (Adapter for i2) to use the machine name specified in the `cisclient.properties` file as its machine name when running remotely.

8. In some cases, you will need to state the machine name of the CIS agent when the machine name of the CIS agent cannot be resolved from a remote machine running the Adapter for i2. To do this:
 - a. Set the IP address of the CIS agent machine as the value in the `<MACHINE_NAME>` element in the `settings.xml` file for your CIS agent.
 - b. Run `configure.py` to make the changes.
 - c. Restart the agent and all adapters.

For more information on running the CIS on different subnets, see your CIS guide.

Tips for troubleshooting

Use the following tips for troubleshooting problems:

- If the CIS agent is running remotely, try to ping the remote machine and also ping this machine from the remote machine.
- Check the CIS agent service.
- Check that the adapters are running.
- Be sure the business object structure is consistent with the operation.
- See if any default value is set for the `instanceId` like in the metaobjects.
- If you want to run the connector in request process mode only, be sure you start the connector with the `-fno` option set.

Appendix A. Standard configuration properties for connectors

This appendix describes the standard configuration properties for the connector component of WebSphere Business Integration Server Express adapters. The information covers InterChange Server Express.

For information about properties specific to this connector, see the relevant section in this guide.

New properties

These standard properties have been added in this release:

- AdapterHelpName
- ControllerEventSequencing
- jms.ListenerConcurrency
- jms.TransportOptimized
- TivoliTransactionMonitorPerformance

Standard connector properties overview

Connectors have two types of configuration properties:

- Standard configuration properties, which are used by the framework
- Application, or connector-specific, configuration properties, which are used by the agent

These properties determine the adapter framework and the agent run-time behavior.

This section describes how to start Connector Configurator Express and describes characteristics common to all properties. For information on configuration properties specific to a connector, see its adapter user guide.

Starting Connector Configurator Express

You configure connector properties from Connector Configurator Express, which you access from System Manager. For more information on using Connector Configurator Express, refer to the sections on Connector Configurator Express in this guide.

Configuration property values overview

The connector uses the following order to determine a property's value:

1. Default
2. Repository for InterChange Server Express integration broker.
3. Local configuration file
4. Command line

The default length of a property field is 255 characters. There is no limit on the length of a STRING property type. The length of an INTEGER type is determined by the server on which the adapter is running.

A connector obtains its configuration values at startup. If you change the value of one or more connector properties during a run-time session, the property's update method determines how the change takes effect.

The update characteristics of a property, that is, how and when a change to the connector properties takes effect, depend on the nature of the property.

There are four update methods for standard connector properties:

- **Dynamic**
The new value takes effect immediately after the change is saved in System Manager. However, if the connector is in stand-alone mode (independently of System Manager).
- **Agent restart (InterChange Server Express only)**
The new value takes effect only after you stop and restart the connector agent.
- **Component restart**
The new value takes effect only after the connector is stopped and then restarted in System Manager. You do not need to stop and restart the agent or the server process.
- **System restart**
The new value takes effect only after you stop and restart the connector agent and the server.

To determine how a specific property is updated, refer to the **Update Method** column in the Connector Configurator Express window, or see the Update Method column in Table 2 on page 45.

There are three locations in which a standard property can reside. Some properties can reside in more than one location.

- **ReposController**
The property resides in the connector controller and is effective only there. If you change the value on the agent side, it does not affect the controller.
- **ReposAgent**
The property resides in the agent and is effective only there. A local configuration can override this value, depending on the property.
- **LocalConfig**
The property resides in the configuration file for the connector and can act only through the configuration file. The controller cannot change the value of the property, and is not aware of changes made to the configuration file unless the system is redeployed to update the controller explicitly.

Standard properties quick-reference

Table 2 on page 45 provides a quick-reference to the standard connector configuration properties. Not all connectors require all of these properties, and property settings may differ. .

See the section following the table for a description of each property.

Note: In the Notes column in Table 2 on page 45, the phrase "RepositoryDirectory is set to <REMOTE>" indicates that the broker is InterChange Server Express.

Table 2. Summary of standard configuration properties

| Property name | Possible values | Default value | Update method | Notes |
|-------------------------------|--|--|---|--|
| AdapterHelpName | One of the valid subdirectories in <ProductDir>\bin\Data\App\Help that has a valid <Regional Setting> directory | Template name, if valid, or blank field | Component restart | Supported regional settings. Include chs_chn, cht_twn, deu_deu, esn_esp, fra_fra, ita_ita, jpn_jpn, kor_kor, ptb_bra, and enu_usa (default). |
| AdminInQueue | Valid JMS queue name | <CONNECTORNAME>/ADMININQUEUE | Component restart | This property is valid only when the value of DeliveryTransport is JMS |
| AdminOutQueue | Valid JMS queue name | <CONNECTORNAME>/ADMINOUTQUEUE | Component restart | This property is valid only when the value of DeliveryTransport is JMS |
| AgentConnections | 1 through 4 | 1 | Component restart | This property is valid only when the value of DeliveryTransport is MQ or IDL, the value of Repository Directory is set to <REMOTE> and the value of BrokerType is ICS. |
| AgentTraceLevel | 0 through 5 | 0 | Dynamic for ICS; otherwise Component restart | |
| ApplicationName | Application name | The value specified for the connector application name | Component restart | |
| BrokerType | ICS, | ICS | Component restart | |
| CharacterEncoding | Any supported code. The list shows this subset: ascii7, ascii8, SJIS, Cp949, GBK, Big5, Cp297, Cp273, Cp280, Cp284, Cp037, Cp437 | ascii7 | Component restart | This property is valid only for C++ connectors. |
| CommonEventInfrastructure | true or false | false | Component restart | |
| CommonEventInfrastructureURL | A URL string, for example, corbaloc:iiop:host:2809. | No default value. | Component restart | This property is valid only if the value of CommonEvent Infrastructure is true. |
| ConcurrentEventTriggeredFlows | 1 through 32,767 | 1 | Component restart | This property is valid only if the value of RepositoryDirectory is set to <REMOTE> and the value of BrokerType is ICS. |
| ContainerManagedEvents | Blank or JMS | Blank | Component restart | This property is valid only when the value of Delivery Transport is JMS. |

Table 2. Summary of standard configuration properties (continued)

| Property name | Possible values | Default value | Update method | Notes |
|-------------------------------|--|--|-------------------|---|
| ControllerEventSequencing | true or false | true | Dynamic | This property is valid only if the value of Repository Directory is set to <REMOTE> and the value of BrokerType is ICS. |
| ControllerStoreAndForwardMode | true or false | true | Dynamic | This property is valid only if the value of Repository Directory is set to <REMOTE> and the value of BrokerType is ICS. |
| ControllerTraceLevel | 0 through 5 | 0 | Dynamic | This property is valid only if the value of RepositoryDirectory is set to <REMOTE> and the value of BrokerType is ICS. |
| DeliveryQueue | Any valid JMS queue name | <CONNECTORNAME>/DELIVERYQUEUE | Component restart | This property is valid only when the value of Delivery Transport is JMS. |
| DeliveryTransport | IDL or JMS | IDL when the value of RepositoryDirectory is <REMOTE>, otherwise JMS | Component restart | If the value of RepositoryDirectory is not <REMOTE>, the only valid value for this property is JMS. |
| DuplicateEventElimination | true or false | false | Component restart | This property is valid only if the value of DeliveryTransport is JMS. |
| EnableOidForFlowMonitoring | true or false | false | Component restart | This property is valid only if the value of BrokerType is ICS. |
| FaultQueue | Any valid queue name. | <CONNECTORNAME>/FAULTQUEUE | Component restart | This property is valid only if the value of DeliveryTransport is JMS. |
| jms.FactoryClassName | CxCommon.Messaging.jms.IBMMQSeriesFactory, CxCommon.Messaging.jms.SonicMQFactory, or any Java class name | CxCommon.Messaging.jms.IBMMQSeriesFactory | Component restart | This property is valid only if the value of DeliveryTransport is JMS. |
| jms.ListenerConcurrency | 1 through 32767 | 1 | Component restart | This property is valid only if the value of jms.TransportOptimized is true. |
| jms.MessageBrokerName | If the value of jms.FactoryClassName is IBM, use crossworlds.queue.manager. | crossworlds.queue.manager | Component restart | This property is valid only if the value of DeliveryTransport is JMS. |
| jms.NumConcurrentRequests | Positive integer | 10 | Component restart | This property is valid only if the value of DeliveryTransport is JMS. |

