

WebSphere Business Integration Server  
Express and Express Plus



# Adapter for PeopleSoft User Guide

*Version 4.3*



WebSphere Business Integration Server  
Express and Express Plus



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*Version 4.3*

**Note!**

Before using this information and the product it supports, read the information in "Notices" on page 103.

**14May2004**

This edition of this document applies to IBM WebSphere Business Integration Server Express, version 4.3, IBM WebSphere Business Integration Server Express Plus, version 4.3, and to all subsequent releases and modifications until otherwise indicated in new editions.

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# Contents

|  |            |
|--|------------|
| <b>About this document</b> . . . . .   | <b>v</b>   |
| Audience . . . . .   | v          |
| Related documents . . . . .  | v          |
| Typographic conventions . . . . .  | v          |
| Naming conventions . . . . .   | vi         |
| <br>   |            |
| <b>New in this release</b> . . . . .   | <b>vii</b> |
| <br>   |            |
| <b>Chapter 1. Overview of the adapter</b> . . . . .                                    | <b>1</b>   |
| Connector components . . . . .   | 1          |
| How the connector works . . . . .  | 3          |
| <br>   |            |
| <b>Chapter 2. Installing and configuring the connector</b> . . . . .                   | <b>11</b>  |
| Compatibility . . . . .  | 11         |
| Prerequisites . . . . .  | 11         |
| Installing the adapter and related files . . . . .                                     | 13         |
| Installed file structures . . . . .  | 13         |
| Enabling the application for the connector . . . . .                                   | 14         |
| Configuring the connector . . . . .  | 20         |
| Creating multiple connector instances . . . . .  | 23         |
| Starting the connector . . . . .   | 24         |
| Stopping the connector . . . . .   | 25         |
| <br>   |            |
| <b>Chapter 3. Understanding business objects for the connector</b> . . . . .           | <b>27</b>  |
| Business object and attribute naming conventions . . . . .                             | 27         |
| Business object structure . . . . .  | 28         |
| Creating a business object . . . . .   | 32         |
| Business object verb processing . . . . .  | 35         |
| Business object attribute properties . . . . .   | 43         |
| Business object application-specific information . . . . .                             | 45         |
| <br>   |            |
| <b>Chapter 4. Generating business object definitions using PeopleSoftODA</b> . . . . . | <b>51</b>  |
| Installation and usage . . . . .   | 51         |
| Using PeopleSoftODA in Business Object Designer Express . . . . .                      | 54         |
| Contents of the generated definition . . . . .   | 61         |
| Sample business object definition file . . . . .                                       | 64         |
| BO_PsftEmployee business object . . . . .  | 65         |
| SavePostChange business object . . . . .   | 69         |
| Modifying information in the business object definition . . . . .                      | 69         |
| <br>   |            |
| <b>Chapter 5. Troubleshooting and error handling</b> . . . . .                         | <b>71</b>  |
| Startup problems . . . . .   | 71         |
| Processing Problems . . . . .  | 71         |
| Mapping . . . . .  | 72         |
| Error Handling and Logging . . . . .   | 72         |
| Loss of Connection to the Application . . . . .  | 73         |
| <br>   |            |
| <b>Appendix A. Standard configuration properties for connectors</b> . . . . .          | <b>75</b>  |
| Configuring standard connector properties . . . . .                                    | 75         |
| Summary of standard properties . . . . .   | 76         |
| Standard configuration properties . . . . .  | 79         |
| <br>   |            |
| <b>Appendix B. Connector Configurator Express</b> . . . . .                            | <b>89</b>  |

|  |            |
|--|------------|
| Overview of Connector Configurator Express . . . . .                       | 89         |
| Starting Connector Configurator Express . . . . .                          | 90         |
| Running Configurator Express from System Manager . . . . .                 | 90         |
| Creating a connector-specific property template . . . . .                  | 90         |
| Creating a new configuration file . . . . .                                | 93         |
| Using an existing file . . . . .   | 94         |
| Completing a configuration file. . . . .                                   | 95         |
| Setting the configuration file properties . . . . .                        | 95         |
| Saving your configuration file . . . . .                                   | 100        |
| Completing the configuration . . . . .                                     | 100        |
| Using Connector Configurator Express in a globalized environment . . . . . | 100        |
| <b>Notices . . . . .</b>   | <b>103</b> |
| Programming interface information . . . . .                                | 104        |
| Trademarks and service marks . . . . .                                     | 104        |

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## About this document

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

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## Audience

This document is for IBM consultants and customers. You should be familiar with PeopleSoft and WebSphere Business Integration Server Express Plus adapter development.

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## Related documents

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

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

**Note:** Important information about this product may be available in Technical Support Technotes and Flashes issued after this document was published. These can be found on the WebSphere Business Integration Support Web site, <http://www.ibm.com/software/integration/websphere/support/>. Select the component area of interest and browse the Technotes and Flashes sections.

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## Typographic conventions

This document uses the following conventions:

---

|                           |  |
|---------------------------|--|
| <code>courier font</code> | Indicates a literal value, such as a command name, file name, information that you type, or information that the system prints on the screen.                                  |
| <b>bold</b>               | Indicates a new term the first time that it appears.   |
| <i>italic, italic</i>     | Indicates a variable name or a cross-reference.  |
| <i>blue text</i>          | 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, square brackets surround an optional parameter.  |
| ...                       | In a syntax line, ellipses indicate a repetition of the previous parameter. For example, <code>option[,...]</code> means that you can enter multiple, comma-separated options. |

---

---

< >

Angle brackets surround individual elements of a name to distinguish them from each other, as in  
<server\_name><connector\_name>tmp.log.

---

## Naming conventions

In this document the following naming conventions are used:

- The connector component of the Adapter for PeopleSoft is referred to simply as the connector.
- The “connector” refers to the combination of the Vision Connector Framework and a connector module.



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## **New in this release**

This is the first release of this guide.



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## Chapter 1. Overview of the adapter

This chapter describes the adapter for the PeopleSoft component of IBM WebSphere Business Integration Server Express Plus. The connector enables the integration broker, InterChange Server Express, to exchange business objects with PeopleSoft version 8 applications that use PeopleTools Version 8.18 or later (8.40, 8.41, 8.42, 8.43).

Connectors consist of an application-specific component and the connector framework. The application-specific component contains code tailored to a particular application. The connector framework, whose code is common to all connectors, acts as an intermediary between InterChange Server Express and the application-specific component. The connector framework provides the following services between InterChange Server Express and the application-specific component:

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

This document contains information about the connector framework and the application-specific component, which it refers to as the connector. It contains the following sections:

- “Connector components”
- “How the connector works” on page 3

For more information about the relationship of InterChange Server Express to the connector, see the *System Administration Guide*.

---

### Connector components

The Adapter for PeopleSoft contains the connector and at least one PeopleSoft Business Component and Component Interface. Figure 1 shows the connector and its relationship to the PeopleSoft application. The integration broker is InterChange Server Express.

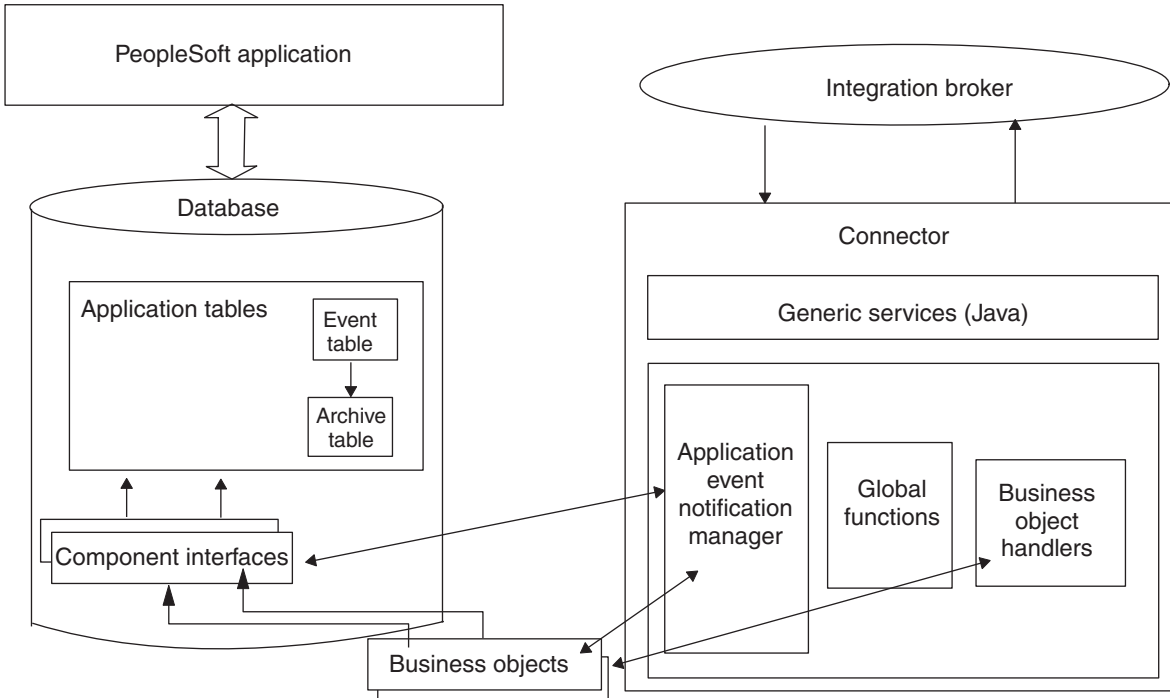


Figure 1. Connector architecture

## Connector for PeopleSoft 8

The connector, which is written in Java, complies with IBM business integration system standards for adapters. It establishes a PeopleSoft session object, and uses the standard connector methods to process components.

## Business components, component interfaces, and records

The connector requires a PeopleSoft Business Component and Component Interface for each hierarchical business object that it processes.

The adapter does not include PeopleSoft-specific business objects or the Component and Component Interface that must be associated with each business object. These objects must be created by the person who implements the connector. However, to assist in business-object development, the adapter includes a sample PeopleSoft-specific business object. This sample is located in the `connectors\PeopleSoft\samples` directory within the product directory. For information on creating a Component Interface and its corresponding business object, see “Component interface and business object relationship” on page 28. For information on creating the required classes and methods, see “Generating APIs” on page 33.

**Note:** In this document backslashes (\) are used as the convention for directory paths. All file pathnames are relative to the directory where the product is installed on your system.

## Event-processing components

To enable event notification, the adapter provides the `CW_EVENT_vX` Project, which includes:

- Fields  
The fields store event information.
- Records  
The records include an event table (CW\_EVENT\_TBL), an archive table (CW\_ARCHIVE\_TBL), and a function library (FUNCLIB\_CW). The function library contains the connector-specific event-notification functions that are called from Components and Records during SavePostChg() PeopleCode events. For more information, see “Processing application events” on page 6, “cw\_publish\_events() Function” on page 17, and “Event and archive tables” on page 18.
- Component  
The CW\_EVENT\_BC Component enables events to be viewed online. It also provides the appropriate structure for the Component Interface required for event processing. The Component Interface exposes the fields from the CW\_EVENT\_TBL record that are required for the connector’s processing. The CW\_EVENT\_BC Component contains the CW\_EVENT\_TBL record.
- Component Interface  
The CW\_EVENT\_CI Component Interface exposes the fields and records of the component as the properties and methods necessary for event processing.
- Menu Definition  
The CW\_EVENT\_MNU Menu Definition enables event pages to be displayed online.

---

## How the connector works

This section describes:

- “Interacting with the PeopleSoft application”
- “Processing business object requests” on page 4
- “Processing application events” on page 6

### Interacting with the PeopleSoft application

At startup, the connector creates a session object through which it connects to the PeopleSoft Application Server. Connecting to the Application Server gives the connector access to the APIs for all the Component Interfaces that correspond to its supported business objects. The server also provides access to the PeopleCode and the Application Designer objects included with the adapter for event notification.

Each Component Interface (and its associated Business Component, Records, Fields, Scrolls, and PeopleCode) contains all the information required by the connector to process a hierarchical WebSphere business object for PeopleSoft. Because each Component Interface encapsulates its Business Component’s data and processing logic, the connector does not replicate this processing logic. For example, the connector need not explicitly handle duplicate record checks, edit-table validations, or security.

If an error occurs within the connector or during its online processing within the PeopleSoft application, the connector’s application-specific component sends the FAIL return code to the connector framework, which sends it to InterChange Server Express. If the connector loses its connection to the Application Server, the connector’s application-specific component sends the return code of APPRESPONSETIMEOUT, and then the terminate() method is invoked on it.

For information on how the connector processes data in a business object, see Chapter 3, “Understanding business objects for the connector,” on page 27

## Processing business object requests

When the connector receives a business object request to change data in the application, the connector processes hierarchical business objects recursively. In other words, the connector processes each child business object until it has processed data for all levels in the Component Interface associated with the business object.

When processing a business object request from InterChange Server Express, the connector calls PeopleSoft APIs from the session object in the following order:

1. The connector uses the `getComponent("ciName")` method to return the Component Interface associated with the business object. The Component Interface’s name is stored in the application-specific information property at the business-object level of each business object.
2. If the business object requests data creation or modification, the connector inserts or changes values in the application. If the business object requests data retrieval, the connector obtains values from the application.
  - For a Create or Update request, the connector uses the `setFieldName(value)` method to set each field on the Component Interface for which it obtained a value in step 1.

If the application-specific information of a key attribute specifies that the PeopleSoft application generate the unique ID, the connector sends the business object to the application with the string `NEXT` specified as the value of the attribute. For information on using the `NEXT` string in a WebSphere business object for PeopleSoft, see “Application-specific information at the attribute level” on page 47.

If the business object’s application-specific information defines `setInteractiveMode` as `true`, entering or exiting each field triggers the associated business logic in the underlying component, which immediately publishes errors to the PeopleSoft `PSMessage` collection queue.

- For a Retrieve request, the connector uses the `getFieldName()` method without specifying a value.

For information on how the connector processes data in a business object, see Chapter 3, “Understanding business objects for the connector,” on page 27. For information on connector-specific properties, see “Connector-specific properties” on page 20.

3. After processing a Create or Update request for an entire business object, including all its child business objects, the connector invokes the Component Interface’s `Save()` method. If successful, the `Save()` method executes a single `COMMIT` statement. If the business object’s application-specific information defines `setInteractiveMode` as `false`, invoking the `Save()` method triggers all `FieldEdit` business logic associated with the records and fields of the underlying component. All `PeopleCode` errors are published to the `PSMessage` collection queue.
4. If the PeopleSoft system generates the unique identifiers (IDs) during a Create request, the connector uses standard PeopleSoft auto-numbering functionality (that is, built-in functions) to retrieve the most recently used ID, and populate the business object with a new one.
5. The connector’s processing uses all the business logic that is provided in the associated Component Interface.

If a connection error is detected when the connector is processing a business object request, the connector's application-specific component logs a fatal error and sends the return code of APPRESPONSETIMEOUT to trigger email notification. The connector is then terminated.

The following sections describe request verb processing:

- "Processing create requests"
- "Processing retrieve requests" on page 5
- "Processing update requests" on page 5
- "Processing delete requests" on page 6
- "Processing existence requests" on page 6

### **Processing create requests**

When InterChange Server Express sends a business object request with the Create verb, the connector uses PeopleSoft's Create() method to create a new instance of the Component Interface. If the instance passes all PeopleSoft business logic as the transaction proceeds, it is saved in the application. The object created in the application contains all values contained in the business object, including all child business objects.

For more information about processing a create operation, see "Create operations" on page 37.

### **Processing retrieve requests**

When InterChange Server Express sends a business object request with the Retrieve verb, the connector uses PeopleSoft's Get() method to verify that a unique instance of the corresponding Component Interface exists. This Get() method instantiates the Component Interface, allowing the connector to load its values into the business object. The business object that the connector returns to InterChange Server Express exactly matches the instance of the Component Interface.

In other words, the value of each simple attribute of the business object returned to InterChange Server Express matches the value of the corresponding Property Field in the Component Interface. Also, if the returned business object is hierarchical, the number of individual business objects in each of its arrays matches the number of levels or collections in the Component Interface for that array.

For more information about processing a retrieve operation, see "Retrieve operations" on page 38.

### **Processing update requests**

When InterChange Server Express sends a business object request with the Update verb, the connector modifies an existing instance of the Component Interface. If the instance passes all PeopleSoft business logic as the transaction proceeds, it is saved in the application.

The object updated in the application exactly matches the request business object. The connector updates all simple Property Fields except those whose corresponding attribute in the request business object contain the value CxIgnore. It inserts all child business objects contained in the request business object. Depending on the value of its KeepRelationship application-specific information parameter, the connector either deletes or retains child business objects that do not exist in the request business object.

For more information about processing an update operation, see “Update operations” on page 41.

### Processing delete requests

Because PeopleSoft does not support deletion of transactions, the connector does not either. The standard behavior for processing a logical delete is to use the Update verb to change the status of the business object’s EffectiveStatus attribute to “I” (Inactive).

However, to cause the connector to support a delete of an entire object, do the following:

1. Create a user-defined PeopleCode method that performs deletion within PeopleSoft.
2. Expose the method through the appropriate Component Interface.

### Processing existence requests

When InterChange Server Express sends a hierarchical business object request with the Exists verb, the connector checks for an instance of the Component Interface. The connector’s application-specific component returns SUCCEED if the instance exists in the application, and FAIL if the object does not exist.

## Processing application events

Event notification involves three main processes:

- “Event publication”—Events are published to the connector’s event table (CW\_EVENT\_TBL), which is stored in the PeopleSoft database.
- “Event polling”—The connector polls the event table through the PeopleSoft API.
- “Event archiving” on page 7—The connector archives events into its archive table (CW\_ARCHIVE\_TBL).

### Event publication

To publish events to the connector’s event table, the PeopleSoft application uses PeopleCode and Application Designer objects included with the adapter. For information about these objects, see “Event-processing components” on page 2.

The event publication process uses the `cw_publish_events()` function, which is stored in the FieldFormula event of the FUNCLIB\_CW record. You must declare and call this function from the `SavePostChg()` PeopleCode of the component involved in the event.

**Note:** This procedure does not use a Component Interface.

For more information, see “`cw_publish_events()` Function” on page 17.

### Event polling

The connector polls the event table at a regular, configurable interval. It searches for events first by status, then by the value of the connector property `ConnectorID`. If this value is null or blank, the property will not be used for the search. When the connector processes an event, it immediately updates the status to INPROGRESS (a value of 3). Any pending INRPOGRESS events are reset to READYFORPOLL (a value of 0) during the connector’s initialization.

The connector uses the `CW_EVENT_CI` Component Interface’s `Find()` method to poll the event table. This method returns a Collection of events with the status



READYFORPOLL. The connector loops through the Collection, obtaining the name of every business object listed in the CW\_EVENT\_TBL.

The connector uses the API to set and get property values, gathering event information for each event returned in the Collection. The connector checks to determine which business objects are subscribed. For subscription information specific to InterChange Server Express, see the broker's implementation guide.

- For each subscribed business object, the connector retrieves the name of its associated Component Interface. Using the key values listed in the CW\_OBJ\_KEYS field, the connector instantiates the Component Interface involved in the event and copies the information into an application-specific business object. After creating the business object, the connector passes it to InterChange Server Express and archives the event.
- For unsubscribed business objects and business objects that generate errors, the connector moves the event to the archive table and updates its status.
- The connector supports the delete verb for outbound objects. The key values of the business object instance are set, and the object is sent to InterChange Server Express.

For more information, see "Event and archive tables" on page 18.

### **Event archiving**

While the CW\_EVENT\_CI Component Interface is instantiated, the connector calls the `cw_archive_events()` user-defined method for each event it processes. This method, which is in the form of PeopleCode, sets the Archive flag to Y. Setting this flag causes the `SavePostChg()` PeopleCode to archive the event when the user invokes the `Save()` method. The archive table also records the date and time the event was processed.

**Note:** The `SavePostChg()` PeopleCode is included with the Project.

You can use the archive table to query for event history or to troubleshoot problems in event processing. For example, all unsubscribed events have a status of unsubscribed.

Because there are potential failure points associated with the processing of events, the event management process does not delete an event from the event table until it has been inserted into the archive table.

### **Event notification process flow**

Figure 2 illustrates the event notification process flow. The integration broker is InterChange Server Express.

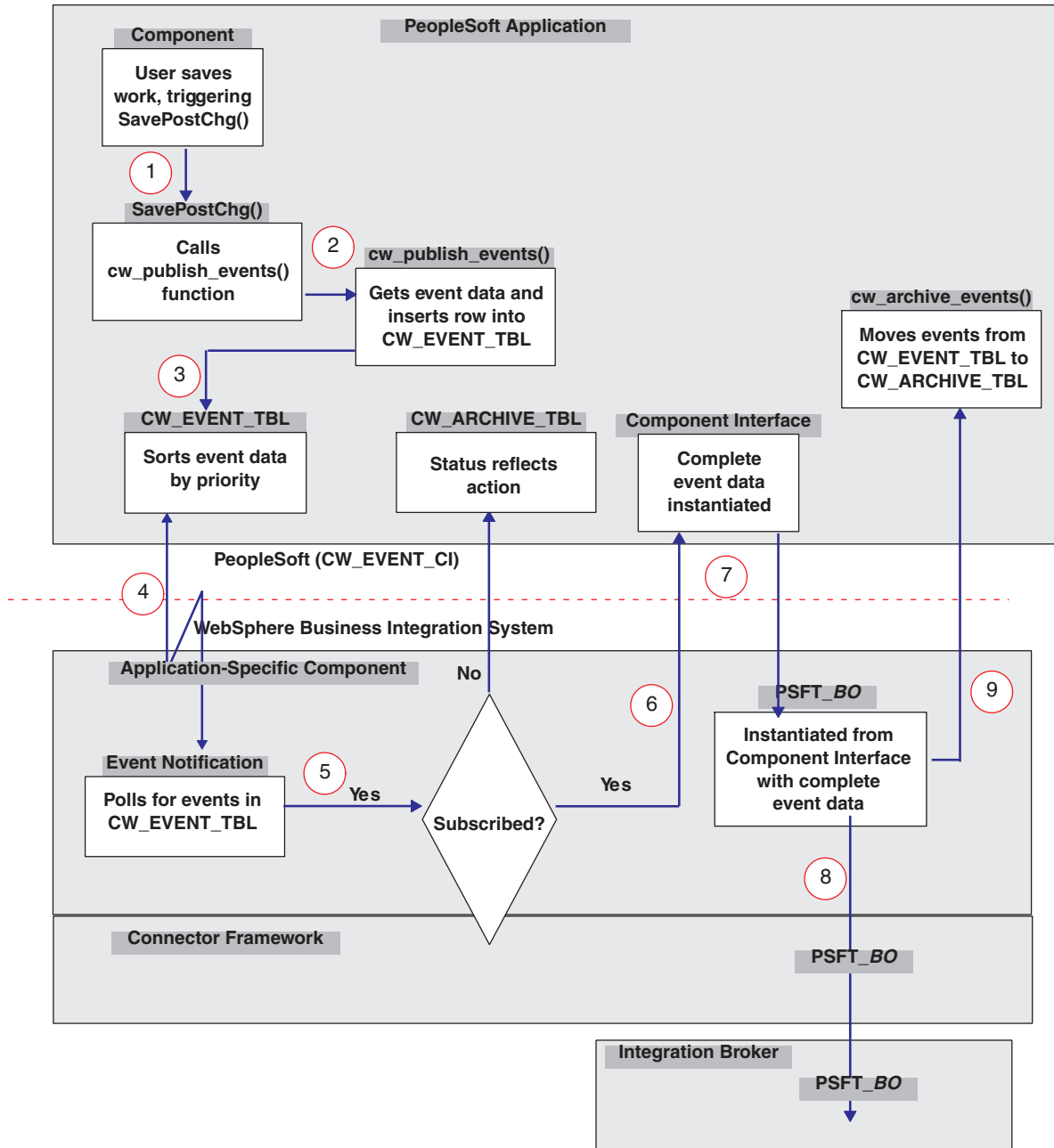


Figure 2. Event notification process flow

The following describes the steps illustrated in Figure 2:

1. When a user saves a change online in a Component, the `SavePostChg()` method calls the `cw_publish_events()` function.
2. The `cw_publish_events()` function, which has four parameters, does the following:
  - Gets the application-specific business object name from its first parameter.
  - Gets the name of each key required to instantiate the Component Interface that corresponds to the application-specific business object. It gets the key names and their respective values from its second parameter.
  - Sets the priority of the event based on the value of the third parameter.

