

IBM WebSphere Partner Gateway Enterprise and
Advanced Editions



Programmer Guide

Version 6.0

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Advanced Editions



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Version 6.0

Note!

Before using this information and the product it supports, read the information in "Notices" on page 177.

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This edition applies to WebSphere Partner Gateway Enterprise Edition (5724-L69), Version 6.0, and Advanced Edition (5724-L68), Version 6.0, and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this document

IBM^(R) WebSphere^(R) Partner Gateway Enterprise and Advanced Editions provide a robust, scalable platform for managing business-to-business (B2B) communication.

This document describes a new set of tools available for the programmatic customization of the system as well as for the automation of certain aspects of day to day system administration.

Audience

This document is for consultants, developers, and system administrators for WebSphere Partner Gateway Enterprise and Advanced Editions.

Typographic conventions

This document uses the following conventions:

Monospace font	Text in this font indicates text that you type, values for arguments or command options, examples, and code samples, or information that the system prints on the screen (message text or prompts).
bold	Boldface text indicates graphical user interface controls (for example, online button names, menu names, or menu options) and column headings in tables and text.
<i>italic</i>	Text in italics indicates emphasis, book titles, new terms and terms that are defined in the text, or variable names.
<i>italic monospace font</i>	Text in italics monospace font indicates variable names within monospace-font text.
Underlined colored text	Underlined colored text indicates a cross-reference. Click the text to go to the object of the reference.
Text in blue outline	(In PDF files only) An outline around text indicates a cross-reference. Click the outlined text to go to the object of the reference. This convention is the equivalent for PDF files of the "Underlined colored text" convention included in this table.
"" (quotation marks)	(In PDF files only) Quotation marks surround cross-references to other sections of the document.
{ }	In a syntax line, curly brackets 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 variable elements of a name to distinguish them from one another. For example, <code><server_name><connector_name>tmp.log</code> .
\,/	Backslashes (\) are used as separators in directory paths in Windows installations. For UNIX installations, substitute slashes (/) for backslashes.
<i>ProductDir</i>	<i>ProductDir</i> represents the directory where the product is installed. When necessary, another variable word is added to <i>ProductDir</i> to indicate the type of directory. For example, <i>ReceiverProductDir</i> .

Related documents

The complete set of documentation available with this product includes comprehensive information about installing, configuring, administering, and using WebSphere Partner Gateway Enterprise and Advanced Editions.

You can download, install, and view the documentation at the following site:
<http://www.ibm.com/software/integration/wspartnergateway/library/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 Support Web site,
<http://www.ibm.com/software/integration/websphere/support/>

New in this release

New in release 6.0

WebSphere Partner Gateway, version 6.0 contains the following new features:

- WebSphere Business Integration Connect has been renamed WebSphere Partner Gateway.
- WebSphere Partner Gateway, version 6.0 does not support the RC5 algorithm.
- A fourth method, `getDTDOOrXSD`, has been added to `MapServiceInterface`.
- FTP scripting receiver support for targets and gateways has been added. This new transport can be used to communicate with value added networks (VANS). See the *Hub Configuration Guide* for information about FTP scripting.

New in release 4.2.2 Second Edition

Version 4.2.2, Second Edition fixes technical errors.

New in release 4.2.2

Version 4.2.2 is the first release of the *Programmer Guide*.

Part 1. Customizing WebSphere Partner Gateway: user exits

WebSphere Partner Gateway is a business-to-business (B2B) community management solution. With WebSphere Partner Gateway, you exchange data and processes within a trading community, crossing enterprise boundaries and extending business integration beyond the enterprise and into the community. A trading community typically revolves around a hub—an enterprise that acts as the community manager. Community participants send documents to the hub, where they are processed and then routed to the appropriate destination.

WebSphere Partner Gateway provides users who have needs that fall outside the range of options delivered with the product, to customize the process at a number of crucial stages. You can develop and deploy plug-in modules that support additional transports, business protocols and so forth, based on a newly developed set of APIs. The points in the process where these plug-in modules can be invoked are called *user exits*.

The following chapters document how to customize WebSphere Partner Gateway by using these user exits.

Chapter 1. User exits overview

To understand WebSphere Partner Gateway user exits, it is useful to divide the hub processing flow into three stages:

- “Receiving a document”
- “Processing a document” on page 4
- “Sending a document” on page 6

This chapter provides a brief description of the WebSphere Partner Gateway components that perform these tasks and the aspects of the process that can be customized.

Receiving a document

Documents enter the hub processing system through components known as *receivers*. Receivers are responsible for monitoring transports for inbound documents, retrieving the documents that arrive, performing some basic processing on them, and then placing them in a storage queue from which the main processing engine can retrieve them.

Receivers are transport-specific. WebSphere Partner Gateway ships with receivers designed to handle FTP/S, JMS, File, SMTP, FTP/S Scripting, and HTTP/S transports. All these receivers support the user exit framework, which allows modification of the transports. WebSphere Partner Gateway includes an API so you can develop your own receivers, based on your specific needs.

Receivers are associated with transport configurations called *targets*. A target designates the entry point for documents coming into WebSphere Partner Gateway. Targets are configured through the Community Console. A user-developed receiver can have one or more targets in the same manner as a provided receiver does. For more information on using the Community Console to configure targets and associate them with receivers, see the *Hub Configuration Guide*.

In addition to developing completely new receivers, you can develop user exit plug-in modules to customize how receivers process incoming documents. These modules are called *handlers*. There are three places in the receiver processing sequence where user exit handlers can be called to do additional processing: preprocessing, sync checking (determining whether a document is to be processed synchronously or asynchronously), and postprocessing. At each of these places, also called *configuration points*, you can use the Community Console to specify one or more handlers.

Preprocessing handlers are used to perform any necessary preprocessing of documents before they are sent to the Document Manager, where the main processing takes place. For example, in some situations multiple records can be sent in one wrapper message. Preprocessing can separate the individual messages before they are sent on for actual processing.

Documents can be processed either synchronously or asynchronously by WebSphere Partner Gateway. In synchronous processing, the sending partner expects business-protocol-level response (in addition to transport-level response) in the same connection as the one in which it sent the request. In asynchronous

processing, the sending partner expects transport-level response. You can use a specialized handler to check whether a partner is expecting a synchronous response. WebSphere Partner Gateway ships with two default sync-check handlers, `DefaultSynchronousSyncCheckHandler` and `DefaultAsynchronousSyncCheckHandler`; however, you can supply your own. This is particularly useful in the case of some document types in which defining dedicated synchronous and asynchronous targets, using default handlers, can increase throughput.

Postprocessing handlers are used to deal with the response documents that WebSphere Partner Gateway returns to initiating partners when WebSphere Partner Gateway is synchronously processing a request document.

Processing a document

WebSphere Partner Gateway processes the business documents so that it can route them to the business partners in the business protocol that trading partners are expecting. The Business Processing Engine (BPE), the core of the Document Manager component, is responsible for this processing. The BPE processes the documents by executing a series of workflows in sequence: fixed inbound workflow, variable workflow, and fixed outbound workflow. Each workflow consists of a series of steps. The BPE executes the steps in sequence. User exits allow user-defined processes to be plugged into each of the workflows.

Fixed inbound workflow

Fixed inbound workflow consists of the standard set of processing steps done to all documents coming into the Document Manager from a receiver. The workflow is fixed because the number and type of steps are always the same. Through user exits, however, you can provide customized handlers for processing the following steps: protocol unpackaging and protocol processing. The last step of fixed inbound workflow performs trading partner connection lookup, which determines the variable workflow that executes for this business document.

All messages that come into WebSphere Partner Gateway are packaged according to the specification of a specific business protocol. For example, a RosettaNet document is packaged according to the RosettaNet Implementation Framework (RNIF) specification. During protocol unpackaging, the message is unpackaged so that it can be further processed. This process can include decryption, decompression, signature verification, extraction of routing information, user authentication, or business document parts extraction. WebSphere Partner Gateway provides handlers for RNIF, AS2, Backend Integration, and NONE packaging. If handlers for other packaging types are necessary, they can be developed as user exits.

Protocol processing involves determining protocol-specific information, which might include parsing the message to determine routing information (such as the sender ID and the receiver ID), protocol information (the business protocol and version, such as RosettaNet Partner Interface Processes (PIPs) version V02.02), and Document Flow Process information (such as 3A4 version V02.02). WebSphere Partner Gateway provides processing for XML, RosettaNet, and EDI protocols. Processing for other protocols such as CSV (comma-separated value), can be provided through a user exit.

If user exits are used to set up new packaging types or new protocol types, new packaging or new protocol information must also be set up in the Community Console. See the *Hub Configuration Guide* for more information.

Variable workflow

As mentioned above, the last step of fixed inbound workflow determines which variable workflow executes for this business document. The business-protocol-specific processing in the BPE takes place in Variable Workflow. Variable workflow consists of a configured sequence of steps, which is also called an *action*. Actions are specified in the Community Console as part of the process of creating Participant Connections. WebSphere Partner Gateway ships with seventeen pre-defined actions. You can use user exits to create new actions either by developing an entirely new set of steps placed into a new sequence or by copying an existing action and modifying it either by substituting a user-defined step for a pre-existing one or by inserting a user-defined stop into an existing sequence.

Note: Not all steps delivered with WebSphere Partner Gateway can be used in new, user-defined actions, as they can be used for internal WebSphere Partner Gateway specific purposes. See “Actions supplied by WebSphere Partner Gateway” on page 56 for more information.

Actions consist of sequences of steps. User exits can be used to create those steps. Typically, steps include the following types:

- **Validation** Checking the form of the business document. For example, an XML document can be validated against an XML schema.
- **Transformation** Changing the form of the business document. An XML document can be transformed into a different XML document by using XSLT.
- **Translation** Changing the entire format of a business document from one type to another.

Note: These steps are typical examples only. Variable workflow is designed to implement business processing logic. The logic dictates the actual steps required.

Once steps have been defined, the sequence in which they are to be executed must be specified in actions. For example, if the defined steps are validation and transformation, they can be sequenced into an action consisting only of validation, another of validation followed by transformation, and a third of validation followed by transformation followed by validation of the transformed document. Sequences of steps are linked together as actions in the Community Console. See the *Hub Configuration Guide* for more information.