Table 2. Summary of standard configuration properties (continued)

| Property name | Possible values | Default value | Update method | Notes |
|------------------------|---|-----------------------|-------------------|---|
| jms.Password | Any valid password | | Component restart | This property is valid only if the value of DeliveryTransport is JMS. |
| jms.TransportOptimized | true or false | false | Component restart | This property is valid only if the value of DeliveryTransport is JMS and the value of BrokerType is ICS. |
| jms.UserName | Any valid name | | Component restart | This property is valid only if the value of Delivery Transport is JMS. |
| JvmMaxHeapSize | Heap size in megabytes | 128m | Component restart | This property is valid only if the value of Repository Directory is set to <REMOTE> and the value of BrokerType is ICS. |
| JvmMaxNativeStackSize | Size of stack in kilobytes | 128k | Component restart | This property is valid only if the value of Repository Directory is set to <REMOTE> and the value of BrokerType is ICS. |
| JvmMinHeapSize | Heap size in megabytes | 1m | Component restart | This property is valid only if the value of Repository Directory is set to <REMOTE> and the value of BrokerType is ICS. |
| ListenerConcurrency | 1 through 100 | 1 | Component restart | This property is valid only if the value of DeliveryTransport is MQ. |
| Locale | This is a subset of the supported locales: en_US, ja_JP, ko_KR, zh_CN, zh_TW, fr_FR, de_DE, it_IT, es_ES, pt_BR | en_US | Component restart | |
| LogAtInterchangeEnd | true or false | false | Component restart | This property is valid only if the value of Repository Directory is set to <REMOTE> and the value of BrokerType is ICS. |
| MaxEventCapacity | 1 through 2147483647 | 2147483647 | Dynamic | This property is valid only if the value of Repository Directory is set to <REMOTE> and the value of BrokerType is ICS. |
| MessageFileName | Valid file name | InterchangeSystem.txt | Component restart | |

Table 2. Summary of standard configuration properties (continued)

| Property name | Possible values | Default value | Update method | Notes |
|----------------------|---|---------------------------------------|---|---|
| MonitorQueue | Any valid queue name | <CONNECTORNAME>/MONITORQUEUE | Component restart | This property is valid only if the value of DuplicateEventElimination is true and ContainerManagedEvents has no value. |
| OADAutoRestartAgent | true or false | false | Dynamic | This property is valid only if the value of Repository Directory is set to <REMOTE> and the value of BrokerType is ICS. |
| OADMaxNumRetry | A positive integer | 1000 | Dynamic | This property is valid only if the value of Repository Directory is set to <REMOTE> and the value of BrokerType is ICS. |
| OADRetryTimeInterval | A positive integer in minutes | 10 | Dynamic | This property is valid only if the value of Repository Directory is set to <REMOTE> and the value of BrokerType is ICS. |
| PollEndTime | HH = 0 through 23 MM = 0 through 59 | HH:MM | Component restart | |
| PollFrequency | A positive integer (in milliseconds) | 10000 | Dynamic if broker is ICS; otherwise Component restart | |
| PollQuantity | 1 through 500 | 1 | Agent restart | This property is valid only if the value of ContainerManagedEvents is JMS. |
| PollStartTime | HH = 0 through 23 MM = 0 through 59 | HH:MM | Component restart | |
| RepositoryDirectory | <REMOTE> if the broker is ICS; otherwise any valid local directory. | For ICS, the value is set to <REMOTE> | Agent restart | |
| RequestQueue | Valid JMS queue name | <CONNECTORNAME>/REQUESTQUEUE | Component restart | This property is valid only if the value of DeliveryTransport is JMS |
| ResponseQueue | Valid JMS queue name | <CONNECTORNAME>/RESPONSEQUEUE | Component restart | This property is valid only if the value of DeliveryTransport is JMS. |
| RestartRetryCount | 0 through 99 | 3 | Dynamic if ICS; otherwise Component restart | |
| RestartRetryInterval | A value in minutes from 1 through 2147483647 | 1 | Dynamic if ICS; otherwise Component restart | |

Table 2. Summary of standard configuration properties (continued)

| Property name | Possible values | Default value | Update method | Notes |
|--------------------------------------|-----------------------------------|---|-------------------|---|
| RHF2MessageDomain | mrm or xml | mrm | Component restart | This property is valid only if the value of DeliveryTransport is JMS and the value of WireFormat is CwXML. |
| SourceQueue | Any valid WebSphere MQ queue name | <CONNECTORNAME>/SOURCEQUEUE | Agent restart | This property is valid only if the value of ContainerManagedEvents is JMS. |
| SynchronousRequest Queue | Any valid queue name. | <CONNECTORNAME>/SYNCHRONOUSREQUEST QUEUE | Component restart | This property is valid only if the value of DeliveryTransport is JMS. |
| SynchronousRequest Timeout | 0 to any number (milliseconds) | 0 | Component restart | This property is valid only if the value of DeliveryTransport is JMS. |
| SynchronousResponse Queue | Any valid queue name | <CONNECTORNAME>/SYNCHRONOUSRESPONSE QUEUE | Component restart | This property is valid only if the value of DeliveryTransport is JMS. |
| TivoliMonitorTransaction Performance | true or false | false | Component restart | |
| WireFormat | CwXML or CwB0 | CwXML | Agent restart | The value of this property must be CwXML if the value of RepositoryDirectory is not set to <REMOTE>. The value must be CwB0 if the value of RepositoryDirectory is set to <REMOTE>. |
| WsifSynchronousRequest Timeout | 0 to any number (milliseconds) | 0 | Component restart | This property is not valid if the value of BrokerType is ICS. |
| XMLNameSpaceFormat | short or long | short | Agent restart | This property is not valid if the value of BrokerType is ICS |

Standard properties

This section describes the standard connector configuration properties.

AdapterHelpName

The AdapterHelpName property is the name of a directory in which connector-specific extended help files are located. The directory must be located in <ProductDir>\bin\Data\App\Help and must contain at least the language directory enu_usa. It may contain other directories according to locale.

The default value is the template name if it is valid, or it is blank.

AdminInQueue

The AdminInQueue property specifies the queue that is used by the integration broker to send administrative messages to the connector.

The default value is `<CONNECTORNAME>/ADMININQUEUE`

AdminOutQueue

The AdminOutQueue property specifies the queue that is used by the connector to send administrative messages to the integration broker.

The default value is `<CONNECTORNAME>/ADMINOUTQUEUE`

AgentConnections

The AgentConnections property controls the number of ORB (Object Request Broker) connections opened when the ORB initializes.

The default value of this property is 1.

AgentTraceLevel

The AgentTraceLevel property sets the level of trace messages for the application-specific component. The connector delivers all trace messages applicable at the tracing level set and lower.

The default value is 0.

ApplicationName

The ApplicationName property uniquely identifies the name of the connector application. This name is used by the system administrator to monitor the integration environment. This property must have a value before you can run the connector.

The default is the name of the connector.

BrokerType

The BrokerType property identifies the integration broker type that you are using. The value is ICS.

CharacterEncoding

The CharacterEncoding property specifies the character code set used to map from a character (such as a letter of the alphabet, a numeric representation, or a punctuation mark) to a numeric value.

Note: Java-based connectors do not use this property. C++ connectors use the value `ascii7` for this property.

By default, only a subset of supported character encodings is displayed. To add other supported values to the list, you must manually modify the `\Data\Std\stdConnProps.xml` file in the product directory (`<ProductDir>`). For more information, see the Connector Configurator Express appendix in this guide.

ConcurrentEventTriggeredFlows

The ConcurrentEventTriggeredFlows property determines how many business objects can be concurrently processed by the connector for event delivery. You set the value of this attribute to the number of business objects that are mapped and delivered concurrently. For example, if you set the value of this property to 5, five business objects are processed concurrently.