**Note:** Because the application can publish multiple events from a single Save action on a Component, the connector uses the value of the third parameter to prioritize events. If sequence order is important to an object, it should specify a priority when it calls the `cw_publish_events()` function. For example, a Location would have a higher priority than a Department because the Location must be processed first.

- Sets the `CW_CONN_ID` field to the value of the fourth parameter, which also corresponds to the ConnectorID connector property. The default is `PeopleSoftConnector`.
- Generates the unique ID for the event.
- Evaluates the PeopleSoft system variable `%Mode` to identify the verb associated with the event.
- Inserts the event into `CW_EVENT_TBL`.

For more information, see “`cw_publish_events()` Function” on page 17.

3. The connector sorts events in `CW_EVENT_TBL` by priority.
4. The connector polls the event table for events at the interval specified by its `PollFrequency` configuration property, picking up no more than the number of events specified by its `PollQuantity` configuration property. To do the polling, the connector instantiates the `CW_EVENT_CI` Component and invokes the `Find()` method.

**Note:** The connector uses a different thread from the one used for request processing.

5. For each record retrieved from the event table, the connector checks whether it subscribes to the event data.  
If the data is not subscribed, the connector moves the event record from `CW_EVENT_TBL` to `CW_ARCHIVE_TBL` with a status of unsubscribed.
6. If the data is subscribed, the connector uses the event record’s key fields to instantiate the appropriate Component Interface, from which it retrieves complete data for the event.
7. After retrieving complete event data from the Component Interface, the connector instantiates the appropriate application-specific business object.
8. The connector sends the application-specific business object to InterChange Server Express.
9. The connector calls the `cw_archive_events()` function, which sets the Archive flag to Y and sets the status and processing time appropriately. Setting the Archive flag causes the `SavePostChg()` PeopleCode to copy the event information to the archive table and delete the event from the event table.



---

## Chapter 2. Installing and configuring the connector

This chapter describes how to install and configure the Adapter for PeopleSoft and how to configure the PeopleSoft application to work with the connector.

This chapter contains the following sections:

- “Prerequisites”
- “Installing the adapter and related files” on page 13
- “Installed file structures” on page 13
- “Enabling the application for the connector” on page 14
- “Configuring the connector” on page 20
- “Starting the connector” on page 24
- “Stopping the connector” on page 25

---

### Compatibility

The adapter for PeopleSoft Guide is supported on the following adapter framework and integration brokers:

- **Adapter framework:** WebSphere Business Integration Server Express Plus Adapter Framework
- **Integration brokers:** InterChange Server Express

**Note:**

For instructions on installing InterChange Server Express and its prerequisites, see the *Installation Guide for WebSphere Business Integration Server Express*.

---

### Prerequisites

Before you use the Adapter for PeopleSoft, verify that your system has the required software. Also, you must perform operations such as creating the connector’s user account, mapping an environment variable, and generating PeopleSoft APIs. This section describes:

- “Required software for using the connector”
- “Required operations for installing the connector” on page 12

### Required software for using the connector

To access a designated Component Interface and its underlying PeopleSoft business logic, the connector requires two layers of PeopleSoft API classes. Before you use the connector, install the following:

- `psjoe.jar`— The connector uses this API to connect to the Application Server through the BEA Systems’ Jolt port. The connector also uses this API to send objects through the Application Server. This file is included with the current version of PeopleTools and is located in the following directory:

```
Windows
%PS_HOME%\web\PSJOA
```

End of Windows

Save this file to the directory documented in “Installed file structure on Windows” on page 13. For more information on retrieving PeopleSoft’s API files, see PeopleSoft’s *Installation and Administration Guide*.

- Component Interface API—The connector accesses this layer only after a session object has been created and a connection to the PeopleSoft Application Server has been established using `psjoa.jar`. The Component Interface API provides access to all of a Component Interface’s exposed objects and PeopleCode methods. You must manually generate this API in Application Designer, as described in “Generating APIs” on page 33.

## Required operations for installing the connector

This section describes required operations that must be performed before you use the connector:

- Map the CLASSPATH environment variable to the following directories:

Windows

```
%ProductDir%\connectors\PeopleSoft\dependencies
```

End of Windows

Also ensure that `psjoa.jar` is defined in the CLASSPATH.

- Create a user account in PeopleSoft for the connector. For more information, see “Creating a user account in PeopleSoft.”
- Configure the PeopleSoft user account so that it does not time out. For more information, see “Configuring time-out for the user account” on page 13.
- Delete any previously installed versions of the connector. Also, delete all previous customizations made in PeopleSoft for the connector. For example, delete all connector-related Menus, Pages, Records, Message Definitions Components, and Component Interfaces. Also, delete the connector’s event and archive tables. Typically, these objects are stored in a connector-specific project that you can open in Application Designer.

**Note:** If you install a WebSphere Business Integration Adapter on the same machine as a previous installation of the connector for ICS, the ICS connector will not run unless you manually switch the IBM WebSphere system environment variable to point to the desired product path.

- Generate Component Interface APIs. For more information, see “Generating APIs” on page 33.

### Creating a user account in PeopleSoft

Before installing the connector, you must create a user account in the PeopleSoft application. The account:

- Can have any valid PeopleSoft user name and password.
- Must have privileges to retrieve, insert, update, and delete data from the appropriate Pages, Components, and Component Interfaces in the PeopleSoft system. For example, for the connector to process customer data, the connector user account must have privileges to work with relevant Customer components.
- Uses General PeopleSoft Security. For more information, see the Security section of Administrator Tools in PeopleBooks.

- Must be configured so that the session never times out. For more information, see “Configuring time-out for the user account.”

### Configuring time-out for the user account

Because the connector uses the Component Interfaces (and the Component Processor on the Application Server) to insert and extract business objects from the PeopleSoft database server, the Application Server must be running. If the user account times out, the Component Processor closes, and the connector logs an error message every time it attempts to access the PeopleSoft system (that is, at every poll, at every create, at every retrieve, and at every update).

To configure the user account to never time out, do the following:

1. In the PeopleSoft application, select PeopleTools from the Go menu option.
2. Select Maintain Security from the PeopleTools menu option.
3. Select Permission Lists from the Use menu option.
4. Select Sign-On Times from the Permission Lists menu option.
5. From the list of permissions, select the one affiliated with the connector’s user account.
6. On the General tab, select Never Time-Out, and select Can Start Application Server, if not already selected.

---

## Installing the adapter and related files

For information on installing the adapter, see the discussion of installing from the Adapter Capacity Pack for WebSphere Business Integration Server Express Plus, in the *Installation Guide for WebSphere Business Integration Server Express*, located in the WebSphere Business Integration Server Express Infocenter at the following site:

<http://www.ibm.com/websphere/wbiserverexpress/infocenter>

---

## Installed file structures

### Installed file structure on Windows

Table 1 describes the Windows file structure used by the connector.

*Table 1. Installed Windows file structure for the connector*

| Subdirectory of %ProductDirS% | Description  |
|-------------------------------|--|
| \connectors\PeopleSoft        | <ul style="list-style-type: none"> <li>• Contains the connector’s CWPeopleSoft.jar and the start_PeopleSoft.bat files.</li> <li>• Contains an executable named EventNotificationInstall.exe, which contains the event notification objects</li> <li>• Contains a file named SavePostChg.txt, which contains a sample of the PeopleCode required to process events</li> </ul> |
| ..\bin                        | Please verify that this folder contains the CWConnEnv.bat file.  |
| ..\lib                        | Please verify that the directory contains the WBIA.jar file. This file corresponds to ADK 2.2.0. If an older version of ADK is required, please refer to the <i>Connector Development Guide</i> .  |

Table 1. Installed Windows file structure for the connector (continued)

| Subdirectory of %ProductDirS%       | Description   |
|-------------------------------------|---|
| \connectors\PeopleSoft\dependencies | <ul style="list-style-type: none"> <li>• Contains the psjoo.jar files that you must copy from the current version of PeopleTools.</li> <li>• Contains the PSFTCI.jar file, which contains all the PeopleSoft Component Interface class files that PeopleSoft generates after you build and compile the APIs.</li> </ul> |
| \connectors\messages                | Contains the PeopleSoftConnector.txt file, as well as PeopleSoftConnector_LL_TT.txt files (message files specific to a language (LL) and a country or territory (TT)).  |
| \connectors\PeopleSoft\samples      | Contains a sample PeopleSoft-specific business object.  |
| \repository\PeopleSoft\             | Contains the CN_PeopleSoft.txt file.  |

## Enabling the application for the connector

Before you can use the connector with your PeopleSoft application, you must:

- Define required Components, Component Interfaces, Menus, Pages, Records, and PeopleCode in your PeopleSoft application. To facilitate the process of defining required business objects, the adapter includes a sample business object. For more information, see Chapter 3, “Understanding business objects for the connector,” on page 27 and Chapter 4, “Generating business object definitions using PeopleSoftODA,” on page 51.
- Import the Project included with the adapter. This Project contains the components required for event processing, build the required tables, and build the API files.

**Note:** Importing the Project is necessary only when you use the connector to process events.

This section describes:

- “Installation operations required to process application events” on page 14
- “Code for processing application events” on page 17

## Installation operations required to process application events

This section describes required operations that must be performed when you use the connector to process application events. Perform this installation before you use the connector for the first time.

Installing event-processing components involves the following processes:

- “Importing the project” on page 14
- “Building required objects” on page 15
- “Building the API files” on page 16

### Importing the project

1. Run the file that unzips the Application Designer project files into the designated folder. From the %ProductDirS%\connectors\PeopleSoft\dependencies directory, select the EventNotificationInstall.exe file.

**Note:** This file is available only on Windows.



Running this file with the default values creates a Projects directory within the dependencies directory. The project name is CW\_EVENT\_Vx, where Vx identifies the version number.

2. Open PeopleSoft's Application Designer and select: Copy Project From File... from the File menu.
3. In the menu that appears, select the import directory into which the project was unzipped. Figure 3 illustrates the screen within PeopleSoft.

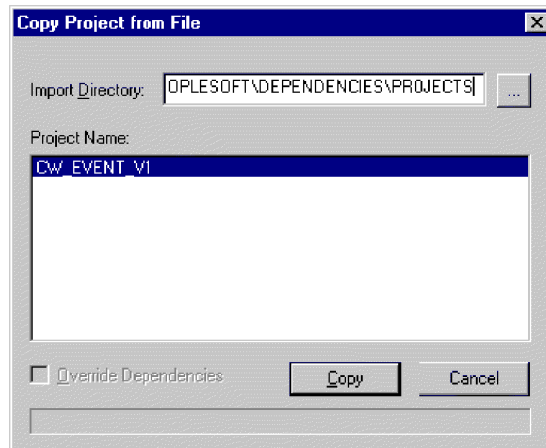


Figure 3. Importing the project

4. Click Copy and verify the list of components with those listed in "Event-processing components" on page 2.

### Building required objects

To build the event and archive tables and the function library:

1. Build the tables by selecting Project... from the Build menu.
2. In the dialog box that appears, verify that the CW\_EVENT\_TBL, FUNCLIB\_CW and CW\_ARCHIVE\_TBL appear as illustrated in Figure 4.

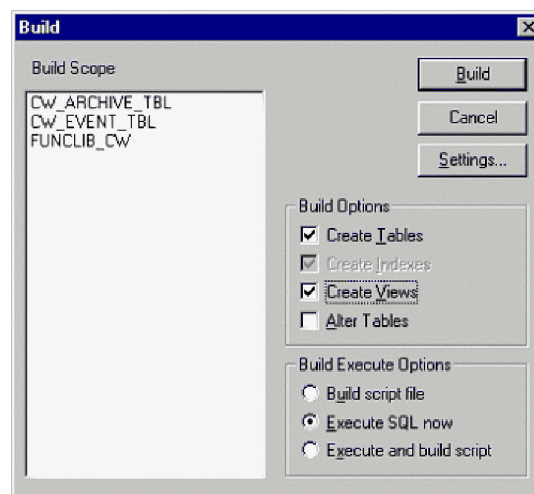


Figure 4. Building the tables

3. Select the build options “Create Tables” and “Execute SQL now”. Also, click the Settings button and, in the window that displays, verify that “create table if it already exists” and “recreate index if it already exists” are selected.
4. Click Build.
5. Log on to a SQL editor using an ID with appropriate database privileges. The default ID is SYSADM/SYSADM. Initialize the CW\_EVENT\_NOT Field on the FUNCLIB\_CW Record with a value of zero. To do so, run the following statement:

```
INSERT INTO PS_FUNCLIB_CW (CW_EVENT_NOT) VALUES ('0');
```

## Building the API files

To build the CW\_EVENT\_CI API files (required when the connector processes only events) or the Component Interface API files (required when the connector processes both events and requests):

1. Open the Component Interface CW\_EVENT\_CI from the project window and select PeopleSoft APIs from the Build menu.
2. In the Java Classes panel:
  - Select the Build box
  - In the “Directory containing PeopleSoft package:” field, enter the path for connector’s dependencies directory (or the directory where all the PeopleSoft API files reside for your implementation). This is usually:

```

Windows
%ProductDirS%\connectors\PeopleSoft\dependencies

End of Windows
  
```

3. From the “Select APIs to Build:” field, select CWEVENT\_CI and its associated collection. Figure 5 illustrates the screen within PeopleSoft.

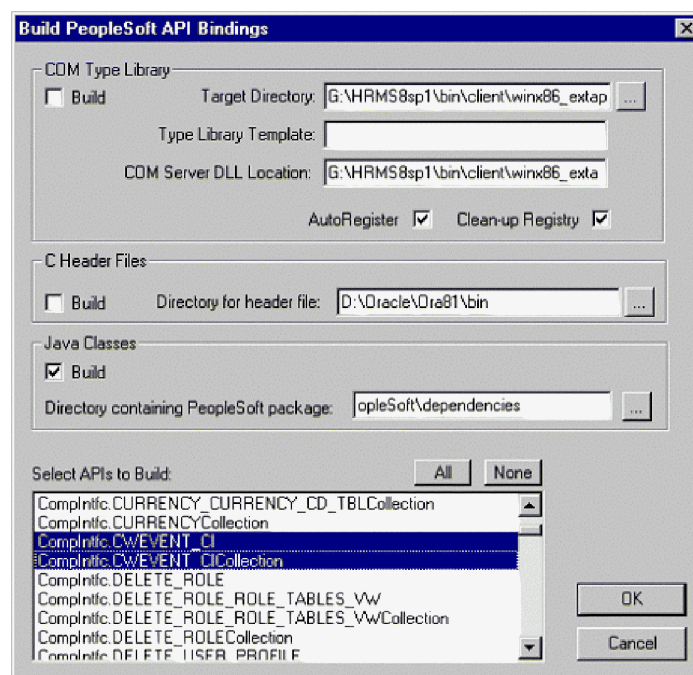


Figure 5. Building APIs

4. Click OK.
5. Compile any API files that you generate, and add them to PSFTCI.jar (if it exists) or create this file if it does not exist.

**Note:** The start script or batch file is configured to search for these API files in a file named PSFTCI.jar in the \connectors\PeopleSoft\dependencies directory. After you compile these API classes, make a jar file that you name PSFTCI.jar. If you put this jar file in a different directory, change the start script or batch file to point to the correct location of these API classes.

6. Place the cw\_publish\_events() function declaration and function call in the SavePostChg() PeopleCode for each Component associated with an event. For more information, see “Sample PeopleCode declaration and function call” on page 18.

**Note:** The function must be placed in the SavePostChg() of the Component and not of the Record.

7. Define all parameters used in the function call and insert PeopleCode to check whether the Component has changed before making the function call. This code eliminates unnecessary calls to the function. Also add a check for %userid to prevent the connector from ping-ponging (that is, creating an endless loop in which the connector interprets a data change from a request as a new application event). For an example, see “Sample PeopleCode declaration and function call” on page 18.

## Code for processing application events

The adapter includes the cw\_publish\_events() function in the FUNCLIB\_CW function library. This function inserts events into the connector’s event table. This section describes the function and the sample code that calls it.

### cw\_publish\_events() Function

The cw\_publish\_events() function takes four parameters, all of type String:

- &BONAME—contains the name of the WebSphere application-specific business object for PeopleSoft that is generated for the event
- &KEYLIST—contains the name of all keys required to instantiate the Component Interface that corresponds to the business object named in the &BONAME parameter. This function uses the GetKey() method for instantiation. Because the connector uses name-value pairs, the order of the keys is not significant. However, the names must match those listed on the Component Interface. Separate multiple keys with a colon or other configurable delimiter, for example, SETID:DEPTID. For more information, see “EventKeyDelimiter” on page 21.
- &CW\_PRIORITY1—defines the priority of the event; defaults to 2. This parameter enables certain events to be processed prior to events with a lower specified priority. The CW\_EVENT\_TBL processes events of higher priority first.
- &CONNID—contains the name of the connector instance that will retrieve the event. This parameter is used for event distribution and defined in the ConnectorID property for the connector. If not using event distribution, use the value “PeopleSoftConnector”.

**Important:** You must define these parameters, in proper form, before or during the function call.

Using the values specified for its parameters and the information currently available in the Component Buffer, the function gathers the required information from the Component and inserts the event in the event table. The function performs the following:

- Evaluates the PeopleSoft system variable %Mode, which contains values such as Add and Update/Display, to identify the verb associated with the event
- Uses the key names to gather the current key values from the Component and creates a list of business object key names and values
- Loads all information into a row, which it inserts into the event table using PeopleCode built-in functions and methods

### Sample PeopleCode declaration and function call

The adapter includes a sample of the PeopleCode declaration and function call in the savepostchg.txt file in the connector's samples directory. Replace the business object's name and keys with the correct information for your business object and then copy and paste the code directly into the PeopleCode editor.

Before making the actual function call, use a simple logic test to verify that the Record or Component actually changed. If it did not change, the connector does not call the function, which enhances performance. Also verify that the %userid is not CW. Doing so prevents the connector from interpreting a data change from a request as a new application event.

The following code is the sample that the adapter provides:

```
/* Place this code in Component's SavePostChg() and define the four */
/* parameters used in the function call */

Declare Function cw_publish_event PeopleCode FUNCLIB_CW.CW_EVENT_NOT
FieldFormula;
Component String &BONAME1;
Component String &KEYLIST1;
Component String &CW_PRIORITY1;
Component String &CONNID1;

    &BONAME1 = "Psft_Dept";
    &KEYLIST1 = "DEPT_TBL.SetId:DEPT_TBL.DeptId";
    &CW_PRIORITY1 = 2;
    &CONNID1 = "PeopleSoftConnector";

/* Check if Component Changed before calling function */
If ComponentChanged() and
    %userid <> "CW" then

    /* Publish this event to the IBM WebSphere
    CW_EVENT_TBL for polling */

    cw_publish_event(&BONAME1,&KEYLIST1,&CW_PRIORITY1,&CONNID1);

End-if;
```

## Event and archive tables

The connector uses the event table to poll events for pickup. For each event, the connector gets the business object's name, verb, and key from the event table. The connector uses this information to retrieve the entire entity from the application. If the entity was changed after the event was first logged, the connector gets the initial event and all subsequent changes. In other words, if an entity is created and updated before the connector gets it from the event table, the connector gets both data changes in the single retrieval.

The following three outcomes are possible for each event processed by a connector:

- Event was processed successfully
- Event was not processed successfully
- Event was not subscribed to

If events are not deleted from the event table after the connector picks them up, they occupy unnecessary space there. However, if they are deleted, all events that are not processed are lost and event-processing cannot be audited. Therefore, the adapter provides the archive table to store events deleted from the event table.

Table 2 describes the columns in the event and archive tables.

