IBM WebSphere Business Integration Adapters

Adapter for i2 User Guide

Adapter Version 1.0.x

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Note!

Before using this information and the product it supports, read the information in Appendix D, “Notices”, on page 77.

18April2003

This edition of this document applies to IBM WebSphere InterChange Server, version 4.2, WebSphere Business Integration Adapters, version 2.2.0, and to all subsequent releases and modification until otherwise indicated in new editions.

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Integration broker compatibility

Supported on IBM WebSphere Business Integration Adapter Framework versions 2.2.0, IBM WebSphere InterChange Server versions 4.1.1 and 4.2, WebSphere MQ Integrator version 2.1.0, and WebSphere MQ Integrator Broker, version 2.1.0.

See *Release Notes* for any exceptions.

Contents

About this document

IBM(R) WebSphere(R) Business Integration Adapters supply integration connectivity for leading e-business technologies and enterprise applications.This document describes the installation, configuration, and business object development for the adapter for i2..

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

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 Adapter installations, and includes reference material on specific components.

To access the documentation, go to the directory where you installed the product and open the `documentation` subdirectory. If a `welcome.html` file is present, open it for hyperlinked access to all documentation. If no documentation is present, you can install it or read it directly online at one of the following sites:
- If you are using WebSphere MQIntegrator as your integration broker: http://www.ibm.com/websphere/integration/wbiadapters/infocenter
- If you are using InterChange Server as your integration broker: http://www.ibm.com/websphere/integration/wicserver/infocenter

The documentation set consists primarily of Portable Document Format (PDF) files, with some additional files in HTML format. To read it, you need an HTML browser such as Netscape Navigator or Internet Explorer, and Adobe Acrobat Reader 4.0.5 or higher. For the latest version of Adobe Acrobat Reader for your platform, go to the Adobe website (www.adobe.com).

Typographic conventions

This document uses the following conventions:

`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.
italic, *`italic`*	Indicates a new term the first time that it appears, a variable name, or a cross-reference.
blue text	Blue text, which is visible only when you view the manual online, indicates a cross-reference hyperlink. Click any blue text 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, `option[,...]` 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 `<server_name><`*`connector_name`*`>tmp.log`.
`/, \`	In this document, backslashes (\) are used as the convention for directory paths. For UNIX installations, substitute slashes (/) for backslashes. All product pathnames are relative to the directory where the connector for i2 is installed on your system.
`%text%` and `$`*`text`*	Text within percent (%) signs indicates the value of the Windows `text` system variable or user variable. The equivalent notation in a UNIX environment is `$`*`text`*, indicating the value of the *`text`* UNIX environment variable.

Chapter 1. Overview of the connector

This chapter describes the connector component of the IBM WebSphere Business Integration 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 6.0 SDK CIS-enabled i2 application. Many i2 modules versions 5.2 and above, support version 6.0 CIS SDK. This connector is available on Windows, Solaris, and AIX.

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 broker 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 *IBM WebSphere InterChange Server System Administration Guide* or *IBM WebSphere Business Integration Adapters Implementation Guide for MQ Integrator Broker*.

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.

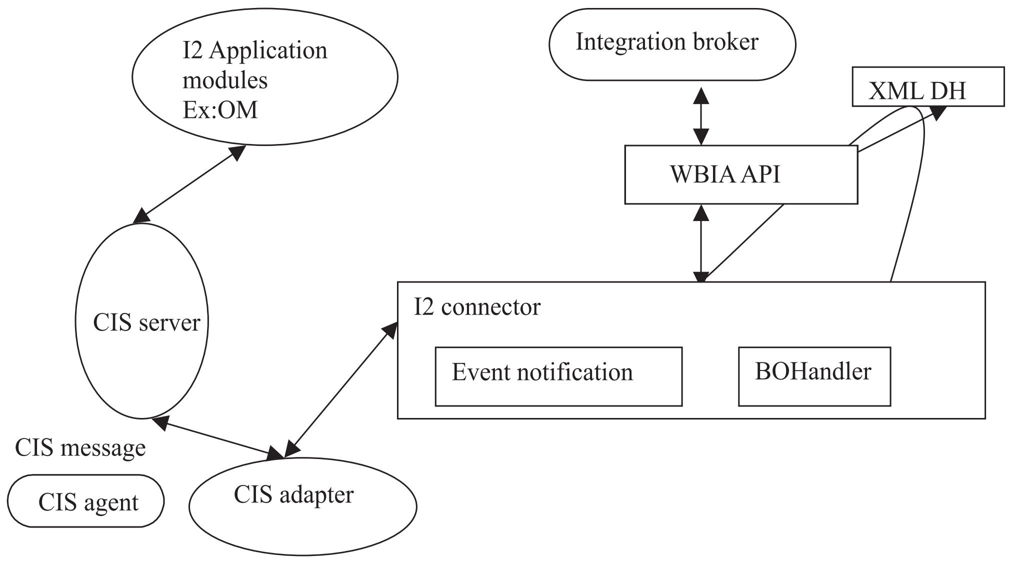
CIS includes three primary components:

- 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. 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 designated integration broker.
integration broker	A program that handles the execution of the business object processing logic. Supported brokers are ICS and WMQI.
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.

Component	Description
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. No authentication is necessary (no user name or password is required). At present, the CIS client API does not support any connection pooling mechanism. Hence, connections are created for every transaction. For information on configuration properties, see "Configuring the connector" on page 8.

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. 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.

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 11.

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. Since no event store is maintained for i2, the status update strategy is not relevant for the i2 connector. Error messages, if any, are logged to the i2 adapter log file. For more information, see Chapter 5, "Troubleshooting and error handling", on page 27.

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 11 and Chapter 4, "Generating business objects using i2 ODA", on page 17.

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

1. 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.
2. 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.
3. 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.
4. 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 instance ID from which this output was retrieved is set as the instance ID in the metaobject attribute of the wrapper. For more information, see Chapter 3, "Understanding business objects for the connector", on page 11.
5. The connector sends the wrapper business object to the integration broker for further processing.

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 11, and Chapter 4, "Generating business objects using i2 ODA", on page 17.

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 the instance ID metaobject (MO_Instance) and the input and output business objects as its children. 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.

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.

Chapter 2. Installing and configuring the connector

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

- "Prerequisites for installing the connector" on page 7
- "Installing the connector on a Windows or UNIX system" on page 7
- "Configuring the connector" on page 8
- "Starting the connector" on page 10

Prerequisites for installing the connector

Before you install the connector, be sure that your system has the required hardware and software for using the connector.

Required hardware and software:

- Applications:
  - CIS SDK 6.0
  - J2EE.jar
  - Appropriate CIS adapter (MetadataService adapter is required for i2 ODA)
- One of the following application platforms:
  - Windows: 2000
  - UNIX: Solaris, HP, or AIX
- One of the following adapter platforms:
  - Windows: NT, 2000
  - UNIX: Solaris 8.0, or AIX 4.3

Note: For instructions on installing the software and installing prerequisites specific to your integration broker, see *IBM WebSphere Business Integration Adapter Implementation Guide for MQ Integrator Broker*; or for InterChange Server, see *IBM WebSphere InterChange Server System Installation Guide for UNIX* or *for Windows*.

As part of the default software installation, the data handlers are installed to your system. When you install the i2 connector from Passport Advantage, the XML data handler is also installed. For the procedures to configure the data handlers for the connector, see *IBM WebSphere Business Integration Adapter Data Handler Guide*.

Installing the connector on a Windows or UNIX system

This section describes how to install the connector on a Windows or UNIX system.

Step for installing the standard files

Before you begin: You need to have WebSphere InterChange Server on your system.

Perform the following step to install the standard files associated with the i2 connector:

- Run the Installer utility for IBM WebSphere Business Integration Adapters from the product CD and select the IBM WebSphere Business Integration Adapter for i2.

  The utility allows you to browse and select the directory into which it will install the connector subdirectories and files. You must install to the *%ProductDir%* product directory that you used for your installation of the IBM WebSphere InterChange Server system. Use the browse button in the Installer to locate the directory and select it.

Result: The Installer utility copies the standard files into your system.

Tip: After you have installed your business integration system, you can install additional connectors from the product CD-ROM at any time. To do this, insert the product CD-ROM, run the installation program, and choose the connectors that you want to install.

Installed file structure

The following table describes the file structure used by the connector and shows the files that are automatically installed with Installer.

Notes:
1. This document uses (\) backslashes as the convention for directory paths. For UNIX installations, substitute slashes (/) for backslashes.
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 Adapters menu. For a fast way to start the connector, create a shortcut to this file on the desktop.

Subdirectory of *%ProductDir%*	**Description**
connectors\i2	Contains the connector CWi2.jar file, Version 1.0.0, which has the connector code and the start_i2.bat files (WIN) or start_i2.sh files (UNIX).
connectors\messages	Contains the i2Adapter.txt file for error messages.
repository\i2	Contains the CN_i2.txt file.
connectors\i2\Sample	Contains sample files for creating business objects.

For more information on installing the connector component, see one of the following guides, depending on the integration broker you are using:
- *IBM WebSphere InterChange Server System Installation Guide* for your platform (when usingthe WebSphere InterChange Server as the integration broker)
- *IBM WebSphere Business Integration Adapters Implementation Guide for MQIntegrator Broker* (when using WebSphere MQIntegrator as the integration broker)

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--if ICS is the integration broker

Tip: Access this tool from the System Manager.

- Connector Configurator--if WebSphere MQIntegrator is the integration broker

  Tip: Access this tool from the IBM WebSphere Business Integration Adapter program folder.

  For more information about Connector Configurator, see Appendix B, "Connector Configurator", on page 55.

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 33.

Note: Because the connector for i2 supports both the ICS and WebSphere MQIntegrator integration brokers, configuration properties for both brokers are relevant to the connector.

In addition, the following supplemental information on standard connector properties applies to i2.

LogAtInterchangeEnd

Tells whether to log errors on the InterChange Server (ICS).

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	*Unique name specified for each connector*	i2Adapter

Property	Description	Possible values
ApplicationUserName	*User name for the i2 connection*	Not used in this release
ApplicationPassword	*Password for the i2 connection*	Not used in this release
CISAgentHostName	*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
PollQuantity	*Number of messages that will be retrieved from the client queue; it will be pollQuantity multiplied by the number of registered operations.*	Default is 1
UseDefaults	*The connector checks for this value to look for 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) or start_i2.sh (for UNIX)

You need to add the proper path to the start files for CIS-SDK and j2ee.jar.