Setting this property to a value greater than 1 allows a connector for a source application to map multiple event business objects at the same time and deliver them to multiple collaboration instances simultaneously. This speeds delivery of business objects to the integration broker, particularly if the business objects use complex maps. Increasing the arrival rate of business objects to collaborations can improve overall performance in the system.

To implement concurrent processing for an entire flow (from a source application to a destination application), the following properties must be configured:

- The collaboration must be configured to use multiple threads by setting its Maximum number of concurrent events property high enough to use multiple threads.
- The destination application's application-specific component must be configured to process requests concurrently.

The ConcurrentEventTriggeredFlows property has no effect on connector polling, which is single-threaded and is performed serially.

This property is valid only if the value of the RepositoryDirectory property is set to <REMOTE>.

The default value is 1.

ContainerManagedEvents

The ContainerManagedEvents property allows a JMS-enabled connector with a JMS event store to provide guaranteed event delivery, in which an event is removed from the source queue and placed on the destination queue as one JMS transaction.

When this property is set to JMS, the following properties must also be set to enable guaranteed event delivery:

- PollQuantity = 1 to 500
- SourceQueue = /SOURCEQUEUE

You must also configure a data handler with the MimeType and DHClass (data handler class) properties. You can also add DataHandlerConfigMOName (the meta-object name, which is optional). To set those values, use the **Data Handler** tab in Connector Configurator Express.

Although these properties are adapter-specific, here are some example values:

- MimeType = text/xml
- DHClass = com.crossworlds.DataHandlers.text.xml
- DataHandlerConfigMOName = MO_DataHandler_Default

The fields for these values in the **Data Handler** tab are displayed only if you have set the ContainerManagedEvents property to the value JMS.

Note: When ContainerManagedEvents is set to JMS, the connector does not call its pollForEvents() method, thereby disabling that method's functionality.

The ContainerManagedEvents property is valid only if the value of the DeliveryTransport property is set to JMS.

There is no default value.

ControllerEventSequencing

The ControllerEventSequencing property enables event sequencing in the connector controller.

This property is valid only if the value of the RepositoryDirectory property is set to set to <REMOTE> (BrokerType is ICS).

The default value is true.

ControllerStoreAndForwardMode

The ControllerStoreAndForwardMode property sets the behavior of the connector controller after it detects that the destination application-specific component is unavailable.

If this property is set to true and the destination application-specific component is unavailable when an event reaches InterChange Server Express (ICS), the connector controller blocks the request to the application-specific component. When the application-specific component becomes operational, the controller forwards the request to it.

However, if the destination application's application-specific component becomes unavailable after the connector controller forwards a service call request to it, the connector controller fails the request.

If this property is set to false, the connector controller begins failing all service call requests as soon as it detects that the destination application-specific component is unavailable.

This property is valid only if the value of the RepositoryDirectory property is set to <REMOTE> (the value of the BrokerType property is ICS).

The default value is true.

ControllerTraceLevel

The ControllerTraceLevel property sets the level of trace messages for the connector controller.

This property is valid only if the value of the RepositoryDirectory property is set to set to <REMOTE>.

The default value is 0.

DeliveryQueue

The DeliveryQueue property defines the queue that is used by the connector to send business objects to the integration broker.

This property is valid only if the value of the DeliveryTransport property is set to JMS.

The default value is <CONNECTORNAME>/DELIVERYQUEUE.

DeliveryTransport

The DeliveryTransport property specifies the transport mechanism for the delivery of events. For Java Messaging Service, the value is JMS.

- If the value of the RepositoryDirectory property is set to <REMOTE>, the value of the DeliveryTransport property can be IDL or JMS and the default is IDL.
- If the value of the RepositoryDirectory property is a local directory, the value can be only JMS.

The connector sends service-call requests and administrative messages over CORBA IIOP if the value of the RepositoryDirectory property is IDL.

The default value is JMS.

JMS

The JMS transport mechanism enables communication between the connector and client connector framework using Java Messaging Service (JMS).

If you select JMS as the delivery transport, additional JMS properties such as `jms.MessageBrokerName`, `jms.FactoryClassName`, `jms.Password`, and `jms.UserName` are listed in Connector Configurator Express. The properties `jms.MessageBrokerName` and `jms.FactoryClassName` are required for this transport.

There may be a memory limitation if you use the JMS transport mechanism for a connector in the following environment when InterChange Server Express (ICS) is the integration broker.

In this environment, you may experience difficulty starting both the connector controller (on the server side) and the connector (on the client side) due to memory use within the WebSphere MQ client. If your installation uses less than 768MB of process heap size, set the following variable and property:

- Set the LDR_CNTRL environment variable in the CWSharedEnv.sh script.

This script is located in the `\bin` directory below the product directory (`<ProductDir>`). Using a text editor, add the following line as the first line in the CWSharedEnv.sh script:

```
export LDR_CNTRL=MAXDATA=0x30000000
```

This line restricts heap memory usage to a maximum of 768 MB (3 segments * 256 MB). If the process memory grows larger than this limit, page swapping can occur, which can adversely affect the performance of your system.

- Set the value of the IPCCBaseAddress property to 11 or 12. For more information on this property, see the *WebSphere Business Integration Server Express Installation Guide for Windows or for OS/400*.

DuplicateEventElimination

When the value of this property is true, a JMS-enabled connector can ensure that duplicate events are not delivered to the delivery queue. To use this feature, during connector development, the connector must have a unique event identifier set as the business object ObjectEventId attribute in the application-specific code.

Note: When the value of this property is true, the MonitorQueue property must be enabled to provide guaranteed event delivery.

The default value is false.

EnableOidForFlowMonitoring

When the value of this property is true, the adapter runtime will mark the incoming ObjectEventID as a foreign key for flow monitoring.

This property is only valid if the BrokerType property is set to ICS.

The default value is false.

FaultQueue

If the connector experiences an error while processing a message, it moves the message (and a status indicator and description of the problem) to the queue specified in the FaultQueue property.

The default value is <CONNECTORNAME>/FAULTQUEUE.

jms.FactoryClassName

The jms.FactoryClassName property specifies the class name to instantiate for a JMS provider. This property must be set if the value of the DeliveryTransport property is JMS.

The default is CxCommon.Messaging.jms.IBMMQSeriesFactory.

jms.ListenerConcurrency

The jms.ListenerConcurrency property specifies the number of concurrent listeners for the JMS controller. It specifies the number of threads that fetch and process messages concurrently within a controller.

This property is valid only if the value of the jms.OptimizedTransport property is true.

The default value is 1.

jms.MessageBrokerName

The jms.MessageBrokerName specifies the broker name to use for the JMS provider. You must set this connector property if you specify JMS as the delivery transport mechanism (in the DeliveryTransport property).

When you connect to a remote message broker, this property requires the following values:

QueueMgrName:Channel:HostName:PortNumber

where:

QueueMgrName is the name of the queue manager.

Channel is the channel used by the client.

HostName is the name of the machine where the queue manager is to reside.

PortNumber is the port number used by the queue manager for listening

For example:

```
jms.MessageBrokerName = WBIMB.Queue.Manager:CHANNEL1:RemoteMachine:1456
```

The default value is crossworlds.queue.manager. Use the default when connecting to a local message broker.

jms.NumConcurrentRequests

The `jms.NumConcurrentRequests` property specifies the maximum number of concurrent service call requests that can be sent to a connector at the same time. Once that maximum is reached, new service calls are blocked and must wait for another request to complete before proceeding.

The default value is 10.

jms.Password

The `jms.Password` property specifies the password for the JMS provider. A value for this property is optional.

There is no default value.

jms.TransportOptimized

The `jms.TransportOptimized` property determines if the WIP (work in progress) is optimized. You must have a WebSphere MQ provider to optimize the WIP. For optimized WIP to operate, the messaging provider must be able to:

1. Read a message without taking it off the queue
2. Delete a message with a specific ID without transferring the entire message to the receiver's memory space
3. Read a message by using a specific ID (needed for recovery purposes)
4. Track the point at which events that have not been read appear.

The JMS APIs cannot be used for optimized WIP because they do not meet conditions 2 and 4 above, but the MQ Java APIs meet all four conditions, and hence are required for optimized WIP.