Fixed outbound workflow

After a document has been processed by the appropriate variable workflow, it must be packaged for transmission to its destination. WebSphere Partner Gateway provides handlers for RNIF, Backend Integration, AS, and NONE packaging, and for cXML and SOAP protocols. If other packaging handlers are required, they can be developed as user exit steps. Typically these steps will take care of one or more of the following processes:

- Assembling or enveloping
- Encrypting
- Signing
- Compressing
- Setting business protocol specific transport headers

Once the business document is packaged, it is picked up by Delivery Manager. Delivery Manager then invokes the configured sender to deliver the business document to the trading partner.

Sending a document

WebSphere Partner Gateway sends the processed documents to the trading partner (or community manager). Delivery Manager sends the processed documents to their respective destinations as given by the gateway to the trading partner or community manager. Senders use the gateway configuration specified by you to obtain the parameters required for sending the document.

You can customize the sending of documents by either creating entirely new senders to support new transports or creating preprocessing and postprocessing handlers to customize the processing of senders delivered with WebSphere Partner Gateway. Sender preprocessing handlers can be used to customize the processing of the document before it is sent out; sender postprocessing handlers can be used to customize processing of the document after it is sent.

Chapter 2. Customizing receivers

The receiver handles the first stage in the WebSphere Partner Gateway data flow. It picks up documents from the transport, performs some basic processing on them, and places them in a storage queue to be picked up by the main processing component, Document Manager. In synchronous requests, it also returns the response document to the initiating participant. You can customize the receiver stage of processing in two ways, by creating new receivers or by creating and configuring new receiver handlers. This chapter covers both ways of customizing receivers in the following sections:

- “Overview for creating new receivers”
- “Overview for creating new receiver handlers” on page 11

An additional section, “Development and deployment” on page 11, covers development and deployment issues.

The API list and the code and pseudocode example outlines follow in the next chapter.

Overview for creating new receivers

Receivers are transport-specific. WebSphere Partner Gateway ships with receivers for FTP directory, JMS, File directory, SMTP (POP3), FTP/S Scripting, and HTTP/S transports. To add a new transport to the WebSphere Partner Gateway system, you can write your own receivers, using an API provided with WebSphere Partner Gateway. Use the Community Console to configure your new receivers, and then integrate them into the processing flow in the normal way. This section describes the process of developing a new receiver. It covers the following topics:

- “Receiver flow”
- “Receiver types” on page 10
- “Multiple box deployment” on page 10

Receiver flow

The nature of the processing flow inside a receiver is in part dictated by the needs of the particular transport, but there are basic tasks that all receivers must accomplish. This section describes those tasks in a high level, general way.

1. Detect message arrival on transport

Receivers use one of two methods to detect request message arrival: polling the targets defined for this transport, as the provided JMS receiver does, or receiving callbacks from the transport, as the provided HTTP/S receiver does.

2. Retrieve message from transport

The receiver retrieves the request message and any transport attributes, like headers, from the transport. This might require the creation of temporary files on the file system.

3. Generate headers required by WebSphere Partner Gateway

WebSphere Partner Gateway uses special metadata to further process the document. The metadata comprises headers that the receiver constructs

from the request message or the transport headers. The receiver sets one or more of following headers on the request document:

- **BCGDocumentConstants.BCG_RCVR_DESTINATION** A destination type (such as production or test) associated with a target and set by receivers on a ReceiverDocumentInterface object upon receiving the document from the target. The destination type configured for the target can be read from the receiver configuration by using the `BCGDocumentConstants.BCG_TARGET_DESTINATION` attribute.
- **BCGDocumentConstants.BCG_RCVD_IPADDRESS** The host IP address where the document is received.
- **BCGDocumentConstants.BCG_INBOUND_TRANSPORT_CHARSET** The character set that is obtained from the transport headers.
- **BCGDocumentConstants.BCG_REQUEST_URI** The URI of the target where the request is received.
- **BCGDocumentConstants.BCG_RCVD_DOC_TIMESTAMP** The time when the document was received.
- **BCGDocumentConstants.BCG_RCVD_CONTENT_LENGTH** The size of the received content.
- **BCGDocumentConstants.BCG_RCVD_MSG_LNGTH_INC_HDRS** The size of the received content including headers.
- **BCGDocumentConstants.BCG_RCVD_CONTENT_TYPE** The content type of the request.

The *receiver request* document that will be forwarded to Document Manager for further processing consists of the transport message, transport headers, and the above WebSphere Partner Gateway headers.

Note: You can execute steps, 4 and 5 in either order.

4. Do preprocessing

The receiver calls a WebSphere Partner Gateway component, the Receiver Framework, to actually do the preprocessing. The Framework executes the handlers, either supplied by WebSphere Partner Gateway or user-defined, that have been specified for this target via the Community Console, in the order they are shown in the Community Console configuration page. The Receiver Framework invokes the configured list of handlers for the target one handler after the other until one of the handlers accepts the received request document. This handler is invoked to process the receiver document. This handler can return one or more documents, and all receivers must be designed to handle multiple returns.

5. Check whether synchronous or asynchronous

The receiver calls the Receiver Framework to determine whether the received request is synchronous or not. The Framework invokes a configured list of handlers for this target, one after the other, until one of the handlers accepts the request receiver document. The Receiver Framework executes this handler to determine whether this is a synchronous request or an asynchronous request. If the handler determines that the request is asynchronous, path A will be followed. If the request is synchronous, path B will be followed.

6A. Process asynchronous request

If the request is asynchronous, (meaning that it does not require a response document to be returned to the originating trading partner) the receiver

calls the Framework to process the request document. The Framework takes care of storing the information in a place from which Document Manager will retrieve it.

6B. Process synchronous request

If the request is synchronous (meaning that it requires a response document to be returned to the originating trading partner) the receiver calls the Framework to process the request document. There are two possible types of synchronous requests: blocking and nonblocking. In blocking mode, the receiver's calling thread will be blocked until the Framework returns the response document to it from Document Manager. In nonblocking mode, the receiver's calling thread will return immediately. When the Framework receives the response document at a later time, it will call the `processResponse` method on the receiver to pass the response document back. A correlation object is used to synchronize the originating request with this response.

Note that the JMS receiver has been migrated to the user-exit Receiver Framework and enhanced to support the handling of synchronous request-responses. Perform the following steps to use the synchronous behavior in the JMS receiver.

1. Configure the back-end application to set the ReplyTo queue and Correlation ID in the JMS headers. When the JMS receiver receives the synchronous response from the Document Manager, it writes the response to the ReplyTo queue and the Correlation ID in the JMS headers.
2. Configure the SyncCheck handler, either a WebSphere Partner Gateway default sync-check handler or a user-defined sync-check handler, for the JMS receiver target in the Community Console. When invoked, the configured handler returns true or false based on the received request. If the handler is the default sync check handler, it always returns true.

7. Do postprocessing

In the case of a synchronous request, the receiver calls the Receiver Framework to execute postprocessing on the response document before it is returned to the originating partner. The Receiver Framework invokes a configured list of handlers for this target one after the other until one of the handlers accepts the response receiver document. The Receiver Framework executes this handler to process the response receiver document.

8. Complete processing

In case of a synchronous request, the response document is returned to the originating trading partner over the transport. The receiver calls the `setResponseStatus` method on the Framework to report on the success or failure of the response delivery. The receiver removes the request message from the transport.

Exceptions

Errors can occur in the following circumstances:

- Retrieval of the message from the transport fails
- Call to preprocess fails
- Sync check fails
- Call to carry out asynchronous or synchronous processing fails
- Call to postprocess the response document fails
- Attempt to return response document on transport fails

If any of these failures occurs, the receiver can perform the following actions:

Reject the message from the transport

The message must be removed from the transport. In the case of a JMS receiver, for example, the message is removed from the queue. In the case of an HTTP receiver, a 500 status code is returned to the trading partner.

Archive the rejected message

This is an optional step. The message is archived, either in a queue to be resubmitted later or in a folder for rejected messages on the local file system.

Generate an event

This is an optional step. Receiver developers can choose to have receivers produce events, alerts, or both in the case of error conditions. For example, if in a synchronous request the receiver is unable to return a response document it has received from the Framework to the originating trading partner, an error event is logged. A list of events available for logging problems in the receiver stage is presented in the following chapter about APIs.

Receiver types

There are two general types of receivers, based on how they detect incoming messages on the transport. Some receivers are polling based. They poll their transports at regular intervals to determine if new messages have arrived. WebSphere Partner Gateway-supplied examples of this type of receiver include JMS, file, POP3, FTP/S Scripting, and FTP. Other receivers are callback based. They receive notification from the transport when messages arrive. The HTTP receiver is an example of a callback-based receiver.

Note: Receivers can be deployed in a multiple-box mode. In this case, multiple receivers and their configured targets might be picking up messages from the same transport location. In such a deployment model, there must be concurrent management access coordination built into the receiver.

Multiple box deployment

Receivers can be deployed in a multiple box (multi-box) mode. In this scenario, multiple receivers and their configured targets can pick up messages from the same transport location. In such a deployment model, there needs to be concurrent management access coordination built into the receiver.

In a deployment model where receiver components are deployed on multiple boxes, all the defined receivers exist on each of the boxes. These receivers get the list of configured targets from the database, which are created from the Community Console. The target configuration must be accessible to each receiver instance; if it is not, the receiver instances fail to receive the document from that target. In some cases, the target has to be created in each of the receiver boxes.

For example, if you have a receiver component running on two boxes with a configured JMS receiver and target (MyJMSTarget) going to a queue, such as MyQueue, both the JMS receiver instances will poll the target called MyJMSTarget, which is configured with the queue 'MyQueue'. In this case, the JMS bindings file that is configured with the target is accessible to both the JMS receiver instances; for example, the bindings file kept in a shared location or the same bindings file kept in each of the boxes. This same deployment model is also applicable for the File and FTP receivers.

Overview for creating new receiver handlers

The receiver can call the Receiver Framework to invoke receiver handlers at three stages, called configuration points, during the receiver processing flow: preprocessing, sync checking, and postprocessing. Preprocessing returns one or more receiver documents. Preprocessing can be used to process the document before submitting it to WebSphere Partner Gateway for processing. It can also be used for splitting an incoming document from a trading partner. The sync-check handler determines whether the document is to be processed as a synchronous or asynchronous request. Postprocessing provides necessary processing for response documents that are returned from Document Manager as a result of a synchronous request.