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

```
set I2_CIS_HOME_DIR=C:\i2\CIS\6.0\cis-sdk
set J2EE_PATH=C:\J2EE_JAR
```

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

Configuring DataHandler

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 *IBM WebSphere Business Integration Adapters Data Handler Guide*.

Starting the connector

For information on starting and stopping a connector, see one of the following documents, depending on the integration broker you are using:

- *IBM WebSphere System InterChange Server Installation Guide* for your platform (when using InterChange server as the integration broker)
- *IBM WebSphere Business Integration Adapters Implementation Guide for MQIntegrator* (when using WebSphere MQIntegrator Broker as the integration broker)

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 11
- "Overview of business object structure" on page 11
- "i2 business object structure" on page 12
- "Specifying business object attribute properties" on page 14
- "Identifying business object application-specific information" on page 15

For information on the Object Discovery Agent (ODA) utility that automates the creation of business objects for the IBM WebSphere Business Integration Adapter for i2, see Chapter 4, "Generating business objects using i2 ODA", on page 17.

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 point to child business objects or arrays of child business objects that contain the data for these objects. Keys relate the data between the parent record and child records.

WebSphere Business Integration Adapter 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.

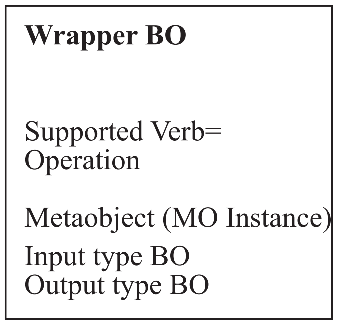
i2 business object structure

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 WebSphere Business Integration 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 i2 ODA”, on page 17 and Chapter 3, "XML data handler" in *IBM WebSphere Business Integration Adapters 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 for the operation. There is one wrapper business object for each operation. For more information, see Chapter 4, “Generating business objects using i2 ODA”, on page 17.

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

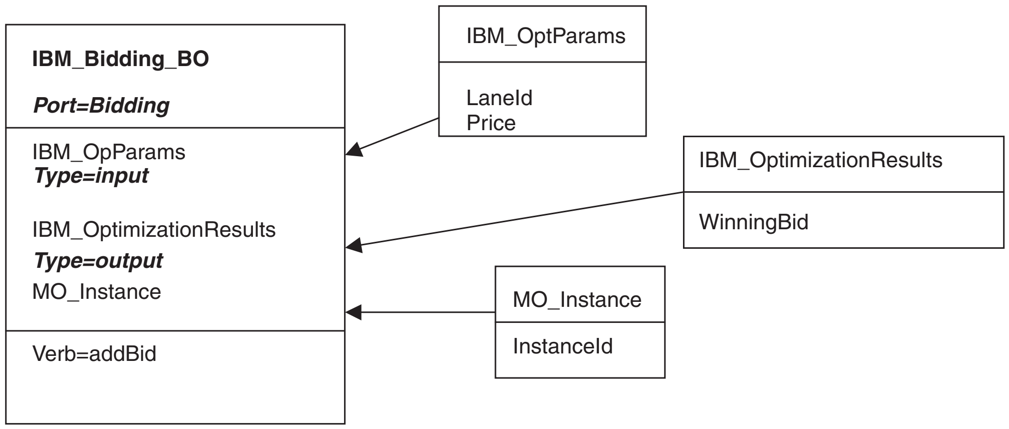


- The *metaobject* embedded within the wrapper is used to configure the *instance ID*. For more information, see “Configuring metaobjects for polling” on page 13.

- The *operation* is set as the verb on the wrapper business object and is associated with a port. i2 does not have standard verbs. 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 *types* are business object attributes which represent data types 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 one attribute--InstanceId



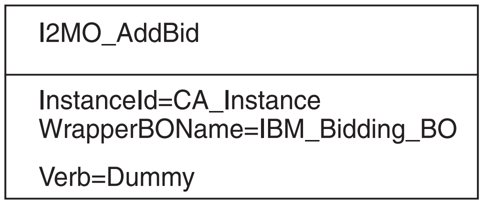
Configuring metaobjects for polling

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.

The attributes (instance ID, wrapper business object name, and operation name) within the metaobjects have a static default value. 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.

In the following diagram, the metaobject named i2MO_AddBid is used to configure the instance ID CA_Instance, for the Bidding operation addBid, which is set on the wrapper business object named IBM_Bidding_BO. The values shown are default values for the attributes.



```
I2MO_AddBid

InstanceId=CA_Instance
WrapperBOName=IBM_Bidding_BO
Verb=Dummy
```

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.
IsForeighKey	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 instance ID, 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.
Relationship	If the child is a container attribute, this is set to `Containment`.
IsKey	Not used
IsForeighKey	Not used.
Is Required	For relationship details between XML elements and requiredness, see Chapter 3, "XML data handler," in *IBM WebSphere Business Integration Adapters Data Handler Guide*.

Attribute	Description
AppSpecInfo	For information on this property, see “Identifying business object application-specific information” on page 15,
Cardinality	For relationship details between XML elements and cardinality, see Chapter 3, "XML data handler," in *IBM WebSphere Business Integration Adapters Data Handler Guide*.

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 `CxBlank`. Simple (String) attributes with a value of `CxBlank` are included in an XML document. Empty double quotation marks ("") in an XML document are used as the PCDATA equivalent of `CxBlank`.

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.

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 i2 ODA

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

This chapter contains the following sections:
- "Overview of i2 ODA" on page 17
- "Installing i2 ODA" on page 17
- "Using i2 ODA in Business Object Designer" on page 19

Overview of i2 ODA

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 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 XML ODA.

For details, see "Steps for using i2ODA" on page 20.

Installing i2 ODA

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

Steps for installing 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 i2 application version 6.0 and i2 ODA 1.0.0.

To install i2 ODA, use the Installer for IBM WebSphere Business Integration Adapters. Follow the instructions in *IBM WebSphere Business Integration Adapters Implementation Guide for MQIntegrator* or *for InterChange Server (ICS)*, or *IBM WebSphere Business Integration System Installation Guide for UNIX* or *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)
- ODA/i2/start_i2ODA.sh (UNIX only)

Notes:

1. Except as otherwise noted, this document uses backslashes (\) as the convention for directory paths. For UNIX installations, substitute slashes (/) for backslashes.
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.
- The Visibroker Object Activation Daemon needs to run on the machine that is running the agent and the one on which Business Object Designer is installed.

Launching i2 ODA

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

You can launch i2 ODA in either of the following ways:

- Automatically—If you registered i2 ODA with the Visibroker Object Activation Daemon (OAD), you do not need to start i2 ODA manually. OAD maintains a list of registered ODA names and listens for requests to start the ODA. When you select the ODA's name in Business Object Designer, OAD starts the ODA.

  For information on registering i2 ODA, see *IBM WebSphere System Installation Guide for UNIX* or *for Windows*.
- Manually—If you have not registered i2 ODA with the Visibroker Object Activation Daemon, start it by running the appropriate file:

  UNIX: start_i2ODA.sh

  Windows: start_i2ODA.bat

  You have to add the proper path to the start files for CIS-SDK and j2ee.jar

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

  ```
  set I2_CIS_HOME_DIR=C:\i2\CIS\6.0\cis-sdk
  set J2EE_PATH=C:\J2EE_JAR
  ```

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

You configure and run i2 ODA using Business Object Designer. Business Object Designer 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*. During installation, if you register the ODA with the Visibroker Object Activation Daemon, the wizard automatically prefixes the host name to the *AGENTNAME* value to make it unique.

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:

`*AgentName*Agent.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 as part of 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 20.

During the configuration process, you specify:
- The name of the file into which 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	• 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	• 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 20.

Using i2 ODA in Business Object Designer

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

After you launch an ODA, you must launch Business Object Designer to configure and run it. Business Object Designer 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 agent properties.
3. Expand nodes and select port types, operations, and input/output types.
4. Confirm selection, generate 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 i2ODA

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

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

   Result: Business Object Designer 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.
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.

   When multiple instances of the ODA are running on different machines, they are visible in the Business Object Designer 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. If the ODA is registered with an Object Activation Daemon by the ODA configuration wizard, the latter prefixes the host name to the *AGENTNAME* value, making it unique.

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

Configure agent properties

The first time Business Object Designer communicates with 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 i2 ODA. For information on specifying an ODA profile, see *IBM WebSphere Business Integration Adapters 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. **Example:** i2_BO
2	SchemaFileLocation	String	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. i2 ODA displays the file name according to the naming convention. **Example:** If the agent is named `i2ODA`, the value of the message file property displays as `i2ODAAgent.txt`.
4	CISAgentHostName	String	Host name of the CIS agent, it is specified if the CIS agent is running on a remote machine.

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

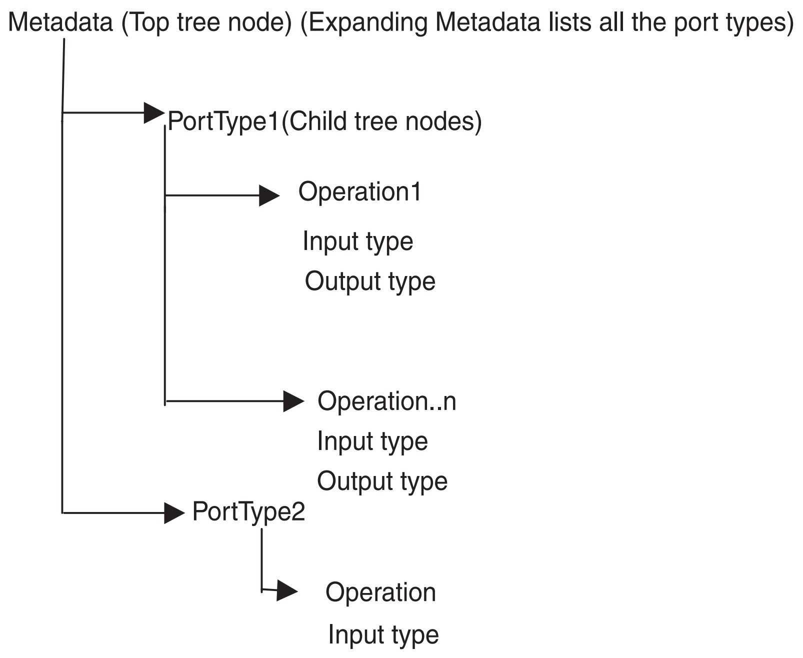
- TraceFileName--File into which i2 ODA writes trace information. The command line option for this parameter is `-t`. i2ODA names the file according to the naming convention.

  Example: If the agent is named `i2ODA`, it generates a trace file named `i2ODAtrace.txt`.
- TraceLevel--Level of tracing enabled for i2 ODA. For more information, see "Working with error and trace message files" on page 19.