This property is valid only if the value of `DeliveryTransport` is `JMS` and the value of `BrokerType` is `ICS`.

The default value is `false`.

jms.UserName

The `jms.UserName` property specifies the user name for the JMS provider. A value for this property is optional.

There is no default value.

JvmMaxHeapSize

The `JvmMaxHeapSize` property specifies the maximum heap size for the agent (in megabytes).

This property is valid only if the value for the `RepositoryDirectory` property is set to `<REMOTE>`.

The default value is 128m.

JvmMaxNativeStackSize

The `JvmMaxNativeStackSize` property specifies the maximum native stack size for the agent (in kilobytes).

This property is valid only if the value for the RepositoryDirectory property is set to <REMOTE>.

The default value is 128k.

JvmMinHeapSize

The JvmMinHeapSize property specifies the minimum heap size for the agent (in megabytes).

This property is valid only if the value for the RepositoryDirectory property is set to <REMOTE>.

The default value is 1m.

ListenerConcurrency

The ListenerConcurrency property supports multithreading in WebSphere MQ Listener when ICS is the integration broker. It enables batch writing of multiple events to the database, thereby improving system performance.

This property is valid only with connectors that use MQ transport. The value of the DeliveryTransport property must be MQ.

The default value is 1.

Locale

The Locale property specifies the language code, country or territory, and, optionally, the associated character code set. The value of this property determines cultural conventions such as collation and sort order of data, date and time formats, and the symbols used in monetary specifications.

A locale name has the following format:

ll_TT.codeset

where:

ll is a two-character language code (in lowercase letters)

TT is a two-letter country or territory code (in uppercase letters)

codeset is the name of the associated character code set (may be optional).

By default, only a subset of supported locales are listed. To add other supported values to the list, you modify the \Data\Std\stdConnProps.xml file in the <ProductDir>\bin directory. For more information, refer to the Connector Configurator Express appendix in this guide.

If the connector has not been internationalized, the only valid value for this property is en_US. To determine whether a specific connector has been globalized, refer to the user guide for that adapter.

The default value is en_US.

LogAtInterchangeEnd

The LogAtInterchangeEnd property specifies whether to log errors to the log destination of the integration broker.

Logging to the log destination also turns on e-mail notification, which generates e-mail messages for the recipient specified as the value of MESSAGE_RECIPIENT in the InterchangeSystem.cfg file when errors or fatal errors occur. For example, when a connector loses its connection to the application, if the value of LogAtInterChangeEnd is true, an e-mail message is sent to the specified message recipient.

This property is valid only if the value of the RespositoryDirectory property is set to <REMOTE> (the value of BrokerType is ICS).

The default value is false.

MaxEventCapacity

The MaxEventCapacity property specifies maximum number of events in the controller buffer. This property is used by the flow control feature.

This property is valid only if the value of the RespositoryDirectory property is set to <REMOTE> (the value of BrokerType is ICS).

The value can be a positive integer between 1 and 2147483647.

The default value is 2147483647.

MessageFileName

The MessageFileName property specifies the name of the connector message file. The standard location for the message file is \connectors\messages in the product directory. Specify the message file name in an absolute path if the message file is not located in the standard location.

If a connector message file does not exist, the connector uses InterchangeSystem.txt as the message file. This file is located in the product directory.

Note: To determine whether a connector has its own message file, see the individual adapter user guide.

The default value is InterchangeSystem.txt.

MonitorQueue

The MonitorQueue property specifies the logical queue that the connector uses to monitor duplicate events.

It is valid only if the value of the DeliveryTransport property is JMS and the value of the DuplicateEventElimination is true.

The default value is <CONNECTORNAME>/MONITORQUEUE

OADAutoRestartAgent

the OADAutoRestartAgent property specifies whether the connector uses the automatic and remote restart feature. This feature uses the WebSphere MQ-triggered Object Activation Daemon (OAD) to restart the connector after an abnormal shutdown, or to start a remote connector from System Monitor.

This property must be set to true to enable the automatic and remote restart feature. For information on how to configure the WebSphere MQ-triggered OAD feature, see the *WebSphere Business Integration Server Express Installation Guide for Windows or for OS/400*.

This property is valid only if the value of the RespositoryDirectory property is set to <REMOTE> (the value of BrokerType is ICS).

The default value is false.

OADMaxNumRetry

The OADMaxNumRetry property specifies the maximum number of times that the WebSphere MQ-triggered Object Activation Daemon (OAD) automatically attempts to restart the connector after an abnormal shutdown. The OADAutoRestartAgent property must be set to true for this property to take effect.

This property is valid only if the value of the RespositoryDirectory property is set to <REMOTE> (the value of BrokerType is ICS).

The default value is 1000.

OADRetryTimeInterval

The OADRetryTimeInterval property specifies the number of minutes in the retry-time interval for the WebSphere MQ-triggered Object Activation Daemon (OAD). If the connector agent does not restart within this retry-time interval, the connector controller asks the OAD to restart the connector agent again. The OAD repeats this retry process as many times as specified by the OADMaxNumRetry property. The OADAutoRestartAgent property must be set to true for this property to take effect.

This property is valid only if the value of the RespositoryDirectory property is set to <REMOTE> (the value of BrokerType is ICS).

The default value is 10.

PollEndTime

The PollEndTime property specifies the time to stop polling the event queue. The format is *HH:MM*, where *HH* is 0 through 23 hours, and *MM* represents 0 through 59 minutes.

You must provide a valid value for this property. The default value is HH:MM without a value, and it must be changed.

If the adapter runtime detects:

- PollStartTime set and PollEndTime not set, or
- PollEndTime set and PollStartTime not set

it will poll using the value configured for the PollFrequency property.

PollFrequency

The PollFrequency property specifies the amount of time (in milliseconds) between the end of one polling action and the start of the next polling action. This is not the interval between polling actions. Rather, the logic is as follows:

- Poll to obtain the number of objects specified by the value of the PollQuantity property.
- Process these objects. For some connectors, this may be partly done on separate threads, which execute asynchronously to the next polling action.
- Delay for the interval specified by the PollFrequency property.
- Repeat the cycle.

The following values are valid for this property:

- The number of milliseconds between polling actions (a positive integer).
- The word `no`, which causes the connector not to poll. Enter the word in lowercase.
- The word `key`, which causes the connector to poll only when you type the letter `p` in the connector Command Prompt window. Enter the word in lowercase.

The default is 10000.

Important: Some connectors have restrictions on the use of this property. Where they exist, these restrictions are documented in the chapter on installing and configuring the adapter.

PollQuantity

The PollQuantity property designates the number of items from the application that the connector polls for. If the adapter has a connector-specific property for setting the poll quantity, the value set in the connector-specific property overrides the standard property value.

This property is valid only if the value of the DeliveryTransport property is JMS, and the ContainerManagedEvents property has a value.

An e-mail message is also considered an event. The connector actions are as follows when it is polled for e-mail.

- When it is polled once, the connector detects the body of the message, which it reads as an attachment. Since no data handler was specified for this mime type, it will then ignore the message.
- The connector processes the first BO attachment. The data handler is available for this MIME type, so it sends the business object to Visual Test Connector.
- When it is polled for the second time, the connector processes the second BO attachment. The data handler is available for this MIME type, so it sends the business object to Visual Test Connector.
- Once it is accepted, the third BO attachment should be transmitted.

PollStartTime

The PollStartTime property specifies the time to start polling the event queue. The format is `HH:MM`, where `HH` is 0 through 23 hours, and `MM` represents 0 through 59 minutes.

You must provide a valid value for this property. The default value is `HH:MM` without a value, and it must be changed.

If the adapter runtime detects:

- PollStartTime set and PollEndTime not set, or
- PollEndTime set and PollStartTime not set

it will poll using the value configured for the PollFrequency property.

RepositoryDirectory

The RepositoryDirectory property is the location of the repository from which the connector reads the XML schema documents that store the metadata for business object definitions.

If the integration broker is ICS, this value must be set to set to <REMOTE> because the connector obtains this information from the InterChange Server Express repository.