*Table 2. Event and archive table schema*

| <b>Name</b>     | <b>Description</b>   | <b>Type</b> | <b>Constraint</b>  |
|-----------------|--|-------------|--|
| CW_EVENT_ID     | Internal identifier of the event A unique key field that identifies each event generated from within PeopleSoft  | NUMBER      | Primary key  |
| CW_CONNECTOR_ID | Unique ID of the connector for which the event is destined. This value is important when multiple connectors poll the same table.  | VARCHAR     |  |
| CW_OBJ_KEYS     | Keys of the business object, specified in name-value format. When defining parameters for a function call (such as <code>cw_publish_events</code> ), the name consists of the table name and field name separated by a period. Multiple keys are separated with a colon or other configurable delimiter, for example:<br>DEPT_TBL.SetId:DEPT_TBL.DeptIdFor more information, see "EventKeyDelimiter" on page 21. | VARCHAR     | Not null   |
| CW_OBJ          | Name of the business object  | VARCHAR     | Not null   |
| CW_VERB         | Verb associated with the event. A PeopleCode function included with the adapter determines the value (Create, Retrieve, Update, Delete) based upon the <code>%Mode</code> system variable used by PeopleSoft   | VARCHAR     | Not null   |
| CW_PRIORITY     | Event priority (0 is highest, n is lowest), which the connector uses to get events on a priority basis.  | NUMBER      | Not null   |
| CW_DTTM         | Date and time the event or archiving occurred  | STRING      | Default current date/time (for archive table, actual event time). PeopleSoft treats the datatype for DATE fields as STRING and returns the same. |
| CW_STATUS       | -2 (Error sending event to InterChange Server Express)<br>-1 (Error processing event)<br>0 (Ready for poll)<br>1 (InterChange Server Express)<br>2 (No Subscriptions for the business object)<br>3 (In Progress). This status is used only in the event table and not in the archive table.  | VARCHAR     | Not null   |

---

## Configuring the connector

You must configure the connector's standard and connector-specific connector configuration properties before you can run it. To configure connector properties, use:

- Connector Designer—for the integration broker, InterChange Server Express.  
Access this tool from System Manager.

As you enter configuration values, they are saved in the repository.

### Standard connector properties

Standard configuration properties provide information that all connectors use. See Appendix A, "Standard configuration properties for connectors," on page 75 for documentation of these properties.

Table 3 provides information specific to this connector about a configuration property in the appendix.

*Table 3. Property information specific to this connector*

| Property          | Note  |
|-------------------|---|
| AgentConnections  | Because this connector is single-threaded, do not change the default value of this property.  |
| CharacterEncoding | This connector does not use this property.  |
| Locale            | Because this connector has been internationalized, you can change the value of this property. See release notes for the adapter to determine currently supported locales. |

### Connector-specific properties

This section documents configuration properties specific to this connector at runtime. Connector-specific properties provide a way of changing static information or logic within the connector without having to recompile and rebuild it.

Table 4 lists the connector-specific configuration properties for the connector. See the sections that follow for explanations of the properties.

Table 4. Connector-specific configuration properties

| Name                      | Possible values  | Default value | Required |
|---------------------------|--|---------------|----------|
| AppServerMachineNameOrIP  |  | n/a           | Yes      |
| ApplicationPassword       | <i>Password for the connector's user account</i>   | PS            | Yes      |
| ApplicationUserName       | <i>Name of the connector's user account</i>  | PS            | Yes      |
| ConnectorID               | <i>Name of connector for event distribution</i>  | null          | No       |
| ConvertToPrimitiveFloat   | true or false  | false         | No       |
| EventKeyDelimiter         | <NameValueChar><DelimiterChar> Note: Do not specify a space between the actual characters. | =:            | No       |
| PingCompInterface         | replace < CHANGEME > with the name of an existing component interface                      | CHANG<br>ME   | Yes      |
| PollQuantity              | Values are 1 to 500  | 1             | No       |
| PortNumber                | <i>The Jolt port number</i>  | 9000          | Yes      |
| ReconnectSessionOnGetFail | true or false  | false         | No       |
| SetLangCode               | Values are 1 or greater  | 1             | No       |
| UseDefaults               | true or false  | false         | Yes      |
| Version                   | PeopleTools version number   | 8.15          | Yes      |

### AppServerMachineNameOrIP

The name or IP address of the machine where the Application Server is running. The connector uses this value only when connecting to the application.

### ApplicationPassword

Password for the connector's user account in the PeopleSoft application.

There is no default value.

### ApplicationUserName

Name of the connector's user account in the PeopleSoft application.

There is no default value.

### ConnectorID

The value of this property is used to search for events in the CW\_EVENT\_TBL through the cweventci. It is used for event distribution, when multiple connectors are used to retrieve specific events. If the value is left blank or null, this property will not be set prior to invoking the Find() method in the event component interface.

### ConvertToPrimitiveFloat

Specifies whether to convert float objects to primitive float objects.

The default value is false.

### EventKeyDelimiter

Specifies the two characters in name-value pairs that separate the name from its value (NameValue character) and the pairs from each other (Delimiter character). The following example uses the default equals (=) NameValue character and default colon (:) Delimiter character:

```
SETID=1234:DEPTID=5678
```

The default value is =:



## **PingComplInterface**

Pings the component interface to test for network connectivity/session validity. FAIL is returned when either the session or connectivity are invalid. When the name of the component interface is given, the connector agent terminates if the session instance is unable to get that interface, because of either invalid session or network connectivity issues.

## **PollQuantity**

Number of rows in the database table that the connector retrieves per polling interval. Allowable values are 1 to 500.

The default is 1.

## **PortNumber**

The Jolt Port Number (not the Tuxedo port number) on the Application Server. The connector connects to the JSL, not to the WSL.

The default value is 9000

## **ReconnectSessionOnGetFail**

If set to true, the connector automatically creates a new session object and reconnects to the PeopleSoft application. The connector uses this property only when the component interface's Get () method returns a non-critical error or warning message that terminates the connector's session object. Typically this problem arises when an instance has different keys from those used by the connector.

The default value is false.

## **SessionPoolSize**

Enables the connector to run multiple PeopleSoft session instances. Set this property to the number of session instances you want to run. Multi-threading is only available to inbound objects. Each inbound object thread is allocated a session instance from a pool of free sessions, and then that session instance moves to a busy pool. When the transaction finishes, the session instance is released back to the free pool.

When the connector runs multi-threaded, one session instance is reserved for polling which is single-threaded and performed serially.

## **SetLangCode**

Specifies whether the connector sets the base language immediately after it connects to the PeopleSoft application. If set to true, the connector uses a workaround that correctly updates the base language in the base table rather than in the language table. If you set this property to false, your base tables may not be updated correctly.

The default value is false.

## **UseDefaults**

If UseDefaults is set to true or is not set, the connector checks whether a valid value or a default value is provided for each required business object attribute. If a value is provided, the Create succeeds; otherwise, it fails.



If UseDefaults is set to false, the connector checks only whether a valid value is provided for each required business object attribute; the Create operation fails if a valid value is not provided.

The default value is false.

### **Version**

Specifies the current version of PeopleTools on which the application is running. The value should be specified to the latest available decimal point.

---

## **Creating multiple connector instances**

Creating multiple instances of a connector is in many ways the same as creating a custom connector.

**Note:** Each additional instance of any adapter supplied with WebSphere Business Integration Server Express will be treated as a separate adapter by the function that limits the total number of adapters that can be deployed.

You can set your system up to create and run multiple instances of a connector by following the steps below. You must:

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

### **Create a new directory**

You must create a connector directory for each connector instance. This connector directory should be named:

`ProductDir\connectors\connectorInstance`

where `connectorInstance` uniquely identifies the connector instance.

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

`ProductDir\repository\connectorInstance`

### **Create business object definitions**

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

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

`ProductDir\repository\initialConnectorInstance`

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

### **Create a connector definition**

You create a configuration file (connector definition) for the connector instance in Connector Configurator Express. To do so:

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

### Create a start-up script

To create a startup script:

1. Copy the initial connector's startup script and name it to include the name of the connector directory:  
dirname
2. Put this startup script in the connector directory you created in "Create a new directory" on page 23.
3. Create a startup script shortcut.
4. Copy the initial connector's shortcut text and change the name of the initial connector (in the command line) to match the name of the new connector instance.

You can now run both instances of the connector on your integration server at the same time.

---

## Starting the connector

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

*ProductDir\connectors\connName*

where *connName* identifies the connector. The name of the startup script depends on the operating-system platform, as Table 5 shows.

Table 5. Startup scripts for a connector

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

You can invoke the connector startup script in any of the following ways:

- On Windows systems, from the **Start** menu  
Select **Programs>IBM WebSphere Business Integration Express>Adapters>Connectors>your\_connector\_name**.  
By default, the program name is "IBM WebSphere Business Integration Express". However, it can be customized. Alternatively, you can create a desktop shortcut to your connector.
- From the command line
  - On Windows systems:  
start\_*connName* *connName* **ICS** [-*cconfigFile* ]  
where *connName* is the name of the connector.
- From System Monitor  
You can load, activate, deactivate, pause, shutdown or delete a connector using this tool.

- On Windows systems, you can configure the connector to start as a Windows service. In this case, the connector starts when the Windows system boots (for an Auto service) or when you start the service through the Windows Services window (for a Manual service).

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

---

## Stopping the connector

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

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



---

## Chapter 3. Understanding business objects for the connector

The connector component of the Adapter for PeopleSoft is meta-data-driven.

**Meta-data**, in the WebSphere business integration system, is application-specific data that is stored in WebSphere business objects and that assists the connector in its interaction with the application. A meta-data-driven connector handles each business object that it supports based on meta-data encoded in the business object definition rather than on instructions hard coded in the connector.

Business object meta-data includes the structure of a business object, the settings of its attribute properties, and the content of its application-specific information. Because the connector is meta-data driven, it can handle new or modified business objects without requiring modifications to the connector code. The connector uses the business object definition and its application-specific information to locate and manipulate the data in a Component Interface.

The connector makes assumptions about the structure of its supported business objects, the relationships between parent and child business objects, the format of the application-specific information, and the Component Interface through which it interacts. Therefore, when you create or modify a business object that will be processed by the connector, your modifications must conform to the rules the connector is designed to follow. If they do not, the connector cannot process new or modified business objects correctly.

This chapter describes how the connector processes business objects and describes the assumptions the connector makes. You can use this information as suggestions for implementing new business objects or as a guide to modifying existing ones.

This chapter contains the following sections:

- “Business object and attribute naming conventions”
- “Business object structure” on page 28
- “Creating a business object” on page 32
- “Business object verb processing” on page 35
- “Business object attribute properties” on page 43
- “Business object application-specific information” on page 45

---

### Business object and attribute naming conventions

For clarity, use the PSFT\_ prefix when you name an business object to represent data in a PeopleSoft Component Interface. Follow this convention for all child business objects as well as for the top-level business object. For example, if you create business objects that represent parent data in the EMERGENCY\_CNTCT table and child data in the EMERGENCY\_PHONE table, you might name the corresponding business objects: PSFT\_EmergencyContact and PSFT\_EmergencyPhone.

**Note:** In this document, the term **hierarchical** business object refers to a complete business object, including all the child business objects that it contains at any level. The term **individual** business object refers to a single business object, independent of any child business objects it might contain. The term **top-level** business object refers to the individual business object at the top of the hierarchy that does not itself have a parent business object.

---

## Business object structure

WebSphere business objects that represent PeopleSoft data can be flat or hierarchical. All the attributes of a **flat** business object are simple, that is, they represent a single value (such as a String or Integer).

In addition to its simple attributes, a **hierarchical** business object can 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.

A **single-cardinality relationship** occurs when an attribute in a parent business object represents a single child business object. In this case, the child business object represents a PeopleSoft Collection that can contain only one Record. The type of the attribute is the same as that of the child business object.

A **multiple-cardinality relationship** occurs when an attribute in the parent business object represents an array of child business objects. In this case, the child business object represents a PeopleSoft Collection that can contain multiple Records. The type of the attribute is the same as the type of the array of child business objects.

The connector assumes that every hierarchical business object represents a single PeopleSoft Component Interface. Although a hierarchical business object may represent data in multiple PeopleSoft Records, the connector assumes that each child business object in the hierarchy represents a single Collection within the Component Interface. The connector uses PeopleSoft's Component architecture and processing (rather than the underlying database) to take advantage of the business logic defined at the Component level.

When you define a business object, the following situations are possible:

- The Collection might have more fields than the corresponding individual business object has simple attributes (that is, some fields in the Collection are not represented in the business object). Include in your design only those fields needed for the business object processing.
- The individual business object might have more simple attributes than the corresponding Collection has fields (that is, some attributes in the business object are not represented in the Collection). The attributes that do not have a representation in the Collection either have no application-specific information or are set with a default value.

## Component interface and business object relationship

Because the connector requires a PeopleSoft Business Component and Component Interface for each business object that it processes, and because the WebSphere business integration system does not provide Business Components, Component Interfaces, or PeopleSoft-specific business objects, you must create these objects to use the connector.

**Note:** For portability, keep all your connector development in one PeopleSoft Project.

After creating the required objects mentioned above, you can use Application Designer to create the class structure required for the connector to process its supported business objects. For more information, see "Generating APIs" on page 33.

To assist you in creating these objects, this section includes:

- “Example Component and Component Interface” on page 29
- “Example business object” on page 32
- “Creating a business object” on page 32

### Example Component and Component Interface

Figure 6 illustrates a simple Component, EMER\_CONTACT, which has two Pages and three Records. The illustrated page, PERSONAL\_DATA\_PANEL1, stores emergency contact information for each employee.

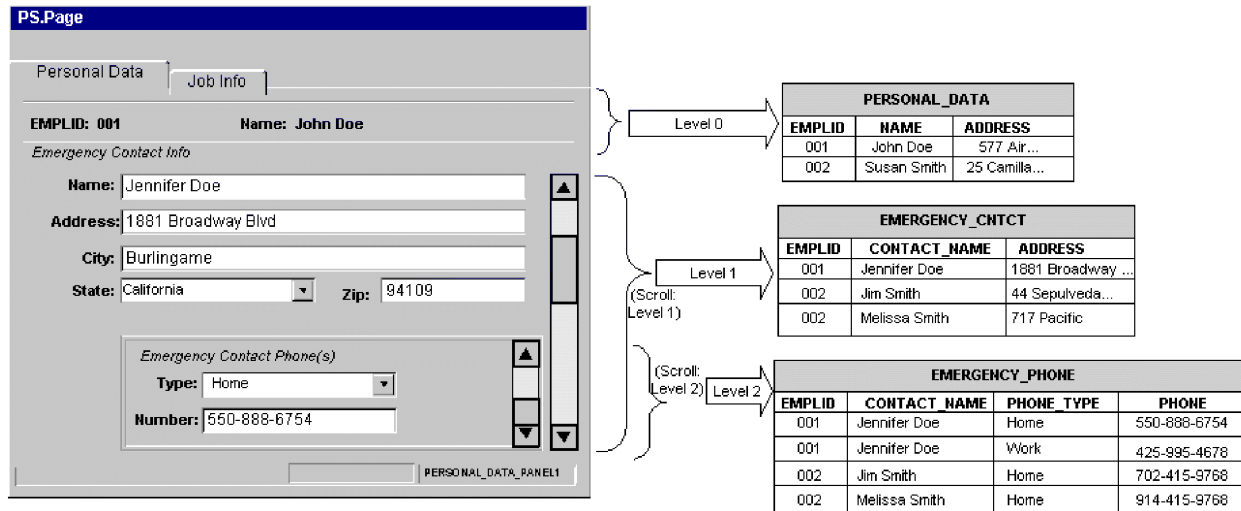


Figure 6. Example component

The above graphic illustrates the relationship between data displayed at each level of the personal data Page and the corresponding Record that stores it:

- Level 0 data is stored in the PERSONAL\_DATA Record, whose key field is EMPLID.
- Level 1 data is stored in the EMERGENCY\_CNTCT Record. Because each employee can have more than one emergency contact, each contact is uniquely identified by name (CONTACT\_NAME), as well as by the employee’s ID (EMPLID). The Scroll in Level 1 allows you to display data in the entire contact Collection.
- Level 2 data is stored in the EMERGENCY\_PHONE Record. Because each contact can have more than one phone, each phone number is uniquely identified by type (PHONE\_TYPE), as well as by the contact’s name (CONTACT\_NAME) and the employee’s ID (EMPLID). The Scroll in Level 2 allows you to display data in the entire phone Collection.

As the EMERGENCY\_CNTCT and EMERGENCY\_PHONE Records illustrate, each Record’s key is a composite that includes its parent’s key as well as its own unique identifier.

Not all Components represent data records in the same straightforward manner as the example. For instance, scroll levels do not always correspond to separate Records or child Records. Sometimes a Component uses derived or work Records; sometimes it embeds related display Records; sometimes it uses the same Record to represent data on several of its levels. In these situations, the design of the Component Interface is much more sophisticated than the example, and requires serious consideration of the processing needs.

When working with a complex Component, consider the following areas when designing:

- “Levels”
- “Hidden Fields”
- “Read-Only Fields”

**Levels:** When designing a Component’s levels, consider the following:

- Verify that the Component Interface behaves like the online Pages contained in the Component that it represents. You may need to modify the structure of Component Interface properties and Collections, or add user-defined methods, to ensure that the connector behaves as designed.
- Keys are exposed only at the first level in which they appear. Remove keys from the top-level Collection of the Component Interface that do not appear at the level-0 Scroll in the page. Manually add those keys that appear on the level-1 Scroll, in the Page definition, to the level-two Collection.

For example, assume you have a Page that uses three keys from the same Record (such as SETID, DEPTID, and EFFDT). Assume further that this Page uses EFFDT at Scroll Level 1 to return historical data for the given SETID and DEPTID. When you create a Component Interface that contains this Page, it displays all three keys in Collection Level 0 because all key fields exist in the same Level-0 primary Record. If you want to use this Component Interface to return a set of rows with EFFDT as the key, manually remove EFFDT from the Level-0 Collection and add it to the Level-1 Collection. Doing so causes the Component Interface to behave the same way as it does online.

- Examine the Page definitions of each Component, paying particular attention to the order of elements on a Page. Verify the Scroll level at which each field appears. Use this information to determine whether corresponding business object attributes are at the correct level, or whether they belong in a child business object.

**Hidden Fields:** Hidden fields are not always loaded into the Component Processor. Exposing these fields might cause application service errors. It is not recommended that you expose anything to the connector that is not visually exposed on the Page.

**Read-Only Fields:** Fields marked as Read-Only on the Component Interface are accessible to the connector, but only by the method that returns values. The connector cannot set values in these fields. Therefore, specify the `get=FieldName` parameter in the corresponding attribute’s application specific text, but leave the `set=FieldName` parameter empty. Specifying the set parameter in such a case causes an error if the method is triggered by an update or create operation.

For more information, see “Application-specific information at the attribute level” on page 47.

Figure 7 illustrates the example Component Interface (EMER\_CONTACT\_PROFILE) that contains the EMER\_CONTACT Component.



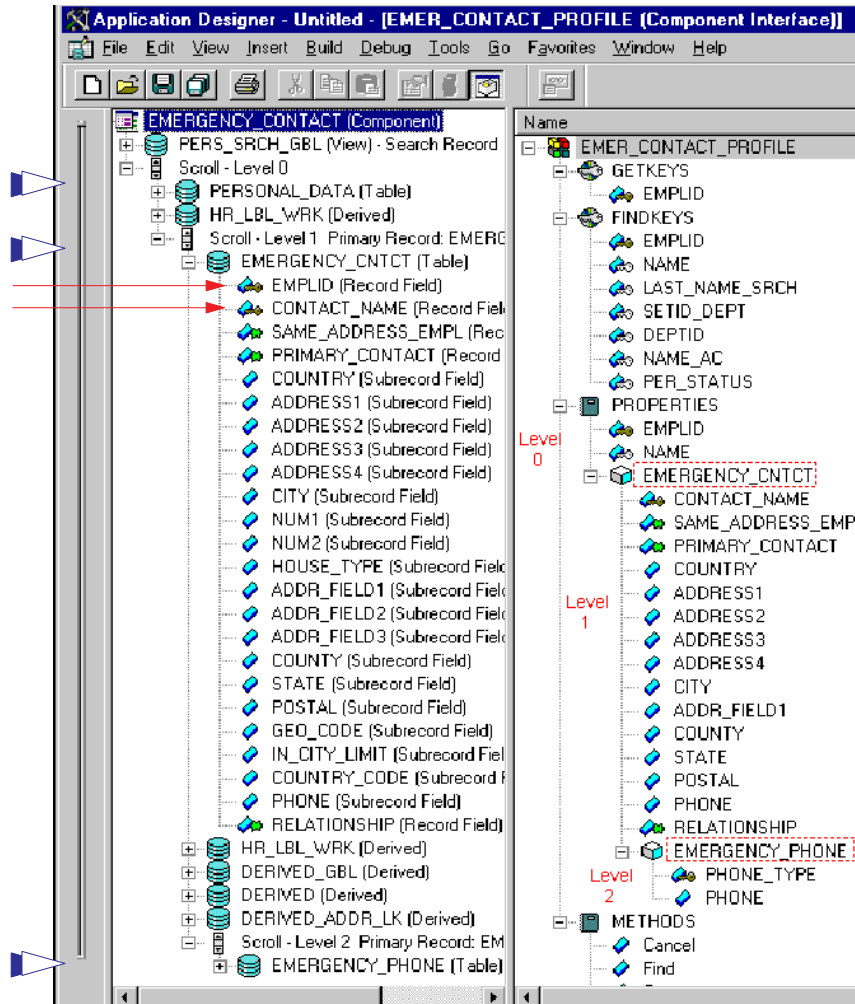


Figure 7. Example component interface

The three broad arrows in the left margin point to the tables (PERSONAL\_DATA, EMERGENCY\_CNTCT, and EMERGENCY\_PHONE) that store data for the Component Interface. The two narrow arrows point to the key icons that indicate the key fields (EMPLID and CONTACT\_NAME) of the EMERGENCY\_CNTCT table.

PeopleSoft designed Component Interfaces to expose desired elements of a Component to third parties, making the business process logic (such as the PeopleCode, Field Edits, and PeopleSoft Security) transparent to external integration applications. Therefore, the connector relies on the application for any processing between the Component Interface and the database.

This dependency causes certain limitations, such as the lack of Search dialog processing. Consequently, the SearchInit, SearchSave, and RowSelect events are never triggered, and any PeopleCode associated with them does not run. This limitation also extends to any PeopleCode events that are exclusively related to GUI or online processing, including Menu PeopleCode and pop-up menus.

Therefore, before you create a Component Interface for the connector, verify that no important behavior will be lost, and that all predetermined data is in place before the connector accesses it. You can implement some of this skipped behavior

as user-defined methods in the Component Interface or as Component-specific PeopleCode (such as the Pre-Build event). Failure to take these precautions can cause runtime errors.

To enable the connector to process the data represented by the EMER\_CONTACT\_PROFILE Component Interface, you must create PeopleSoft-specific business objects in the WebSphere business integration system.

### Example business object

Figure 8 illustrates a hierarchical PeopleSoft-specific business object that you can create in the WebSphere business integration system to represent the example Component Interface.