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

i2 ODA uses the properties you configured in the preceding step to connect to the specified i2 application. Business Object Designer 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.

The following diagram shows a tree view with expanded nodes.


Metadata (Top tree node) (Expanding Metadata lists all the port types)
PortType1(Child tree nodes)
Operation1
Input type
Output type
Operation..n
Input type
Output type
PortType2
Operation
Input type

- 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: 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. 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

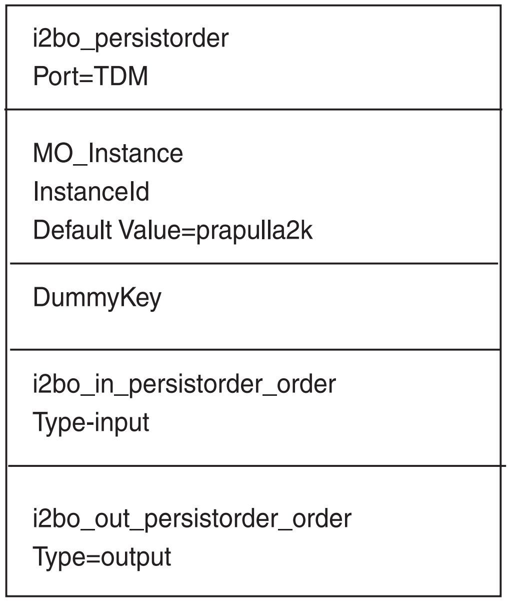
1. Confirm the operations you have selected for i2 ODA to generate wrapper business objects.

   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
- Instance ID
- 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.



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

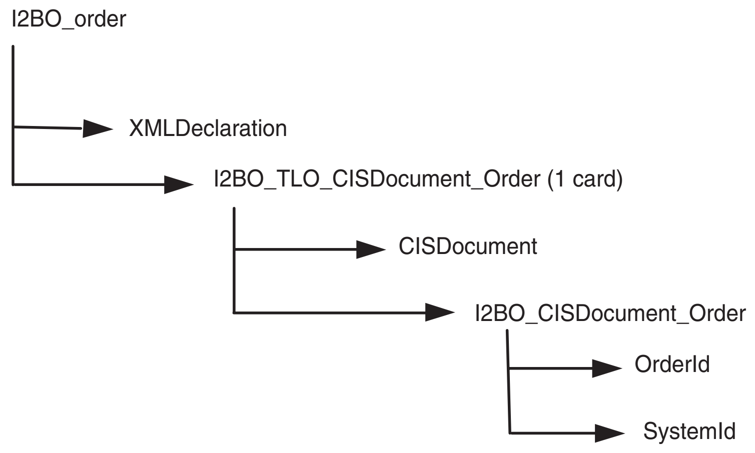
   Guideline: When you save the business objects into a file in this step, the current Business Object Designer wizard looks at the machine where the agent is running. Another pop-up window prompts you for a location to save the generated wrapper business objects.

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

1. Check the property values that Business Object Designer 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: The 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.



Save the business object files

Now that all the required business objects are generated, you need to save them to the InterChange server for use by the collaborations. Use the Business Object Designer 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:

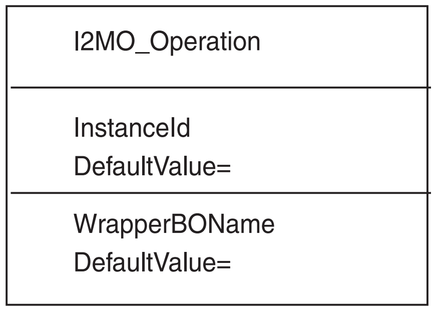
Property	**Value**
FileName	D:\i2\odaschema\i2persist_in_persistOrder_Order_Order.xsd
Root	CISDocument
TopLevel	in_persistOrder_Order
BOSelection	false
BOPrefix	i2persist
DoctypeorSchemaLocation	true
TraceFileName	XMLODAtrace.txt
TraceLevel	5
MessageFile	XMLODAAgent.txt

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 instance ID on these. You will need to replace the default MO_Instance with the newly created ones in the wrapper business objects for the operations.

Create the metaobject for polling

Once the business objects are created, you need to create the metaobjects for polling using the CSM. 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 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 instance ID, operation, and business object wrapper name.



For more information on configuring metaobjects, see Chapter 3, "Understanding business objects for the connector", on page 11.

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 27
- "Tracing messages" on page 30
- "Tips for troubleshooting" on page 31

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	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 11. The error "required information for polling was not found for the specified metaobject" is logged and the processing continues for other messages.
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.

Error description	Error type	Handling by i2 connector
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	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.
No instance ID found in the metadata object within the incoming business object	Error	The connector checks for the default value setting for the instance ID 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.

Error description	Error type	Handling by i2 connector
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 IBM WebSphere Business Integration 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	• Messages logged each time a business object is posted to the integration broker from gotApplEvent. • Messages that indicate each time a business object request is received.
Level 3	Not applicable
Level 4	• 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.

Tracing Level	Tracing Messages
Level 5	• 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).

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 instance ID 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

Connectors have two types of configuration properties:
- Standard configuration properties
- Connector-specific configuration properties

This chapter describes standard configuration properties, applicable to all connectors. For information about properties specific to the connector, see the installing and configuring chapter of its adapter guide.

The connector uses the following order to determine a property's value (where the highest numbers override the value of those that precede):
1. Default
2. Repository (relevant only if InterChange Server is the integration broker)
3. Local configuration file
4. Command line

Note: In this document backslashes (\) are used as the convention for directory paths. For UNIX installations, substitute slashes (/) for backslashes and obey the appropriate operating system-specific conventions.

New and deleted properties

The following are the standard properties that have been either added or deleted in the 2.2 release of the adapters.
- **New properties**
  CharacterEncoding
  Local
  JVMMinHeapSize
  JVMMaxHeapSize
  JVMMaxStackSize
  WireFormat
  MaxEventCapacity
  DuplicateEventElimination
  jms.NumConcurrentRequests
  ContainerManagedEvents
  jms.Messagebrokername (replaces jms.BrokerName)
- **Deleted properties**
  RequestTransport
  PingFrequency
  TraceLevel
  AgentProxyType
  MaxThreadPoolSize
  Anonymous Connections
  GW Name
  Agent URL

Listener Port

Certificate Location

LogFileName

TraceFileName

jms.BrokerName

Configuring standard connector properties for WebSphere InterChange Server

This section describes standard configuration properties applicable to connectors whose integration broker is WebSphere InterChange Server (ICS). Standard configuration properties provide information that is used by a configurable component of InterChange Server called the **connector controller**. Like the connector framework, the code for the connector controller is common to all connectors. However, you configure a separate instance of the controller for each connector.

A connector, which consists of the connector framework and the application-specific component, has been referred to historically as the **connector agent**. When a standard configuration property refers to the agent, it is referring to both the connector framework and the application-specific component.

For general information about how connectors work with InterChange Server, see the *Technical Introduction to IBM WebSphere InterChange Server.*

Important: Not all properties are applicable to all connectors that use InterChange Server. For information specific to an connector, see its adapter guide.

You configure connector properties from Connector Configurator, which you access from System Manager.

Note: Connector Configurator and System Manager run only on the Windows system. Even if you are running the connector on a UNIX system, you must still have a Windows machine with these tools installed. Therefore, to set connector properties for a connector that runs on UNIX, you must start up System Manager on the Windows machine, connect to the UNIX InterChange Server, and bring up Connector Configurator for the connector.

A connector obtains its configuration values at startup. If you change the value of one or more connector properties during a runtime session, the property's update semantics determine how and when the change takes effect. There are four different types of update semantics for standard connector properties:

- Dynamic—The change takes effect immediately after it is saved.
- Component restart—The change takes effect only after the connector is stopped and then restarted in System Manager. This does not require stopping and restarting the application-specific component or InterChange Server.
- Server restart—The change takes effect only after you stop and restart the application-specific component and InterChange Server.
- Agent restart—The change takes effect only after you stop and restart the application-specific component.

To determine the update semantics for a specific property, refer to the Update Method column in the Connector Configurator window, or see the Update Method column of the table below.

The following table provides a quick reference to the standard connector configuration properties. You must set the values of some of these properties before running the connector. See the sections that follow for explanations of the properties.

Property Name	Possible values	Default value	Update method	Notes
AdminInQueue	*valid JMS queue name*	*CONNECTORNAME* /ADMININQUEUE		
AdminOutQueue	*valid JMS queue name*	*CONNECTORNAME*/ADMINOUTQUEUE		
AgentConnections	1-4	1	server restart	multi-threaded connector only
AgentTraceLevel	0-5	0	dynamic	
ApplicationName	*application name*	*the value that is specified for the connector name*	component restart	value required
BrokerType	ICS, WMQI			ICS is required if your broker is ICS
CharacterEncoding	ascii7, ascii8, SJIS, Cp949, GBK, Big5, Cp297,Cp273,Cp280, Cp284,Cp037, Cp437	ascii7	component restart	
ConcurrentEventTriggeredFlows	1 to 32,767	no value	component restart	
ContainerManagedEvents	JMS or no value	JMS		guaranteed event delivery
ControllerStoreAndForwardMode	true or false	true	dynamic	
ControllerTraceLevel	0-5	0	dynamic	
DeliveryQueue		*CONNECTORNAME*/DELIVERYQUEUE	component restart	JMS transport only
DeliveryTransport	MQ, IDL, or JMS	IDL	component restart	
FaultQueue		*CONNECTORNAME*/FAULTQUEUE	component restart	
DuplicateEventElimination	True/False	False	component restart	JMS transport only, Container Managed Events must be <NONE>
JvmMaxHeapSize	heap size in megabytes	128m	component restart	
JvmMaxNativeHeapSize	size of stack in kilobytes	128k	component restart	
JvmMinHeapSize	heap size in megabytes	1m	component restart	
jms.MessageBrokerName	If FactoryClassName is IBM, use crossworlds.queue.manager. If FactoryClassName is Sonic, use localhost:2506.	crossworlds.queue.manager	server restart	JMS transport only
jms.FactoryClassName	CxCommon.Messaging. jms.IBMMQSeriesFactory or CxCommon.Messaging. jms.SonicMQFactory or any Java class name	CxCommon.Messaging. jms.IBMMQSeriesFactory	server restart	JMS transport only