RequestQueue

The RequestQueue property specifies the queue that is used by the integration broker to send business objects to the connector.

This property is valid only if the value of the DeliveryTransport property is JMS.

The default value is <CONNECTORNAME>/REQUESTQUEUE.

ResponseQueue

The ResponseQueue property specifies the JMS response queue, which delivers a response message from the connector framework to the integration broker. When the integration broker is InterChange Server Express (ICS), the server sends the request and waits for a response message in the JMS response queue.

This property is valid only if the value of the DeliveryTransport property is JMS.

The default value is <CONNECTORNAME>/RESPONSEQUEUE.

RestartRetryCount

The RestartRetryCount property specifies the number of times the connector attempts to restart itself. When this property is used for a connector that is connected in parallel, it specifies the number of times the master connector application-specific component attempts to restart the client connector application-specific component.

The default value is 3.

RestartRetryInterval

The RestartRetryInterval property specifies the interval in minutes at which the connector attempts to restart itself. When this property is used for a connector that is linked in parallel, it specifies the interval at which the master connector application-specific component attempts to restart the client connector application-specific component.

Possible values for the property range from 1 through 2147483647.

The default value is 1.

RHF2MessageDomain

The RHF2MessageDomain property allows you to configure the value of the field domain name in the JMS header. When data is sent to a WebSphere message broker over JMS transport, the adapter framework writes JMS header information,

with a domain name and a fixed value of `mrm`. A configurable domain name lets you track how the WebSphere message broker processes the message data.

This is an example header:

```
<mcd><Msd>mrm</Msd><Set>3</Set><Type>
Retek_POPhyDesc</Type><Fmt>CwXML</Fmt></mcd>
```

This property is not valid if the value of `BrokerType` is `ICS`. Also, it is valid only if the value of the `DeliveryTransport` property is `JMS`, and the value of the `WireFormat` property is `CwXML`.

Possible values are `mrm` and `xml`. The default value is `mrm`.

SourceQueue

The `SourceQueue` property designates the JMS source queue for the connector framework in support of guaranteed event delivery for JMS-enabled connectors that use a JMS event store. For further information, see “`ContainerManagedEvents`” on page 51.

This property is valid only if the value of `DeliveryTransport` is `JMS`, and a value for `ContainerManagedEvents` is specified.

The default value is `<CONNECTORNAME>/SOURCEQUEUE`.

SynchronousRequestQueue

The `SynchronousRequestQueue` property delivers request messages that require a synchronous response from the connector framework to the broker. This queue is necessary only if the connector uses synchronous execution. With synchronous execution, the connector framework sends a message to the synchronous request queue and waits for a response from the broker on the synchronous response queue. The response message sent to the connector has a correlation ID that matches the ID of the original message.

This property is valid only if the value of `DeliveryTransport` is `JMS`.

The default value is `<CONNECTORNAME>/SYNCHRONOUSREQUESTQUEUE`

SynchronousRequestTimeout

The `SynchronousRequestTimeout` property specifies the time in milliseconds that the connector waits for a response to a synchronous request. If the response is not received within the specified time, the connector moves the original synchronous request message (and error message) to the fault queue.

This property is valid only if the value of `DeliveryTransport` is `JMS`.

The default value is `0`.

SynchronousResponseQueue

The `SynchronousResponseQueue` property delivers response messages in reply to a synchronous request from the broker to the connector framework. This queue is necessary only if the connector uses synchronous execution.

This property is valid only if the value of `DeliveryTransport` is `JMS`.

The default is `<CONNECTORNAME>/SYNCHRONOUSRESPONSEQUEUE`

TivoliMonitorTransactionPerformance

The TivoliMonitorTransactionPerformance property specifies whether IBM Tivoli Monitoring for Transaction Performance (ITMTP) is invoked at run time.

The default value is `false`.

WireFormat

The WireFormat property specifies the message format on the transport:

- If the value of the RepositoryDirectory property is a local directory, the value is `CwXML`.
- If the value of the RepositoryDirectory property is a remote directory, the value is `CwB0`.

Appendix B. Connector Configurator Express

This appendix describes how to use Connector Configurator Express to set configuration property values for your adapter.

You use Connector Configurator Express to:

- Create a connector-specific property template for configuring your connector
- Create a configuration file
- Set properties in a configuration file

The topics covered in this appendix are:

- “Overview of Connector Configurator Express”
- “Creating a connector-specific property template” on page 65
- “Creating a new configuration file” on page 67
- “Setting the configuration file properties” on page 70

Overview of Connector Configurator Express

Connector Configurator Express allows you to configure the connector component of your adapter for use with the InterChange Server Express integration broker.

You use Connector Configurator Express to:

- Create a **connector-specific property template** for configuring your connector.
- Create a **connector configuration file**; you must create one configuration file for each connector you install.
- Set properties in a configuration file.

You may need to modify the default values that are set for properties in the connector templates. You must also designate supported business object definitions and, with ICS, maps for use with collaborations as well as specify messaging, logging and tracing, and data handler parameters, as required.

Connector configuration properties include both standard configuration properties (the properties that all connectors have) and connector-specific properties (properties that are needed by the connector for a specific application or technology).

Because **standard properties** are used by all connectors, you do not need to define those properties from scratch; Connector Configurator Express incorporates them into your configuration file as soon as you create the file. However, you do need to set the value of each standard property in Connector Configurator Express.

The range of standard properties may not be the same for all brokers and all configurations. Some properties are available only if other properties are given a specific value. The Standard Properties window in Connector Configurator Express will show the properties available for your particular configuration.

For **connector-specific properties**, however, you need first to define the properties and then set their values. You do this by creating a connector-specific property template for your particular adapter. There may already be a template set up in

your system, in which case, you simply use that. If not, follow the steps in “Creating a new template” on page 65 to set up a new one.

Starting Connector Configurator Express

You can start and run Connector Configurator Express in either of two modes:

- Independently, in stand-alone mode
- From System Manager

Running Configurator in stand-alone mode

You can run Connector Configurator Express without running System Manager and work with connector configuration files, irrespective of your broker.

To do so:

- From **Start>Programs**, click **IBM WebSphere Business Integration Adapters>IBM WebSphere Business Integration Toolset>Connector Configurator Express**.
- Select **File>New>Connector Configuration**.
- When you click the pull-down menu next to **System Connectivity Integration Broker**, you can select ICS.

You may choose to run Connector Configurator Express independently to generate the file, and then connect to System Manager to save it in a System Manager project (see “Completing a configuration file” on page 69.)

Running Configurator from System Manager

You can run Connector Configurator Express from System Manager.

To run Connector Configurator Express:

1. Open the System Manager.
2. In the System Manager window, expand the **Integration Component Libraries** icon and highlight **Connectors**.
3. From the System Manager menu bar, click **Tools>Connector Configurator Express**. The Connector Configurator Express window opens and displays a **New Connector** dialog box.
4. When you click the pull-down menu next to **System Connectivity Integration Broker**, you can select ICS.

To edit an existing configuration file:

- In the System Manager window, select any of the configuration files listed in the Connector folder and right-click on it. Connector Configurator Express opens and displays the configuration file with the integration broker type and file name at the top.
- From Connector Configurator Express, select **File>Open**. Select the name of the connector configuration file from a project or from the directory in which it is stored.
- Click the Standard Properties tab to see which properties are included in this configuration file.

Creating a connector-specific property template

To create a configuration file for your connector, you need a connector-specific property template as well as the system-supplied standard properties.

You can create a brand-new template for the connector-specific properties of your connector, or you can use an existing connector definition as the template.

- To create a new template, see “Creating a new template” on page 65.
- To use an existing file, simply modify an existing template and save it under the new name. You can find existing templates in your `\WebSphereAdapters\bin\Data\App` directory.

Creating a new template

This section describes how you create properties in the template, define general characteristics and values for those properties, and specify any dependencies between the properties. Then you save the template and use it as the base for creating a new connector configuration file.