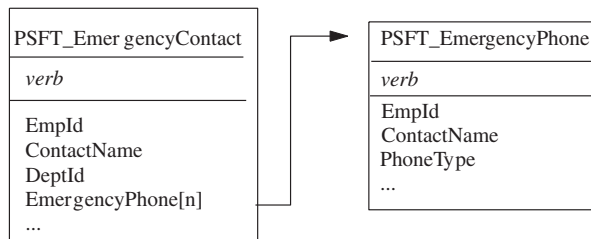


Figure 8. Example business objects

The PSFT\_EmergencyContact business object contains two simple attributes that represent the key field data: EmpId and ContactName. These attributes correspond to EMPLID and CONTACT\_NAME in the EMERGENCY\_CNTCT Record. PSFT\_EmergencyContact also has an array attribute (EmergencyPhone[n]) that represents the array of PSFT\_EmergencyPhone business objects.

The PSFT\_EmergencyPhone business object contains three simple attributes that represent the key field data: EmpId, ContactName, and PhoneType. The first two attributes serve as keys, uniquely identifying the parent business object. The third attribute uniquely distinguishes the child from other business objects in the same array.

---

## Creating a business object

To create a supported business object, perform the following steps:

1. Locate the Component that represents the event and transaction. If necessary, create one.
2. Use the PeopleSoft Application Designer to create a Component Interface from the Component in step 1.
3. Use PeopleSoftODA or Business Object Designer Express to create a corresponding PeopleSoft-specific business object. For more information about business objects, see “Business object attribute properties” on page 43 and “Business object application-specific information” on page 45. For more information about PeopleSoftODA, see Chapter 4, “Generating business object definitions using PeopleSoftODA,” on page 51.
4. Add the PeopleSoft-specific business object to the list of the connector’s supported business objects. For business-object subscription information specific to InterChange Server Express, see the broker’s implementation guide.

Use the PeopleSoft Application Designer to create a class structure from a Component Interface. The business object that corresponds to the Component Interface requires these classes to process the data; it is part of the PeopleSoft API.

To assist you in creating and using the generated classes, this section covers:

- “Generating APIs” on page 33
- “Example APIs” on page 33

## Generating APIs

To generate APIs from a Component Interface, do the following:

1. Open the Component Interface in the Application Designer.
2. Select the PeopleSoft APIs menu from the Build menu.
3. Select only the Java option, specifying the destination as:

```
Windows
%ProductDir%\connectors\PeopleSoft\dependencies

End of Windows
```

4. Compile the generated classes and verify that they are in the following directories:

*%ProductDirS%* directory:

Component Interface class files

*\connectors\PeopleSoft\dependencies\PeopleSoft\Generated\CompIntfc*

Session-specific class files

*\connectors\PeopleSoft\dependencies\PeopleSoft\Generated\PeopleSoft*

For a more detailed explanation of the API-generating process, including screen shots, see “Building the API files” on page 16.

## Example APIs

If you use the PeopleSoft APIs menu (a submenu of the Build menu) to create a class structure from the example EMER\_CONTACT\_PROFILE Component Interface, you have the following:

- *EmerContactProfile.class*—corresponds to the Component Interface  
The connector uses the name of this class to retrieve and instantiate the Component Interface in PeopleSoft. The classname is stored in the *CiName* property in the application-specific information at the business object level. For more information, see “Application-specific information at the business object level” on page 45.
- *EmerContactProfileEmergencyCntct.class*—corresponds to the EMERGENCY\_CNTCT Collection.
- *EmerContactProfileEmergencyCntctEmergencyPhone.class*—corresponds to the EMERGENCY\_PHONE Collection.

The generated methods that the connector uses are:

- “getFieldName() Method” on page 34
- “setFieldName() Method” on page 34
- “getCollectionName() Method” on page 34

- “CurrentItem() Method” on page 34
- “Item(index) Method” on page 35

## getFieldName() Method

Each of the generated classes contains the *getFieldName()* method, which enables the connector to get the data value of each simple field of the Component Interface, and load it into the corresponding business object attribute.

For example, as illustrated in the right half of Figure 7, there are seven fields listed as FINDKEYS for the EMER\_CONTACT\_PROFILE Component. These fields include EMPLID, NAME, and DEPTID. To get data from these fields, the connector uses the *getEmpId()*, *getName()*, and *getDeptId()* methods. After obtaining the values, the connector loads them into the *EmpId*, *ContactName*, and *DeptId* business object attributes.

To return the value of simple fields in a Collection, the connector first returns the Collection, and then returns the fields in it. For example, to get the values in the CONTACT\_NAME and SAME\_ADDRESS\_EMPL fields of the EMERGENCY\_CNTCT Collection, the connector first executes the *getEmergencyCntct()* method. Then it executes the *getContactName()* and *getSameAddressEmpl()* methods. For more information, see “getCollectionName() Method” on page 34.

## setFieldName() Method

Each of the generated classes contains the *setFieldName()* method, which enables the connector to set the data value of each simple field of the Component Interface based on the value of its corresponding business object attribute.

For example, to load data from the *EmpId*, *ContactName*, and *DeptId* business object attributes into the EMPLID, NAME, and DEPTID fields, the connector uses the *setEmpId()*, *setName()*, and *setDeptId()* methods.

## getCollectionName() Method

To return the Collection of emergency contacts for a given employee, the connector uses the *getEmergencyCntct()* method in the *EmerContactProfile* class. The way that the connector handles the multiple rows depends on the setting of application-specific information at the business-object level.

- If the EFFDT parameter evaluates to true, the connector uses the *CurrentItem()* method to return only the record with the latest effective date.
- If the EFFDT parameter evaluates to false, the connector uses the *Item(index)* method to return only the first record, regardless of the effective date. For example, the connector returns a future date, if one is listed.

For information about the EFFDT parameter, see “Application-specific information at the business object level” on page 45.

To return the Collection of phone types and phone numbers for each of an employee’s emergency contacts, the connector uses the *getEmergencyPhone()* method in the *EmerContactProfileEmergencyCntct* class. After obtaining all Records, the connector loads them into the business object’s array attribute, *EmergencyPhone[n]*.

## CurrentItem() Method

When retrieving the records in a Collection, the connector uses the *CurrentItem()* method in the *EmerContactProfile* class to return only the record with the latest

effective date. The connector uses this method only if the EFFDT parameter of the business-object level application-specific information evaluates to true.

## Item(index) Method

When retrieving the records in a Collection, to return only the record with the specified record number, the connector uses the `Item(index)` method in the `EmerContactProfile` class. The connector uses this method only if the EFFDT parameter of the business-object level application-specific information evaluates to false. By default, this method returns the first row retrieved.

---

## Business object verb processing

This section describes the following aspects of processing a business object's verbs:

- "Afterimages and deltas" on page 35, which defines the terms and explains how the connector works with afterimages.
- "Verb Processing for business object requests" on page 37, which explains the steps the connector takes when creating, retrieving, updating, or deleting a business object.
- "Committing data" on page 43, which briefly explains how the connector saves data.

## Afterimages and deltas

An afterimage is the state of a business object after all changes have been made to it. A delta is a business object used in an update operation that contains only key values and the data to be changed. This connector supports only afterimages, not business object deltas. When the connector receives a request business object for update, it assumes that the business object represents the desired state of the data after update.

Therefore, when the connector receives a request business object with the Update verb, it changes the current representation of the business object in the Component Interface so that it exactly matches the source business object. To do this, the connector changes simple attribute values and adds or removes child business objects.

For an example of how the connector modifies child business objects, assume that the `PSFT_EmergencyContact` business object has two additional attributes, one of which represents a single-cardinality child and the other of which represents an array of child business objects. Each child of the array can contain its own array of child business objects.

Figure 9 illustrates the current state of `PSFT_EmergencyContact` for an employee whose ID is 2345. The `ArrayData` attribute represents three Records (A, B, and C). The array attribute in two of these records represents two additional Records.

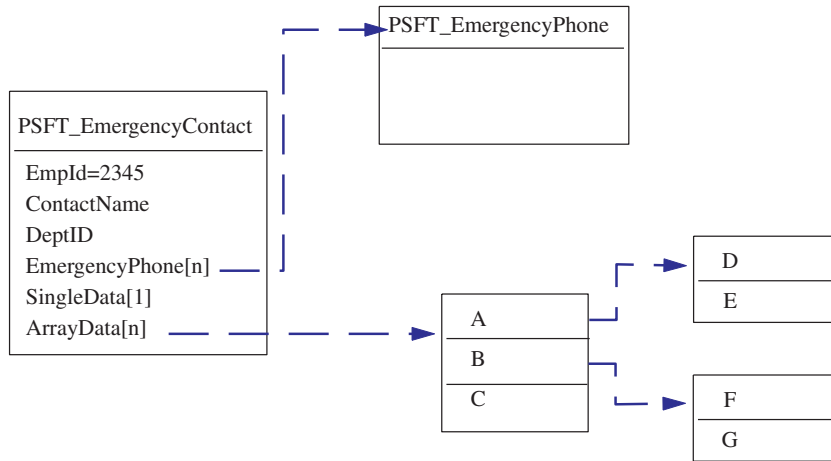


Figure 9. State of data prior to update

Figure 10 illustrates a business object request. This business object contains a new single-cardinality child business object and contains different business objects in its arrays.

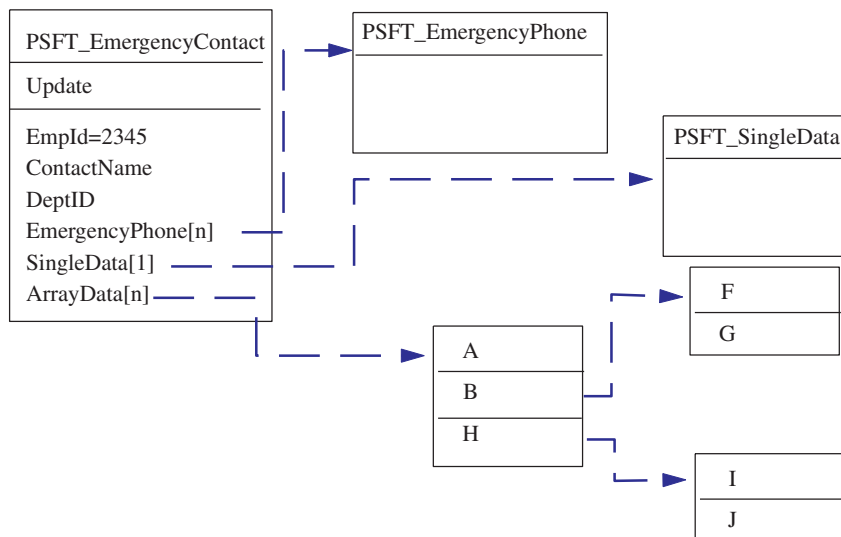


Figure 10. Data represented by an update request

To process the update, the connector applies the following changes to the Component Interface:

- Updates the simple attributes in the PSFT\_EmergencyContact and the PSFT\_EmergencyPhone business objects.
- Creates the PSFT\_SingleData business object.
- Updates the simple attributes in the child business objects A, B, F and G.
- Deletes the child business objects C, D and E.
- Creates the child business objects H, I and J.

Because the connector assumes that each request business object it receives represents an afterimage, it is important that each business object sent to the connector for updating contains all valid existing child business objects. Even if none of a child business object's simple attributes have changed, the child business object must be included in the source business object.

There is a way, however, that you can prevent the connector from deleting missing child business objects during an update operation. To instruct the connector to keep child business objects that are not included in the source business object, use the application-specific information for the attribute that represents the child or array of children. To do so, set `KeepRelationship` to true. For more information, see "Application-specific information at the attribute level" on page 47.

## Verb Processing for business object requests

This section outlines the steps the connector takes when creating, retrieving, updating, or deleting a business object that it receives as a request. The connector processes hierarchical business objects recursively; that is, it performs the same steps for each child business object until it has processed all individual business objects.

### Business object comparison

At various points in the processing outlined below, the connector compares two business objects to see if they are the same. For example, during an update operation, the connector determines whether a particular business object exists in an array of business objects. To perform the check, the connector compares the business object to each business object within the array. For two business objects to be identical, the following two conditions must be satisfied:

- The type of the business objects being compared must be the same. For example, a `PSFT_Customer` business object is never considered identical to a `PSFT_Contact` business object even if all of their attributes are exactly the same.
- All corresponding key attributes in the two business objects must contain identical values. If a key attribute is set to `CxIgnore` in both business objects, the connector considers them identical. However, if a key attribute is set to `CxIgnore` in one business object but not in the other, the business objects are not identical.

### Create operations

When creating a business object, the connector returns a status of either `VALCHANGE` if the operation was successful (regardless of whether the operation caused changes to the business object), or `FAIL` if the operation failed.

The connector performs the following steps when creating a hierarchical business object:

1. Creates a new instance of a Component Interface for the top-level business object.
  - Uses PeopleSoft's `SetFieldName(value)` method to populate properties in the Component Interface with values from attributes in the business object.

**Important:** If the UID parameter of a key attribute's application-specific information evaluates to false, the business process that creates the business object must provide a new unique ID value for the attribute. If the business object does not have the required value, the connector logs an error.

If the UID parameter of a key attribute's application-specific information evaluates to true, the application is responsible for



generating a unique ID. In this case, the attribute's value or the Default Value property must contain the string NEXT. In other words, if the business process that creates the business object does not populate its value as NEXT, this value must be specified in the attribute's Default Value property. If the business object uses the Default Value property to provide the String NEXT, the connector's UseDefaults property must evaluate to true. For more information, see "UseDefaults" on page 22.

If a unique identifier is not provided for the attribute's value, and the string NEXT is not specified in the Default Value property, the application logs a duplicate-key error.

- Verifies that all Required attributes contain a value, and throws an error if such a value is missing. For more information on Required attributes, see "Required property" on page 43.
2. Recursively inserts each child business object and each array of child business objects into the Component Interface. In other words, the connector creates the child and all child business objects that the child and its children contain.

**Note:** If the business object definition for an attribute that represents a single-cardinality child business object specifies that the child is required (that is, its Required property evaluates to true), the retrieval must return a row. If it does not return a row, the connector returns an error and stops processing. However, if the child is not required and the attribute is empty, the connector ignores the attribute.

3. The connector calls the Save() method, which writes and commits the data.
  - If the connector is generating the unique ID, the generation occurs as this method executes.
  - If the application is generating the unique ID, the connector retrieves the key values set by the application after this method executes.

**Note:** Because InterChange Server Express is the integration broker, the ID must be delivered synchronously because InterChange Server Express requires the ID to cross-reference the business object.

- If setInteractiveMode is defined as false in the business object's application-specific information, all PeopleCode editing occurs at this point. Any PeopleCode errors are published to the PSMessage collection queue.
- If an instance of the Component Interface already exists with the same key values, the application returns a duplicate-key error, and the connector sends the FAIL return code.

For more information on attribute properties, see "Business object attribute properties" on page 43. For more information on specifying application-specific information, see "Application-specific information at the attribute level" on page 47.

## Retrieve operations

When retrieving a business object, the connector returns a status either of VALCHANGE if the operation was successful (regardless of whether the operation caused changes to the business object), or FAIL if the operation failed.

The connector performs the following steps when retrieving a hierarchical business object:



1. Removes all child business objects from the top-level business object that it received from InterChange Server Express.
2. Retrieves the Component Interface that corresponds to the top-level business object.

The connector uses the key values in the source business object to instantiate the Component Interface. The result of the retrieval causes one of the following actions:

- If it finds a Component Interface instance, the connector continues processing.
- If it does not find a Component Interface instance, indicating that the top-level business object does not have a corresponding Component Interface in the application, the connector returns FAIL.
- If it finds multiple Component Interface instances, the connector returns MULTIPLE\_HITS.

**Note:** A business object can contain attributes that do not correspond to any Component Interface property. During retrieval, the connector does not change such attributes in the top-level business object; they remain set to the values it received. For child business objects, the connector sets such attributes to their default values during retrieval.

3. Recursively retrieves all Collections of the Component Interface that correspond to business object arrays.

The connector uses the keys in each parent business object and the unique key of each child to select a data row from the Component Interface instance or Component Interface Collection. For each row returned, the connector performs the following actions:

- a. Creates a new individual business object of the correct type.
- b. Sets all of the current business object's attributes based on the values in the returned row.
- c. Recursively retrieves all of the current business object's children.
- d. Inserts the current business object with all of its children into the appropriate array of the parent.

**Note:** The connector does not enforce uniqueness when populating an array of business objects. It is the application's responsibility to ensure uniqueness. If the application returns duplicate child business objects, the connector returns duplicate children to InterChange Server Express.

4. Recursively retrieves the Collections for each of the top-level business object's single-cardinality children. The connector uses the keys in each parent business object and the unique key of each child to select a data row from the Component Interface instance or Component Interface Collection. The connector performs the following:

- a. If the business object's definition specifies that the child is required, the retrieval must return a row. If the child is not required and the retrieval returns no rows, indicating that the child does not exist in the Component Interface, the connector leaves the parent's single-cardinality attribute empty. If the retrieval returns more than one row, the retrieval fails.
- b. Recursively retrieves the Collections for all children contained by the child business object.
- c. Inserts the business object with all of its children into the appropriate attribute in the parent business object.

## RetrieveByContent operations

When retrieving a business object, the connector returns a status of VALCHANGE if the operation was successful (regardless of whether the operation caused changes to the business object), FAIL if the operation failed, or MULTIPLE\_HITS if the operation returned more than one row.

The connector performs the following steps when retrieving a hierarchical business object:

1. Removes all child business objects from the top-level business object that it received from InterChange Server Express.
2. Retrieves the Component Interface that corresponds to the top-level business object.

The connector uses the values of those attributes that are find keys in the source business object to instantiate the Component Interface. (For more information about specifying application-specific information for find key attributes, see “Application-specific information at the attribute level” on page 47.) The result of the retrieval causes one of the following actions:

- If it finds a Component Interface instance, the connector continues processing.
- If it does not find a Component Interface instance, indicating that the top-level business object does not have a corresponding Component Interface in the application, the connector returns FAIL.
- If it finds multiple Component Interface instances, the connector returns MULTIPLE\_HITS.

**Note:** A business object can contain attributes that do not correspond to any Component Interface property. During retrieval, the connector does not change such attributes in the top-level business object; they remain set to the values it received. For child business objects, the connector sets such attributes to their default values during retrieval.

3. Recursively retrieves all Collections of the Component Interface that correspond to business object arrays.

The connector uses the keys in each parent business object and the unique key of each child to select a data row from the Component Interface instance or Component Interface Collection. For each row returned, the connector performs the following actions:

- a. Creates a new individual business object of the correct type.
- b. Sets all of the current business object’s attributes based on the values in the returned row.
- c. Recursively retrieves all of the current business object’s children.
- d. Inserts the current business object with all of its children into the appropriate array of the parent.

**Note:** The connector does not enforce uniqueness when populating an array of business objects. It is the application’s responsibility to ensure uniqueness. If the application returns duplicate child business objects, the connector returns duplicate children to InterChange Server Express.

4. Recursively retrieves the Collections for each of the top-level business object’s single-cardinality children. The connector uses the keys in each parent business object and the unique key of each child to select a data row from the Component Interface instance or Component Interface Collection. The connector performs the following:

- a. If the business object's definition specifies that the child is required, the retrieval must return a row. If the child is not required and the retrieval returns no rows, indicating that the child does not exist in the Component Interface, the connector leaves the parent's single-cardinality attribute empty. If the retrieval returns more than one row, the retrieval fails.
- b. Recursively retrieves the Collections for all children contained by the child business object.
- c. Inserts the business object with all of its children into the appropriate attribute in the parent business object.

## Update operations

When updating a business object, the connector returns a status of either VALCHANGE if the operation was successful (regardless of whether the operation caused changes to the business object), or FAIL if the operation failed.

The connector performs the following steps when updating a hierarchical business object:

1. Uses the key values of the source business object to retrieve the corresponding Component Interface instance. The retrieved Component Interface is an accurate representation of the current state of the data in the PeopleSoft application.
  - If the retrieval fails, indicating that the top-level business object does not exist in the application, the connector returns BO\_DOES\_NOT\_EXIST.
  - If the retrieval succeeds, the connector compares the retrieved Component Interface to the source business object to determine which child business objects require changes in the Component Interface. The connector does not, however, compare values in the source business object's simple attributes to those in the retrieved Component Interface; the connector updates the value of all simple attributes.
2. Recursively updates all single-cardinality children of the top-level business object.

If the business object definition requires that an attribute contain a child business object, the child must exist in both the source business object and the retrieved Component Interface. If it does not, the update fails, and the connector returns an error.

The connector processes the update of single-cardinality child business objects in one of the following ways:

- If the child is present in both the source business object and the retrieved Component Interface, the connector recursively updates it in the Component Interface.

**Note:** The source business object and the retrieved Component Interface must match. If the two hierarchical objects contain the same single-cardinality ownership children in different order, the connector returns an error and stops processing.

- If the child is present in the source business object but not in the retrieved Component Interface, the connector recursively creates it in the Component Interface.

**Important:** If the UID parameter of a key attribute's application-specific information evaluates to false, the business process that creates the business object must provide a new unique ID value for the attribute. If the business object does not have the required value, the connector logs an error.

If the UID parameter of a key attribute's application-specific information evaluates to true, the application is responsible for generating a unique ID. In this case, the attribute's value or the Default Value property must contain the string NEXT. In other words, if the business process that creates the business object does not populate its value as NEXT, this value must be specified in the attribute's Default Value property. If the business object uses the Default Value property to provide the String NEXT, the connector's UseDefaults property must evaluate to true. For more information, see "UseDefaults" on page 22.

If a unique identifier is not provided for the attribute's value, and the string NEXT is not specified in the Default Value property, the application logs a duplicate-key error.

- If the child is present in the retrieved Component Interface but not in the source business object, the connector recursively deletes it from the Component Interface. However, if the KeepRelationship parameter of the parent's application-specific information evaluates to true, the connector preserves the child business object.

When deleting child business objects during an Update operation, the connector uses PeopleSoft's deleteItem() method to delete the corresponding Collection from the Component Interface instance. The connector physically or logically deletes only Collections that are at level 1 or higher.

For more information on specifying application-specific information, see "Application-specific information at the attribute level" on page 47.