Property Name	Possible values	Default value	Update method	Notes
jms.NumConcurrentRequests	positive integer	10	component restart	JMS transport only
jms.Password	Any valid password		server restart	JMS transport only
jms.UserName	Any valid name		server restart	JMS transport only
Locale	`en_US` , `ja_JP`, `ko_KR`, `zh_C`, `zh_T`, `fr_F`, `de_D`, `it_I`, `es_E`, `pt_BR` **Note:** These are only a subset of supported locales.	`en_US`	component restart	
LogAtInterchangeEnd	`true` or `false`	`false`	component restart	
MaxEventCapacity	1-2147483647	2147483647	dynamic	Repository Directory value must be <REMOTE>
MessageFileName	*path/filename*	*`Connectorname`*`.txt or InterchangeSystem.txt`	component restart	
MonitorQueue	any valid queue name	*`CONNECTORNAME`*`/MONITORQUEUE`	component restart	JMS transport only, DuplicateEvent Elimination must be True
OADAutoRestartAgent	`true` or `false`	`false`	dynamic	
OADMaxNumRetry	*a positive number*	`1000`	dynamic	
OADRetryTimeInterval	*a positive number in minutes*	`10`	dynamic	
PollEndTime	`HH:MM`	`HH:MM`	component restart	
PollFrequency	*a positive integer in milliseconds* `no` (to disable polling) `key` (to poll only when the letter `p` is entered in the connector's Command Prompt window)	`10000`	dynamic	
PollQuantity	1-500	1	component restart	Number of items to poll from application
PollStartTime	`HH:MM`*(HH is 0-23, MM is 0-59)*	`HH:MM`	component restart	
RepositoryDirectory	location where repository is located	<REMOTE>	component restart	<REMOTE> for ICS broker
RequestQueue	*valid JMS queue name*	*`CONNECTORNAME`*`/REQUESTQUEUE`	component restart	
ResponseQueue	*valid JMS queue name*	*`CONNECTORNAME`*`/RESPONSEQUEUE`	component restart	
RestartRetryCount	`0-99`	`3`	dynamic	
RestartRetryInterval	*a sensible positive value in minutes*	`1`	dynamic	
SourceQueue	*valid MQSeries queue name*	*`CONNECTORNAME`*`/SOURCEQUEUE`	component restart	Valid only if delivery transport is JMS and Container Managed Events is specified.

Property Name	Possible values	Default value	Update method	Notes
SynchronousRequestQueue		*CONNECTORNAME*/ SYNCHRONOUSREQUESTQUEUE	component restart	
"SynchronousResponseQueue" on page 52		*CONNECTORNAME*/ SYNCHRONOUSRESPONSEQUEUE	component restart	
SynchronousRequestTimeout		0	component restart	
"WireFormat" on page 53	CwXML, CwBO	cwxml	agent restart	CwXML for non-ICS broker; CwBO if Repository Directory is <REMOTE>

AdminInQueue

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

The default value is `CONNECTORNAME/ADMININQUEUE`.

AdminOutQueue

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 IIOP connections opened for request transport between an application-specific component and its connector controller. By default, the value of this property is set to 1, which causes InterChange Server to open a single IIOP connection.

This property enhances performance for a multi-threaded connector by allowing multiple connections between the connector controller and application-specific component. When there is a large request/response workload for a particular connection, the IBM WebSphere administrator can increase this value to enhance performance. Recommended values are in the range of 2 to 4. Increasing the value of this property increases the scalability of the Visigenic software, which establishes the IIOP connections. You must restart the application-specific component and the server for a change in property value to take effect.

Important: If a connector is single-threaded, it cannot take advantage of the multiple connections. Increasing the value of this property causes the request transport to bottleneck at the application-specific component. To determine whether a specific connector is single- or multi-threaded, see the installing and configuring chapter of its adapter guide.

AgentTraceLevel

Level of trace messages for the application-specific component. The default is `0`. The connector delivers all trace messages applicable at the tracing level set or lower.

ApplicationName

Name that uniquely identifies the connector's application. This name is used by the system administrator to monitor the WebSphere business integration system environment. This property must have a value before you can run the connector.

BrokerType

Identifies the integration broker type that you are using. If you are using an ICS connector, this setting must be ICS.

CharacterEncoding

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. A C++ connector currently uses the value ASCII for this property. If you previously configured the value of this property to `ascii7` or `ascii8`, you must reconfigure the connector to use either `ASCII` or one of the other supported values. To determine whether a specific connector is written in Java or C++, see the installing and configuring chapter of its adapter guide.

Important: By default only a subset of supported character encodings display in the drop list. To add other supported values to the drop list, you must manually modify the `\Data\Std\stdConnProps.xml` file in the product directory. For more information, see the appendix on Connector Configurator.

Attention: Do not run a non-internationalized connector against InterChange Server version 4.1.1 if you cannot guarantee that only ISO Latin-1 data will be processed.

The default value is `ascii`.

ConcurrentEventTriggeredFlows

Determines how many business objects can be concurrently processed by the connector controller for event delivery. Set the value of this attribute to the number of business objects you want concurrently mapped and delivered. For example, set the value of this property to `5` to cause five business objects to be concurrently processed. The default value is `1`.

Setting this property to a value greater than 1 allows a connector controller for a source application to simultaneously map multiple event business objects, and to simultaneously deliver them to multiple collaboration instances. Setting this property to enable concurrent mapping of multiple business objects can speed delivery of business objects to a collaboration, particularly if the business objects use complex maps. Increasing the arrival rate of business objects to collaborations can improve overall performance in the system.

Note: To implement concurrent processing for an entire flow (from a source application to a destination application) also requires that the collaboration be configured to use multiple threads and that the destination application's application-specific component be able to process requests concurrently. To configure the collaboration, set its `Maximum number of concurrent events` property high enough to use multiple threads. For an application-specific component to process requests concurrently, it must be either multi-threaded, or be capable of using Connector Agent Parallelism and be configured for multiple processes (setting the `Parallel Process Degree` configuration property greater than `1`).

Important: To determine whether a specific connector is single- or multi-threaded, see the installing and configuring chapter of its adapter guide.

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

ContainerManagedEvents

Setting this property to JMS 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 a single JMS transaction. This property can also be set to no value.

Notes:

1. When ContainerManagedEvents is set to `JMS`, you must also configure the following properties to enable guaranteed event delivery: PollQuantity = `1` to `500`, SourceQueue = `SOURCEQUEUE`. In addition, you must configure a data handler with the MimeType, DHClass, and DataHandlerConfigMOName (optional) properties. To set those values, use the Data Handler tab of Connector Configurator. The fields for the values under the Data Handler tab will be displayed only if you have set ContainerManagedEvents to JMS.
2. When ContainerManagedEvents is set to `JMS`, the connector does *not* call its `pollForEvents()` method, thereby disabling that method's functionality.

The default value is `JMS`.

This property only appears if the DeliveryTransport property is set to the value `JMS`.

ControllerStoreAndForwardMode

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, the connector controller blocks the request to the application-specific component. When the application-specific component becomes operational, the controller forward the request to it.

Important: 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.

The default is `true`.

ControllerTraceLevel

Level of trace messages for the connector controller. The default is `0`.

DeliveryQueue

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

The default value is `DELIVERYQUEUE`.

DeliveryTransport

Specifies the transport mechanism for the delivery of events. Possible values are `MQ` for WebSphere MQ, `IDL` for CORBA IIOP, or `JMS` for Java Messaging Service.

If ICS is the broker type, the value of the DeliveryTransport property can be MQ, IDL, or JMS, and the default is IDL.

If WMQI is the broker type, JMS is the only possible Delivery Transport value.

The connector sends service call requests and administrative messages over CORBA IIOP if the value configured for the `DeliveryTransport` property is `MQ` or `IDL`.

WebSphere MQ and IDL

Use WebSphere MQ rather than IDL for event delivery transport, unless you have compelling reasons not to license and maintain two separate products. WebSphere MQ offers the following advantages over IDL:

- Asynchronous communication – WebSphere MQ allows the application-specific component to poll and persistently store events even when the server is not available.
- Server side performance – WebSphere MQ provides faster performance on the server side. In optimized mode, WebSphere MQ stores only the pointer to an event in the repository database, while the actual event remains in the WebSphere MQ queue. This saves the overhead of having to write potentially large events to the repository database.
- Agent side performance – WebSphere MQ provides faster performance on the application-specific component side. Using WebSphere MQ, the connector's polling thread picks up an event, places it in the connector's queue, then picks up the next event. This is faster than IDL, which requires the connector's polling thread to pick up an event, go over the network into the server process, store the event persistently in the repository database, then pick up the next event.

JMS

Enables communication between the connector controller 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,″ display in Connector Configurator. The first two of these properties are required for this transport.

Important: There may be a memory limitation if you use the JMS transport mechanism for a connector in the following environment:

- AIX 5.0
- WebSphere MQ 5.3.0.1
- InterChange Server (ICS) as the Integration broker

In this environment, you may experience difficulty starting the 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 768M of process heap size, IBM recommends that you set:

- The LDR_CNTRL environment variable in the `CWSharedEnv.sh` script.

  This script resides in the `\bin` directory below the product directory. With 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 more than this limit, page swapping can occur, which can adversely affect the performance of your system.
- The IPCCBaseAddress property to a value of 11 or 12. For more information on this property, see the *System Installation Guide for UNIX*.

Notes:

- If your installation uses more than 768M of process heap size, this resolution would adversely affect product performance.
- If you run on AIX 4.3.3, you do not need to set the LDR_CNTRL environment variable. However, you must set IPCCBaseAddress to a value of 11 or 12.

DuplicateEventElimination

Setting this property to `true` enables a JMS-enabled connector with a non-JMS event store to ensure that duplicate events are not delivered to the delivery queue. To make use of this feature, during connector development a unique event identifier must be set as the business object's ObjectEventId attribute in the application specific code.

This property can also be set to `false`.

Note: When DuplicateEventElimination is set to `true`, you must also configure the MonitorQueue property to enable guaranteed event delivery.

FaultQueue

If the connector experiences an error while processing a message then the connector moves the message to the queue specified in this property, along with a status indicator and a description of the problem.

The default value is `CONNECTORNAME/FAULTQUEUE`.

JvmMaxHeapSize

The maximum heap size for the agent (in megabytes). This property is applicable only if the RepositoryDirectory value is <REMOTE>.

The default value is 128m.

JvmMaxNativeStackSize

The maximum native stack size for the agent (in kilobytes). This property is applicable only if the RepositoryDirectory value is <REMOTE>.

The default value is 128k.

JvmMinHeapSize

The minimum heap size for the agent (in megabytes). This property is applicable only if the RepositoryDirectory value is <REMOTE>.