The Framework relies on handlers to execute these processing requests. You can develop handlers to satisfy your specific needs, using APIs that ship with WebSphere Partner Gateway. After you write and deploy the handlers, you need to configure them by using the Community Console. For further information about this process, see the *Hub Configuration Guide*.

Development and deployment

The following sections describe development and deployment for user-created receivers and handlers.

Development environment

The receiver and receiver handler development API relies on classes and interfaces from two packages:

- `com.ibm.bcg.bcgdk.receiver`
- `com.ibm.bcg.bcgdk.common`

These packages are part of the `bcgjdk.jar` file, which is found among the installable WebSphere Partner Gateway files in the following directories:

- `ProductDir\router\lib`
- `ProductDir\receiver\lib`
- `ProductDir\console\lib`

In all deployed instances, the `bcgjdk.jar` file is installed in the application server classpath.

For development, the `bcgjdk.jar` file must be included in the build path of the project that contains the user exit classes, that is, in the classpath.

Deployment and packaging (receivers)

All user-created code needs to be made available to the run-time environment. Package and deploy user-created code in one of the following ways for use during runtime:

- Placed in a JAR file in `\<receiver>\lib\userexits`
- Added as classes in `\<receiver>\lib\userexits\classes`

Adding the JAR or class files to the run-time environment makes them available only if the transport or handler is configured to be used by the run-time library. Receiver transports and handlers are configured for use like the other product-provided transports and handlers. In order to configure them you must

first make them known to the Community Console. You do this by importing their definitions into the Community Console by means of an XML descriptor file.

To import a Receiver transport, click **Hub Admin > Hub Configuration > Targets > Manage Transport Types**.

To import a Receiver transport handler, click **Hub Admin > Hub Configuration > Handlers > Target > Import**. One of the descriptors is the Handler Type. Only defined Handler Types are allowed and are based on the transport target configuration points. For user-defined transports, the transport descriptor file must be imported first in order to provide the handler type.

Descriptor file definition for a receiver transport

The receiver transport descriptor file uses the bcgtarget.xsd schema. Following is a brief outline for each of the elements in the descriptor file based on the following example:

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- Copyright (c) 2004 IBM Corp. - All Rights Reserved.-->
<!-- IBM makes no representations or warranties about the suitability of -->
<!-- this program, either express or implied, including but not limited to -->
<!-- the implied warranties of merchantability, fitness for a particular -->
<!-- purpose, or non-infringement. -->
<tns:TargetDefinition
  xmlns:tns="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external"
  xmlns:tns2="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external/types"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external
  bcgtarget.xsd http://www.ibm.com/websphere/bcg/2004/v0.1/import/external/types
  bcgimport.xsd">
  <tns:TargetClassName>com.mycompany.MyHTTPTransport</tns:TargetClassName>
  <tns:Description>My company HTTP Transport</tns:Description>
  <tns:TransportTypeName>MYHTTP</tns:TransportTypeName><tns:TransportAttributes>
  <tns2:ComponentAttribute>
  <tns2:AttributeName>URI</tns2:AttributeName>
  <tns2:AttributeDefaultValue>localhost</tns2:AttributeDefaultValue>
  </tns2:ComponentAttribute>
  <tns2:ComponentAttribute>
  <tns2:AttributeName>Timeout</tns2:AttributeName>
  </tns2:ComponentAttribute>
  </tns:TransportAttributes>
  <tns:TargetConfigurationPoints>
  <tns:Preprocess>RECEIVER.PREPROCESS.MYHTTP</tns:Preprocess>
  <tns:SyncCheck>RECEIVER.SYNCHECK.MYHTTP</tns:SyncCheck>
  </tns:TargetConfigurationPoints>
</tns:TargetDefinition>
```

A description of the XML elements follows:

TargetClassName

The full class name of the Receiver implementation

Description

General description for the transport

TransportTypeName

The name that appears in the Transport drop down list in the Console Target List page

TransportAttributes (optional)

Any attributes that this transport can have

ComponentAttribute

An attribute name and default value that are used to provide configuration information to the target at runtime

AttributeName

The name of a specific attribute

AttributeDefaultValue (optional)

The attribute's default value

TargetConfigurationPoints (optional)

The names of the configuration points that this transport has

Preprocess

A preprocess configuration point, RECEIVER.PREPROCESS.xxx where xxx is the value of the TransportTypeName

SyncCheck

A SyncCheck configuration point, RECEIVER.SYNCHECK.xxx where xxx is the value of the TransportTypeName

SyncResponseProcess

A SyncResponseProcess configuration point, RECEIVER.SYNCRESPONSEPROCESS.xxx where xxx is the value of the TransportTypeName

Any handlers defined for this receiver transport must match one of these TargetConfigurationPoints values.

Descriptor file definition for a receiver transport handler

The receiver transport handler descriptor file uses the bcghandler.xsd schema. Following is a brief outline for each of the elements in the descriptor file based on the following example:

```
<?xml version="1.0" encoding="UTF-8"?>
<tns:HandlerDefinition
  xmlns:tns="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external"
  xmlns:tns2="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external/types"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external
  bcghandler.xsd http://www.ibm.com/websphere/bcg/2004/v0.1/import/external/types
  bcgimport.xsd ">
  <tns:HandlerClassName>com.mycompany.RecvHandler</tns:HandlerClassName>
  <tns:Description>My companies handler for my business protocol and multiple
  transports.</tns:Description>
  <tns:HandlerTypes>
  <tns:HandlerTypeValue>RECEIVER.PREPROCESS.MYHTTP</tns:HandlerTypeValue>
  <tns:HandlerTypeValue>RECEIVER.PREPROCESS.JMS</tns:HandlerTypeValue>
  </tns:HandlerTypes>
  <tns:HandlerAttributes>
  <tns2:ComponentAttribute>
  <tns2:AttributeName>Attribute 1</tns2:AttributeName>
  </tns2:ComponentAttribute>
  <tns2:ComponentAttribute>
  <tns2:AttributeName>Attribute 2</tns2:AttributeName>
  <tns2:AttributeDefaultValue>Attribute2DefaultValue</tns2:AttributeDefaultValue>
  </tns2:ComponentAttribute>
  </tns:HandlerAttributes>
</tns:HandlerDefinition>
```

A description of the XML elements follows:

HandlerClassName

The full class name of the handler implementation.

Description

General description for the handler.

HandlerTypes

The handler types with which this handler can be used. For transports, the handler type corresponds to the TargetConfigurationPoints value defined for that transport. To see a list of the currently defined transport Handler Types, click **Hub Admin > Hub Configuration > Handlers > Target > HandlerTypes**.

HandlerTypeValue

The HandlerType value that corresponds to the TargetConfigurationPoints value. A handler can be associated with more than one transport type.

HandlersAttributes (optional)

The attributes, if any, for this handler.

ComponentAttribute

An attribute's name and default values that are used to provide configuration information to the handler at runtime.

AttributeName

The name of a specific attribute.

AttributeDefaultValue (optional)

The attribute's default value.

Reserved attribute names

Every target configuration has the following two reserved attribute names:

ACTIVESTATUSCD

An attribute whose value indicates whether the target of a receiver is enabled or disabled. You can enable or disable a target from the Community Console. If a target is enabled, this attribute has a value of 1. Do not obtain the value of this attribute at runtime from the configuration of the target by using the constant `BCGDocumentConstants.BCG_TARGET_STATUS`. While developing a receiver, do not define `ACTIVESTATUSCD` as an attribute in the receiver's deployment descriptor.

DESTNAME

An attribute whose value indicates the gateway type associated with the target. Every target has a gateway type associated with it. The gateway type can be configured from the Community Console while configuring a target. A gateway type is required for determining the participant connection. You can obtain the value of this attribute at runtime from the configuration of the target by using the constant `BCGDocumentConstants.BCG_TARGET_DESTINATION`. While developing a receiver, make sure that you do not define `DESTNAME` as an attribute in the deployment descriptor of the receiver. For every business document received by a target, the receiver creates an object of type `ReceiverDocumentInterface`, also referred to as a receiver document. The receiver sets the `BCGDocumentConstants.BCG_RCVR_DESTINATION` attribute on the receiver document. The value of this attribute should be same as the value of the `BCGDocumentConstants.BCG_TARGET_DESTINATION` attribute from the target configuration. If `BCGDocumentConstants.BCG_RCVR_DESTINATION` is not set on

the receiver document, the Document Manager cannot determine the participant connection for this document.

Chapter 3. APIs and example code for receivers and receiver handlers

The following chapter provides an annotated list of the APIs provided for developing custom receivers and receiver handlers. The following classes and interfaces are documented:

- “ReceiverInterface” on page 18
- “ReceiverDocumentInterface” on page 20
- “ReceiverFrameworkInterface” on page 23
- “ReceiverConfig” on page 27
- “ResponseCorrelation” on page 29
- “BCGReceiverException” on page 30
- “ReceiverPreProcessHandlerInterface” on page 31
- “ReceiverSyncCheckHandlerInterface” on page 32
- “ReceiverPostProcessHandlerInterface” on page 34
- “BCGReceiverUtil” on page 36
- “Events” on page 37

A brief example of code and pseudo code for a custom receiver implementation is included in “Example receiver implementation outline” on page 38.

ReceiverInterface

Each receiver must implement this interface. It has the following methods:

- `init`
- `refreshConfig`
- `startReceiving`
- `processResponse`
- `stopReceiving`

Method

`init`

Method description

Initializes the receiver, based on the contents of the `ReceiverConfig` object

Syntax

```
public void init (Context context, ReceiverConfig config)
    throws BCGReceiverException
```

Parameters

<code>context</code>	Run-time context information for this receiver
<code>config</code>	Configuration details as specified in the Community Console

Method

`refreshConfig`

Method description

Called by the Receiver Framework if it detects changes in the configuration of this receiver

Note: The target of a receiver can be enabled or disabled from the Community Console. The target status can be read from the target configuration attribute `BCGDocumentConstants.BCG_TARGET_STATUS`. The value of this attribute returns 1 if the target is enabled.

Syntax

```
public void refreshConfig(ReceiverConfig config)
    throws BCGReceiverException
```

Parameters

<code>config</code>	An object that carries configuration details as specified in the Community Console
---------------------	--

Method

`startReceiving`

Method description

Called by the Receiver Framework in its thread. After this method is called, the receiver can receive documents on its active targets. If the receiver is of the callback type, it processes callbacks in its own thread only after this point. The receiver receives documents in its own threads. This method returns quickly.

Note: The receiver is responsible for its own thread management.

Syntax