3. Updates all simple attributes of the retrieved Component Interface except those whose corresponding attribute in the source business object contain the value CxIgnore.
4. Processes all arrays of the retrieved Component Interface in one of the following ways:
  - If a child exists in both the source business object's array and the retrieved Component Interface's array, the connector recursively updates it in the Component Interface.
  - If a child exists in the source array but not in the retrieved Component Interface's array, the connector recursively creates it in the Component Interface.
  - If the child exists in the retrieved Component Interface's array but not in the source array, the connector recursively deletes it from the Component Interface.

**Important:** The business process that creates the business object must ensure that multiple-cardinality business objects in the source business object are unique (that is, that an array does not contain two or more copies of the same business object). If the connector receives duplicates of a business object in a source array, it processes the business object twice, with possibly unpredictable results.

**Note:** The connector locks data while retrieving it to ensure data integrity.

## Delete operations

The connector does not delete a top-level business object. However, it does physically delete a child business object if its top-level business object uses the Update verb, and the child does not exist in the request business object that represents source data.

For more information, see “Update operations” on page 41.

## Committing data

Whenever the connector receives a business object for create or update processing, it either saves all changes to the Component Interface or none. The connector never saves subset of data changes.

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## Business object attribute properties

Business object architecture defines various properties that apply to attributes. This section describes how the connector interprets several of these properties and describes how to set them.

### Name property

Each business object attribute must have a unique name.

### Type property

Each business object attribute must have a type, such as Integer, String or the type of a child business object.

### Cardinality property

Each business object attribute that represents a child or array of child business objects has the value of 1 or n, respectively, in this attribute. All attributes that represent child business objects also have a `ContainedObjectVersion` property (which specifies the child’s version number) and a `Relationship` property (which specifies the value `Containment`).

### Key property

At least one simple attribute of each business object must be specified as the key. To do so, set this property to true.

**Note:** The connector does not support specifying an attribute that represents a child business object or an array of child business objects as a key attribute.

The connector uses each key attribute to uniquely identify or create an instance of a Component Interface. For information about causing the application to generate a unique ID, see “Create operations” on page 37 and “Update operations” on page 41.

### Required property

The Required property specifies whether a simple attribute or an attribute that represents a single-cardinality child business object must contain a value.

If this property is specified for an attribute that represents a single-cardinality child business object, the connector requires the parent business object to contain a child business object for this attribute.

When the connector receives a business object with a Create request, the connector causes the Create operation to fail if a required attribute does not have a valid value.

When the connector receives a business object with a Retrieve request and the business object does not have a valid value or a default value for a required attribute, the connector causes the retrieval operation to fail.

The connector does not use this property for attributes that represent an array of child business objects.

## Max length property

If the attribute is of type String, this property specifies the maximum length allowed for the attribute's value.

## AppSpecificInfo

For information on this property, see "Application-specific information at the attribute level" on page 47.

## Default value property

This property specifies a default value that the connector uses to populate a simple field if the attribute does not contain a value. The connector does not evaluate this property for attributes that represent child business objects. For a create operation, the connector uses the value of this property only if its UseDefaults property evaluates to true. For more information, see "UseDefaults" on page 22.

The connector sends the value of this property to the application to use in identifier-generation if the following is true:

- The Default Value property is specified for a key attribute whose application-specific information specifies true in its UID parameter
- The value of the Default Value property is the string NEXT
- The connector's UseDefaults property evaluates to true

For information about causing the application to generate a unique ID, see "Create operations" on page 37 and "Update operations" on page 41.

## Special attribute value

Simple attributes in business object can have a special value: CxIgnore. When the connector receives a request business object, the connector ignores all attributes with a value of CxIgnore. It is as if those attributes were invisible to the connector.

When the connector retrieves data from a Component Interface with a field that contains a null value, the connector sets the value of its corresponding attribute to CxIgnore by default.

Because the connector requires at least one key attribute to create a business object, the business process that creates the business object should ensure that business objects passed to the connector have at least one key that is not set to CxIgnore. The only exception to this requirement is a business object whose key is to be generated by the connector.

---

## Business object application-specific information

Application-specific information in business object definitions provides the connector with application-dependent instructions on how to process business objects. The connector parses the application-specific information from the attributes or verb of a business object or from the business object itself to generate queries for Create, Update, Retrieve, and Delete operations.

The connector stores some of the business object's application-specific information in cache and uses this information to build queries for all the verbs.

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.

This section provides information on the application-specific information format for business objects supported by the connector.

Table 6 provides an overview of the functionality available in business object application-specific information.

*Table 6. Overview of application-specific information in supported business objects*

---

| Scope of application-specific information | Functionality  |
|---|--|
| Entire business object                    | Specifies: <ul style="list-style-type: none"><li>• The name of the corresponding Component Interface</li><li>• Whether triggering of online Field PeopleCode edits is immediate or batch</li><li>• Whether all rows associated with component interface are retrieved or only the most recent instance</li></ul> |
| Simple attributes                         | Specifies: <ul style="list-style-type: none"><li>• Whether the application generates unique identifier values or whether the connector provides them</li><li>• Whether an attribute should be used as a key for retrieving data</li></ul>  |
| Business object verb                      | The connector does not specify functionality based on the verb.  |

---

The following sections discuss this functionality in more detail.

### Application-specific information at the business object level

Application-specific information at the business-object level allows you to:

- Specify the name of the corresponding Component Interface.
- Define whether online Field PeopleCode triggers immediately after update or during save() method
- Indicate whether or not all rows from a Component Interface are retrieved regardless of effective date.

At the business-object level, application-specific information format consists of four parameters separated by a colon (:) delimiter. The format is:

```
cIName=<ComponentInterface>
:EFFDT=[true|false]:setInteractiveMode=[true|false]:GetHistoryItems
=[true|false]:setEditHistoryItems=[true|false]
:GetDummyRows=[true|false]:InsAt01destEffDtPos=[true]
:InsAtCurrentEffDtPos=[true]
```



Table 7 describes these parameters.

*Table 7. AppSpecificInfo at the business-object level*

| AppSpecificInfo parameter | Description   |
|---------------------------|---|
| cIName                    | Specifies the name of the Component Interface defined in the PeopleSoft application.  |
| EFFDT (isEffectiveDated)  | <p>Specifies whether the business object (or child business object) uses an Effective Date:</p> <ul style="list-style-type: none"> <li>• If the EFFDT parameter evaluates to true, the connector uses the <code>CurrentItem()</code> method to return only the record with the latest effective date.</li> <li>• If the EFFDT parameter evaluates to false, the connector uses the <code>Item(index)</code> method to return only the first record, regardless of the effective date. For example, the connector returns a future date, if one is listed.</li> </ul> <p>The default value is true.</p>  |
| setInteractiveMode        | <p>Determines when the connector sends changes to the Application Server. This property is typically used to enhance performance.</p> <ul style="list-style-type: none"> <li>• When set to true, the connector processes each time the value of a property or attribute changes; in other words, all online Field PeopleCode immediately triggers after the connector calls <code>setPropertyName()</code> on each attribute.</li> <li>• When set to false, the PeopleSoft application batches the processing, sending changes to the Application Server only when the connector calls <code>Save()</code> on a Component Interface.</li> </ul> <p>The default value is true.</p> |
| GetHistoryItems           | <p>Determines how much data the connector retrieves.</p> <ul style="list-style-type: none"> <li>• When set to true, the connector retrieves all data rows, regardless of effective date, for the corresponding Component Interface.</li> <li>• When set to false, the connector retrieves only the current data (the effective row).</li> </ul> <p>The default value is true.</p>   |
| GetDummyRows              | <p>Supports the <code>GetDummyRows</code> property in PeopleTools 8.4 and higher. Do not set this if you are using older versions of PeopleTools. For information about this property, see your PeopleSoft documentation.</p>   |
| InsAtOldestEffDtPos       | <p>This parameter is provided to address limitations in older versions of PeopleTools where the call <code>getEffectiveItemNum()</code> returns an insert position of -1 for effective-dated rows. When <code>InsAtOldestEffDtPos</code> is set, the connector inserts the row at the highest index, which has the oldest effective date. If you set this parameter, do not set <code>InsAtCurrentEffDtPos</code>.</p>  |
| InsAtCurrentEffDtPos      | <p>This parameter is provided to address limitations in older versions of PeopleTools where the call <code>getEffectiveItemNum()</code> returns an insert position of -1 for effective-dated rows. When <code>InsAtCurrentEffDtPos</code> is set, the connector inserts the row at the lowest index zero, which has the current effective date. If you set this parameter, do not set <code>InsAtOldestEffDtPos</code>.</p>   |
| SetEditHistoryItems       | <p>Enables editing and saving of history data. Applies to effective-dated fields only.</p>  |

For more information about the `setInteractiveMode` and `GetHistoryItems` properties, see the documentation from PeopleSoft.



For example, the PSFT\_EmergencyContact business object might have the following value specified for its business object application-specific information:

```
cINAME=EMER_CONTACT_PROFILE:setInteractiveMode=false:
GetHistoryItems=true:isEffectiveDated=false
```

## Application-specific information at the attribute level

Application-specific information at the attribute level specifies the connector's behavior on an attribute-by-attribute level. The format of the application-specific information is a set of five name-value parameters, each of which includes the parameter name and its value. Each parameter set is separated from the next by a colon (:) delimiter. A vertical bar (|) separates the members of a set of options. The format is:

```
get=getFieldName:set=setFieldName:UID=[true|false]:GetKey=[true|false]:KeepRelationship=[true|false]:findKey=[true|false]:bigDec=true:EFFDT=[true|false]:EFFDTSEQ=[true|false]
```

**Important:** Case is significant when the connector evaluates application-specific information.

For example, for a Read-Only simple attribute that should be used in addition to the key fields when retrieving data, you might specify the following format:

```
get=getBusinessUnit:GetKey=true
```

For a multiple-cardinality attribute whose children should be preserved even if they are not included in an Update business object request, you might specify the following format:

```
get=getEmergencyPhone:set=setEmergencyPhone:KeepRelationship=true
```

Table 8 describes each name-value parameter.

*Table 8. Name-value parameters in attribute application-specific information*

| Parameter                     | Description  |
|-------------------------------|--|
| <code>get=getFieldName</code> | This parameter specifies the method to use when retrieving a value from a Component Interface field or Component Interface Collection to the current attribute.                |
| <code>set=setFieldName</code> | This parameter specifies the method to use when setting a value in a Component Interface field or Component Interface Collection, based on the value in the current attribute. |

Table 8. Name-value parameters in attribute application-specific information (continued)

| Parameter             | Description  |
|-----------------------|--|
| UID=[true   false]    | <p data-bbox="673 258 1429 367">If this parameter is set to false, a unique value for the attribute must be provided by the business process that creates the business object. If the attribute does not contain a value, the connector sends an error message.</p> <p data-bbox="673 399 1429 651">If this parameter is set to true, the application is responsible for generating a unique ID (using auto-numbering). Identifier generation requires the attribute's value to contain the String NEXT. The business process that creates the business object must populate its value as NEXT, or this value can be specified in the attribute's Default Value property. If the business object uses the Default Value property to provide the String NEXT, the connector's UseDefaults property must evaluate to true. For more information, see "UseDefaults" on page 22.</p> <p data-bbox="673 682 1429 791">If the key value is set to anything other than varchar, and you want the application to generate the IDs, leave the value blank and UID=True. Only set the value to NEXT when the key value is set to a varchar datatype.</p> <p data-bbox="673 823 1429 905">When the application generates the unique ID, the connector retrieves the generated ID from the application after the Save operation completes and the data has been committed.</p> <p data-bbox="673 936 1429 1018">When InterChange Server Express is InterChange Server Express, the connector uses the retrieved ID in cross-referencing the business object.</p> |
| GetKey=[true   false] | <p data-bbox="673 1047 1429 1129">If an attribute does not require the application to generate a unique ID, set this value to false, or do not include this parameter in the application-specific information.</p> <p data-bbox="673 1140 1429 1222">If this parameter is set to true and the attribute's Key and Required properties evaluate to true, the connector includes the attribute as part of the key during a retrieve or retrieve-for-update operation.</p> <p data-bbox="673 1253 1429 1446">The connector uses this parameter to differentiate a retrieval key from a create key when a distinction is necessary. When executing a create operation, the connector provides as keys only those attributes whose Key and Required properties evaluate to true. Because the create-key fields alone do not always uniquely retrieve required data, the connector adds to the keys all attributes whose GetKey parameter evaluates to true when it executes a retrieve operation.</p>   |

Table 8. Name-value parameters in attribute application-specific information (continued)

| Parameter                       | Description   |
|---------------------------------|---|
| KeepRelationship=[true   false] | <p>Used only on an attribute that represents an array of child business objects, this parameter specifies whether the connector deletes existing child business objects that are not represented in the source business object during an update operation.</p> <ul style="list-style-type: none"> <li>• Set to true to prevent deletion.</li> <li>• Set to false to allow deletion.</li> </ul> <p>For example, assume an existing phone number is associated with an existing contact. Assume further that the connector receives a request to update a PSFT_EmergencyContact business object that contains a single child business object. The child associates an emergency phone number with the contact. If KeepRelationship evaluates to true for the EmergencyPhone[n] attribute, the connector updates the contact by adding its new association without deleting its existing association.</p> <p>However, if KeepRelationship evaluates to false, the connector deletes all existing child data that is not contained in the source business object. In such a case, the contact is associated only with the new phone number.</p> |
| findKey=[true   false]          | <p>If this parameter is set to true, the connector includes the attribute as a key during a retrieve-by-content operation. Set this parameter for attributes that are find keys in the Component Interface.</p>   |
| bigDec=[true   false]           | <p>This parameter identifies bigdecimal type attributes. Set this parameter to true for bigdecimal attributes in the Component Interface.</p>   |
| EFFDT=[true   false]            | <p>This parameter identifies effective-dated attributes in the Component Interface. The connector only uses this if, at the business object level, application-specific information has EFFDT set to true.</p>  |
| EFFDTSEQ=[true   false]         | <p>This parameter identifies the sequence of effective-dated attributes based on which insert position getEffectiveItemNum returns. The connector only uses this if the business object definition includes an effective-dated attribute.</p>   |



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## Chapter 4. Generating business object definitions using PeopleSoftODA

This chapter describes PeopleSoftODA, an object discovery agent (ODA), that generates business object definitions for the Adapter for PeopleSoft. Because the connector works with objects that are based on PeopleSoft Component Interfaces and their associated Collections, PeopleSoftODA uses the Component Interface Java API to discover business object requirements specific to the PeopleSoft data source.

This chapter contains the following sections:

- “Installation and usage”
- “Using PeopleSoftODA in Business Object Designer Express” on page 54
- “Contents of the generated definition” on page 61
- “Sample business object definition file” on page 64
- “Modifying information in the business object definition” on page 69

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### Installation and usage

This section discusses the following:

- “Installing PeopleSoftODA”
- “Before using PeopleSoftODA” on page 51
- “Launching PeopleSoftODA” on page 52
- “Running multiple instances of PeopleSoftODA” on page 53
- “Working with error and trace message files” on page 53

### Installing PeopleSoftODA

To install PeopleSoftODA, use Installer for IBM WebSphere Business Integration Server Express Plus Adapters. Follow the instructions in the *Installation Guide for WebSphere Business Integration Server Express*. When the installation is complete, the following files are installed in the product directory on your system:

- ODA\PeopleSoft\PeopleSoftODA.jar
- ODA\messages\PeopleSoftODAAgent.txt
- ODA\messages\PeopleSoftODAAgent\_*ll*\_*TT*.txt files (message files specific to a language (*ll*) and a country or territory (*TT*))
- ODA\PeopleSoft\start\_PeopleSoftODA.bat (Windows only)

**Note:** Except as otherwise noted, this document uses backslashes (\) as the convention for directory paths. All product pathnames are relative to the directory where product is installed on your system.

### Before using PeopleSoftODA

Before you run PeopleSoftODA, verify that your system has the required files and that the variables are correctly set in the script or batch file that runs the ODA. This chapter assumes that you have already followed the instructions for installing the connector. As part of the connector’s installation, you should have followed instructions in the following sections:

- “Required software for using the connector” on page 11—for information on downloading psjoa.jar
- “Enabling the application for the connector” on page 14—for information on creating PSFTCI.jar

Therefore, you should find the following files in the connectors\PeopleSoft\dependencies directory below the product directory:

- psjoa.jar—Downloaded from \web\PSJOA in the PS\_HOME directory. PeopleSoftODA uses this file to synchronously send Component Interfaces and their information through the Jolt portion of the PeopleSoft Application Server.
- PSFTCI.jar—Created from Component Interface definitions in the Application Designer. You must compile the Component Interface API files after you generate them in PeopleSoft. PeopleSoftODA uses this file to generate business object definitions. For more information, see “Generating APIs” on page 33.

**Important:** It is recommended that you regenerate and recompile all component interfaces prior to running PeopleSoftODA to assure consistency. If the component interfaces are not in a jar file, or if either of the above jar files are not in the correct directory, modify the start script or batch file to locate them.

Open for editing the shell or batch file and confirm that the values described in Table 9 are correct.

Table 9. Shell and batch file configuration variables

| Variable      | Explanation                | Example  |
|---------------|----------------------------|--|
| set AGENTNAME | Name of the ODA            | set AGENTNAME = PeopleSoftODA  |
| set AGENT     | Name of the ODA’s jar file | <b>WINDOWS:</b> set AGENT = %ProductDirS%\ODA\PeopleSoft\PeopleSoftODA.jar |

**Note:** If you register PeopleSoftODA as a CORBA object or with an Object Activation Daemon (OAD), you can modify the class path for the PeopleSoft driver through the object discovery agent registration wizard. For information on registering the ODA, see the *Installation Guide for WebSphere Business Integration Server Express*.

After installing the PeopleSoft driver and setting configuration values in the shell or batch file, you must do the following to generate business objects:

1. Launch the ODA.
2. Launch Business Object Designer Express.
3. Follow a six-step process in Business Object Designer Express to configure and run the ODA.

The following sections describe these steps in detail.

## Launching PeopleSoftODA

Launch the PeopleSoftODA with this script:

- 

```
start_PeopleSoftODA.bat
```

You configure and run PeopleSoftODA using Business Object Designer Express. Business Object Designer Express locates each ODA by the name specified in the AGENTNAME variable of each script or batch file. The default ODA name for this connector is PeopleSoftODA. During installation, if you register the ODA with an Object Activation Daemon, the wizard automatically prefixes the hostname to the AGENTNAME value to make it unique.

## Running multiple instances of PeopleSoftODA

It is recommended that you change the name of the ODA when you run multiple instances of it. To create additional uniquely named instances of PeopleSoftODA:

- Create a separate script or batch file for each instance.
- Specify a unique name in the AGENTNAME variable of each script or batch file.

It is recommended that you prefix each name with the name of the host machine when you run ODA instances on different machines. If you registered the ODA with an Object Activation Daemon, you can use an ORB finder (osfind) to locate existing CORBA object names on your network.

Figure 11 on page 55 illustrates the window in Business Object Designer Express from which you select the ODA to run.

**Note:** The connection properties must be the same for each particular ODA instance. Each additional ODA instance must connect to application server instance to which it first connected.

## Working with error and trace message files

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

AgentNameAgent.txt

If you create multiple instances of the ODA script or batch file and provide a unique name for each represented ODA, you can have a message file for each ODA instance. Alternatively, you can have differently named ODAs use the same message file. There are two ways to specify a valid message file:

- If you change the name of an ODA and do not create a message file for it, you must change the name of the message file in Business Object Designer Express as part of ODA configuration. Business Object Designer Express provides a name for the message file but does not actually create the file. If the file displayed as part of ODA configuration does not exist, change the value to point to an existing file.
- You can copy the existing message file for a specific ODA, and modify it as required. Business Object Designer Express assumes you name each file according to the naming convention. For example, if the AGENTNAME variable specifies PeopleSoftODA1, the tool assumes that the name of the associated message file is PeopleSoftODA1Agent.txt. Therefore, when Business Object Designer Express provides the filename for verification as part of ODA configuration, the filename is based on the ODA name. Verify that the default message file is named correctly, and correct it as necessary.

**Important:** 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 initialization properties” on page 55.

During the configuration process, you specify:

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

Table 10 describes these values.

*Table 10. Tracing levels*

| Trace Level | Description   |
|-------------|---|
| 0           | Logs all errors   |
| 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 details of all spawned threads   |
| 5           | • Indicates the ODA initialization values for all of its properties • Traces a detailed status of each thread that PeopleSoftODA spawned • Traces the business object definition dump |

For information on where you configure these values, see “Configure initialization properties” on page 55.

---

## Using PeopleSoftODA in Business Object Designer Express

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

After you launch an ODA, you must launch Business Object Designer Express to configure and run it. There are six steps in Business Object Designer Express to generate business object definitions using an ODA. Business Object Designer Express provides a wizard that guides you through each of these steps.

After starting the ODA, do the following to start the wizard:

1. Open Business Object Designer Express.
2. From the File menu, select the New Using ODA... submenu.  
Business Object Designer Express displays the first window in the wizard, named Select Agent. Figure 11 on page 55 illustrates this window.

To select, configure, and run the ODA, follow these steps:

1. “Select the ODA” on page 55
2. “Configure initialization properties” on page 55
3. “Expand nodes and select component interfaces and collections” on page 57
4. “Confirm selection of objects” on page 58
5. “Generate the definition” on page 59 and, optionally, “Provide additional information” on page 59



6. "Save the definition" on page 60

## Select the ODA

Figure 11 illustrates the first dialog box in Business Object Designer Express's six-step wizard. From this window, select the ODA to run.

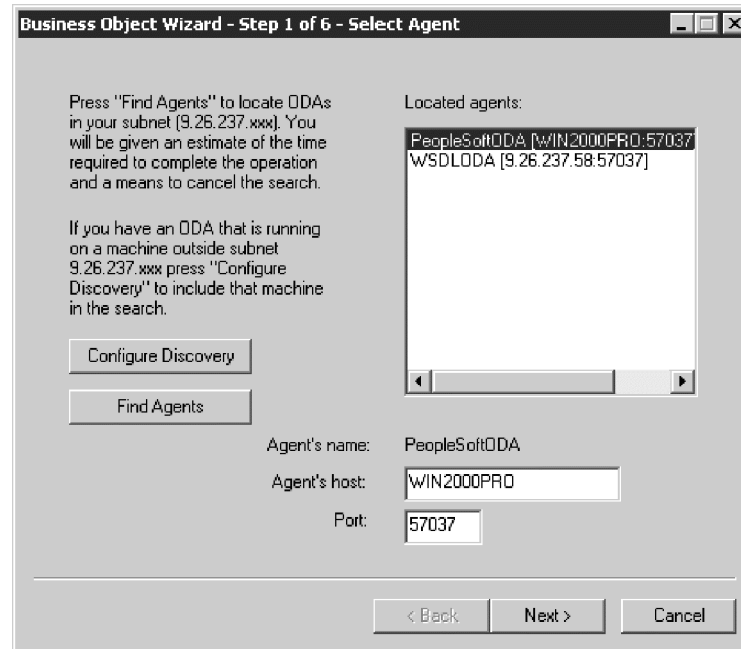


Figure 11. Selecting the ODA

To select the ODA:

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

**Note:** If Business Object Designer Express does not locate your desired ODA, check the setup of the ODA.

2. Select the desired ODA from the displayed list.

Business Object Designer Express displays your selection in the Agent's name field.