The default value is 1m.

jms.FactoryClassName

Specifies the class name to instantiate for a JMS provider. You *must* set this connector property when you choose `JMS` as your delivery transport mechanism (DeliveryTransport).

The default is `CxCommon.Messaging.jms.IBMMQSeriesFactory`.

jms.MessageBrokerName

Specifies the broker name to use for the JMS provider. You *must* set this connector property when you choose `JMS` as your delivery transport mechanism (DeliveryTransport).

The default is `crossworlds.queue.manager`.

jms.NumConcurrentRequests

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 block and wait for another request to complete before proceeding.

The default value is 10.

jms.Password

Specifies the password for the JMS provider. A value for this property is optional.

There is no default.

jms.UserName

Specifies the user name for the JMS provider. A value for this property is optional.

There is no default.

Locale

Specifies the language code, country or territory, and, optionally, the associated character code set. The value of this property determines such cultural conventions as collation and sort order of data, date and time formats, and the symbols used in monetary specifications. For more information, see the overview chapter of the connector guide for an internationalized connector.

A locale name has the following format:

`ll_TT.codeset`

where:

`ll`	a two-character language code (usually in lower case)

TT	a two-letter country or territory code (usually in upper case)
codeset	the name of the associated character code set; this portion of the name is often optional.

The default is `en_US`.

Important: By default only a subset of supported locales display in the drop list. To add other supported values to the drop list, you must manually modify the `\Data\Std\stdConnProps.xml` file in the product directory. For more information, see the appendix on Connector Configurator.

Attention: If the connector has not been internationalized, the only valid value for this property is en_US. Do not run a non-internationalized C++ connector against InterChange Server version 4.1.1 if you cannot guarantee that only ISO Latin-1 data will be processed. To determine whether a specific connector has been internationalized, see the installing and configuring chapter of its connector guide.

LogAtInterchangeEnd

Specifies whether to log errors to InterChange Server's log destination, in addition to the location specified in the LogFileName property. Logging to the server's log destination also turns on email notification, which generates email messages for the `MESSAGE_RECIPIENT` specified in the `InterchangeSystem.cfg` file when errors or fatal errors occur. As an example, when a connector loses its connection to its application, if LogAtInterChangeEnd is set to `true`, an email message is sent to the specified message recipient. The default is `false`.

MaxEventCapacity

The maximum number of events in the controller buffer. This property is used by flow control and is applicable only if the value of the RepositoryDirectory property is <REMOTE>.

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

MessageFileName

The name of the connector message file. The standard location for the message file is `\connectors\messages`. Specify the message filename 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.

Important: To determine whether a specific connector has its own message file, see the installing and configuring chapter of its adapter guide.

OADAutoRestartAgent

Specifies whether the Object Activation Daemon (OAD) automatically attempts to restart the application-specific component after an abnormal shutdown. The properties "OADMaxNumRetry" on page 44 and "OADRetryTimeInterval" on page 44 are related to this property. This property is required for automatic restart.

The default value is `false`.

OADMaxNumRetry

Specifies the maximum number of times that the OAD automatically attempts to restart the application-specific component after an abnormal shutdown.

The default value is `1000`.

OADRetryTimeInterval

Specifies the number of minutes of the retry time interval that the OAD automatically attempts to restart the application-specific component after an abnormal shutdown. If the application-specific component does not start within the specified interval, the OAD repeats the attempt as many times as specified in "OADMaxNumRetry".

The default is `10`.

PollEndTime

Time to stop polling the event queue. The format is `HH:MM`, where *`HH`* represents 0-23 hours, and *`MM`* represents 0-59 seconds.

You must provide a valid value for this property. The default value is `HH:MM`, but must be changed.

PollFrequency

The amount of time between polling actions. Set PollFrequency to one of the following values:

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

The default is `10000`.

Important: Some connectors have restrictions on the use of this property. To determine whether a specific connector does, see the installing and configuring chapter of its adapter guide.

PollStartTime

The time to start polling the event queue. The format is *`HH:MM`*, where *`HH`* represents 0-23 hours, and *`MM`* represents 0-59 seconds.

You must provide a valid value for this property. The default value is `HH:MM`, but must be changed.

RequestQueue

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

The default value is `REQUESTQUEUE`.

RepositoryDirectory

The location of the repository from which the connector reads the XML schema documents that store the meta-data of business object definitions.

When the integration broker is ICS, this value must be set to <REMOTE> because the connector uses the InterChange Server repository to obtain its connector-definition information

ResponseQueue

Designates the JMS response queue, which delivers a response message from the connector framework to the integration broker. When the integration broker is InterChange Server, InterChange Server sends the request and waits for a response message in the JMS response queue.

RestartRetryCount

Specifies the number of times the connector attempts to restart itself. When used for a parallel connector, specifies the number of times the master connector application-specific component attempts to restart the slave connector application-specific component.

The default is `3`.

RestartRetryInterval

Specifies the interval in minutes at which the connector attempts to restart itself. When used for a parallel connector, specifies the interval at which the master connector application-specific component attempts to restart the slave connector application-specific component.

The default is `1`.

SourceQueue

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 39.

The default value is `SOURCEQUEUE`.

SynchronousRequestQueue

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 SynchronousRequestQueue and waits for a response back from the broker on the SynchronousResponseQueue. The response message sent to the connector bears a correlation ID that matches the ID of the original message.

SynchronousResponseQueue

Delivers response messages sent in reply to a synchronous request from the broker to the connector framework. This queue is necessary only if the connector uses synchronous execution.

SynchronousRequestTimeout

Specifies the time in minutes that the connector waits for a response to a synchronous request. If the response is not received within the specified time then the connector moves the original synchronous request message into the fault queue along with an error message.

The default value is 0.

TraceFileName

The name of the file where the application-specific component writes trace messages. Specify the filename in an absolute path. The default is `STDOUT`.

WireFormat

Message format on the transport.

Possible values are:

- `CwXML`if the broker is not ICS.
- `CwBO`if the value of RepositoryDirectory is <REMOTE>.

Configuring standard connector properties for WebSphere MQ Integrator

This section describes standard configuration properties applicable to adapters whose integration broker is WebSphere MQ Integrator Broker. For information on using WebSphere Integrator Broker, see the *Implementation Guide for WebSphere MQ Integrator Broker.*

Important: Not all properties are applicable to all connectors that use WebSphere MQ Integrator Broker. For information specific to a connector, see its adapter user guide.

You configure connector properties from Connector Configurator.

Note: Connector Configurator runs only on the Windows system. Even if you are running the connector on a UNIX system, you must still have a Windows machine with this tool installed. Therefore, to set connector properties for a connector that runs on UNIX, you must run Connector Configurator on the Windows computer and copy the configuration files to the UNIX computer using FTP or some other file transfer mechanism. For more information about Connector Configurator, see Appendix B, ″Connector Configurator.″

A connector obtains its configuration values at startup. If you change the value of one or more connector properties during a runtime session, you must restart the connector. Standard configuration properties provide information that is used by the adapter framework and connector framework, and is common to all connectors.

Standard connector properties

The following table provides a quick reference for standard connector configuration properties. See the sections that follow for explanations of the properties.

Name	Possible values	Default value
AdminInQueue	*valid JMS queue name*	CONNECTORNAME/ADMININQUEUE
AdminOutQueue	*valid WebSphere MQ queue name*	CONNECTORNAME/ADMINOUTQUEUE
AgentTraceLevel	0-5	0
ApplicationName	*application name*	*AppName*Connector
BrokerType	WMQI	WMQI
CharacterEncoding	ASCII, SJIS, Cp949, GBK, Big5, Cp297, Cp273, Cp280, Cp284, Cp037, Cp437 **Note:** These are only a subset of supported values.	ASCII
ContainerManagedEvents	JMS *or no value*	JMS
DeliveryQueue	*valid WebSphere MQ queue name*	CONNECTORNAME/DELIVERYQUEUE
DeliveryTransport	JMS	JMS
DuplicateEventElimination	true, false	
FaultQueue	*valid WebSphere MQ queue name*	CONNECTORNAME/FAULTQUEUE
jms.FactoryClassName		CxCommon.Messaging.jms. IBMMQSeriesFactory
jms.MessageBrokerName	If FactoryClassName is IBM, use crossworlds.queue.manager. If FactoryClassName is Sonic, use localhost:2506.	crossworlds.queue.manager
jms.NumConcurrentRequests		10
jms.Password		
jms.UserName		
Locale	en_US , ja_JP, ko_KR, zh_C, zh_T, fr_F, de_D, it_I, es_E, pt_BR **Note:** These are only a subset of supported locales.	en_US
MessageFileName	*path/filename*	*InterchangeSystem.txt*
PollEndTime	*HH:MM*	HH:MM
PollFrequency	*milliseconds*/key/no	10000
PollStartTime	*HH:MM*	HH:MM
RepositoryDirectory	*path/directory name* Note: Typically you must change this value from the default to whatever path and directory name was actually used when you installed the the connector files.	C:\crossworlds\Repository
RequestQueue	*valid WebSphere MQ queue name*	CONNECTORNAME/REQUESTQUEUE
ResponseQueue		RESPONSEQUEUE
RestartRetryCount	0-99	3
RestartRetryInterval	*an appropriate integer indicating the number of minutes between restart attempts*	1

Name	Possible values	Default value
SourceQueue	*valid WebSphere MQ queue name*	`CONNECTORNAME/SOURCEQUEUE`
SynchronousRequestQueue	*valid WebSphere MQ queue name*	
SynchronousResponseQueue	*valid WebSphere MQ queue name*	
SynchronousTimeout	*an appropriate integer indicating the number of minutes the connector waits for a response to a synchronous request*	`0`
WireFormat	CwXML	`CwXML`

AdminInQueue

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

The default value is `CONNECTORNAME/ADMININQUEUE`.

AdminOutQueue

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

AgentTraceLevel

Level of trace messages for the connector's application-specific component. The default is `0`. The connector delivers all trace messages applicable at the tracing level set or lower.

ApplicationName

Name that uniquely identifies the connection to the application. This name is used by the system administrator to monitor the connector's environment. When you create a new connector definition, this property defaults to the name of the connector; when you work with the definition for an IBM WebSphere-delivered connector, the property is also likely to be set to the name of the connector. Set the property to a value that suggests the program with which the connector is interfacing, such as the name of an application, or something that identifies a file system or website in the case of technology connectors.

BrokerType

This property is set to the value `WMQI` for connectors that are configured to use WebSphere MQ Integrator Broker as the integration broker.

CharacterEncoding

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. A C++ connector currently uses the value ASCII for this property. If you previously configured the value of this property to `ascii7` or `ascii8`, you must reconfigure the connector to use either `ASCII` or one of the other supported values. To determine whether a specific connector is written in Java or C++, see the installing and configuring chapter of its adapter guide.