```
public void startReceiving()
    throws BCGReceiverException
```

Parameters

None

Method

```
processResponse
```

Method description

In the case of nonblocking synchronous requests, called by the Receiver Framework when the response document has returned from Document Manager. The call comes on a Receiver Framework (or internal class) thread. The receiver returns this call quickly.

Syntax

```
public void processResponse(ResponseCorrelation respCorr,
    ReceiverDocumentInterface response)
    throws BCGReceiverException
```

Parameters

respCorr	An object that contains the information needed to synchronize the response document to the original request document
response	The response document

Method

```
stopReceiving
```

Method description

This method is called by the Receiver Framework in its thread. This method returns quickly. After this method is called, the receiver stops receiving the documents, and cleanup is performed. After this method is called, all references to the receiver are removed. This method is called when the Receiver Framework receives a request to terminate.

Syntax

```
public void stopReceiving()
    throws BCGReceiverException
```

Parameters

None

ReceiverDocumentInterface

Represents the document. This object will be created by the receiver before it invokes the Framework. It has the following methods:

- `getTempObject`
- `setTempObject`
- `getAttribute`
- `setAttribute`
- `getAttributes`
- `getTransportHeaders`
- `setTransportHeaders`
- `getDocument`
- `setDocument`
- `getDocumentUUID`

Method

`getTempObject`

Method description

Retrieves temporary information for passing among handlers

Syntax

```
public Object getTempObject(String objectName)
```

Parameters

`objectName` The name of the object holding the temporary information

Method

`setTempObject`

Method description

Sets temporary information for passing among handlers

Syntax

```
public void setTempObject(String objectName, Object objectValue)
```

Parameters

`objectName` The name of the object holding the temporary information
`objectValue` The temporary information

Method

`getAttribute`

Method description

Retrieves a console-defined attribute

Syntax

```
public Object getAttribute(String name)
```

Parameters

name The name of the attribute

Method

```
setAttribute
```

Method description

Sets console-defined attribute

Syntax

```
public void setAttribute(String name, Object value)
```

Parameters

name The name of the attribute

value The value to be set on the attribute

Method

```
getAttributes
```

Method description

Retrieves the entire attribute map

Syntax

```
public Map getAttributes()
```

Parameters

None

Method

```
getTransportHeaders
```

Method description

Retrieves transport headers

Syntax

```
public HashMap getTransportHeaders()
```

Parameters

None

Method

```
setTransportHeaders
```

Method description

Sets transport headers

Syntax

```
public setTransportHeaders(HashMap transportHeaders)
```

Parameters

transportHeaders
The transport headers

Method

```
getDocument
```

Method description

Retrieves the document content as a file

Syntax

```
public File getDocument()
```

Parameters

None

Method

```
setDocument
```

Method description

Sets the document content in the file object

Syntax

```
public void setDocument(File document)
```

Parameters

document The name of the file object that contains the document

Method

```
getDocumentUUID
```

Method description

Gets the unique reference ID for this document. Every document is assigned a unique ID.

Syntax

```
String getDocumentUUID()
```

Parameters

None

ReceiverFrameworkInterface

This interface specifies the methods available in the Receiver Framework, which are as follows:

- remove
- preProcess
- syncCheck
- postProcess
- process
- setResponseStatus

Method

remove

Method description

Called by the receiver when it detects a nonrecoverable condition. The receiver calls this method only if it cannot continue receiving. The framework marks this receiver for removal and returns immediately. Later the stopReceiving method will be called on the receiver object.

Syntax

```
public void remove(String transportType)
                throws BCGReceiverException
```

Parameters

transportType

A string identifying the receiver by the transport it supports

Method

preProcess

Method description

Called by the receiver to preprocess the document. The Receiver Framework invokes preprocessing handlers configured in the Community Console for this target. The framework invokes the applies method of the handlers (by passing the request document as input) one after the other (in the same sequence as they are configured in the Community Console), until a handler's applies method returns true. The Receiver Framework executes this handler's process method to process the request document. This method returns an array of receiver documents.

Syntax

```
public ReceiverDocumentInterface[] preProcess(
                String transportType,
                String target,
                ReceiverDocumentInterface request)
                throws BCGReceiverException
```

Parameters

transportType

A string identifying the receiver by the transport it supports

target	A string identifying the target
request	The request document to be processed

Method

syncCheck

Method description

Called by the receiver to determine whether the received document can be processed synchronously or asynchronously. The Receiver Framework invokes syncCheck handlers configured in the Community Console for this target. The framework invokes the applies method of each handler one after the other (in the same sequence as they are configured in Community Console), until a handler's applies method returns true. The Receiver Framework executes this handler's syncCheck method to determine whether the request document can be processed synchronously or asynchronously. A value of true indicates that the request is synchronous. A value of false indicates that the request is configured to be asynchronous or that there are no syncCheck handlers configured for this receiver; the request is handled asynchronously.

Syntax

```
public boolean syncCheck(String transportType, String target,
                        ReceiverDocumentInterface request)
    throws BCGReceiverException
```

Parameters

transportType	A string identifying the receiver by the transport it supports
target	A string identifying the target
request	The request document to be processed

Method

postProcess

Method description

In the case of a synchronous request, the receiver calls the Receiver Framework to postprocess the response document. The Receiver Framework invokes postprocessing handlers configured in the Community Console for this target. The framework invokes each handler's applies method by passing the response document as input one after the other (in the same sequence that they are configured in the Community Console), until the applies method of a handler returns true. The Receiver Framework executes this handler's process method to process the response document.

Syntax

```
public ReceiverDocumentInterface[] postProcess(
    String receiverType,
    String target,
    ReceiverDocumentInterface request)
    throws BCGReceiverException
```

Parameters

receiverType	A string identifying the receiver
target	A string identifying the target
request	The response document to be processed

Method

process

Method description

When this method is called, the framework checks for the Universal Unique ID (UUID) in the request document. If the UUID has not been set, the framework generates the UUID. The framework checks the router_in and sync_in folders for a pre-existing file with the same name as the newly generated UUID (<UUID>.vcm). If the framework finds a pre-existing file with that UUID, it regenerates the UUID. The receiver document is then introduced into the WebSphere Partner Gateway Document Manager. The method has three distinct signatures, depending on the type of processing required: asynchronous, blocking synchronous, or nonblocking synchronous.

Note: The method takes only one request document at a time. If multiple documents exist as a result of preprocessing, the receiver can call this method for each received document.

Syntax

Asynchronous request

```
public void process(String transportType, ReceiverDocumentInterface request)
    throws BCGReceiverException
```

This method returns immediately after introducing the document into WebSphere Partner Gateway Document Manager.

Blocking synchronous request

```
public void process(String transportType,
    ReceiverDocumentInterface request,
    ReceiverDocumentInterface response)
    throws BCGReceiverException
```

This method introduces the document into the WebSphere Partner Gateway Document Manager. The method does not return until a response is available.

Nonblocking synchronous request

```
public void process(String transportType,
    ReceiverDocumentInterface request,
    ResponseCorrelation responseCorr)
    throws BCGReceiverException
```

This method returns immediately after introducing the document into the WebSphere Partner Gateway Document Manager. When a response is available, the Receiver Framework invokes the processResponse method on the receiver that made the process call. The Receiver Framework passes the correlation object that was passed in the process method. The receiver can use the response correlation object to correlate the request with the response document.

Parameters

<code>transportType</code>	A string identifying the receiver
<code>request</code>	The input document
<code>response</code>	The blank document to hold the response from Document Manager
<code>responseCorr</code>	The response correlation object that holds information allowing the receiver to synchronize the original request document with the response document to be returned from Document Manager.

Method

`setResponseStatus`

Method description

Notifies the Receiver Framework of the status of the synchronous response document after it has been returned to the trading partner

Syntax

```
public void setResponseStatus(String documentUUID,  
                             boolean status, String statusMessage)  
    throws BCGReceiverException
```

Parameters

<code>documentUUID</code>	The document's unique ID
<code>status</code>	A Boolean value that represents the state of the response document
<code>statusMessage</code>	Information related to the status of the response document

ReceiverConfig

This object stores receiver configuration information. It provides the following methods:

- `getTransportType`
- `getConfigs`
- `getAttribute`
- `setAttribute`
- `getTargetConfig`
- `getTargetConfigs`

Method

`getTransportType`

Method description

Retrieves the type of receiver

Syntax

```
public String getTransportType()
```

Parameters

None

Method

`getConfigs`

Method description

Retrieves the configuration properties of a receiver

Syntax

```
public Map getConfigs()
```

Parameters

None

Method

`getAttribute`

Method description

Retrieves the value of a configuration property

Syntax

```
public Object getAttribute(String configName)
```

Parameters

`configName` The name of the property

Method

setAttribute

Method description

Sets the value of a configuration property

Syntax

```
public void setAttribute(String configName, Object value)
```

Parameters

configName	The name of the property
value	The value to be set on the property

Method

getTargetConfig

Method description

Retrieves the target configuration

Syntax

```
public Config getTargetConfig(String targetName)
```

Parameters

targetName	The name of the target
------------	------------------------

Method

getTargetConfigs

Method description

Retrieves the configuration of all targets

Syntax

```
public List getTargetConfigs()
```

Parameters

None

ResponseCorrelation

This interface provides a generic way to persist information needed to synchronize a request with a response when nonblocking synchronous processing has been invoked.

For example, a JMS receiver stores the JMS correlation ID, so the call looks like:

```
ResponseCorrelation respCorrel = new ResponseCorrelation()
respCorrel.set (CORREL_ID_STRING, correlID);
```

Multiple types of information might need to be stored, depending on the transport type.

The interface provides the following methods:

- set
- get

Method

set

Method description

Sets serializable key and data

Syntax

```
public Object set(Serializable key, Serializable value)
throws NullPointerException
```

Parameters

key	The key for the correlation-enabling data
value	The value to be set

Method

get

Method description

Gets serializable data of the serializable key

Syntax

```
public Object get(Serializable key)
```

Parameters

key	The serializable key for retrieving serializable data
-----	---

BCGReceiverException

Exception class for the receiver

Examples

```
public class BCGReceiverException extends  
com.ibm.bcg.bcgdk.common.exception.BCGException {  
}
```

ReceiverPreProcessHandlerInterface

This interface describes the methods that all preprocess handlers must implement:

- `init`
- `applies`
- `process`

Method

`init`

Method description

Initializes the handler

Syntax