To create a template in Connector Configurator Express:

1. Click **File>New>Connector-Specific Property Template**.
2. The **Connector-Specific Property Template** dialog box appears.
 - Enter a name for the new template in the **Name** field below **Input a New Template Name**. You will see this name again when you open the dialog box for creating a new configuration file from a template.
 - To see the connector-specific property definitions in any template, select that template’s name in the **Template Name** display. A list of the property definitions contained in that template appears in the **Template Preview** display.
3. You can use an existing template whose property definitions are similar to those required by your connector as a starting point for your template. If you do not see any template that displays the connector-specific properties used by your connector, you will need to create one.
 - If you are planning to modify an existing template, select the name of the template from the list in the **Template Name** table below **Select the Existing Template to Modify: Find Template**.
 - This table displays the names of all currently available templates. You can also search for a template.

Specifying general characteristics

When you click **Next** to select a template, the **Properties - Connector-Specific Property Template** dialog box appears. The dialog box has tabs for General characteristics of the defined properties and for Value restrictions. The General display has the following fields:

- **General:**
 - Property Type
 - Property Subtype
 - Updated Method
 - Description
- **Flags**
 - Standard flags
- **Custom Flag**
 - Flag

The **Property Subtype** can be selected when **Property Type** is a String. It is an optional value which provides syntax checking when you save the configuration file. The default is a blank space, and means that the property has not been subtyped.

After you have made selections for the general characteristics of the property, click the **Value** tab.

Specifying values

The **Value** tab enables you to set the maximum length, the maximum multiple values, a default value, or a value range for the property. It also allows editable values. To do so:

1. Click the **Value** tab. The display panel for Value replaces the display panel for General.
2. Select the name of the property in the **Edit properties** display.
3. In the fields for **Max Length** and **Max Multiple Values**, enter your values.

To create a new property value:

1. Right-click on the square to the left of the Value column heading.
2. From the pop-up menu, select **Add** to display the Property Value dialog box. Depending on the property type, the dialog box allows you to enter either a value, or both a value and a range.
3. Enter the new property value and click OK. The value appears in the **Value** panel on the right.

The **Value** panel displays a table with three columns:

The **Value** column shows the value that you entered in the **Property Value** dialog box, and any previous values that you created.

The **Default Value** column allows you to designate any of the values as the default.

The **Value Range** shows the range that you entered in the **Property Value** dialog box.

After a value has been created and appears in the grid, it can be edited from within the table display.

To make a change in an existing value in the table, select an entire row by clicking on the row number. Then right-click in the **Value** field and click **Edit Value**.

Setting dependencies

When you have made your changes to the **General** and **Value** tabs, click **Next**. The **Dependencies - Connector-Specific Property Template** dialog box appears.

A dependent property is a property that is included in the template and used in the configuration file *only if* the value of another property meets a specific condition. For example, `Pol1Quantity` appears in the template only if `JMS` is the transport mechanism and `DuplicateEventElimination` is set to `True`.

To designate a property as dependent and to set the condition upon which it depends, do this:

1. In the **Available Properties** display, select the property that will be made dependent.

2. In the **Select Property** field, use the drop-down menu to select the property that will hold the conditional value.
3. In the **Condition Operator** field, select one of the following:
 - == (equal to)
 - != (not equal to)
 - > (greater than)
 - < (less than)
 - >= (greater than or equal to)
 - <=(less than or equal to)
4. In the **Conditional Value** field, enter the value that is required in order for the dependent property to be included in the template.
5. With the dependent property highlighted in the **Available Properties** display, click an arrow to move it to the **Dependent Property** display.
6. Click **Finish**. Connector Configurator Express stores the information you have entered as an XML document, under \data\app in the \bin directory where you have installed Connector Configurator Express.

Setting pathnames

Some general rules for setting pathnames are:

- The maximum length of a filename in Windows is 255 characters.
- In Windows, the absolute pathname must follow the format [Drive:][Directory]\filename: for example, C:\WebSphereAdapters\bin\Data\Std\StdConnProps.xml
- Queue names may not have leading or embedded spaces.

Creating a new configuration file

When you create a new configuration file, you must name it and select an integration broker.

You also select an operating system for extended validation on the file. The toolbar has a droplist called **Target System** that allows you to select the target operating system for extended validation of the properties. The available options are: Windows, i5/OS, or Other (if not Windows), and None-no extended validation (switches off extended validation). The default on startup is Windows.

To start Connector Configurator Express:

- In the System Manager window, select **Connector Configurator Express** from the **Tools** menu. Connector Configurator Express opens.
- In stand-alone mode, launch Connector Configurator Express.

To set the operating system for extended validation of the configuration file:

- Pull down the **Target System:** droplist on the menu bar.
- Select the operating system you are running on.

Then select **File>New>Connector Configuration**. In the New Connector window, enter the name of the new connector.

You also need to select an integration broker. The broker you select determines the properties that will appear in the configuration file. To select a broker:

- In the **Integration Broker** field, select ICS.

- Complete the remaining fields in the **New Connector** window, as described later in this chapter.

Creating a configuration file from a connector-specific template

Once a connector-specific template has been created, you can use it to create a configuration file:

1. Set the operating system for extended validation of the configuration file using the **Target System:** droplist on the menu bar (see “Creating a new configuration file” above).
2. Click **File>New>Connector Configuration**.
3. The **New Connector** dialog box appears, with the following fields:

- **Name**

Enter the name of the connector. Names are case-sensitive. The name you enter must be unique, and must be consistent with the file name for a connector that is installed on the system.

Important: Connector Configurator Express does not check the spelling of the name that you enter. You must ensure that the name is correct.

- **System Connectivity**

Click ICS.

- **Select Connector-Specific Property Template**

Type the name of the template that has been designed for your connector. The available templates are shown in the **Template Name** display. When you select a name in the Template Name display, the **Property Template Preview** display shows the connector-specific properties that have been defined in that template.

Select the template you want to use and click **OK**.

4. A configuration screen appears for the connector that you are configuring. The title bar shows the integration broker and connector name. You can fill in all the field values to complete the definition now, or you can save the file and complete the fields later.
5. To save the file, click **File>Save>To File** or **File>Save>To Project**. To save to a project, System Manager must be running. If you save as a file, the **Save File Connector** dialog box appears. Choose *.cfg as the file type, verify in the File Name field that the name is spelled correctly and has the correct case, navigate to the directory where you want to locate the file, and click **Save**. The status display in the message panel of Connector Configurator Express indicates that the configuration file was successfully created.

Important: The directory path and name that you establish here must match the connector configuration file path and name that you supply in the startup file for the connector.

6. To complete the connector definition, enter values in the fields for each of the tabs of the Connector Configurator Express window, as described later in this chapter.

Using an existing file

You may have an existing file available in one or more of the following formats:

- A connector definition file.
This is a text file that lists properties and applicable default values for a specific connector. Some connectors include such a file in a `\repository` directory in their delivery package (the file typically has the extension `.txt`; for example, `CN_XML.txt` for the XML connector).
- An ICS repository file.
Definitions used in a previous ICS implementation of the connector may be available to you in a repository file that was used in the configuration of that connector. Such a file typically has the extension `.in` or `.out`.
- A previous configuration file for the connector.
Such a file typically has the extension `*.cfg`.

Although any of these file sources may contain most or all of the connector-specific properties for your connector, the connector configuration file will not be complete until you have opened the file and set properties, as described later in this chapter.

To use an existing file to configure a connector, you must open the file in Connector Configurator Express, revise the configuration, and then resave the file.

Follow these steps to open a `*.txt`, `*.cfg`, or `*.in` file from a directory:

1. In Connector Configurator Express, click **File>Open>From File**.
2. In the **Open File Connector** dialog box, select one of the following file types to see the available files:
 - Configuration (`*.cfg`)
 - ICS Repository (`*.in`, `*.out`)
Choose this option if a repository file was used to configure the connector in an ICS environment. A repository file may include multiple connector definitions, all of which will appear when you open the file.
 - All files (`*.*`)
Choose this option if a `*.txt` file was delivered in the adapter package for the connector, or if a definition file is available under another extension.
3. In the directory display, navigate to the appropriate connector definition file, select it, and click **Open**.

Follow these steps to open a connector configuration from a System Manager project:

1. Start System Manager. A configuration can be opened from or saved to System Manager only if System Manager has been started.
2. Start Connector Configurator Express.
3. Click **File>Open>From Project**.