## Configure initialization properties

The first time Business Object Designer Express communicates with PeopleSoftODA, it prompts you to enter a set of initialization properties as shown in Figure 12. You can save these properties in a named profile so that you do not need to re-enter them each time you use PeopleSoftODA. For information on specifying an ODA profile, see the *Business Object Development Guide*.

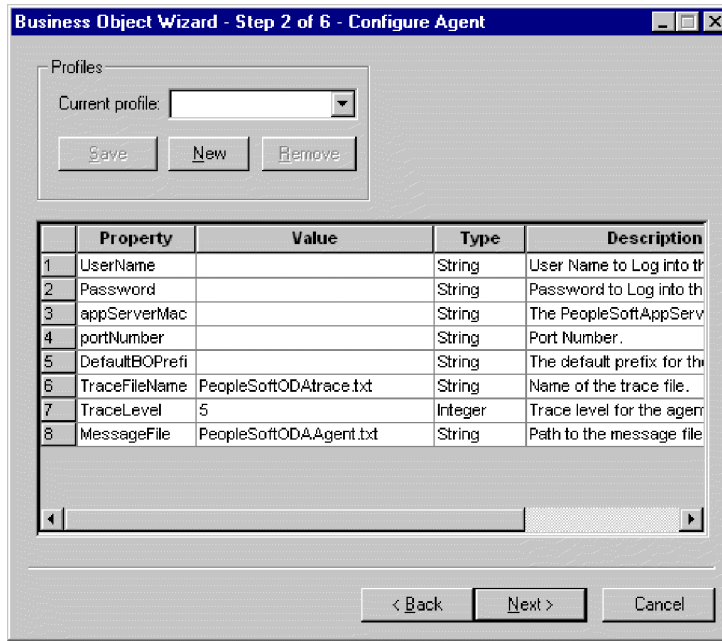


Figure 12. Configuring agent initialization properties

Configure the PeopleSoftODA properties described in Table 11.

Table 11. PeopleSoftODA properties

| Row number | Property name        | Property type | Description  |
|------------|----------------------|---------------|--|
| 1          | UserName             | String        | Name of the user with authorization to connect to the PeopleSoft application using the Application Server  |
| 2          | Password             | String        | Password of the user with authorization to connect to the PeopleSoft application   |
| 3          | AppServerMachineName | String        | Name or IP address of the machine on which the PeopleSoft Server is running  |
| 4          | PortNumber           | String        | The Jolt port used to connect to the Application Server. The default value is 9000. Note: This port is different from the Tuxedo port.   |
| 5          | DefaultBOPrefix      | String        | Text that is prepended to the name of the business object to make it unique. The prefix cannot begin with an underscore (_). You can change this value later, if required, when Business Object Designer Express prompts you for business object properties. For more information, see "Provide additional information" on page 59.  |
| 6          | TraceFileName        | String        | File into which PeopleSoftODA writes trace information. If the file does not exist, PeopleSoftODA creates it in the \ODA\PeopleSoft directory. If the file already exists, PeopleSoftODA appends to it. PeopleSoftODA names the file according to the naming convention. For example, if the agent is named PeopleSoftODA, it generates a trace file named PeopleSoftODAttrace.txt. Use this property to specify a different name for this file. |
| 7          | TraceLevel           | Integer       | Level of tracing enabled for PeopleSoftODA. For more information, see "Working with error and trace message files" on page 53.   |

Table 11. PeopleSoftODA properties (continued)

| Row number | Property name | Property type | Description  |
|------------|---------------|---------------|--|
| 8          | MessageFile   | String        | Name of the error and message file. PeopleSoftODA displays the filename according to the naming convention. For example, if the agent is named PeopleSoftODA, the value of the message file property displays as PeopleSoftODAAgent.txt. <b>Important:</b> The error and message file must be located in the \ODA\messages directory. Use this property to verify or specify an existing file. |

**Important:** Correct the name of the message file if the default value displayed in Business Object Designer Express represents a non-existent file. If the name is not correct when you move forward from this dialog box, Business Object Designer Express displays an error message in the window from which the ODA was launched. This message does not popup in Business Object Designer Express. Failing to specify a valid message file causes the ODA to run without messages.

## Expand nodes and select component interfaces and collections

Business Object Designer Express uses the properties configured in the previous step to create a connect string that connects the tool to the specified PeopleSoft application. After connecting, Business Object Designer Express displays a tree whose nodes represent all the Component Interfaces defined in the PeopleSoft application.

Click on a node to display the next-level Collection of the Component Interface. You can expand the Component Interfaces to display the entire hierarchical representation. For each Collection, PeopleSoftODA creates a child business object definition.

Figure 13 illustrates this dialog box with some Component Interfaces expanded.

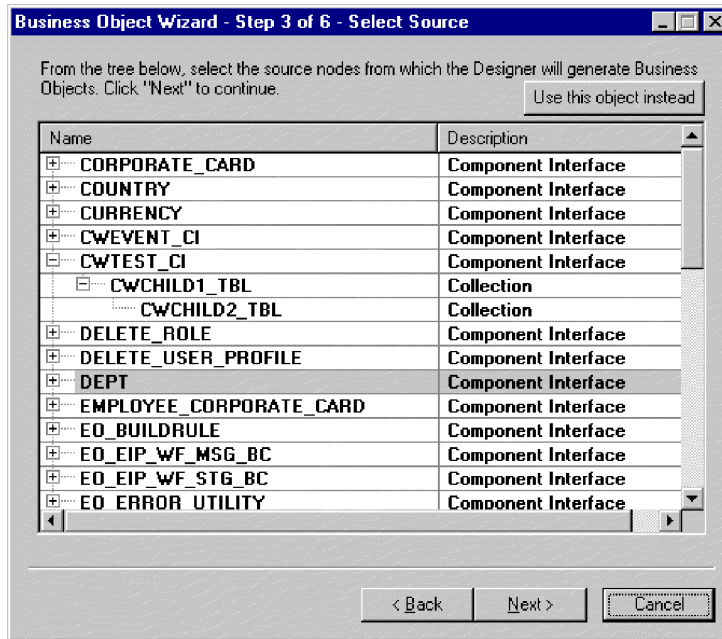


Figure 13. Tree of component interfaces with expanded nodes

Select all required Component Interfaces, along with all necessary Collections, and click Next.

## Confirm selection of objects

After you identify all the Component Interfaces and Collections to be associated with the generated business object definitions, Business Object Designer Express displays the dialog box with only the selected objects. Figure 14 illustrates this dialog box.

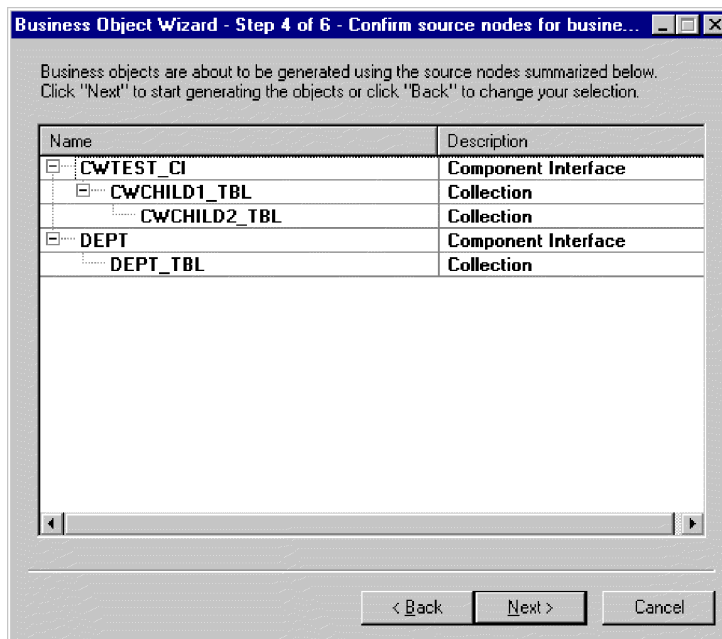


Figure 14. Confirming selection of objects

This window provides the following options:

- To confirm the selection, click Next.
- If the selection is not correct, click Back to return to the previous window and make the necessary changes. When the selection is correct, click Next.

## Generate the definition

After you confirm the Component Interfaces and Collections, the next dialog box informs you that Business Object Designer Express is generating the definitions. If a large number of Component Interfaces has been selected, this generation step can take time.

Figure 15 illustrates this dialog box.

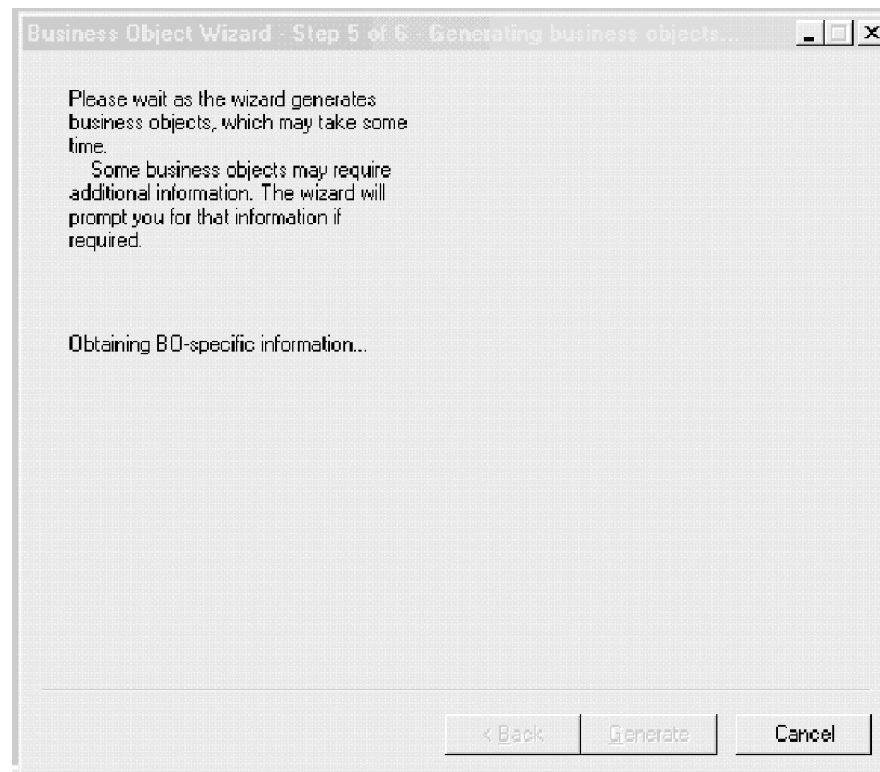


Figure 15. Generating the definition

## Provide additional information

If the PeopleSoftODA needs additional information, Business Object Designer Express displays the BO Properties window, which prompts you for the information. Figure 16 illustrates this dialog box.

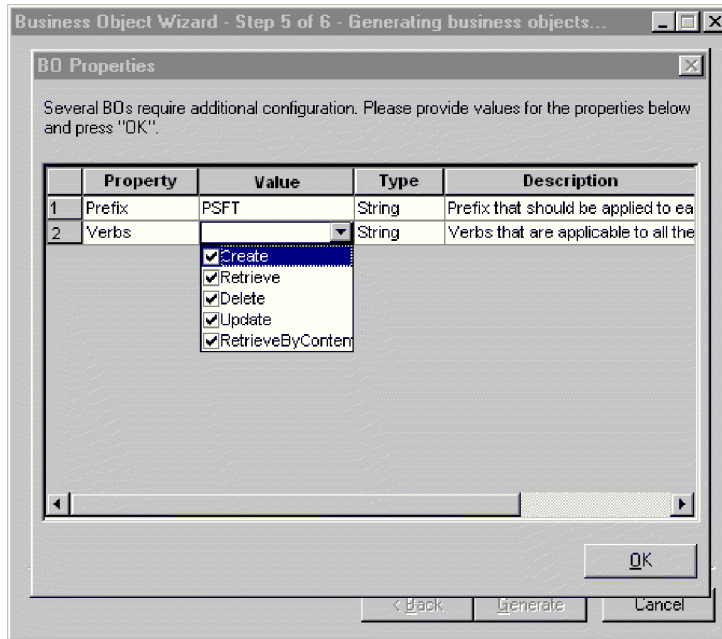


Figure 16. Providing additional Information

In the BO Properties window, enter or change the following information:

- *Prefix*—The text that is prepended to the name of the business object to make it unique. If you are satisfied with the value you entered for the *DefaultBOPrefix* property in the Configure Agent window (Figure 12 on page 56), you do not need to change the value here.
- *Verbs*— Click in the *Value* field and select one or more verbs from the pop-up menu. These are the verbs supported by the business object.

**Note:** If a field in the BO Properties dialog box has multiple values, the field appears to be empty when the dialog box first displays. Click in the field to display a drop-down list of its values.

## Save the definition

After you provide all required information in the BO Properties dialog box and click OK, Business Object Designer Express displays the final dialog box in the wizard. In this dialog box, you can save the definition to the server or to a file, or you can open the definition for editing in Business Object Designer Express. For more information, and to make further modifications, see the *Business Object Development Guide*.

Figure 17 illustrates this dialog box.

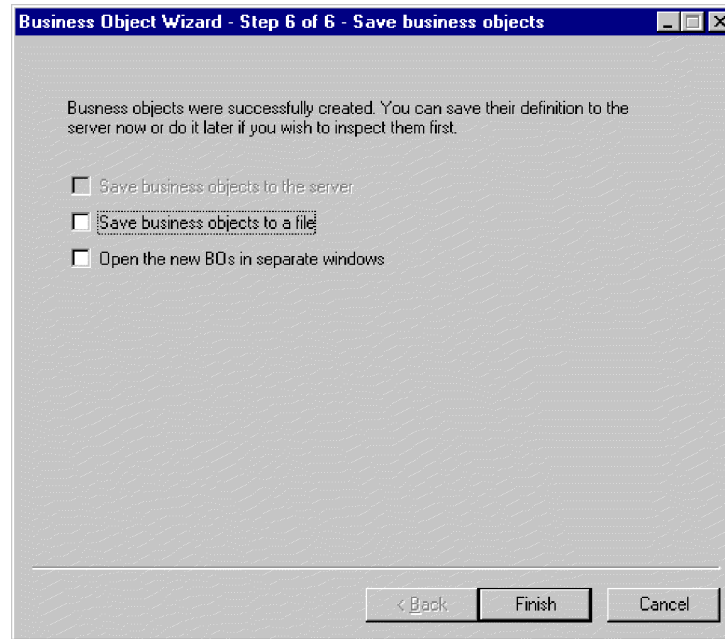


Figure 17. Saving the business object definition

## Contents of the generated definition

The business object definition that PeopleSoftODA generates contains:

- A simple attribute for each property in the specified Component Interface
- An attribute that represents an array of child business objects for each Collection that was selected in the hierarchical representation of the Component Interface
- The verbs specified in the BO Properties window (Figure 16 on page 60)
- Application-specific information:
  - At the business-object level
  - For each attribute

This section describes:

- “Business-object-level properties”
- “Attribute properties” on page 62

### Business-object-level properties

PeopleSoftODA generates the following information at the business-object level:

- Name of the business object
- Version—defaults to 1.0.0
- Application-specific information

At the business-object level, application-specific information format consists of four parameters separated by a colon (:) delimiter. The format is:

```
cIName=ComponentInterface:EFFDT=[true|false]:setInteractiveMode=[true|false]:
GetHistoryItems=[true|false]:SetEditHistoryItems=[true|false]
```

Table 12 describes these parameters.

Table 12. *AppSpecificInfo* at the business-object level

| AppSpecificInfo Parameter | Description   |
|---------------------------|---|
| ComponentInterface        | Specifies the name of the Component Interface defined in the PeopleSoft application     |
| setInteractiveMode        | Determines when the connector sends changes to the Application Server                   |
| GetHistoryItems           | Determines how much data the connector retrieves  |
| EFFDT                     | Specifies whether the business object (or child business object) uses an Effective Date |
| SetEditHistoryItems       | Enables editing and saving of history data. Applies to effective-dated fields only.     |

**Important:** PeopleSoftODA uses the name of the Component Interface from which it has generated the definition to specify a value for the ComponentInterface property. It does not provide values for the other properties. You must modify the business object definition to provide values for the remaining properties. For information on these properties, see “Application-specific information at the business object level” on page 45. For information on modifying a business object definition, see the *Business Object Development Guide*.

## Attribute properties

This section describes the properties that PeopleSoftODA generates for each attribute. For more information about the attributes, see “Business object attribute properties” on page 43.

### Name property

PeopleSoftODA derives the attribute’s name from a property in the corresponding Component Interface.

### Data type property

When setting the type of an attribute, PeopleSoftODA converts the data type of a property into a corresponding business object data type as shown in Table 13:

Table 13. *Correspondence of data types*

| PeopleSoft | Business object | Length                            |
|------------|-----------------|-----------------------------------|
| String     | String          | Length specified in the data type |
| Boolean    | Boolean         |                                   |
| Collection | Object          |                                   |
| Float      | Float           |                                   |
| Number     | Integer         |                                   |

**Note:** If a property’s data type is not one of those shown in Table 13, PeopleSoftODA skips the property and displays a message stating that the property cannot be processed.

### Cardinality property

PeopleSoftODA sets the cardinality of all simple attributes to 1. It sets the cardinality of all attributes that represent an array of child business objects to n.



## MaxLength property

PeopleSoftODA provides the default length of 255 characters for strings; for all other data types, it uses the standard maximum length for the corresponding business object data type.

## IsKey property

If a property is a CreateKey in a Component Interface, PeopleSoftODA sets this property to true. If a property is a GetKey in a Component Interface, PeopleSoftODA sets this property to false, and sets the attribute's AppSpecificInfo parameter to GetKey=true.

## IsForeignKey property

PeopleSoftODA sets this property to false. You can change the setting in Business Object Designer Express.

## IsRequired property

Because PeopleSoftODA generates some keys internally, it always sets this property to false. You can change the setting in Business Object Designer Express.

## AppSpecificInfo property

Attribute application-specific information is a set of five name-value parameters that are separated from one another by a colon (:) delimiter. A vertical bar (|) separates the members of a set of options. The format is:

```
get=getFieldName:set=setFieldName:UID=[true|false]:GetKey=[true|false]:KeepRelationship=[true|false]
```

PeopleSoftODA generates only those properties that are relevant to an attribute, as described in Table 14. If it generates more than one parameter, it separates parameters with a colon.

Table 14. Attribute AppSpecificInfo generated by PeopleSoftODA

| AppSpecificInfo parameter | Description  |
|---------------------------|--|
| GetKey=true               | PeopleSoftODA generates this parameter only for attributes that correspond to a Component Interface property defined as a GetKey. The connector uses the value of such an attribute to retrieve Component Interface instances.   |
| get=getPropertyName       | For PropertyName, PeopleSoftODA substitutes the name of the Component Interface property associated with the attribute. It generates this parameter for every simple attribute that corresponds to a Component Interface property. The connector uses this method to retrieve values for the attribute.                                      |
| get=getCollectionName     | For CollectionName, PeopleSoftODA substitutes the name of the Component Interface Collection associated with the attribute. It generates this parameter for every attribute that represents an array of child business objects corresponding to a Component Interface Collection. The connector uses this method to retrieve the Collection. |
| set=setPropertyName       | For PropertyName, PeopleSoftODA substitutes the name of the Component Interface property associated with the attribute. It generates this parameter for every simple attribute that corresponds to a Component Interface property. The connector uses the method to update values for the attribute.   |

**Note:** You can set additional AppSpecificInfo parameters in Business Object Designer Express. For information about these parameters, see “Application-specific information at the attribute level” on page 47. For more information on modifying definitions, see the *Business Object Development Guide*. For an example of using the parameters described in Table 14, see “Sample business object definition file” on page 64.

## Verbs

**Note:** PeopleSoftODA generates the verbs specified in the BO Properties window (as illustrated in Figure 16 on page 60).