```
public void init(Context context, Config handlerConfig)
    throws BCGReceiverException
```

Parameters

`context` The context in which the handler executes
`handlerConfig` Handler configuration

Method

`applies`

Method description

The handler returns true if it can process the request document. Otherwise it returns false.

Syntax

```
public boolean applies(ReceiverDocumentInterface request)
    throws BCGReceiverException
```

Parameters

`request` The request document

Method

`process`

Method description

Performs preprocessing. Returns an array of documents

Syntax

```
public ReceiverDocumentInterface[] process(
    ReceiverDocumentInterface request) throws BCGReceiverException
```

Parameters

`request` The request document

ReceiverSyncCheckHandlerInterface

This interface describes the methods that all syncCheck handlers must implement:

- init
- applies
- syncCheck

Sync-check handlers are configured in the Community Console just as other handlers are.

Method

init

Method description

Initializes the handler

Syntax

```
public void init(Context context, Config handlerConfig)
    throws BCGReceiverException
```

Parameters

context The context in which the handler executes
handlerConfig Handler configuration

Method

applies

Method description

The handler returns true if it can process the request document. Otherwise it returns false.

Syntax

```
public boolean applies(ReceiverDocumentInterface request)
    throws BCGReceiverException
```

Parameters

request The request document

Method

syncCheck

Method description

Checks to see whether the document is to be processed synchronously. The method returns true if the request is synchronous, false if asynchronous.

Syntax

```
public boolean syncCheck(ReceiverDocumentInterface request)
    throws BCGReceiverException
```

Parameters

request The request document

Sync-check handlers are configured in the Community Console just as other handlers are.

ReceiverPostProcessHandlerInterface

This interface describes the methods that all postprocessing handlers must implement:

- `init`
- `applies`
- `process`

Method

`init`

Method description

Initializes the handler

Syntax

```
public void init(Context context, Config handlerConfig)
    throws BCGReceiverException
```

Parameters

`context` The context in which the handler executes
`handlerConfig` Handler configuration

Method

`applies`

Method description

The handler returns true if it can process the request document. Otherwise it returns false.

Syntax

```
public boolean applies(ReceiverDocumentInterface request response)
    throws BCGReceiverException
```

Parameters

`request` The request document

Method

`process`

Method description

Postprocesses the response document. Returns an array of a receiver document.

Syntax

```
public ReceiverDocumentInterface[] process(
    ReceiverDocumentInterface request response)
    throws BCGReceiverException
```

Parameters

request

The request document

BCGReceiverUtil

This static class provides essential utility methods used for business document storage and management.

- createReceiverDocument
- getReceiverFramework
- getTempDir
- getRejectDir

Method

createReceiverDocument

Method description

Creates the receiver document (an instance of the ReceiverDocumentInterface class), which can be used as a request or a response receiver document

Syntax

```
public static ReceiverDocumentInterface createReceiverDocument()
```

Method

getReceiverFramework

Method description

Returns a reference to the Receiver Framework so that document processing can begin

Syntax

```
public static ReceiverFrameworkInterface getReceiverFramework()
```

Method

getTempDir

Method description

Gets a location for temporary storage

Syntax

```
public static File getTempDir()
```

Method

getRejectDir

Method description

Gets a location for archiving rejected messages

Syntax

```
public static File getRejectDir()
```

Events

A list of events available for the receiver execution flow follows.

Informational events

BCG103207 - Receiver Entrance

Event text: Receiver *{0}* entrance.
{0} Receiver class name

BCG103208 - Receiver Exit

Event text: Receiver *{0}* exit.
{0} Receiver class name

Warning events

BCG103204 - Target Processing Warning

Event text: Target '*{0}*,*{1}*' processing document warning, reason: *{2}*.
{0} Target name
{1} Target (receiver) type
{2} Warning reason specific to target

(Target Processing Warning is a general warning, such as an error in closing the queue connection)

Error events

BCG103203 - Target Processing Error

Event text: Target '*{0}*,*{1}*' failed to processing document, error: *{2}*.
{0} Target name
{1} Target (receiver) type
{2} Exception message

BCG103205 - Target Error

Event text: Target '*{0}*,*{1}*' failed to process target: *{2}*.
{0} Target name
{1} Target (receiver) type
{2} Exception message

(An example of a Target Error event is a failure in opening a queue connection)

Example receiver implementation outline

The following code and pseudocode outlines an example implementation for a JMS receiver.

```
public class CustomJMSReceiver implements ReceiverInterface {
    private Context m_context = null;
    private ReceiverConfig m_rcvConfig = null;
    String receiverType = "CustomJMS";

    public void init(Context context, ReceiverConfig receiverConfig) {
        this.m_context = context;
        this.m_rcvConfig = receiverConfig;
        return;
    }

    public void refreshConfig(ReceiverConfig rcvconfig) throws BCGReceiverException {
        this.m_rcvConfig = rcvconfig;

        // Check which receiver targets are updated, added newly, or deleted
        // If new target is added, create a new thread and start polling the target.
        // If current target is updated, stop the thread that is polling the
        // target, and, using the updated configuration information, start polling.
        // If the current target is deleted, stop the thread which is polling the
        // target and delete the thread that is responsible for polling the target.
        ...

        return;
    }

    public void startReceiving() throws BCGReceiverException {
        // Read the list of targets in the ReceiverConfig object.
        // For each target, create a UserJMSThread and start the thread.

        ...

        return;
    }

    public void processResponse(ResponseCorrelation respCorr,
        ReceiverDocumentInterface response) throws BCGReceiverException {

        ReceiverDocumentInterface responseDocs[];
        responseDocs = rcvFramework.postProcess(receiverType, target, response);

        // Process the responseDocs.
        // Get the correlation information, for example, reply-to-queue
        // and correlation ID, and send the responses to the reply-to-queue queue.

        ...

        return;
    }

    public void stopReceiving() throws BCGReceiverException {
        // Get the list of UserJMSReceiverThreads associated with each target.
        // Call the stop method.

        ...

        return;
    }

    private class UserJMSReceiverThread extends Thread {

        String target; // Name of the target
        String receiverType = "CustomJMS";
    }
}
```

```

Config targetConfig;

public UserJMSReceiverThread(Config targetConfig) {
    target = targetConfig.getName();
    this.targetConfig = targetConfig;
    // Create the queue session, connection, queue receiver
    // for this target.
    ...
}

public void run() {
    while (true) {
        try {
            // Call the receive method on the queue.
            // If a message is available, read the message and process the
            // document.
            ...

            processDocument(data);

            ...

            // else continue to poll the queue.
            ...

        } catch(Exception e) {

            ...

        }
    }
}

// Upon receiving the document from the queue, start processing the
// document by using Receiver Framework APIs.

public void processDocument(byte[] data) throws BCGReceiverException {

    // Get the temporary location where data can be written.
    File tempDir = BCGReceiverUtil.getTempDir();

    // Now create the temp file and write the data into it.
    File fileLocation = new File(tempDir, fileStr);
    FileOutputStream fos = new FileOutputStream(fileLocation);
    fos.write(data);
    fos.close();

    // Create the ReceiverDocument object.
    ReceiverDocumentInterface request = BCGReceiverUtil.createReceiverDocument();

    // Set document, transport headers, and BCG headers in the request.
    request.setDocument(fileLocation);
    String destination = targetConfig.getAttribute(
    BCGDocumentConstants.BCG_TARGET_DESTINATION)
    request.setAttribute(BCGDocumentConstants.BCG_RCVR_DESTINATION, destination);
    ...

    // Now start processing the document using ReceiverFramework APIs.
    ReceiverFrameworkInterface rcvFramework =
    BCGReceiverUtil.getReceiverFramework();

    ReceiverDocumentInterface requestDocs[] =
    rcvFramework.preprocess(receiverType, target, request);

    // Check whether the requestDocs length is 1; if yes, document is not.
    // Split into multiple documents. In this example, it is assumed
    // that there is no splitting.

```

```

ReceiverDocumentInterface requestDoc = requestDocs[0];
boolean sync = rcvFramework.syncCheck(receiverType, target, requestDoc);
...

    if (!sync) {
        // Request is not synchronous.
        rcvFramework.process(receiverType, target, requestDoc);

    } else {
        // Request is synchronous. Your receiver can make a blocking
        // or nonblocking process call to the framework. The flow in
        // this example is for illustration purpose only.
        // Depending on your requirements, your receiver can make
        // only one type of synchronous process call.

        if (isRequestBlocking(requestDoc)) {

            ReceiverDocumentInterface responseDoc;
            ReceiverDocumentInterface responseDocs[];
            rcvFramework.process(receiverType, requestDoc, responseDoc);
            responseDocs =
            rcvFramework.postProcess(receiverType, target, responseDoc);

            // Process the responseDocs.
            // Get the correlation information, for example, reply-to-queue and
            // correlation ID, and send the responses to reply-to-queue queue.

            ...

        } else {
            ResponseCorrelation respCorr;
            // Create response correlation by using the information that
            // you can use later in CustomJMSReceiver.processResponse
            // to correlate response with the request.