Important: By default only a subset of supported character encodings display in the drop list. To add other supported values to the drop list, you must manually modify the \Data\Std\stdConnProps.xml file in the product directory. For more information, see the appendix on Connector Configurator.

Attention: Do not run a non-internationalized connector against InterChange Server version 4.1.1 if you cannot guarantee that only ISO Latin-1 data will be processed.

The default value is ascii.

ContainerManagedEvents

Setting this property to JMS enables 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 a single JMS transaction. This property can also be set to no value.

Notes:

1. When ContainerManagedEvents is set to JMS, you must also configure the following properties to enable guaranteed event delivery: PollQuantity = 1 to 500, SourceQueue = SOURCEQUEUE. In addition, you must configure a data handler with the MimeType, DHClass, and DataHandlerConfigMOName (optional) properties.
2. When ContainerManagedEvents is set to JMS, the connector does *not* call its pollForEvents() method, thereby disabling that method's functionality.

The default value is JMS.

DeliveryQueue

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

The default value is CONNECTORNAME/DELIVERYQUEUE.

DeliveryTransport

Specifies the transport mechanism for the delivery of events. The property defaults to the value JMS, indicating that the Java Messaging Service (JMS) is used for communication with WebSphere MQ Integrator. This property *must* be set to JMS when WebSphere MQ Integrator Broker is the integration broker. Otherwise, the connector cannot start.

DuplicateEventElimination

Setting this property to true enables a JMS-enabled connector with a non-JMS event store to ensure that duplicate events are not delivered to the delivery queue. To make use of this feature, during connector development a unique event identifier must be set as the business object's ObjectEventId attribute in the application specific code.

This property can also be set to false.

Note: When DuplicateEventElimination is set to true, you must also configure the MonitorQueue property to enable guaranteed event delivery.

FaultQueue

If the connector experiences an error while processing a message then the connector moves the message to the queue specified in this property, along with a status indicator and a description of the problem.

The default value is `CONNECTORNAME/FAULTQUEUE`.

jms.FactoryClassName

Specifies the class name to instantiate for a JMS provider.

The default is `CxCommon.Messaging.jms.IBMMQSeriesFactory`.

jms.MessageBrokerName

Specifies the broker name to use for the JMS provider.

The default is `crossworlds.queue.manager`.

jms.NumConcurrentRequests

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 block and wait for another request to complete before proceeding.

The default value is 10.

jms.Password

Specifies the password for the JMS provider. A value for this property is optional.

There is no default.

jms.UserName

Specifies the user name for the JMS provider. A value for this property is optional.

There is no default.

Locale

Specifies the language code, country or territory, and, optionally, the associated character code set. The value of this property determines such cultural conventions as collation and sort order of data, date and time formats, and the symbols used in monetary specifications. For more information, see the overview chapter of the connector guide for an internationalized connector.

A locale name has the following format:

`ll_TT.codeset`

where:

`ll`	a two-character language code (usually in lower case)
`TT`	a two-letter country or territory code (usually in upper case)
`codeset`	the name of the associated character code set; this portion of the name is often optional.

The default is `en_US`.

Important: By default only a subset of supported locales display in the drop list. To add other supported values to the drop list, you must manually modify the `\Data\Std\stdConnProps.xml` file in the product directory.

Attention:

- WebSphere MQ Integrator supports only one locale at a time. Ensure that every component of the installation (for example, all adapters, applications, and the integration broker itself) is set to the same locale.
- If the connector has not been internationalized, the only valid value for this property is en_US. Do not run a non-internationalized C++ connector against InterChange Server version 4.1.1 if you cannot guarantee that only ISO Latin-1 data will be processed. To determine whether a specific connector has been internationalized, see the installing and configuring chapter of its connector guide.

MessageFileName

The name of the connector message file. The standard location for the message file is `\connectors\messages`. Specify the message filename in an absolute path if the message file is not located in the standard location. This property defaults to the value `InterchangeSystem.txt` for new connector definitions and should be changed to the name of the message file for the specific connector.

PollEndTime

Time to stop polling the event queue. The format is *`HH:MM`*, where *`HH`* represents 0-23 hours, and *`MM`* represents 0-59 seconds.

You must provide a valid value for this property. The default value is `HH:MM`, but must be changed.

PollFrequency

The amount of time between polling actions. Set the PollFrequency to one of the following values:

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

The default is `10000`.

Important: Some connectors have restrictions on the use of this property. To determine whether a specific connector does, see the installing and configuring chapter of its adapter guide.

PollStartTime

The time to start polling the event queue. The format is *`HH:MM`*, where *`HH`* represents 0-23 hours, and *`MM`* represents 0-59 seconds.

You must provide a valid value for this property. The default value is `HH:MM`, but must be changed.

RepositoryDirectory

The path and name of the directory from which the connector reads the XML schema documents that store the meta-data of business object definitions.

The default value is `C:\crossworlds\repository`. You must change this to the directory path that you are using for the \repository directory for your connector. Typically that path is established when you install the adapter product; for example, `C:\WebSphereAdapters\repository`. The value must be a directory path. Do not use <REMOTE> as the RepositoryDirectory value for a connector that is not using ICS as the broker.

RequestQueue

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

The default value is `CONNECTORNAME/REQUESTQUEUE`.

ResponseQueue

Designates the JMS response queue, which delivers a response message from the connector framework to the integration broker.

RestartRetryCount

Specifies the number of times the connector attempts to restart itself. The default value is 3, indicating that the connector tries to restart 3 times. For instance, if a connector is unable to log in to an application it fails to start, but with this property set to the value 3 the connector tries a total of three times to start. When used in conjunction with the "RestartRetryInterval" property, this behavior enables a connector to make several attempts at communicating with an application that might not reliably have a connection available all the time.

RestartRetryInterval

Specifies the interval in minutes at which the connector attempts to restart itself. The default value is 1, indicating that the connector waits 1 minute in between its restart attempts.

SourceQueue

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 39.

The default is `CONNECTORNAME/SOURCEQUEUE`.

SynchronousRequestQueue

Delivers request messages that require a synchronous response from the connector framework to WebSphere MQ Integrator Broker. This queue is necessary only if the connector uses synchronous execution. With synchronous execution, the connector framework sends a message to the SynchronousRequestQueue and waits for a response back from WebSphere MQ Integrator Broker on the SynchronousResponseQueue. The response message sent to the connector bears a correlation ID that matches the ID of the original message.

SynchronousResponseQueue

Delivers response messages sent in reply to a synchronous request from WebSphere MQ Integrator Broker to the connector framework. This queue is necessary only if the connector uses synchronous execution.

SynchronousTimeout

Specifies the time in minutes that the connector waits for a response to a synchronous request. If the response is not received within the specified time then the connector moves the original synchronous request message into the fault queue along with an error message.

The default value is 0.

WireFormat

The data format for messages exchanged by the connector. The default value `CwXML` is the only valid value, and directs the connector to compose the messages in XML.

Appendix B. Connector Configurator

Before you can use a connector, you must create a connector configuration file that sets the properties for the connector, designates the business objects and any meta-objects that it supports, and sets logging and tracing values that the connector will use at runtime. The configuration file may also contain properties for the use of messaging and data handlers required by your connector.

Use Connector Configurator to create and modify the configuration file for your connector. If a configuration file has previously been created for your connector, you can use Connector Configurator to open the file and modify its settings. If no configuration file has yet been created for your connector, you can use Connector Configurator to both create the file and set its properties.

When you complete a connector configuration file, the file is saved as an XML document. You will save the XML document either as a project in System Manager (if ICS is your broker) or as a file with a *.cfg extension in a directory folder (if WebSphere MQ Integrator Broker is your broker, or if you are using the file as a local configuration file for ICS).

This appendix describes how to use Connector Configurator to:

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

Connector Configurator runs only in a Windows environment. If you are running the connector itself in a UNIX environment, use Connector Configurator in the Windows system in the network to modify the configuration file. Then copy the file to your UNIX environment.

Note: Some properties in the connector configuration file use directory paths, and these paths default to the Windows convention for directory paths. If you use the connector configuration file in a UNIX environment, revise any directory path constructs in the configuration properties to match the UNIX convention for directory paths.