---

## Sample business object definition file

There are three sample business object definition files included with the product:

- BO\_Psft\_DEPT
- BO\_PsftEmployee
- SavePostChange

### BO\_Psft\_DEPT business object

The following example is the BO\_Psft DEPT business object.

```
[BusinessObjectDefinition] Name = DeptTbl Version = 1.0.0 AppSpecificInfo =
CiName=DEPT [Attribute] Name = Company Type = String
MaxLength = 255 IsKey = true IsForeignKey = false IsRequired =
false AppSpecificInfo = get=getCompany:set=setCompany
IsRequiredServerBound = false [End] [Attribute] Name =
BudgetLvl Type = String MaxLength = 1 IsKey = false
IsForeignKey = false IsRequired = false AppSpecificInfo =
get=getBudgetLvl:set=setBudgetLvl IsRequiredServerBound = false
[End] [Attribute] Name = Descr Type = String MaxLength = 1
IsKey = false IsForeignKey = false IsRequired = false
AppSpecificInfo = get=getDescr:set=setDescr IsRequiredServerBound =
false [End] [Attribute] Name = DescrShort Type = String
MaxLength = 1 IsKey = false IsForeignKey = false IsRequired =
false AppSpecificInfo = get=getDescrshort:set=setDescrshort
IsRequiredServerBound = false [End] [Attribute] Name =
ObjectEventId Type = String MaxLength = 255 IsKey = false
IsForeignKey = false IsRequired = false IsRequiredServerBound =
false [End] [Verb] Name = Create [End] [Verb] Name
= Delete [End] [Verb] Name = Retrieve [End] [Verb]
Name = Update [End] [End] [BusinessObjectDefinition] Name = Psft_dept
Version = 1.0.0 AppSpecificInfo = CiName=DEPT [Attribute] Name =
Deptid Type = String MaxLength = 255 IsKey = true
IsForeignKey = false IsRequired = true AppSpecificInfo =
get=getDeptid:set=setDeptid:GetKey=true IsRequiredServerBound = false
[End] [Attribute] Name = Setid Type = String MaxLength
= 1 IsKey = true IsForeignKey = false IsRequired = true
AppSpecificInfo = get=getSetid:set=setSetid:GetKey=true
IsRequiredServerBound = false [End] [Attribute] Name = DptTbl
Type = DeptTbl ContainedObjectVersion = 1.0.0 Relationship =
Containment Cardinality = n MaxLength = 1 IsKey = false
IsForeignKey = false IsRequired = true AppSpecificInfo =
get=getDeptTbl:KEEPRELATIONSHIP=true IsRequiredServerBound = false
```

```

[End]      [Attribute]      Name = ObjectEventId      Type = String
MaxLength = 255      IsKey = false      IsForeignKey = false      IsRequired =
false      IsRequiredServerBound = false      [End]      [Verb]      Name =
Create      [End]      [Verb]      Name = Delete      [End]      [Verb]      Name
= Retrieve      [End]      [Verb]      Name = Update      [End] [End]

```

---

## BO\_PsftEmployee business object

The following example is the BO\_PsftEmployee business object.

```

[BusinessObjectDefinition] Name = PSFTEmployee Version = 1.0.0
AppSpecificInfo = cIName=Emp      [Attribute]      Name = EMPID      Type =
String      Cardinality = 1      MaxLength = 255      IsKey = true
IsForeignKey = false      IsRequired = true      AppSpecificInfo =
get=getEmpId:set=setEmpId:keepRelationship=false:uid=true:
findKey=true:getKey=true:createKey=true      IsRequiredServerBound = false
      [End]      [Attribute]      Name = EMPL_RCD      Type = String
Cardinality = 1      MaxLength = 1      IsKey = true      IsForeignKey = false
      IsRequired = true      AppSpecificInfo =
get=getEmpRcd:set=setEmpRcd:keepRelationship=false:uid=true:
findKey=true:getKey=true:createKey=true      IsRequiredServerBound = false
      [End]      [Attribute]      Name = NAME      Type = String      Cardinality
= 1      MaxLength = 1      IsKey = true      IsForeignKey = false
      IsRequired = true      AppSpecificInfo =
get=getName:set=setName:keepRelationship=false:uid=false:
findKey=true:getKey=false:createKey=false      IsRequiredServerBound = false
      [End]      [Attribute]      Name = LAST_NAME_SRCH      Type = String
Cardinality = 1      MaxLength = 1      IsKey = true      IsForeignKey = false
      IsRequired = true      AppSpecificInfo =
get=getLastNameSrch:set=setLastNameSrch:keepRelationship=false:uid=false:
      findKey=true:getKey=false:createKey=false      IsRequiredServerBound =
false      [End]      [Attribute]      Name = NAME_AC      Type = String
Cardinality = 1      MaxLength = 1      IsKey = true      IsForeignKey = false
      IsRequired = true      AppSpecificInfo =
get=getNameAc:set=setNameAc:keepRelationship=false:uid=false:
findKey=true:getKey=false:createKey=false      IsRequiredServerBound = false
      [End]      [Attribute]      Name = PER_STATUS      Type = String
Cardinality = 1      MaxLength = 1      IsKey = true      IsForeignKey = false
      IsRequired = true      AppSpecificInfo =
get=getPerStatus:set=setPerStatus:keepRelationship=false:uid=false:
findKey=true:getKey=false:createKey=false      IsRequiredServerBound = false
      [End]      [Attribute]      Name = EMPLID_0      Type = String
Cardinality = 1      MaxLength = 1      IsKey = false      IsForeignKey =
false      IsRequired = false      AppSpecificInfo =
get=getEmpId0:set=setEmpId0:keepRelationship=false:uid=false:
findKey=false:getKey=false:createKey=false      IsRequiredServerBound =
false      [End]      [Attribute]      Name = ORIG_HIRE_DT      Type = String
      Cardinality = 1      MaxLength = 1      IsKey = false      IsForeignKey =
false      IsRequired = false      AppSpecificInfo =
get=getOrigHireDt:set=setOrigHireDt:keepRelationship=false:uid=false:
findKey=false:getKey=false:createKey=false      IsRequiredServerBound =
false      [End]      [Attribute]      Name = SEX      Type = String
Cardinality = 1      MaxLength = 1      IsKey = false      IsForeignKey =
false      IsRequired = true      AppSpecificInfo =
get=getSex:set=setSex:keepRelationship=false:uid=false:findKey=false:
getKey=false:createKey=false      IsRequiredServerBound = false      [End]

```

```

    [Attribute]      Name = BIRTHDATE      Type = String      Cardinality = 1
    MaxLength = 1    IsKey = false      IsForeignKey = false      IsRequired
= false      AppSpecificInfo =
get=getBirthdate:set=setBirthdate:keepRelationship=false:
uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false      [End]      [Attribute]      Name =
FT_STUDENT      Type = String      Cardinality = 1      MaxLength = 1
IsKey = false      IsForeignKey = false      IsRequired = true
AppSpecificInfo = get=getFtStudent:set=setFtStudent:keepRelationship=false:
    uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false      [End]      [Attribute]      Name =
BENEFIT_RCD_NBR      Type = String      Cardinality = 1      MaxLength = 1
IsKey = false      IsForeignKey = false      IsRequired = false
AppSpecificInfo = get=getBenefitRcdNbr:set=setBenefitRcdNbr:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false
    IsRequiredServerBound = false      [End]      [Attribute]      Name =
HOME_HOST_CLASS      Type = String      Cardinality = 1      MaxLength = 1
IsKey = false      IsForeignKey = false      IsRequired = true
AppSpecificInfo = get=getHomeHostClass:set=setHomeHostClass:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false
    IsRequiredServerBound = false      [End]      [Attribute]      Name =
HIRE_DT      Type = String      Cardinality = 1      MaxLength = 1      IsKey =
false      IsForeignKey = false      IsRequired = false      AppSpecificInfo =
get=getHireDt:set=setHireDt:keepRelationship=false:
uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false      [End]      [Attribute]      Name =
CMPNY_SENIORITY_DT      Type = String      Cardinality = 1      MaxLength = 1
    IsKey = false      IsForeignKey = false      IsRequired = false
AppSpecificInfo = get=getCmpnySeniorityDt:
set=setCmpnySeniorityDt:keepRelationship=false:uid=false:
findKey=false:getKey=false:createKey=false      IsRequiredServerBound =
false      [End]      [Attribute]      Name = SERVICE_DT      Type = String
Cardinality = 1      MaxLength = 1      IsKey = false      IsForeignKey =
false      IsRequired = false      AppSpecificInfo =
get=getServiceDt:set=setServiceDt:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false
    IsRequiredServerBound = false      [End]      [Attribute]      Name =
PROF_EXPERIENCE_DT      Type = String      Cardinality = 1      MaxLength = 1
    IsKey = false      IsForeignKey = false      IsRequired = false
AppSpecificInfo = get=getProfExperienceDt:
set=setProfExperienceDt:keepRelationship=false:uid=false:
findKey=false:getKey=false:createKey=false      IsRequiredServerBound =
false      [End]      [Attribute]      Name = LAST_VERIFICATN_DT      Type =
String      Cardinality = 1      MaxLength = 1      IsKey = false
IsForeignKey = false      IsRequired = false      AppSpecificInfo =
get=getLastVerificatnDt:set=setLastVerificatnDt:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false
    IsRequiredServerBound = false      [End]      [Attribute]      Name =
EXPECTED_RETURN_DT      Type = String      Cardinality = 1      MaxLength = 1
    IsKey = false      IsForeignKey = false      IsRequired = false
AppSpecificInfo = get=getExpectedReturnDt:set=
setExpectedReturnDt:keepRelationship=false:
uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false      [End]      [Attribute]      Name =
LAST_DATE_WORKED      Type = String      Cardinality = 1      MaxLength = 1
    IsKey = false      IsForeignKey = false      IsRequired = false

```

```

AppSpecificInfo = get=getLastDateWorked:
set=setLastDateWorked:keepRelationship=false:uid=false:
findKey=false:getKey=false:createKey=false      IsRequiredServerBound =
false      [End]      [Attribute]      Name = LAST_INCREASE_DT      Type =
String      Cardinality = 1      MaxLength = 1      IsKey = false
IsForeignKey = false      IsRequired = false      AppSpecificInfo =
get=getLastIncreaseDt:      set=setLastIncreaseDt:keepRelationship=false:
uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false      [End]      [Attribute]      Name =
OWN_5PERCENT_CO      Type = String      Cardinality = 1      MaxLength = 1
IsKey = false      IsForeignKey = false      IsRequired = true
AppSpecificInfo = get=getOwn5percentCo:
set=setOwn5percentCo:keepRelationship=false:
uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false      [End]      [Attribute]      Name =
BUSINESS_TITLE      Type = String      Cardinality = 1      MaxLength = 1
IsKey = true      IsForeignKey = false      IsRequired = true
AppSpecificInfo = get=getBusinessTitle:
set=setBusinessTitle:keepRelationship=false:
uid=false:findKey=false:getKey=true:createKey=false
IsRequiredServerBound = false      [End]      [Attribute]      Name =
REPORTS_TO      Type = String      Cardinality = 1      MaxLength = 1
IsKey = false      IsForeignKey = false      IsRequired = false
AppSpecificInfo = get=getReportsTo:set=setReportsTo:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false      [End]      [Attribute]      Name =
SUPERVISOR_ID      Type = String      Cardinality = 1      MaxLength = 1
IsKey = false      IsForeignKey = false      IsRequired = false
AppSpecificInfo = get=getSupervisorId:set=setSupervisorId:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false      [End]      [Attribute]      Name =
PROBATION_DT      Type = String      Cardinality = 1      MaxLength = 1
IsKey = false      IsForeignKey = false      IsRequired = false
AppSpecificInfo = get=getProbationDt:set=setProbationDt:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false      [End]      [Attribute]      Name =
SECURITY_CLEARANCE      Type = String      Cardinality = 1      MaxLength = 1
IsKey = false      IsForeignKey = false      IsRequired = false
AppSpecificInfo = get=getSecurityClearance:
set=setSecurityClearance:keepRelationship=false:
uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false      [End]      [Attribute]      Name = PHONE
Type = String      Cardinality = 1      MaxLength = 1      IsKey = false
IsForeignKey = false      IsRequired = false      AppSpecificInfo =
get=getPhone:set=setPhone:      keepRelationship=false:uid=false:
findKey=false:getKey=false:createKey=false      IsRequiredServerBound =
false      [End]      [Attribute]      Name = TIME_RPT_LOCK      Type = String
Cardinality = 1      MaxLength = 1      IsKey = false      IsForeignKey =
false      IsRequired = false      AppSpecificInfo =
get=getTimeRptLock:set=setTimeRptLock:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false      [End]      [Attribute]      Name =
JOB_REPORTING      Type = String      Cardinality = 1      MaxLength = 1
IsKey = false      IsForeignKey = false      IsRequired = true
AppSpecificInfo = get=getJobReporting:set=setJobReporting:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false

```

```

    IsRequiredServerBound = false    [End]    [Attribute]    Name =
DED_TAKEN    Type = String    Cardinality = 1    MaxLength = 1    IsKey
= false    IsForeignKey = false    IsRequired = true    AppSpecificInfo
= get=getDedTaken:set=setDedTaken:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false
    IsRequiredServerBound = false    [End]    [Attribute]    Name =
DED_SUBSET_ID    Type = String    Cardinality = 1    MaxLength = 1
IsKey = false    IsForeignKey = false    IsRequired = false
AppSpecificInfo = get=getDedSubsetId:set=setDedSubsetId:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false
    IsRequiredServerBound = false    [End]    [Attribute]    Name =
CAN_ABORIGINAL    Type = String    Cardinality = 1    MaxLength = 1
IsKey = false    IsForeignKey = false    IsRequired = false
AppSpecificInfo = get=getCanAboriginal:set=setCanAboriginal:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false
    IsRequiredServerBound = false    [End]    [Attribute]    Name =
CAN_VISBL_MINORITY    Type = String    Cardinality = 1    MaxLength = 1
    IsKey = false    IsForeignKey = false    IsRequired = true
AppSpecificInfo = get=getCanVisblMinority:set=setCanVisblMinority:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false
    IsRequiredServerBound = false    [End]    [Attribute]    Name =
CURRENT_SEQ    Type = String    Cardinality = 1    MaxLength = 1
IsKey = false    IsForeignKey = false    IsRequired = false
AppSpecificInfo = get=getCurrentSeq:set=setCurrentSeq:
keepRelationship=false:uid=false:findKey=false:getKey=false:createKey=false
    IsRequiredServerBound = false    [End]    [Attribute]    Name =
PERS_DATA_EFFDT    Type = PERS_DATA_EFFDT    ContainedObjectVersion =
1.0.0    Relationship = Containment    Cardinality = n    MaxLength = 1
    IsKey = false    IsForeignKey = false    IsRequired = false
AppSpecificInfo = get=getPersDataEffdt:keepRelationship=false:
uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false    [End]    [Attribute]    Name =
EMAIL_ADDRESSES    Type = EMAIL_ADDRESSES    ContainedObjectVersion =
1.0.0    Relationship = Containment    Cardinality = n    MaxLength = 1
    IsKey = false    IsForeignKey = false    IsRequired = false
AppSpecificInfo = get=getEmailAddresses:keepRelationship=false:
uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false    [End]    [Attribute]    Name =
PERSONAL_PHONE    Type = PERSONAL_PHONE    ContainedObjectVersion = 1.0.0
    Relationship = Containment    Cardinality = n    MaxLength = 1
IsKey = false    IsForeignKey = false    IsRequired = false
AppSpecificInfo = get=getPersonalPhone:keepRelationship=false:
uid=false:findKey=false:getKey=false:createKey=false
IsRequiredServerBound = false    [End]    [Attribute]    Name = PERS_NID
    Type = PERS_NID    ContainedObjectVersion = 1.0.0    Relationship =
Containment    Cardinality = n    MaxLength = 1    IsKey = false
IsForeignKey = false    IsRequired = false    IsRequiredServerBound =
false    [End]    [Attribute]    Name = JOB    Type = JOB
    ContainedObjectVersion = 1.0.0    Relationship = Containment
    Cardinality = n    MaxLength = 1    IsKey = false    IsForeignKey =
false    IsRequired = false    IsRequiredServerBound = false    [End]
    [Attribute]    Name = ObjectEventId    Type = String    MaxLength =
255    IsKey = false    IsForeignKey = false    IsRequired = false
IsRequiredServerBound = false    [End]    [Verb]    Name = Create
[End]    [Verb]    Name = Delete    [End]    [Verb]    Name = Retrieve
[End]    [Verb]    Name = Update    [End]    [End]

```



---

## SavePostChange business object

The following example is the SavePostChange business object.

```
/* Place this code in Component's SavePostChg() and define the four
parameters used in the function call */ Declare Function cw_publish_event
PeopleCode FUNCLIB_CW.CW_EVENT_NOT FieldFormula; Component string &BONAME1;
Component string &KEYLIST1; Component number &CWPRORITY1; Component string
&CONNID; &BONAME1 = "Psft_Dept"; &KEYLIST1 =
"DEPT_TBL.SETID:DEPT_TBL.DEPTID"; &CWPRORITY1 = 2; &CONNID = "PeopleSoft
Connector"; /* Check if Component Changed before calling function */ If
ComponentChanged() And %UserId <> "CW" Then /* Publish this event to
the CrossWorlds CW_EVENT_TBL for polling */ cw_publish_event(&BONAME1,
&KEYLIST1, &CWPRORITY1, &CONNID); End-If;
```

---

## Modifying information in the business object definition

It may be necessary to modify information in the business object definition that PeopleSoftODA creates. For example, you must manually remove unwanted attributes, change the default values for the `getHistoryItems` and `setInteractiveMode` parameters of the application-specific information at the business-object level, and add required parameters for attribute application-specific information. For more information, see Chapter 3, "Understanding business objects for the connector," on page 27.

To examine or modify the business object definition, you can use Business Object Designer Express or a text editor. To reload a revised definition into the repository, you can use Business Object Designer Express.





---

## Chapter 5. Troubleshooting and error handling

The chapter describes problems that you may encounter when starting up or running the Adapter for PeopleSoft.

This chapter contains the following sections:

- “Startup problems”
- “Processing Problems”
- “Mapping” on page 72
- “Error Handling and Logging” on page 72
- “Loss of Connection to the Application” on page 73

---

### Startup problems

If you encounter difficulties when trying to start the connector, do the following:

- Use the `psadmin` utility to check that the PeopleSoft Application Server is running.
- Use the Test Component Interface utility in Application Designer to verify that the Component Interface is working online.
- Rebuild and recompile the APIs in PeopleSoft. For more information, see “Generating APIs” on page 33.
- Verify that PeopleSoft security has been set correctly, and that the Component Interface is listed on the Permission List, and that time-out has been configured for the connector’s user account. For more information, see “Configuring time-out for the user account” on page 13.
- Verify that Row-Level Security has been set for the connector’s user account.
- Trace the API by selecting relevant options on the Trace tab in the PeopleSoft Configuration Manager.

---

### Processing Problems

If an error occurs when the connector is processing, create a simple Java program and test the following using IDE:

1. The connection to the application
2. The `Get()`, `Create()`, and `Find()` methods
3. The retrieval of Property values from each level of the corresponding Component Interface

This test can isolate problems arising between the PeopleSoft API and the connector. In other words, if you have no problems in the test program, then there probably is a problem with the connector code.

PeopleSoft generates a template for a test Java program. To generate the template:

1. Open the Component Interface in question.
2. Right click anywhere in the window and select Generate Java Template from the popup menu.

---

## Mapping

If the business objects are not being mapped or mapping is not being invoked, check to make sure the maps have been installed in the correct directory.

---

## Error Handling and Logging

The connector logs an error message whenever it encounters a condition that causes its current processing of a business object and verb to fail. When such an error occurs, the connector also prints a textual representation of the failed business object as it received it. It writes the text to the connector log file or the standard output stream, depending on its configuration. You can use the text as an aid in determining the source of the error.

### Error Types

Table 15 describes the types of tracing messages that the connector outputs at each trace level. These messages are in addition to any tracing messages output by the WebSphere business integration system's architecture, such as the Java connector execution wrapper.

*Table 15. PeopleSoft Tracing Messages*

---

| Tracing Level | Tracing Messages  |
|---------------|---|
| Level 0       | Message that identifies the connector version. No other tracing is done at this level. This is the default value.   |
| Level 1       | <ul style="list-style-type: none"><li>• Status messages</li><li>• Messages that provide identifying (key) information for each business object processed</li><li>• Messages delivered each time the pollForEvents method is executed</li></ul>  |
| Level 2       | <ul style="list-style-type: none"><li>• Business object handler messages that contain information such as the arrays and child business objects that the connector encounters or retrieves during the processing of a business object</li><li>• Messages logged each time a business object is posted to the InterChange Server Express, either from <code>gotAppEvent()</code> or <code>consumeSync()</code></li><li>• Messages that indicate that a business object has been received as a request</li></ul>        |
| Level 3       | <ul style="list-style-type: none"><li>• Foreign key processing messages that contain such information as when the connector has found or has set a foreign key in a business object</li><li>• Messages that provide information about business object processing. For example, these messages are delivered when the connector finds a match between business objects, or finds a business object in an array of child business objects</li></ul>   |
| Level 4       | <ul style="list-style-type: none"><li>• Application-specific information messages, for example, messages showing the values returned by the functions that parse the business object's application-specific information fields</li><li>• Messages that identify when the connector enters or exits a function, which helps trace the process flow of the connector</li><li>• All thread-specific messages. If the connector spawns multiple threads, a message appears for the creation of each new thread.</li></ul> |

---

Table 15. PeopleSoft Tracing Messages (continued)

---

| Tracing Level | Tracing Messages  |
|---------------|---|
| Level 5       | <ul style="list-style-type: none"><li>• Messages that indicate connector initialization, for example, messages showing the value of each configuration property retrieved from InterChange Server Express.</li><li>• Messages that include statements executed in the application. At this trace level, the connector log file contains all statements executed in the destination application and the value of any variables that are substituted.</li><li>• Messages that comprises a representation of a business object before the connector begins processing it (displaying its state as the connector receives it) and after the connector has completed its processing (displaying its state as the connector returns it to InterChange Server Express)</li><li>• Messages that comprise a business object dump</li><li>• Messages that indicate the status of each thread the connector spawns while it is running</li></ul> |

---

## Error Messages

All the error messages that the connector generates are stored in a message file named `PeopleSoftConnector.txt`. Each error has an error number followed by the error message. For example:

```
1210
```

```
PeopleSoft Connector unable to initialize.
```

```
1211
```

```
PeopleSoft Connector failed to locate.
```

---

## Loss of Connection to the Application

If the connector's application-specific component fails to establish connection, it sends FAIL to InterChange Server Express and terminates.



---

## Appendix A. Standard configuration properties for connectors

This appendix describes the standard configuration properties for the connector component of the adapters in WebSphere Business Integration Server Express, running on WebSphere InterChange Server Express.

Not every connector makes use of all these standard properties. When you select an integration broker from Connector Configurator Express, you will see a list of the standard properties that you need to configure for your adapter.

For information about properties specific to the connector, see the relevant adapter user guide.

---

### Configuring standard connector properties

Adapter connectors have two types of configuration properties:

- Standard configuration properties
- Connector-specific configuration properties

This section describes the standard configuration properties. For information on configuration properties specific to a connector, see its adapter user guide.

### Using Connector Configurator Express

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

### Setting and updating property values

The default length of a property field is 255 characters.

The connector uses the following order to determine a property's value (where the highest number overrides other values):

1. Default
2. Repository
3. Local configuration file
4. Command line

A connector obtains its configuration values at startup. If you change the value of one or more connector properties during a run-time session, the property's **Update Method** determines how the change takes effect. There are four different update methods for standard connector properties:

- **Dynamic**  
The change takes effect immediately after it is saved in System Manager.
- **Component restart**  
The change takes effect only after the connector is stopped and then restarted in System Manager. You do not need to stop and restart the application-specific component or the integration broker.

- **Server restart**  
The change takes effect only after you stop and restart the application-specific component and the integration broker.
- **Agent restart**  
The change takes effect only after you stop and restart the application-specific component.

To determine how a specific property is updated, refer to the **Update Method** column in the Connector Configurator Express window, or see the Update Method column in the Property Summary table below.