            ...

            rcvFramework.process(receiverType, requestDoc, responseCorr)

            ...
            // In case of nonblocking process, whenever response is
            // available, Receiver Framework calls
            // CustomJMSReceiver.processResponse.
        }
    }
}

public void isRequestBlocking(ReceiverDocumentInterface request) {
    // Return true if you want to invoke Receiver Framework
    // by using blocking process call for this request.
    // Return false if you want to use nonblocking one.
    ...

    return true;
}
}
}

```

Chapter 4. Customizing fixed and variable workflow

WebSphere Partner Gateway processes the business documents so that it can route them to the business partners in the business protocol that the trading partners are expecting. As described earlier, the Business Processing Engine (BPE), the core component of the Document Manager component, is responsible for running the flow as the business document flows through Document Manager. The entire business document flow in the BPE is divided into three units, also referred to as workflows: fixed inbound workflow, variable workflow, and fixed outbound workflow. Each workflow consists of series of steps, which the BPE runs in sequence.

Fixed inbound and fixed outbound workflow refer to the standard processing that all documents undergo as they flow into and out of the main processing stage. They are called fixed because the number and type of processing steps are always the same. Figure 1 illustrates Document Manager and the workflow.

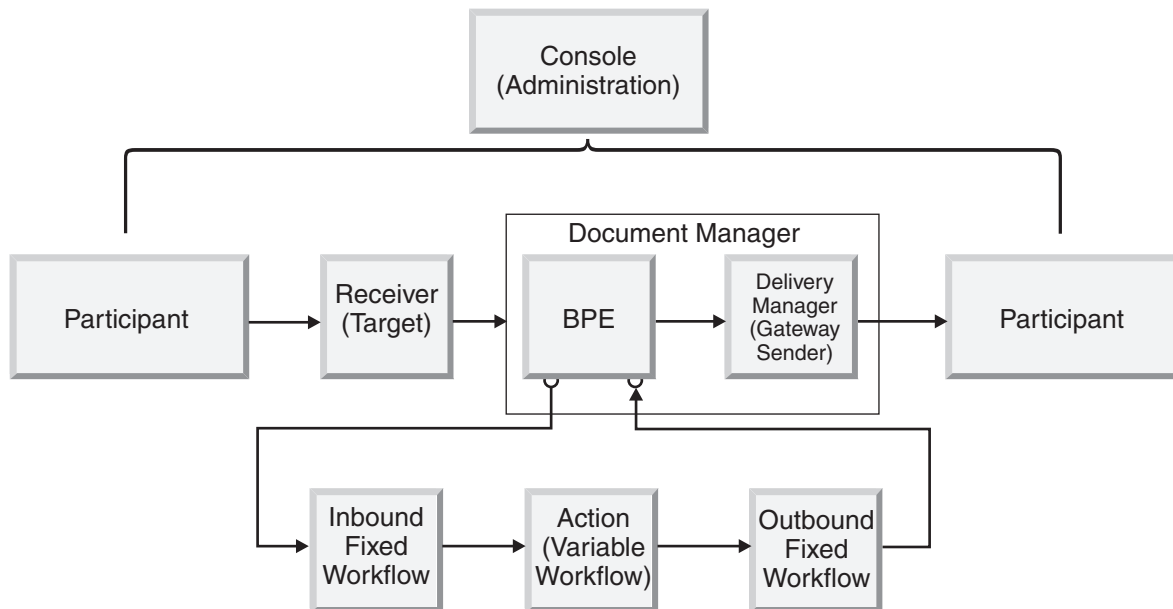


Figure 1. Document Manager and workflow

In variable workflow, the number and type of processing steps depend completely on the requirements of the business protocol. You can customize the business document processing in two ways:

- By creating custom handlers for steps in fixed inbound and fixed outbound workflows
- By defining new actions (steps and their sequence) in the variable workflow stage

This chapter covers both ways of customizing the workflow:

- "Overview for creating handlers in fixed inbound workflow" on page 42
- "Overview for creating actions in variable workflow" on page 51
- "Overview for creating handlers in fixed outbound workflow" on page 58

An additional section covers development and deployment issues.

- “Development and deployment” on page 63

The API and some example code are provided in the next chapter. Information on a number of utility, security, and classes common to all WebSphere Partner Gateway components are also provided.

Overview for creating handlers in fixed inbound workflow

Business documents received by WebSphere Partner Gateway are packaged according to the packaging requirements of the business protocol. WebSphere Partner Gateway uses the following terminology:

Packaging A type of document packaging such as RNIF, AS2, or Backend Integration.

Protocol The business protocol that the contents of the document follow; for example, RosettaNet, XML, or EDI.

Document flow

A particular document type such as RosettaNet 3A4.

To process the business document, the BPE determines the packaging, protocol, and document flow associated with the incoming business document. The protocol unpackaging and protocol processing steps of fixed inbound workflow provide this information. When running fixed inbound workflow, the BPE first runs the protocol unpackaging step followed by the protocol processing step. These steps generate meta-information defined by WebSphere Partner Gateway that is used by fixed inbound workflow to determine the participant connection that can be used to route this business document. Note that the participant connection determines which variable workflow will run for this business document.

Each step invokes a series of handlers, the sequence of which is configured in the WebSphere Partner Gateway Community Console. While running the steps, the BPE runs these handlers one after the other, until one of the handlers determines that it can handle the business document. If a handler determines that it can handle the business document, the BPE invokes the handler to process the business document. If there is no such handler, the BPE fails the flow of this business document. After the process method of the handler runs, the BPE logs the events generated by this process method. The BPE checks the status of business document. The BPE fails the flow of a business document if its status is marked as failed.

For the business protocols that it supports, WebSphere Partner Gateway delivers handlers for these steps. With the user exit support and APIs available in WebSphere Partner Gateway, you can develop handlers for these steps. The handlers implement all the methods of `BusinessProcessHandlerInterface`. `BusinessDocumentInterface` represents the business document processed by these handlers. `BusinessDocumentInterface` consists of following components:

- Business data stored in a file object
- Transport headers associated with the business document
- Metadata specific to WebSphere Partner Gateway associated with this business document flow

Protocol unpackaging handlers

WebSphere Partner Gateway provides RNIF, AS2, backend integration, and NONE packaging. If you are required to support packaging not currently supported by WebSphere Partner Gateway, you can develop a new protocol unpackaging handler.

The protocol unpackaging handler is expected to unpackage business documents. Depending on business protocol requirements and the TPA (trading partner agreement) between the sending and receiving business partners, the incoming business document might be encrypted, signed, or compressed. The protocol unpackaging handler determines whether it can handle the incoming business document. If it can, it unpackages the business document so that the following fixed inbound workflow steps, and the BPE workflows can process it. Additionally, this handler extracts package-level meta-information from the incoming business document.