Completing a configuration file

When you open a configuration file or a connector from a project, the Connector Configurator Express window displays the configuration screen, with the current attributes and values.

The title of the configuration screen displays the integration broker and connector name as specified in the file. Make sure you have the correct broker. If not, change the broker value before you configure the connector. To do so:

1. Under the **Standard Properties** tab, select the value field for the `BrokerType` property. In the drop-down menu, select the value `ICS`.

2. The Standard Properties tab will display the connector properties associated with the selected broker. The table shows **Property name**, **Value**, **Type**, **Subtype** (if the Type is a string), **Description**, and **Update Method**.
3. You can save the file now or complete the remaining configuration fields, as described in “Specifying supported business object definitions” on page 73..
4. When you have finished your configuration, click **File>Save>To Project** or **File>Save>To File**.

If you are saving to file, select *.cfg as the extension, select the correct location for the file and click **Save**.

If multiple connector configurations are open, click **Save All to File** to save all of the configurations to file, or click **Save All to Project** to save all connector configurations to a System Manager project.

Before you created the configuration file, you used the **Target System** droplist that allows you to select the target operating system for extended validation of the properties.

Before it saves the file, Connector Configurator Express checks that values have been set for all required standard properties. If a required standard property is missing a value, Connector Configurator Express displays a message that the validation failed. You must supply a value for the property in order to save the configuration file.

If you have elected to use the extended validation feature by selecting a value of Windows or Other from the **Target System** droplist, the system will validate the property subtype as well as the type, and it displays a warning message if the validation fails.

Setting the configuration file properties

When you create and name a new connector configuration file, or when you open an existing connector configuration file, Connector Configurator Express displays a configuration screen with tabs for the categories of required configuration values.

Connector Configurator Express requires values for properties in these categories for connectors running on all brokers:

- Standard Properties
- Connector-specific Properties
- Supported Business Objects
- Trace/Log File values
- Data Handler (applicable for connectors that use JMS messaging with guaranteed event delivery)

Note: For connectors that use JMS messaging, an additional category may display, for configuration of data handlers that convert the data to business objects.

For connectors running on **ICS**, values for these properties are also required:

- Associated Maps
- Security

Important: Connector Configurator Express accepts property values in either English or non-English character sets. However, the names of both standard and connector-specific properties, and the names of supported business objects, must use the English character set only.

Standard properties differ from connector-specific properties as follows:

- Standard properties of a connector are shared by both the application-specific component of a connector and its broker component. All connectors have the same set of standard properties. These properties are described in Appendix A of each adapter guide. You can change some but not all of these values.
- Application-specific properties apply only to the application-specific component of a connector, that is, the component that interacts directly with the application. Each connector has application-specific properties that are unique to its application. Some of these properties provide default values and some do not; you can modify some of the default values. The installation and configuration chapters of each adapter guide describe the application-specific properties and the recommended values.

The fields for **Standard Properties** and **Connector-Specific Properties** are color-coded to show which are configurable:

- A field with a grey background indicates a standard property. You can change the value but cannot change the name or remove the property.
- A field with a white background indicates an application-specific property. These properties vary according to the specific needs of the application or connector. You can change the value and delete these properties.
- Value fields are configurable.
- The **Update Method** field is displayed for each property. It indicates whether a component or agent restart is necessary to activate changed values. You cannot configure this setting.

Setting standard connector properties

To change the value of a standard property:

1. Click in the field whose value you want to set.
2. Either enter a value, or select one from the drop-down menu if it appears.

Note: If the property has a Type of String, it may have a subtype value in the Subtype column. This subtype is used for extended validation of the property.

3. After entering all the values for the standard properties, you can do one of the following:
 - To discard the changes, preserve the original values, and exit Connector Configurator Express, click **File>Exit** (or close the window), and click **No** when prompted to save changes.
 - To enter values for other categories in Connector Configurator Express, select the tab for the category. The values you enter for **Standard Properties** (or any other category) are retained when you move to the next category. When you close the window, you are prompted to either save or discard the values that you entered in all the categories as a whole.
 - To save the revised values, click **File>Exit** (or close the window) and click **Yes** when prompted to save changes. Alternatively, click **Save>To File** from either the File menu or the toolbar.

To get more information on a particular standard property, left-click the entry in the Description column for that property in the Standard Properties tabbed sheet. If you have Extended Help installed, an arrow button will appear on the right. When you click on the button, a Help window will open and display details of the standard property.

Note: If the hot button does not appear, no Extended Help was found for that property.

If installed, the Extended Help files are located in
<ProductDir>\bin\Data\Std\Help\<RegionalSetting>\.

Setting connector-specific configuration properties

For connector-specific configuration properties, you can add or change property names, configure values, delete a property, and encrypt a property. The default property length is 255 characters.

1. Right-click in the top left portion of the grid. A pop-up menu bar will appear. Click **Add** to add a property. To add a child property, right-click on the parent row number and click **Add child**.
2. Enter a value for the property or child property.

Note: If the property has a Type of String, you can select a subtype from the Subtype droplist. This subtype is used for extended validation of the property.

3. To encrypt a property, select the **Encrypt** box.
4. To get more information on a particular property, left-click the entry in the Description column for that property. If you have Extended Help installed, a hot button will appear. When you click on the hot button, a Help window will open and display details of the standard property.

Note: If the hot button does not appear, no Extended Help was found for that property.

5. Choose to save or discard changes, as described for “Setting standard connector properties” on page 71.

If the Extended Help files are installed and the AdapterHelpName property is blank, Connector Configurator Express will point to the adapter-specific Extended Help files located in <ProductDir>\bin\Data\App\Help\<RegionalSetting>\. Otherwise, Connector Configurator Express will point to the adapter-specific Extended Help files located in <ProductDir>\bin\Data\App\Help\<AdapterHelpName>\<RegionalSetting>\. See the AdapterHelpName property described in the Standard Properties appendix.

The Update Method displayed for each property indicates whether a component or agent restart is necessary to activate changed values.

Important: Changing a preset application-specific connector property name may cause a connector to fail. Certain property names may be needed by the connector to connect to an application or to run properly.

Encryption for connector properties

Application-specific properties can be encrypted by selecting the **Encrypt** check box in the Connector-specific Properties window. To decrypt a value, click to clear the **Encrypt** check box, enter the correct value in the **Verification** dialog box, and click **OK**. If the entered value is correct, the value is decrypted and displays.

The adapter user guide for each connector contains a list and description of each property and its default value.

If a property has multiple values, the **Encrypt** check box will appear for the first value of the property. When you select **Encrypt**, all values of the property will be encrypted. To decrypt multiple values of a property, click to clear the **Encrypt** check box for the first value of the property, and then enter the new value in the **Verification** dialog box. If the input value is a match, all multiple values will decrypt.

Update method

Refer to the descriptions of update methods found in the Standard Properties appendix, under “Standard connector properties overview” on page 43.

Specifying supported business object definitions

Use the **Supported Business Objects** tab in Connector Configurator Express to specify the business objects that the connector will use. You must specify both generic business objects and application-specific business objects, and you must specify associations for the maps between the business objects.

Note: Some connectors require that certain business objects be specified as supported in order to perform event notification or additional configuration (using meta-objects) with their applications. For more information, see the *Connector Development Guide for C++* or the *Connector Development Guide for Java*.

Because ICS is your broker

To specify that a business object definition is supported by the connector, or to change the support settings for an existing business object definition, click the **Supported Business Objects** tab and use the following fields.

Business object name: To designate that a business object definition is supported by the connector, with System Manager running:

1. Click an empty field in the **Business Object Name** list. A drop list displays, showing all the business object definitions that exist in the System Manager project.
2. Click on a business object to add it.
3. Set the **Agent Support** (described below) for the business object.
4. In the File menu of the Connector Configurator Express window, click **Save to Project**. The revised connector definition, including designated support for the added business object definition, is saved to an ICL (Integration Component Library) project in System Manager.

To delete a business object from the supported list:

1. To select a business object field, click the number to the left of the business object.
2. From the **Edit** menu of the Connector Configurator Express window, click **Delete Row**. The business object is removed from the list display.
3. From the **File** menu, click **Save to Project**.