Using Connector Configurator in an internationalized environment

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

Connector Configurator 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>
```

Starting Connector Configurator

Connector Configurator can be started and run in either of two modes:

- Launched from System Manager
- Independent of System Manager (stand-alone mode)

Running Configurator from System Manager

When you run Connector Configurator in conjunction with System Manager, you can

- Save connector configuration files (XML documents with the extension *.cfg) to a directory that you specify, and
- Save connector configuration files as components of System Manager projects. If you are using ICS as your broker, this is a mandatory step before you deploy your configuration into the ICS.

Note: When you save a configuration file as a component of a System Manager project, the file is stored in the designated project as an XML document file with the extension *.con. It is not advisable to open the *.con file and edit it directly; instead, make any changes by opening the component in System Manager.

To run Connector Configurator with System Manager, do any of the following:

- In System Manager, right-click on the Connector folder of the Integration Components Library (to create a new configuration), or right-click on a connector configuration component within the Connector folder (to edit an existing configuration), or
- From the System Manager menu, choose Tools>Connector Configurator, or
- With System Manager already running, from Start>Programs choose IBM WebSphere InterChange Server>IBM WebSphere Business Integration Toolset>Development>Connector Configurator.

For details about using projects in System Manager and deploying to InterChange Server, see the *Implementation Guide for WebSphere InterChange Server*.

Running Configurator independently of System Manager

When you run Connector Configurator without connecting to System Manager, you can save a connector configuration file (an XML document with the extension *.cfg) to a directory that you specify, but you cannot save or open a System Manager project.

When you are creating a connector for use with a broker other than ICS, you do not need to connect to System Manager at any point in order to use the file. If you are creating a connector configuration for use with ICS as the broker, you may still find it useful on occasion to run Connector Configurator independently, and then connect to System Manager when you are ready to save the configuration file as a component of a System Manager project.

Choosing your broker

Connector Configurator can be used to configure connectors either for use with ICS as the broker, or with WebSphere MQ Integrator Broker (also referred to as WMQI) as the broker.

Before you begin to configure the connector, you must choose the mode of Connector Configurator that is appropriate for your broker. The mode that you choose determines the properties that Connector Configurator will include in the configuration file. Choosing a broker is a mandatory step when you begin the process of creating a completely new configuration file. After a configuration file has been created, you can optionally change the designated broker mode, using a standard configuration property. (This makes it possible to use an existing configuration file as a starting point for creating a configuration file that will be used with a different broker. However, be aware that revising a configuration file for use with a different broker typically involves changing other configuration properties as well, and not just the broker mode property.)

To choose a broker when you create a new configuration file (mandatory):

- In the Connector Configurator home menu, choose File>New>Connector Configuration. The New Connector Dialog displays.
- In the Integration Broker field, choose either WMQI connectivity (for WebSphere Integrator Broker) or ICS connectivity, according to the broker you are using.
- Complete the remaining fields of the New Connector dialog, as described later in this chapter for your specific broker.

To change your broker selection within an existing configuration file (optional):

- Open the existing configuration file in Connector Configurator.
- Select the Standard Properties tab.
- In the Broker Type field of the Standard Properties tab, choose the value that is appropriate for your broker. If you change the existing value, the available tabs and field selections of the properties screen will immediately refresh, to show only those tabs and fields that appropriate for a configuration using the broker you have selected.

After you have chosen your broker type, you can complete the remaining Connector Configurator tasks for configuring your connector. When you save the connector configuration file, Connector Configurator will save it in the broker mode that you have already selected. The title bar of Connector Configurator always displays the broker mode (such as ICS or WMQI) that Connector Configurator is currently using.

After you have completed the configuration file and set its properties, it will need to be deployed to the appropriate location for your connector.

- If you are using ICS as your broker, save the configuration in a System Manager project, and use System Manager to load the file into InterChange Server.
- If you are using WebSphere MQ Integrator Broker as your broker, manually copy the configuration file to its appropriate location, which must match exactly the configuration file location specified in the startup file for your connector.

For further information about deployment, see the *Implementation Guide for WebSphere InterChange Server* (for using the connector with ICS as the broker), or the *Implementation Guide for WebSphere MQ Integrator Broker* (for using the connector with MQ Integrator as the broker).

Using a connector-specific property template

To create a configuration file for your connector, you can start with a previously created connector configuration file (*.cfg), a connector definition file (*.txt) or a repository file (*.in or *.out), if any of these already exists for your connector. For instructions on using such existing files, see "Using an existing file" on page 62.

If none of those files exist, or if they are too dissimilar to the configuration requirements of your connector, you can start instead by creating a template for the connector-specific properties of your connector. You'll create properties in the template, define general characteristics and values for those properties, and specify any dependencies between the properties. Then you'll save the template and use it as the base for creating a new connector configuration file.

Creating a template of connector-specific properties

To create a template:

1. Choose File>New>Connector-Specific Property Template.
2. The Connector-Specific Property Template dialog appears, with the following fields
   - Name

     Enter a unique name that identifies the connector, or type of connector, for which this template will be used. You will see this name again when you open the dialog for creating a new configuration file from a template.
   - Find Template, and Template Name

     The names of all currently available templates are displayed in the Template Name display. Look for an existing template that would make a good starting point for your new connector template (such as a template whose property definitions are a subset of the properties used by your connector).

     To see the connector-specific property definitions that are contained in any template, select that template's name in the Template Name display. A list of the property definitions contained in that template will appear in the Template Preview display.

     If you do not see any template that displays the connector-specific properties that are used by your connector, you will need to create one. Connector Configurator provides a template named None, containing no property definitions, as a default choice.

     Choose a template from the Template Name display, enter that template name in the Find Name field (or highlight your choice in Template Name), and choose Next.

Specifying general characteristics

The Properties - Connector-Specific Property Template dialog appears. The dialog has tabs for General characteristics of the defined properties and for Value restrictions. The General display has the following fields:

- Edit properties

  Use the buttons provided (or right-click within the Edit properties display) to add a new property to the template, to edit or delete an existing property, or to add a child property to an existing property.

  A child property is a property that is an attribute of another property--the ″parent″ property. The parent property can obtain values, or child properties, or both. These property relationships are commonly referred to as ″hierarchical″ properties. Later, when you create a configuration file from these properties, Connector Configurator will identify hierarchical property sets with a plus sign in a box at the left of any parent property.
- Property type

  Choose one of these property types: Boolean, String, Integer, or Time.
- Flags

  You can set Standard Flags (IsRequired, IsDepracated, IsOverridden) or Custom Flags (for Boolean operators) to apply to this property

After you have made selections for the general characteristics of the property, choose 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. To do so:

1. Choose 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, make any necessary changes. Note that the changes will not be accepted until and unless you also open the Property Value dialog for the property, described in the next step.
4. Right-click the box in the left-hand corner of the Value display panel. A Property Value dialog displays. Depending on the type of the property, the dialog allows you to enter either a value, or both a value and range. Enter the appropriate value or range, and click OK.
5. The Value panel refreshes to display any changes you made in Max Length and Max Multiple Values, and it displays a table with three columns:

   The Value column shows the value that you entered in the Property Value dialog, 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.

   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 choose EditValue.

Setting dependencies

After you have finished making changes in both the General and the Value tabs, choose Next. The Dependencies dialog 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. To designate a property as being dependent and 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, choose 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 stores the information you have entered as an XML document, under \data\app in the\bin directory where you have installed Connector Configurator.

Creating a configuration file from a connector-specific template

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

1. Choose File > New>Connector Configuration.
2. The New Connector dialog appears, with the following fields:
   - Name

     Enter the name of the connector. Names are case-sensitive. The name you enter must be unique, must end with the word “connector”, and must be consistent with the file name for a connector that is installed on the system; for example, enter `PeopleSoftConnector` if the connector file name is `PeopleSoft.jar`.

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

     Choose ICS or choose WMQI (for WebSphere MQ Integrator Broker) connectivity.
   - Select Connector-Specific Property Template

     Type the name of the template that has been designed for your connector. The names of all available templates are displayed 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.

After you have chosen the template you want to use, choose OK.

3. A configuration screen will display for the connector that you are configuring. The title bar of the configuration screen shows the broker that you are using and the name that you have given to the connector. You can fill in all the field values to complete the definition now, or you can save the file and complete the fields later.

   When you are using the configuration screen, you can, if you wish, add additional connector-specific properties, as described under "Setting application-configuration properties (ICS)" on page 64. Any such additions become part of the configuration file that you are creating, but do not affect the template that you used in creating the file.
4. To save the file, choose File > Save > to File or File > Save > Save to the project. To save to a project, you must be using ICS as the broker, and System Manager must be running. If you save as a file, the Save File Connector dialog displays. 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 choose Save. The status display in the message panel of Connector Configurator 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.
5. To complete the connector definition, enter values in the fields for each of the tabs of the Connector Configurator window, as described for your broker later in this chapter.

Using Connector Configurator with ICS as the broker

To use Connector Configurator to configure a connector that will be used with ICS, first select ICS as the broker mode in which you are running Connector Configurator, as described under"Choosing your broker" on page 57.

In a typical ICS implementation, the configuration file that you create with Connector Configurator is not put into use until after you have deployed it to the ICS server. You will perform that deployment (described in the *Implementation Guide for WebSphere InterChange Server*) after you have finished using Connector Configurator to complete the connector configuration file.

Completing a configuration file

This topic assumes that you already have a starting point for your connector configuration, either from an existing file (a connector definitions file, a repository file, or a *.cfg file) or from an existing project in System Manager. If you do not, see "Creating a template of connector-specific properties" on page 58.

When you open a configuration file or a connector from a project, the Connector Configurator window displays the configuration screen, with the attributes and values that Connector Configurator finds in the connector definition file.

The title of the configuration screen displays the type of the broker and the name of the connector as specified in the file. Make sure the title indicates the appropriate type for your broker--either ICS or WebSphere MQ Integrator Broker (for WMQI). If it does 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 `WMQI` or `ICS`.
2. The Standard Properties tab refreshes to display properties associated with the selected broker. When you save the file, you retain this broker selection. You can save the file now or proceed to complete the remaining configuration fields, as described in "Setting the configuration file properties (WebSphere MQ Integrator Broker)" on page 68.
3. When you have finished making entries in the configuration fields, choose *File>Save>To Project* or *File>Save>To File*.

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

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

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

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, revise the configuration, and then save the file as a configuration file (`*.cfg` file).

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

1. In Connector Configurator, choose File > Open > From File.
2. In the Open File Connector dialog, choose 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 display 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 choose Open.

Using an existing System Manager project

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.
3. Choose File > Open > From Project.

Setting the configuration file properties (ICS)

The topics in this section apply if you are using InterChange Server as the integration broker. If you are using WebSphere MQ Integrator Broker as the integration broker, see “Setting the configuration file properties (WebSphere MQ Integrator Broker)” on page 68. When you create and name a new connector configuration file, or when you open an existing connector configuration file, Connector Configurator displays a configuration screen with tabs for the categories of required configuration values.

Connector Configurator requires values for properties in all of these categories:

1. Standard Properties
2. Connector-Specific Properties
3. Supported Business Objects
4. Associated Maps
5. Resources
6. Trace/Log File values
7. Messaging (where applicable)
8. Data handlers (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.

Important: Connector Configurator 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-configuration (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 chapter of each adapter guide describes 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 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 informational and not configurable. This field specifies the action required to activate a property whose value has changed.

Setting standard connector properties (ICS)

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 choose from the drop-down menu if one appears.