Depending on the business protocol requirements, the protocol unpackaging handler might perform one or more of the following steps:

Decryption

Decrypt the message if it is encrypted

Decompression

Decompress the message if it is compressed

Signature verification

Verify the signature if the message is signed

Routing information extraction

Extract package-level business IDs for sending to and receiving from a trading partner, if the packaging provides them

Form packaging and versions

Use a packaging code and version to identify the packaging; for example, RNIF v02.00

Business document parts extraction

Extract the location of various message parts such as payload and attachments, if the packaging specifies them

These steps are not exhaustive and might not apply to all business protocols.

Important:

- WebSphere Partner Gateway provides a security service API that you can leverage to decrypt messages and verify signatures.
- Define the packaging and version associated with this handler in the WebSphere Partner Gateway Community Console on the Manage Document Flow Definitions page.

To implement a protocol unpackaging handler:

1. Create a handler class that implements `BusinessProcessHandlerInterface`.
2. Implement a `BusinessProcessHandlerInterface.init` method. Use this method to initialize your handler. The handler can have configuration properties that can be configured in the Community Console.
3. Implement a `BusinessProcessHandlerInterface.applies` method. In this method, the handler determines whether it can process the business document. (The business document is passed as an argument of type

BusinessDocumentInterface to this method.) You can make the handler determine this by making the handler look at transport-level headers, quickly scan the business document, or take any other protocol-specific approach. If the handler can handle this document, the applies method returns true; otherwise, it returns false.

4. Implement a BusinessProcessHandler.process method. The business document is passed as an argument of type BusinessDocumentInterface to this method. This method performs the following tasks:
 - Unpackage the business document so that other steps and workflows can process it. If the handler is changing the contents of the business document, update BusinessDocumentInterface by calling the setDocument method.
 - Set the metadata required by WebSphere Partner Gateway on the BusinessDocumentInterface object by calling the setAttribute method. These constants, defined in the BCGDocumentConstants class, are described in the following table:

Attribute name	Description
BCGDocumentConstants.BCG_PKG_FRBUSINESSID	The "From" business ID at the package level. For example, for AS2 the "From" business ID is available in the AS2-From HTTP header.
BCGDocumentConstants.BCG_PKG_TOBUSINESSID	The "To" Business ID at the package level. For example, for AS2 the "To" business ID is available in the AS2-To HTTP header.
BCGDocumentConstants.BCG_PKG_INITBUSINESSID	The initiating business ID at the package level. Set it the same as BCG_PKG_FRBUSINESSID or set it as the business ID that belongs to the same partner as BCG_PKG_FRBUSINESSID.
BCGDocumentConstants.BCG_FRPACKAGINGCD	The attribute to which the code of the received packaging is set when WebSphere Partner Gateway receives a document. Use the WebSphere Partner Gateway Community Console to define this code for the packaging document flow.
BCGDocumentConstants.BCG_FRPACKAGINGVER	The version to which the received packaging is set when WebSphere Partner Gateway receives a document. Use the WebSphere Partner Gateway Community Console to define this version for the packaging document flow.

- Add events to the BusinessDocumentInterface object. You can add events to this object by calling the addEvent method. These events will be visible in the Community Console with this business document. For a list of events that you can add in this step, see "Events" on page 110.
- Update the status of the BusinessDocumentInterface object. If there were any errors, mark this object as failed by calling the setDocumentState method with the BCGDocumentConstants.BCG_DOCSTATE_FAILED argument.

5. Define the packaging implemented by this handler, as shown in Figure 2.

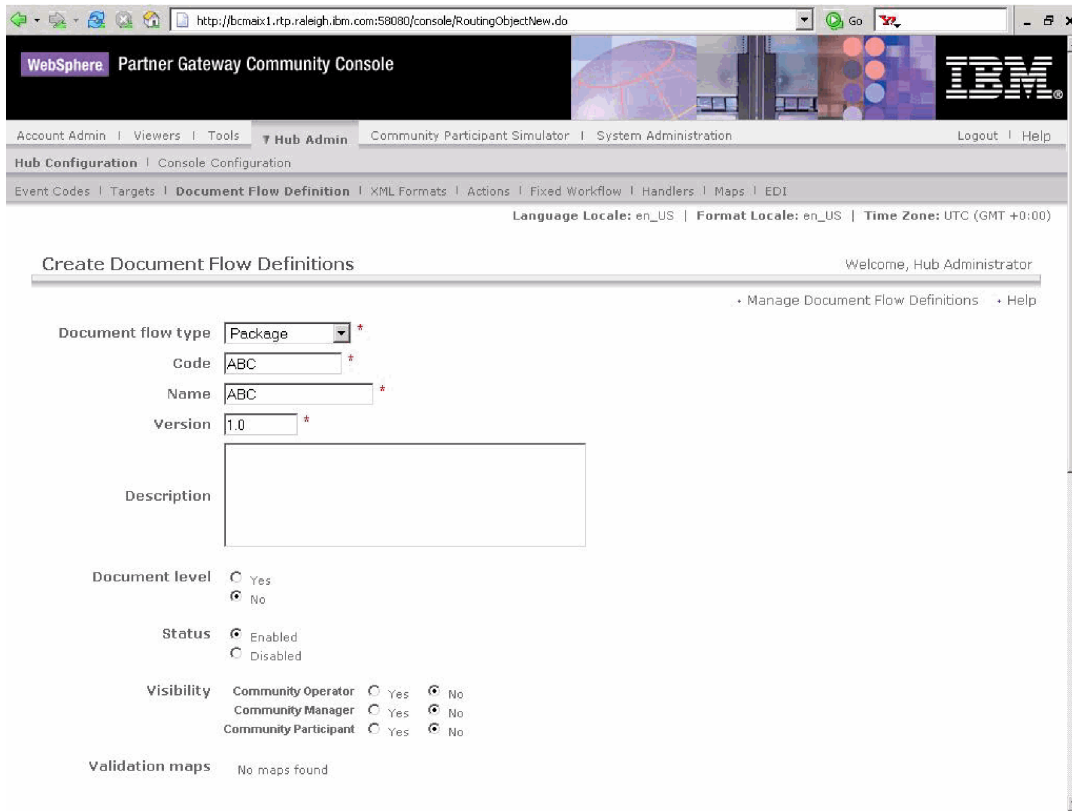


Figure 2. Defining a package for a protocol unpacking handler

6. Create a deployment descriptor for this handler. See the section “Development and deployment” on page 63.

7. Use the Community Console to upload your handler, as shown in Figure 3.

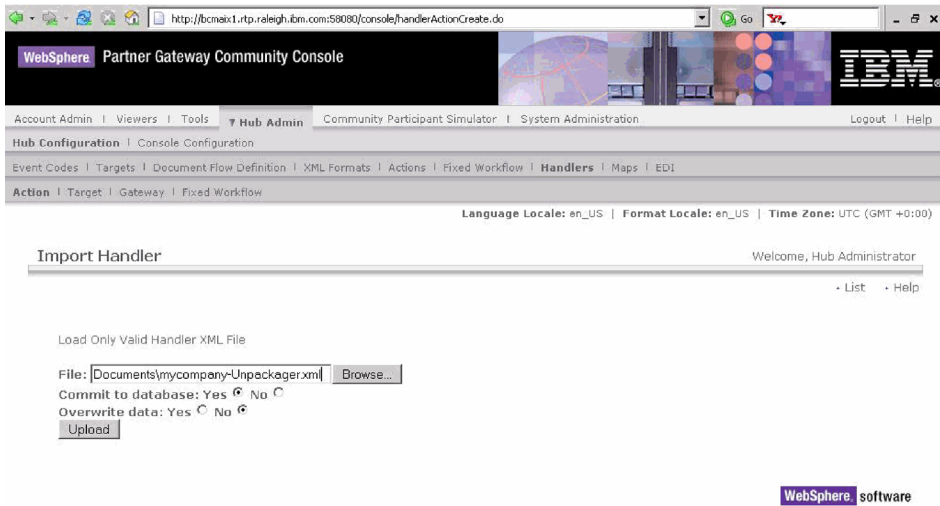


Figure 3. Uploading the protocol unpacking handler

- Configure your handler. Specify the sequence in which to call your handler as shown in Figure 4.

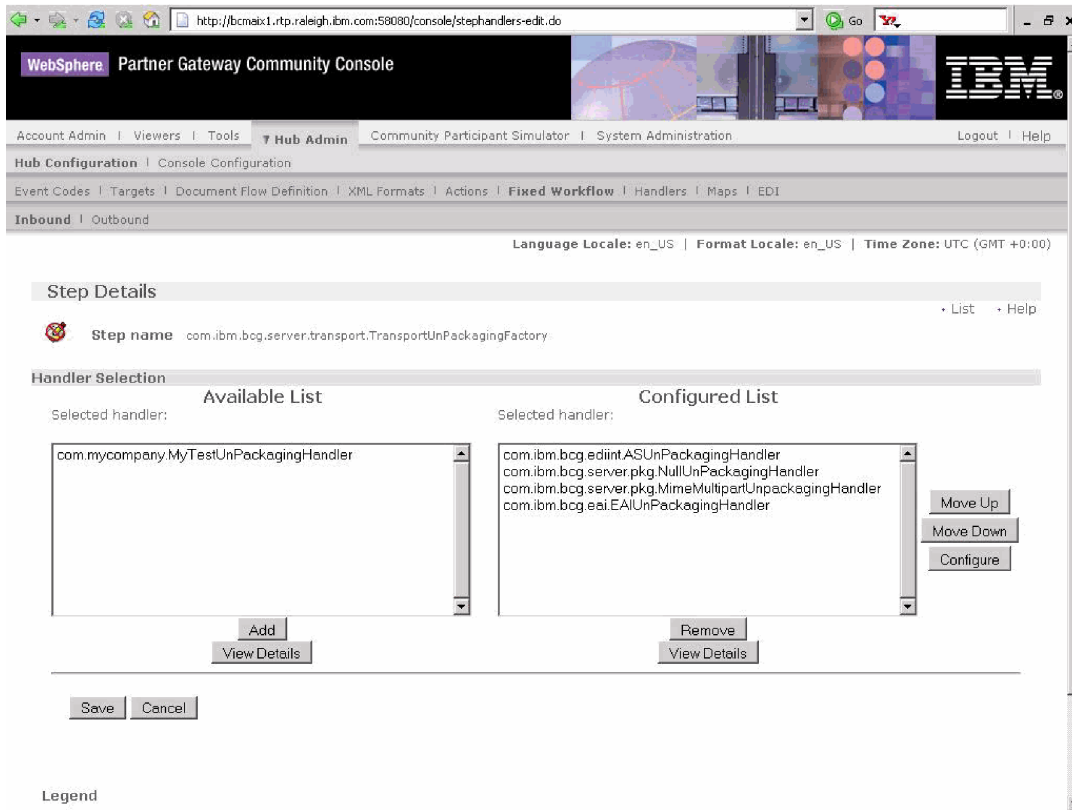


Figure 4. Configuring the protocol unpackaging handler

Protocol processing handlers

WebSphere Partner Gateway provides processing for the XML, RosettaNet, and EDI protocols. If you are required to support a protocol not currently supported by WebSphere Partner Gateway, you can develop a protocol processing handler.

A protocol processing handler is responsible for parsing the business document to determine meta-information required by WebSphere Partner Gateway. Depending on business protocol, this handler can provide one or more of following items:

Routing information

Business IDs of the sending and receiving trading partners