## Summary of standard properties

Table 16 provides a quick reference to the standard connector configuration properties. Not all the connectors make use of all these properties, and property settings may differ from integration broker to integration broker, as standard property dependencies are based on RepositoryDirectory.

You must set the values of some of these properties before running the connector. See the following section for an explanation of each property.

Table 16. Summary of standard configuration properties

| Property name                 | Possible values  | Default value                                      | Update method     | Notes                            |
|-------------------------------|--|--|-------------------|----------------------------------|
| AdminInQueue                  | Valid JMS queue name   | CONNECTORNAME /ADMININQUEUE                        | Component restart | Delivery Transport is JMS        |
| AdminOutQueue                 | Valid JMS queue name   | CONNECTORNAME/ADMINOUTQUEUE                        | Component restart | Delivery Transport is JMS        |
| AgentConnections              | 1-4  | 1  | Component restart | Delivery Transport is IDL        |
| AgentTraceLevel               | 0-5  | 0  | Dynamic           |                                  |
| ApplicationName               | Application name   | Value specified for the connector application name | Component restart |                                  |
| BrokerType                    | ICS  | ICS  |                   |                                  |
| CharacterEncoding             | ascii7, ascii8, SJIS, Cp949, GBK, Big5, Cp297, Cp273, Cp280, Cp284, Cp037, Cp437<br><b>Note:</b> This is a subset of supported values. | ascii7   | Component restart |                                  |
| ConcurrentEventTriggeredFlows | 1 to 32,767  | 1  | Component restart | Repository directory is <REMOTE> |
| ContainerManagedEvents        | No value or JMS  | No value   | Component restart | Delivery Transport is JMS        |
| ControllerStoreAndForwardMode | true or false  | truetrue   | Dynamic           | Repository directory is <REMOTE> |

Table 16. Summary of standard configuration properties (continued)

| Property name              | Possible values   | Default value                             | Update method     | Notes   |
|----------------------------|---|---|-------------------|---|
| ControllerTraceLevel       | 0-5   | 0   | Dynamic           | Repository directory is <REMOTE>                            |
| DeliveryQueue              |   | CONNECTORNAME/DELIVERYQUEUE               | Component restart | JMS transport only  |
| DeliveryTransport          | IDL or JMS  | IDL                                       | Component restart |   |
| DuplicateEventElimination  | true or false   | false                                     | Component restart | JMS transport only: Container Managed Events must be <NONE> |
| EnableOidForFlowMonitoring | true or false   | false                                     | Component restart |   |
| FaultQueue                 |   | CONNECTORNAME/FAULTQUEUE                  | Component restart | JMS transport only  |
| jms.FactoryClassName       | CxCommon.Messaging.jms.IBMMQSeriesFactory or any Java class name  | CxCommon.Messaging.jms.IBMMQSeriesFactory | Component restart | JMS transport only  |
| jms.MessageBrokerName      | crossworlds.queue.manager   | crossworlds.queue.manager                 | Component restart | JMS transport only  |
| jms.NumConcurrentRequests  | Positive integer  | 10  | Component restart | JMS transport only  |
| jms.Password               | Any valid password  |   | Component restart | JMS transport only  |
| jms.UserName               | Any valid name  |   | Component restart | JMS transport only  |
| JvmMaxHeapSize             | Heap size in megabytes  | 128m                                      | Component restart | Repository directory is <REMOTE>                            |
| JvmMaxNativeStackSize      | Size of stack in kilobytes  | 128k                                      | Component restart | Repository directory is <REMOTE>                            |
| JvmMinHeapSize             | Heap size in megabytes  | 1m  | Component restart | Repository directory is <REMOTE>                            |
| Locale                     | en_US, ja_JP, ko_KR, zh_CN, zh_TW, fr_FR, de_DE, it_IT, es_ES, pt_BR<br><b>Note:</b> This is a subset of the supported locales. | en_US                                     | Component restart |   |
| LogAtInterchangeEnd        | true or false   | false                                     | Component restart |   |
| MaxEventCapacity           | 1-2147483647  | 2147483647                                | Dynamic           | Repository Directory is <REMOTE>                            |
| MessageFileName            | Path or filename  | InterchangeSystem.txt                     | Component restart |   |

Table 16. Summary of standard configuration properties (continued)

| Property name           | Possible values   | Default value                             | Update method     | Notes   |
|-------------------------|---|---|-------------------|---|
| MonitorQueue            | Any valid queue name  | CONNECTORNAME/MONITORQUEUE                | Component restart | JMS transport only: DuplicateEvent Elimination must be true                 |
| OADAutoRestartAgent     | true or false   | false                                     | Dynamic           | Repository Directory is <REMOTE>  |
| OADMaxNumRetry          | A positive number   | 1000                                      | Dynamic           | Repository Directory is <REMOTE>  |
| OADRetryTimeInterval    | A positive number in minutes  | 10  | Dynamic           | Repository Directory is <REMOTE>  |
| PollEndTime             | HH:MM<br>(HH is 0-23, MM is 0-59)   | HH:MM                                     | Component restart |   |
| PollFrequency           | A positive integer in milliseconds<br><br>no (to disable polling)<br><br>key (to poll only when the letter p is entered in the connector's Command Prompt window) | 10000                                     | Dynamic           |   |
| PollQuantity            | 1-500   | 1   | Agent restart     | JMS transport only: Container Managed Events is specified                   |
| PollStartTime           | HH:MM(HH is 0-23, MM is 0-59)   | HH:MM                                     | Component restart |   |
| RepositoryDirectory     | Location of metadata repository   |   | Agent restart     | Set to <REMOTE>   |
| RequestQueue            | Valid JMS queue name  | CONNECTORNAME/REQUESTQUEUE                | Component restart | Delivery Transport is JMS   |
| ResponseQueue           | Valid JMS queue name  | CONNECTORNAME/RESPONSEQUEUE               | Component restart | Delivery Transport is JMS:  |
| RestartRetryCount       | 0-99  | 3   | Dynamic           |   |
| RestartRetryInterval    | A sensible positive value in minutes:<br>1 - 2147483547   | 1   | Dynamic           |   |
| SourceQueue             | Valid JMS queue name  | CONNECTORNAME/SOURCEQUEUE                 | Agent restart     | Only if Delivery Transport is JMS and Container Managed Events is specified |
| SynchronousRequestQueue | Valid JMS queue name  | CONNECTORNAME/<br>SYNCHRONOUSREQUESTQUEUE | Component restart | Delivery Transport is JMS   |



Table 16. Summary of standard configuration properties (continued)

| Property name             | Possible values               | Default value                              | Update method     | Notes                     |
|---------------------------|-------------------------------|--|-------------------|---------------------------|
| SynchronousRequestTimeout | 0 - any number (milliseconds) | 0  | Component restart | Delivery Transport is JMS |
| SynchronousResponseQueue  | Valid JMS queue name          | CONNECTORNAME/<br>SYNCHRONOUSRESPONSEQUEUE | Component restart | Delivery Transport is JMS |
| WireFormat                | CwBO                          | CwBO                                       | Agent restart     |                           |

## Standard configuration properties

This section lists and defines each of the standard connector configuration properties.

### 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 ORB connections opened by `orb.init[]`.

By default, the value of this property is set to 1. There is no need to change this default.

### 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 that you are using, which is 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 `ascii7` for this property.

By default, a subset of supported character encodings only is displayed 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 using Connector Configurator Express in this guide.

## ConcurrentEventTriggeredFlows

Determines how many business objects can be concurrently processed by the connector 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 for a source application to map multiple event business objects at the same time and deliver them to multiple collaboration instances simultaneously. This speeds delivery of business objects to the integration broker, particularly if the business objects use complex maps. Increasing the arrival rate of business objects to collaborations can improve overall performance in the system.

To implement concurrent processing for an entire flow (from a source application to a destination application), you must:

- Configure the collaboration to use multiple threads by setting its `Maximum number of concurrent events` property high enough to use multiple threads.
- Ensure that the destination application's application-specific component can process requests concurrently. That is, it must be multi-threaded, or be able to use connector agent parallelism and be configured for multiple processes. Set the `Parallel Process Degree` configuration property to a value greater than 1.

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

## ContainerManagedEvents

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

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

The default value is `No value`.

When `ContainerManagedEvents` is set to `JMS`, you must configure the following properties to enable guaranteed event delivery:

- `PollQuantity` = 1 to 500
- `SourceQueue` = `CONNECTORNAME/SOURCEQUEUE`

You must also configure a data handler with the `MimeType`, `DHClass`, and `DataHandlerConfigMOName` (optional) properties. To set those values, use the **Data Handler** tab in Connector Configurator Express. The fields for the values under the Data Handler tab will be displayed only if you have set `ContainerManagedEvents` to `JMS`.

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

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

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

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

The default is `true`.

## ControllerTraceLevel

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

## DeliveryQueue

Applicable only if `DeliveryTransport` is `JMS`.

The queue that is used by the connector to send business objects to the WebSphere InterChange Server Express.

The default value is `CONNECTORNAME/DELIVERYQUEUE`.

## DeliveryTransport

Specifies the transport mechanism for the delivery of events. Possible values are `IDL` for CORBA IIOP or `JMS` for Java Messaging Service. The default is `IDL`.

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

### JMS

Enables communication between the connector and client connector framework using Java Messaging Service (JMS).

If you select `JMS` as the delivery transport, additional `JMS` properties such as `jms.MessageBrokerName`, `jms.FactoryClassName`, `jms.Password`, and `jms.UserName`, appear in Connector Configurator Express. 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 running on WebSphere InterChange Server Express.

In this environment, you may experience difficulty starting both the connector controller (on the server side) and the connector (on the client side) due to memory use within the WebSphere MQ client.

## DuplicateEventElimination

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

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.

## EnableOidForFlowMonitoring

When you set this property to true, the adapter framework will mark the incoming **ObjectEventId** as a foreign key for the purpose of flow monitoring.

The default is false.

## 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).

The default value is 128m.

## JvmMaxNativeStackSize

The maximum native stack size for the agent (in kilobytes).

The default value is 128k.

## JvmMinHeapSize

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

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 (see 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.

A locale name has the following format:

*ll\_TT.codeset*

where:

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

By default, only a subset of supported locales appears 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 using Connector Configurator Express in this guide.

The default value is `en_US`. If the connector has not been globalized, the only valid value for this property is `en_US`. To determine whether a specific connector has been globalized, see the connector version list on these websites:

<http://www.ibm.com/software/websphere/wbiadapters/infocenter>, or  
<http://www.ibm.com/websphere/integration/wicserver/infocenter>

## LogAtInterchangeEnd

Specifies whether to log errors to the integration broker's log destination. Logging to the broker's log destination also turns on e-mail notification, which generates e-mail messages for the MESSAGE\_RECIPIENT specified in the InterchangeSystem.cfg file when errors or fatal errors occur.

For example, when a connector loses its connection to its application, if LogAtInterChangeEnd is set to true, an e-mail 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.

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.

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

## MonitorQueue

The logical queue that the connector uses to monitor duplicate events. It is used only if the DeliveryTransport property value is JMS and DuplicateEventElimination is set to TRUE.

The default value is CONNECTORNAME/MONITORQUEUE

## OADAutoRestartAgent

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

This property must be set to true to enable the automatic and remote restart feature. For information on how to configure the MQ-triggered OAD feature, see the *Installation Guide for Windows*.

The default value is false.

## OADMaxNumRetry

Specifies the maximum number of times that the MQ-triggered OAD automatically attempts to restart the connector after an abnormal shutdown. The OADAutoRestartAgent property must be set to true for this property to take effect.

The default value is 1000.

## OADRetryTimeInterval

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

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.

## PollQuantity

Designates the number of items from the application that the connector should poll for. If the adapter has a connector-specific property for setting the poll quantity, the value set in the connector-specific property will override the standard property value.

## 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 WebSphere InterChange Server Express to send business objects to the connector.

The default value is *CONNECTOR/REQUESTQUEUE*.

## RepositoryDirectory

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

This value must be set to <REMOTE> because the connector obtains this information from the InterChange Server Express repository.

## ResponseQueue

Applicable only if DeliveryTransport is JMS.

Designates the JMS response queue, which delivers a response message from the connector framework to the integration broker. WebSphere InterChange Server Express 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. Possible values ranges from 1 to 2147483647.

The default is 1.

## SourceQueue

Applicable only if DeliveryTransport is JMS and ContainerManagedEvents is specified.

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 80.

The default value is CONNECTOR/SOURCEQUEUE.

## SynchronousRequestQueue

Applicable only if DeliveryTransport is JMS.

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.

The default is CONNECTORNAME/SYNCHRONOUSREQUESTQUEUE



## **SynchronousResponseQueue**

Applicable only if DeliveryTransport is JMS.

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.

The default is CONNECTORNAME/SYNCHRONOUSRESPONSEQUEUE

## **SynchronousRequestTimeout**

Applicable only if DeliveryTransport is JMS.

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**

This is the message format on the transport. The setting is CwB0.



---

## Appendix B. Connector Configurator Express

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

The topics covered in this appendix are:

- “Overview of Connector Configurator Express” on page 89
- “Starting Connector Configurator Express” on page 90
- “Creating a connector-specific property template” on page 90
- “Creating a new configuration file” on page 93
- “Setting the configuration file properties” on page 95
- “Using Connector Configurator Express in a globalized environment” on page 100

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### Overview of Connector Configurator Express

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

You use Connector Configurator Express to:

- Create a **connector-specific property template** for configuring your connector.
- Create a **connector configuration file**; you must create one configuration file for each connector you install.
- Set properties in a configuration file.  
You may need to modify the default values that are set for properties in the connector templates. You must also designate supported business object definitions and maps for use with collaborations as well as specify messaging, logging and tracing, and data handler parameters, as required.

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

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

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

For **connector-specific properties**, however, you need first to define the properties and then set their values. You do this by creating a connector-specific property template for your particular adapter. There may already be a template set up in your system, in which case, you simply use that. If not, follow the steps in “Creating a new template” on page 91 to set up a new one.

**Note:** Connector Configurator Express runs only in a Windows environment. If you are running the connector in a UNIX environment, use Connector Configurator Express in Windows to modify the configuration file and then copy the file to your UNIX environment.

---

## Starting Connector Configurator Express

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

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

### Running Configurator Express in stand-alone mode

You can run Connector Configurator Express independently and work with connector configuration files, irrespective of your broker.

To do so:

- From **Start>Programs**, click **IBM WebSphere Business Integration Server Express>Toolset Express>Development>Connector Configurator Express**.
- Select **File>New>Configuration File**.

You may choose to run Connector Configurator Express independently to generate the file, and then connect to System Manager to save it in a System Manager project (see “Completing a configuration file” on page 95.)

---

## Running Configurator Express from System Manager

You can run Connector Configurator Express from System Manager.

To run Connector Configurator Express:

1. Open the System Manager.
2. In the System Manager window, expand the **Integration Component Libraries** icon and highlight **Connectors**.
3. From the System Manager menu bar, click **Tools>Connector Configurator Express**. The Connector Configurator Express window opens and displays a **New Connector** dialog box.

To edit an existing configuration file:

1. In the System Manager window, select any of the configuration files listed in the Connector folder and right-click on it.
2. Click the Standard Properties tab to see which properties are included in this configuration file.

---

## Creating a connector-specific property template

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

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

- To create a new template, see “Creating a new template” on page 91.
- To use an existing file, simply modify an existing template and save it under the new name.

## Creating a new template

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

To create a template:

1. Click **File>New>Connector-Specific Property Template**.
2. The **Connector-Specific Property Template** dialog box appears, with the following fields:
  - **Template**, and **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 box for creating a new configuration file from a template.
  - **Old Template**, and **Select the Existing Template to Modify**  
The names of all currently available templates are displayed in the **Template Name** display.
  - To see the connector-specific property definitions in any template, select that template's name in the **Template Name** display. A list of the property definitions contained in that template will appear in the **Template Preview** display. You can use an existing template whose property definitions are similar to those required by your connector as a starting point for your template.
3. Select a template from the **Template Name** display, enter that template name in the **Find Name** field (or highlight your selection in **Template Name**), and click **Next**.

If you do not see any template that displays the connector-specific properties used by your connector, you will need to create one.

### Specifying general characteristics

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

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

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

### Specifying values

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

1. Click the **Value** tab. The display panel for Value replaces the display panel for General.

2. Select the name of the property in the **Edit properties** display.
3. In the fields for **Max Length** and **Max Multiple Values**, make any changes. The changes will not be accepted unless you also open the **Property Value** dialog box for the property, described in the next step.
4. Right-click the box in the top left-hand corner of the value table and click **Add**. A **Property Value** dialog box appears. Depending on the property type, the dialog box 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**. It displays a table with three columns:
 

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

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

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

After a value has been created and appears in the grid, it can be edited from within the table display. To make a change in an existing value in the table, select an entire row by clicking on the row number. Then right-click in the **Value** field and click **Edit Value**.

## Setting dependencies

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

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

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

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

---

## Creating a new configuration file

You create a connector configuration file from a connector-specific template or by modifying an existing configuration file.

### Creating a configuration file from a connector-specific template

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

1. Click **File>New>Connector Configuration**.

2. The **New Connector** dialog box appears, with the following fields:

- **Name**

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

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

- **System Connectivity**

The default broker is ICS. You cannot change this value.

- **Select Connector-Specific Property Template**

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

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

3. A configuration screen appears for the connector that you are configuring. The title bar shows the integration broker and connector names. You can fill in all the field values to complete the definition now, or you can save the file and complete the fields later.

4. To save the file, click **File>Save>To File** or **File>Save>To Project**. To save to a project, System Manager must be running.

If you save as a file, the **Save File Connector** dialog box appears. Choose **\*.cfg** as the file type, verify in the File Name field that the name is spelled correctly and has the correct case, navigate to the directory where you want to locate the file, and click **Save**. The status display in the message panel of Connector Configurator Express indicates that the configuration file was successfully created.

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

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

---

## Using an existing file

To use an existing file to configure a connector, you must open the file in Connector Configurator Express, revise the configuration, and then save the file as a configuration file (\*.cfg).

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 InterChange Server Express repository file.  
Definitions used in a previous InterChange Server Express implementation of the connector may be available to you in a repository file that was used in the configuration of that connector. Such a file typically has the extension .in or .out.
- A previous configuration file for the connector.  
Such a file typically has the extension \*.cfg.

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

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

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

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

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

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



---

## Completing a configuration file

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

Connector Configurator Express requires values for properties described in the following sections:

- “Setting standard connector properties”
- “Setting application-specific configuration properties” on page 96
- “Specifying supported business object definitions” on page 97
- “Associated maps” on page 98
- “Setting trace/log file values” on page 99

**Note:** For connectors that use JMS messaging, an additional category may display, for special configuration of data handlers that convert the data to business objects. For further information, see “Data handlers” on page 100.

---

## Setting the configuration file properties

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

Standard properties differ from connector-specific properties as follows:

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

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

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

### Setting standard connector properties

To change the value of a standard property:

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

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

## Setting application-specific configuration properties

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

1. Right-click in the top left portion of the grid. A pop-up menu bar will appear. Click **Add** to add a property. To add a child property, right-click on the parent row number and click **Add child**.
2. Enter a value for the property or child property.
3. To encrypt a property, select the **Encrypt** box.
4. Choose to save or discard changes, as described for “Setting standard connector properties” on page 95.

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

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

### Encryption for connector properties

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

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

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

### Update method

Refer to the descriptions of update methods found in the *Standard configuration properties for connectors* appendix, under “Setting and updating property values” on page 75.

Connector properties are almost all static and the **Update Method** is Component restart. For changes to take effect, you must restart the connector after saving the revised connector configuration file.

## Specifying supported business object definitions

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

For you to specify a supported business object, the business objects and their maps must exist in the system. Business object definitions, including those for data handler meta-objects, and map definitions should be saved into Integration Component Library (ICL) projects. For more information on ICL projects, see the *User Guide for WebSphere Business Integration Server Express*.

**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 chapter on business objects in this guide as well as the *Business Object Development Guide*.

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

### Business object name

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

1. Click an empty field in the **Business Object Name** list. A drop-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 Express window, click **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 Express window, click **Delete Row**. The business object is removed from the list display.
3. From the **File** menu, click **Save to Project**.

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

### Agent support

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

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

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

## Maximum transaction level

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

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

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

## Associated maps

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

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

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

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

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

- **Business Object Name**

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

- **Associated Maps**

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

- **Explicit**

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 Express boots, it tries to automatically bind a map to each supported business object for each connector.

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

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

To explicitly bind a map:

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

## Resources

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. If you are running a connector agent that was designed in Java to be multi-threaded, you are advised not to use this feature, since it is usually more efficient to use multiple threads than multiple processes.

## Setting trace/log file values

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

To change the logging and tracing values:

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

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

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

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

## Data handlers

The data handlers section is available for configuration only if you have designated a value of JMS for DeliveryTransport and a value of JMS for ContainerManagedEvents. Adapters that make use of the guaranteed event delivery enable this tab.

See the descriptions under ContainerManagedEvents in the Standard Properties appendix for values to use for these properties.

---

## Saving your configuration file

After you have created the configuration file and set its properties, you need to deploy it to the correct location for your connector. Save the configuration in an ICL project, and use System Manager to load the file into InterChange Server Express.

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

- From System Manager, as a file with a \*.con extension in an Integration Component Library, or
- In a directory that you specify.
- In stand-alone mode, as a file with a \*.cfg extension in a directory folder.

For details about using projects in System Manager, and for further information about deployment, see the *User Guide for IBM WebSphere Business Integration Server Express*.

---

## Completing the configuration

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

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

---

## Using Connector Configurator Express in a globalized environment

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

Connector Configurator Express supports non-English characters in:

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

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

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

```
<Property name="Locale"
isRequired="true"
updateMethod="component restart">
  <ValidType>String</ValidType>
  <ValidValues>
    <Value>ja_JP</Value>
    <Value>ko_KR</Value>
    <Value>zh_CN</Value>
    <Value>zh_TW</Value>
    <Value>fr_FR</Value>
    <Value>de_DE</Value>
    <Value>it_IT</Value>
    <Value>es_ES</Value>
    <Value>pt_BR</Value>
    <Value>en_US</Value>
    <Value>en_GB</Value>
  <DefaultValue>en_US</DefaultValue>
</ValidValues>
</Property>
```





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Programming interface information, if provided, is intended to help you create application software using this program.

General-use programming interfaces allow you to write application software that obtain the services of this program's tools.

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