Deleting a business object from the supported list changes the connector definition and makes the deleted business object unavailable for use in this implementation of this connector. It does not affect the connector code, nor does it remove the business object definition itself from System Manager.

Agent support: If a business object has Agent Support, the system will attempt to use that business object for delivering data to an application via the connector agent.

Typically, application-specific business objects for a connector are supported by that connector's agent, but generic business objects are not.

To indicate that the business object is supported by the connector agent, check the **Agent Support** box. The Connector Configurator Express window does not validate your Agent Support selections.

Maximum transaction level: The maximum transaction level for a connector is the highest transaction level that the connector supports.

For most connectors, Best Effort is the only possible choice.

You must restart the server for changes in transaction level to take effect.

Associated maps

Each connector supports a list of business object definitions and their associated maps that are currently active in WebSphere InterChange Server Express. This list appears when you select the **Associated Maps** tab.

The list of business objects contains the application-specific business object which the agent supports and the corresponding generic object that the controller sends to the subscribing collaboration. The association of a map determines which map will be used to transform the application-specific business object to the generic business object or the generic business object to the application-specific business object.

If you are using maps that are uniquely defined for specific source and destination business objects, the maps will already be associated with their appropriate business objects when you open the display, and you will not need (or be able) to change them.

If more than one map is available for use by a supported business object, you will need to explicitly bind the business object with the map that it should use.

The **Associated Maps** tab displays the following fields:

- **Business Object Name**

These are the business objects supported by this connector, as designated in the **Supported Business Objects** tab. If you designate additional business objects under the Supported Business Objects tab, they will be reflected in this list after you save the changes by choosing **Save to Project** from the **File** menu of the Connector Configurator Express window.

- **Associated Maps**

The display shows all the maps that have been installed to the system for use with the supported business objects of the connector. The source business object for each map is shown to the left of the map name, in the **Business Object Name** display.

- **Explicit Binding**

In some cases, you may need to explicitly bind an associated map.

Explicit binding is required only when more than one map exists for a particular supported business object. When ICS boots, it tries to automatically bind a map

to each supported business object for each connector. If more than one map takes as its input the same business object, the server attempts to locate and bind one map that is the superset of the others.

If there is no map that is the superset of the others, the server will not be able to bind the business object to a single map, and you will need to set the binding explicitly.

To explicitly bind a map:

1. In the **Explicit** column, place a check in the check box for the map you want to bind.
2. Select the map that you intend to associate with the business object.
3. In the **File** menu of the Connector Configurator Express window, click **Save to Project**.
4. Deploy the project to ICS.
5. Reboot the server for the changes to take effect.

Security

You can use the **Security** tab in Connector Configurator Express to set various privacy levels for a message. You can only use this feature when the `DeliveryTransport` property is set to JMS.

By default, Privacy is turned off. Check the **Privacy** box to enable it.

The **Keystore Target System Absolute Pathname** is:

- For Windows:
`<ProductDir>\connectors\security\<connectorname>.jks`

This path and file should be on the system where you plan to start the connector, that is, the target system.

You can use the Browse button at the right only if the target system is the one currently running. It is greyed out unless **Privacy** is enabled and the **Target System** in the menu bar is set to Windows.

The **Message Privacy Level** may be set as follows for the three messages categories (All Messages, All Administrative Messages, and All Business Object Messages):

- "" is the default; used when no privacy levels for a message category have been set.
- none
Not the same as the default: use this to deliberately set a privacy level of none for a message category.
- integrity
- privacy
- integrity_plus_privacy

The **Key Maintenance** feature lets you generate, import and export public keys for the server and adapter.

- When you select **Generate Keys**, the Generate Keys dialog box appears with the defaults for the keytool that will generate the keys.
- The keystore value defaults to the value you entered in **Keystore Target System Absolute Pathname** on the Security tab.

- When you select OK, the entries are validated, the key certificate is generated and the output is sent to the Connector Configurator Express log window.

Before you can import a certificate into the adapter keystore, you must export it from the server keystore. When you select **Export Adapter Public Key**, the Export Adapter Public Key dialog box appears.

- The export certificate defaults to the same value as the keystore, except that the file extension is <filename>.cer.

When you select **Import Server Public Key**, the Import Server Public Key dialog box appears.

- The import certificate defaults to <ProductDir>\bin\ics.cer (if the file exists on the system).
- The import Certificate Association should be the server name. If a server is registered, you can select it from the droplist.

The **Adapter Access Control** feature is enabled only when the value of DeliveryTransport is IDL. By default, the adapter logs in with the guest identity. If the **Use guest identity** box is not checked, the **Adapter Identity** and **Adapter Password** fields are enabled.

Setting trace/log file values

When you open a connector configuration file or a connector definition file, Connector Configurator Express uses the logging and tracing values of that file as default values. You can change those values in Connector Configurator Express.

To change the logging and tracing values:

1. Click the **Trace/Log Files** tab.
2. For either logging or tracing, you can choose to write messages to one or both of the following:
 - To console (STDOUT):
Writes logging or tracing messages to the STDOUT display.

Note: You can only use the STDOUT option from the **Trace/Log Files** tab for connectors running on the Windows platform.

- To File:
Writes logging or tracing messages to a file that you specify. To specify the file, click the directory button (ellipsis), navigate to the preferred location, provide a file name, and click **Save**. Logging or tracing message are written to the file and location that you specify.

Note: Both logging and tracing files are simple text files. You can use the file extension that you prefer when you set their file names. For tracing files, however, it is advisable to use the extension .trace rather than .trc, to avoid confusion with other files that might reside on the system. For logging files, .log and .txt are typical file extensions.

Data handlers

The data handlers section is available for configuration only if you have designated a value of JMS for DeliveryTransport and a value of JMS for ContainerManagedEvents. Not all adapters make use of data handlers.

See the descriptions under `ContainerManagedEvents` in Appendix A, Standard Properties, for values to use for these properties.

Saving your configuration file

When you have finished configuring your connector, save the connector configuration file. Connector Configurator Express saves the file in the broker mode that you selected during configuration. The title bar of Connector Configurator Express always displays the broker mode that InterChange Server Express is currently using.

The file is saved as an XML document. You can save the XML document in three ways:

- From System Manager, as a file with a `*.con` extension in an Integration Component Library, or
- In a directory that you specify.
- In stand-alone mode, as a file with a `*.cfg` extension in a directory folder. By default, the file is saved to `\WebSphereAdapters\bin\Data\App`.

For details about using projects in System Manager, and for further information about deployment, see the System Implementation Guide. f

Completing the configuration

After you have created a configuration file for a connector and modified it, make sure that the connector can locate the configuration file when the connector starts up.

To do so, open the startup file used for the connector, and verify that the location and file name used for the connector configuration file match exactly the name you have given the file and the directory or path where you have placed it.

Using Connector Configurator Express in a globalized environment

Connector Configurator Express is globalized and can handle character conversion between the configuration file and the integration broker. Connector Configurator Express uses native encoding. When it writes to the configuration file, it uses UTF-8 encoding.

Connector Configurator Express supports non-English characters in:

- All value fields
- Log file and trace file path (specified in the **Trace/Log files** tab)

The drop list for the `CharacterEncoding` and `Locale` standard configuration properties displays only a subset of supported values. To add other values to the drop list, you must manually modify the `\Data\Std\stdConnProps.xml` file in the product directory.

For example, to add the locale `en_GB` to the list of values for the `Locale` property, open the `stdConnProps.xml` file and add the line in boldface type below:

```
<Property name="Locale"
isRequired="true"
updateMethod="component restart">
  <ValidType>String</ValidType>
  <ValidValues>
    <Value>ja_JP</Value>
```

```
<Value>ko_KR</Value>
<Value>zh_CN</Value>
<Value>zh_TW</Value>
<Value>fr_FR</Value>
<Value>de_DE</Value>
<Value>it_IT</Value>
<Value>es_ES</Value>
<Value>pt_BR</Value>
<Value>en_US</Value>
<Value>en_GB</Value>
<DefaultValue>en_US</DefaultValue>
</ValidValues>
</Property>
```

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