3. After entering all values for the standard properties, you can do one of the following:
   - To discard the changes, preserve the original values, and exit Connector Configurator, choose File > Exit (or close the window), and choose No when prompted to save changes.
   - To enter values for other categories in Connector Configurator, choose the tab for the category. The values you enter for Standard Properties (or 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 of the categories as a whole.
   - To save the revised values, choose File > Exit (or close the window) and choose Yes when prompted to save changes. Alternatively, choose Save > To File from either the File menu or the toolbar.

Setting application-configuration properties (ICS)

For application-specific configuration properties, you can add or change property names, configure values, delete a property, and encrypt a property:

1. Right click in the top-left portion of the grid. A pop-up menu bar will appear. Select Add to add a property or Add Child to add a child property for a property.
2. Enter a value for the property or child property.
3. To encrypt a property, click the Encrypt box.
4. Choose to save or discard changes, as described for Setting Standard Connector Properties.

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 (ICS)

Application-specific properties can be encrypted by clicking the Encrypt check box in the Edit Property window. To decrypt a value, click to clear the Encrypt check box, enter the correct value in the Verification dialog box, and choose OK. If the entered value is correct, the value is decrypted and displays. The adapter 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 click the Encrypt check box, all values of the property will encrypted. To decrypt multiple values of a property, click to clear the Encrypt check box of the first value of the property, and then enter the correct value of the first value in the Verification dialog box. If the input value is a match, all multiple values will decrypt.

Update method (ICS)

When WebSphere MQ Integrator Broker is the integration broker, connector properties are static. The Update Method is always Connector Restart. In other words, for changes to take effect, you must restart the connector after saving the revised connector configuration file.

Specifying supported business object definitions (ICS)

This topic assumes that you have already created or acquired the intended business objects, created or acquired maps for them, and have saved both the business object definitions and map definitions into System Manager projects.

Before you can make use of a connector (and before you can bind the connector with a collaboration's ports), you must make selections under the Supported Business Objects tab to specify the business objects that the connector will use. You must specify both generic business objects and corresponding 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*.

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

Business object name

These instructions assume that you started Business Object Designer with System Manager running.

To designate that a business object definition is supported by the connector:

1. Click in an empty field of the Business Object Name list. A drop-down 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 window, choose Save to Project. The revised connector definition, including designated support for the added business object definition, is saved to the 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 window, choose Delete Row. The business object is removed from the list display.
3. From the File menu, choose Save to Project.

Note that deleting a business object from the supported list does not affect the code of the connector, nor does it remove the business object definition itself from System Manager. It does, however, change the connector definition and make the deleted business object unavailable for use in this implementation of this connector.

Agent support

Indicating Agent Support for a business object means that 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, put a check in the Agent Support box. Note that the Connector Configurator 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, because most application APIs do not support the Stringent level.

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

Note: For this release, maximum transaction level of a connector is always Best Effort.

Associated maps (ICS)

Each connector supports a list of business object definitions and their associated maps that are currently active in InterChange Server. This list displays 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 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

  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 InterChange Server 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 not a 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 window, choose Save to Project.
  4. Deploy the project to InterChange Server.
  5. Reboot the InterChange Server for the changes to take effect.

Resources (ICS)

The Resource tab allows you to set a value that determines whether and to what extent the connector agent will handle multiple processes concurrently using connector agent parallelism. Not all connectors support this feature, and use of this feature is not usually advised for connector agents that were designed in Java to be multi-threaded, since it is usually more efficient to use multiple threads than multiple processes.

Setting trace/log file values (ICS)

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

To change the logging and tracing values:

1. Choose 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.
   - To File: Writes logging or tracing messages to a file that you specify. To specify the file, choose the directory button (ellipsis), navigate to the preferred location, provide a file name, and choose 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.

Configuring messaging

The messaging properties are available only if you have set MQ as the value of the DeliveryTransport standard property and ICS as the broker type. These properties affect how your connector will use queues.

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. See the descriptions under ContainerManagedEvents in Appendix A, Standard Properties, for values to use for these properties. For additional details, see the *Connector Development Guide for C++*or the *Connector Development Guide for Java.*

Setting the configuration file properties (WebSphere MQ Integrator Broker)

The topics in this section apply if you are using WebSphere MQ Integrator (also referred to as WMQI) as the integration broker.

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

Connector Configurator requires values for properties in all of these categories:

1. Standard Properties
2. Connector-Specific Properties
3. Supported Business Objects
4. Trace/Log File values
5. Data Handlers (where applicable)

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 information about the values to use in the Data Handlers category, see the *Connector Development Guide for C++* or the *Connector Development Guide for Java*.

Important: Connector Configurator 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-configuration (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 chapter of each adapter guide describes 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 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 informational and not configurable. This field specifies the action required to activate a property whose value has changed.

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 choose from the drop-down menu if one appears.
3. After entering all values for the standard properties, you can do one of the following:
   - To discard the changes, preserve the original values, and exit Connector Configurator, choose File > Exit (or close the window), and choose No when prompted to save changes.
   - To enter values for other categories in Connector Configurator, choose the tab for the category. The values you enter for Standard Properties (or 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 of the categories as a whole.
   - To save the revised values, choose File > Exit (or close the window) and choose Yes when prompted to save changes. Alternatively, choose Save > To File from either the File menu or the toolbar.

Setting application-configuration properties

For application-specific configuration properties, you can add or change property names, configure values, delete a property, and encrypt a property:

1. Click in the field whose name or value you want to set.

2. Enter a name or value.
3. To encrypt a property, click the Encrypt box.
4. Choose to save or discard changes, as described for Setting Standard Connector Properties.

The Update Method displayed for each property indicates whether a component or agent restart is necessary to activatechanged 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 clicking the Encrypt check box in the Edit Property window. To decrypt a value, click to clear the Encrypt check box, enter the correct value in the Verification dialog box, and choose OK. If the entered value is correct, the value is decrypted and displays. The adapter guide for each connector contains a list and description of each property and its default value.

Update method

When WebSphere MQ Integrator Broker is the integration broker, connector properties are static. The Update Method is always Agent Restart. In other words, for changes to take effect, you must restart the connector agent after saving the revised connector configuration file.

Specifying supported business object definitions

The procedures in this section assume that you have already created:

- Business object definitions
- MQ message set files (`*.set` files)

The `*.set` files contain message set IDs that Connector Configurator requires for designating the connector's supported business objects. See the *Implementation Guide for WebSphere MQ Integrator Broker* for information about creating the MQ message set files.

Each time that you add business object definitions to the system, you must use Connector Configurator to designate those business objects as supported by the connector.

Important: If the connector requires meta-objects, you must create message set files for each of them and load them into Connector Configurator, in the same manner as for business objects.

To specify supported business objects:

1. Select the Supported Business Objects tab and choose Load. The Open Message Set ID File(s) dialog displays.
2. Navigate to the directory where you have placed the message set file for the connector and select the appropriate message set file (*.set) or files.
3. Choose Open. The Business Object Name field displays the business object names contained in the *.set file; the numeric message set ID for each business object is listed in its corresponding Message Set ID field. Do not change the message set IDs. These names and numeric IDs are saved when you save the configuration file.

4. When you add business objects to the configuration, you must load their message set files. If you attempt to load a message set that contains a business object name that already exists in the configuration, or if you attempt to load a message set file that contains a duplicate business object name, Connector Configurator detects the duplicate and displays the Load Results dialog. The dialog shows the business object name or names for which there are duplicates. For each duplicate name shown, click in the Message Set ID field, and choose the Message Set ID that you wish to use.

Setting trace/log file values

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

To change the logging and tracing values:

1. Choose 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.
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   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.

Configuring 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. See the descriptions under ContainerManagedEvents in Appendix A, Standard Properties, for values to use for these properties. For additional details, see the *Connector Development Guide for C++* or the *Connector Development Guide for Java*

Using standard and connector-specific properties with Connector Configurator

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 within your configuration file; Connector Configurator already has those definitions, and it incorporates them into your configuration file as soon as you create the file. For standard properties, your only task is to use Connector Configurator to set the values of the properties.

For connector-specific properties, however, you will need to both define the properties and set their values. Connector Configurator provides the interface for performing both of these tasks.

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.

Appendix C. Connector feature list

This appendix details the features supported by the i2 connector. For descriptions of these features, see “Appendix A: Connector feature checklist” in *IBM WebSphere Business Integration Adapters Connector Development Guide*.

Event notification features

The following table details the event notification features supported by the connector.

Category	Feature	Support	Notes
Connector properties	Event distribution	No	
	PollQuantity	Full	
Event table	Event status values	N/A	
	Object key	N/A	
	Object name	N/A	
	Priority	N/A	The connector listens to each operation output PollQuantity number of times.
Misc.	Archiving	N/A	The events are not archived, and the events are lost once they reach the connector for processing.
	CDK method gotApplEvent	Full	
	Delta event notification	Full	An operation needs to be created which handles the same as the connection handles this operation.
	Event sequence	N/A	
	Future event processing	No	
	In-Progress event recovery	N/A	
	Physical delete event	No	The incoming business object is converted to XML, as is, and sent across for any operation.
	RetrieveAll	No	No retrieval is done. The incoming record is converted to XML and then to an IBM business object.
	Smart filtering	Full	
	Verb stability	Full	

Service call request handling features

The following table details the service call request handling features supported by the connector.

Category	Feature	Support	Notes
Create	Create verb	Full	However, there is no real Create verb but an operation that creates a record in i2.
Delete	Delete verb	Full	This is again operation specific.

Category	Feature	Support	Notes
	Logical delete	N/A	
Exist	Exist verb	No	
Misc	Attribute names	Partial	MO_Instance is the standard used to represent the metaobject containing the instance ID in any wrapper business object.
	Business object names	Full	
Retrieve	Ignore missing child object	N/A	
RetrieveByContent	Ignore missing child object	N/A	
	Multiple results	N/A	There is only one output type per operation.
	RetrieveByContent verb	N/A	
Update	After-image support	Full	
	Delta support	No	
	KeepRelations	N/A	
Verbs	Retrieve verb	N/A	This is decided by the operation for retrieval.
	Subverb support	N/A	The verbs are operations that are valid for the entire wrapper business object. The children are essentially the input and output types for the operation, and they have no existence without the operation.
	Verb stability	Full	

General features

The following table details the general features supported by the connector.

Category	Feature	Support	Notes
Business object attributes	Foreign key	No	
	Foreign key attribute property	N/A	No validations are done by the connector.
	Key	No	The connector does not validate the XML messages.
	Max Length	N/A	
	Metadata-driven design	Full	
	Required	Full	If set to true on the child attribute, the child is expected to have a representation in the parent business object.
Connection lost	Connection lost on poll	Partial	The connector returns APPRESPONSETIMEOUT only when it fails to register all the operations. Otherwise, the polling continues after a fatal message is logged for e-mail triggering, giving information on the failed poll call.
	Connection lost on request processing	No	A fatal error is logged to trigger e-mail notification, and the connector returns a FAIL.
	Connection lost while idle	No	

Category	Feature	Support	Notes
Connector properties	ApplicationPassword	No	
	ApplicationUserName	No	
	UseDefaults	No	There is no validation of the business objects by the connector. i2 validates the XML sent from the connector as input. No call to initAndValidateAttributes.
Message tracing	General messaging	Full	
	generateMsg()	No	
	Trace level 0	Full	
	Trace level 1	Full	
	Trace level 2	Full	
	Trace level 3	N/A	
	Trace level 4	Full	
	Trace level 5	Full	
Misc.	CDK method LogMsg	Full	WBIA API methods generateAndTrace and generateAndLogMsgs are used.
	Java Package Names	Full	
	Logging messages	Full	
	NT service compliance	Full	
	Transaction support	N/A	There is no transaction support in i2.
Special value	CxBlank processing	Full	Empty double quotation marks ("") in an XML document are used as the PCDATA equivalent of CxBlank.
	CxIgnore processing	Full	No XML is generated for CxIgnore attributes.

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