"From" protocol and version

The protocol code and version that WebSphere Partner Gateway uses to identify the protocol; for example RosettaNet PIP V02.02

Document flow and version

The document flow code and version that WebSphere Partner Gateway uses to identify the document flow, for example, 3A4, V02.00 (for RosettaNet)

Important:

- Define the protocol and version associated with this handler in the WebSphere Partner Gateway Community Console on the Manage Document Flow Definitions page.

2. Define the document flow and version associated with this handler in the WebSphere Partner Gateway Community Console on the Manage Document Flow Definitions page.

To implement a protocol processing handler:

1. Create a handler class that implements `BusinessProcessHandlerInterface`.
2. Implement a `BusinessProcessHandlerInterface.init` method. In this method initialize your handler. The handler can have configuration properties that can be configured in the Community Console.
3. Implement a `BusinessProcessHandlerInterface.applies` method. In this method the handler determines whether it can process the business document, whose name is passed to the method as an argument of type `BusinessDocumentInterface`. You can determine this by looking at transport-level headers, quickly scanning the business document, or by using any other protocol-specific approach. If the handler can handle this document, the `applies` method returns `true`; otherwise, it returns `false`.
4. Implement a `BusinessProcessHandler.process` method. The business document is passed to this method as an argument of type `BusinessDocumentInterface`. This method performs the following actions:
 - Set metadata required by WebSphere Partner Gateway on the `BusinessDocumentInterface` object by calling the `setAttribute` method. These constants, defined in the `BCGDocumentConstant` class, are described in the following table:

Protocol attribute name	Description
<code>BCGDocumentConstants.BCG_FRBUSINESSID</code>	The "From" business ID obtained from the protocol.
<code>BCGDocumentConstants.BCG_TOBUSINESSID</code>	The "To" business ID obtained from the protocol.
<code>BCGDocumentConstants.BCG_INITBUSINESSID</code>	The initiating business ID obtained from the protocol.
<code>BCGDocumentConstants.BCG_FRPROTOCOLCD</code>	The protocol code associated with the incoming business document. This must be a valid process name as defined in the Community Console, for example, <code>RosettaNet</code> .
<code>BCGDocumentConstants.BCG_FRPROTOCOLVER</code>	The protocol version associated with the incoming business document. This must be a valid process version as defined in the Community Console, for example, <code>V02.00</code> .
<code>BCGDocumentConstants.BCG_FRPROCESSCD</code>	The process code associated with the incoming business document. This must be a valid code as defined in the Community Console, for example, <code>3A4</code> .
<code>BCGDocumentConstants.BCG_FRPROCESSVER</code>	The process version associated with the incoming business document. This must be a valid process version as defined in the Community Console, for example, <code>V02.00</code> .

- Add events to the `BusinessDocumentInterface` object by calling the `addEvent` method. These events will be visible in the Community Console with this business document. For a list of events that you can add in this step, see "Events" on page 110.

- Update the status of the BusinessDocumentInterface object. If there were any errors, mark BusinessDocumentInterface as failed by calling the setDocumentState method with a BCGDocumentConstants.BCG_DOCSTATE_FAILED argument.
5. Define the protocol implemented by this handler as shown in Figure 5.

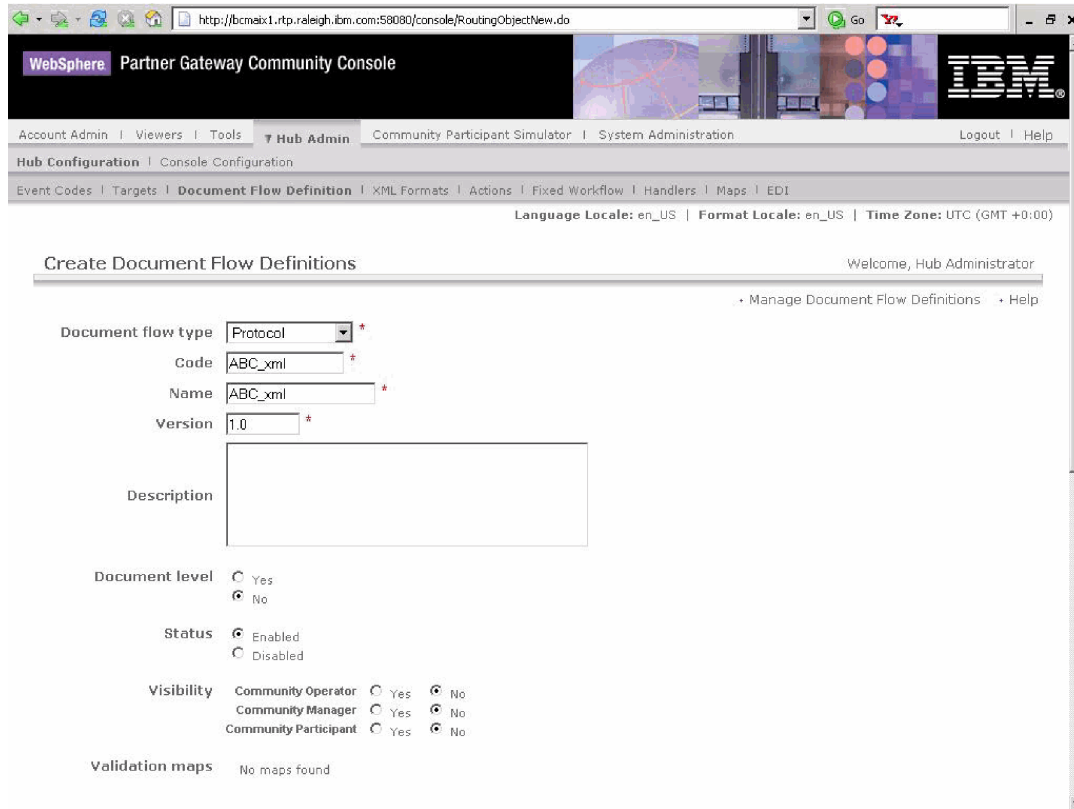


Figure 5. Defining the protocol for a protocol processing handler

6. Create a deployment descriptor for this handler. For information on how to deploy your handler, see “Development and deployment” on page 63.

7. Use the Community Console to upload your handler as shown in Figure 6.



Figure 6. Uploading a protocol processing handler

8. Configure your handler. Specify the sequence in which your handler is called as shown in Figure 7.

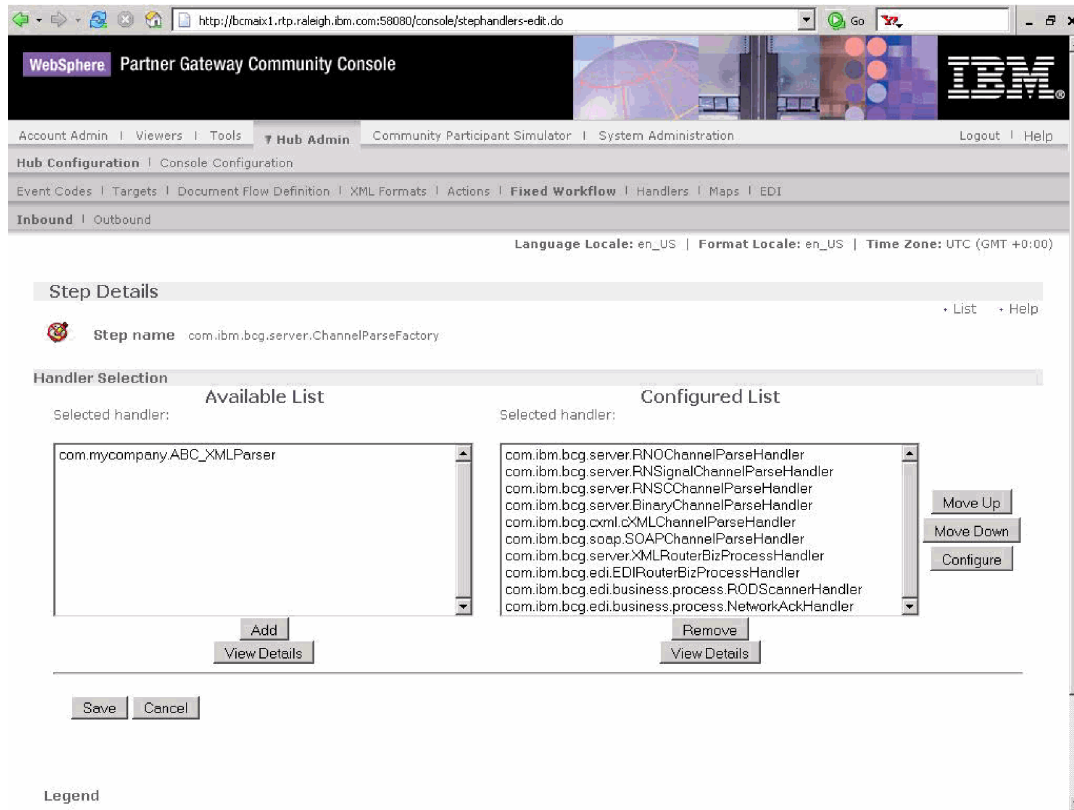


Figure 7. Configuring a protocol processing handler

Overview for creating actions in variable workflow

When the inbound workflow is completed, the appropriate variable workflow path is determined by the participant connection. This variable workflow, or action, is specified in the Community Console by the hub administrator while creating the interactions. For more information on using the Community Console to configure participant connections and variable workflows, see the *Hub Configuration Guide*.

An action is a number of steps, arranged in a sequence. WebSphere Partner Gateway ships with eleven predefined actions. If other options are required, you can customize a variable workflow by defining new actions. You can do this in either of two ways:

- Develop an entirely new set of steps, placed into a new sequence
- Copy an existing action and modify it by adding a step, deleting or replacing a pre-existing step, or modifying the order of the steps

Note: Not all steps delivered by WebSphere Partner Gateway can be used in new, user-defined actions. Some are used by WebSphere Partner Gateway for internal purposes. For more detailed information, see "Actions supplied by WebSphere Partner Gateway" on page 56

Actions consist of a series of steps, the sequence of which is configured in the Community Console, as shown in Figure 8 and Figure 9 on page 53. The steps can be reused across the actions.

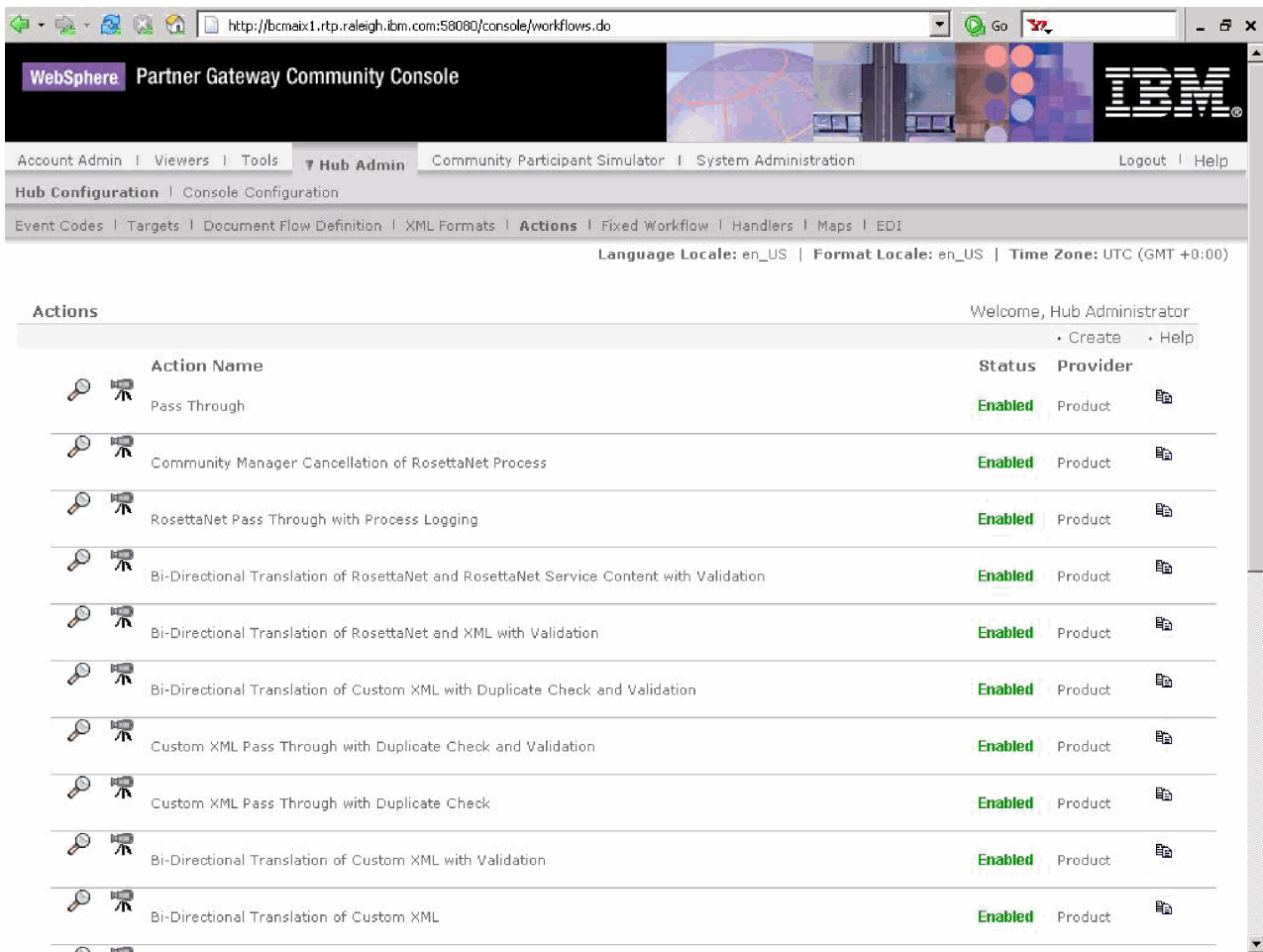


Figure 8. Creating an action by configuring a sequence of steps

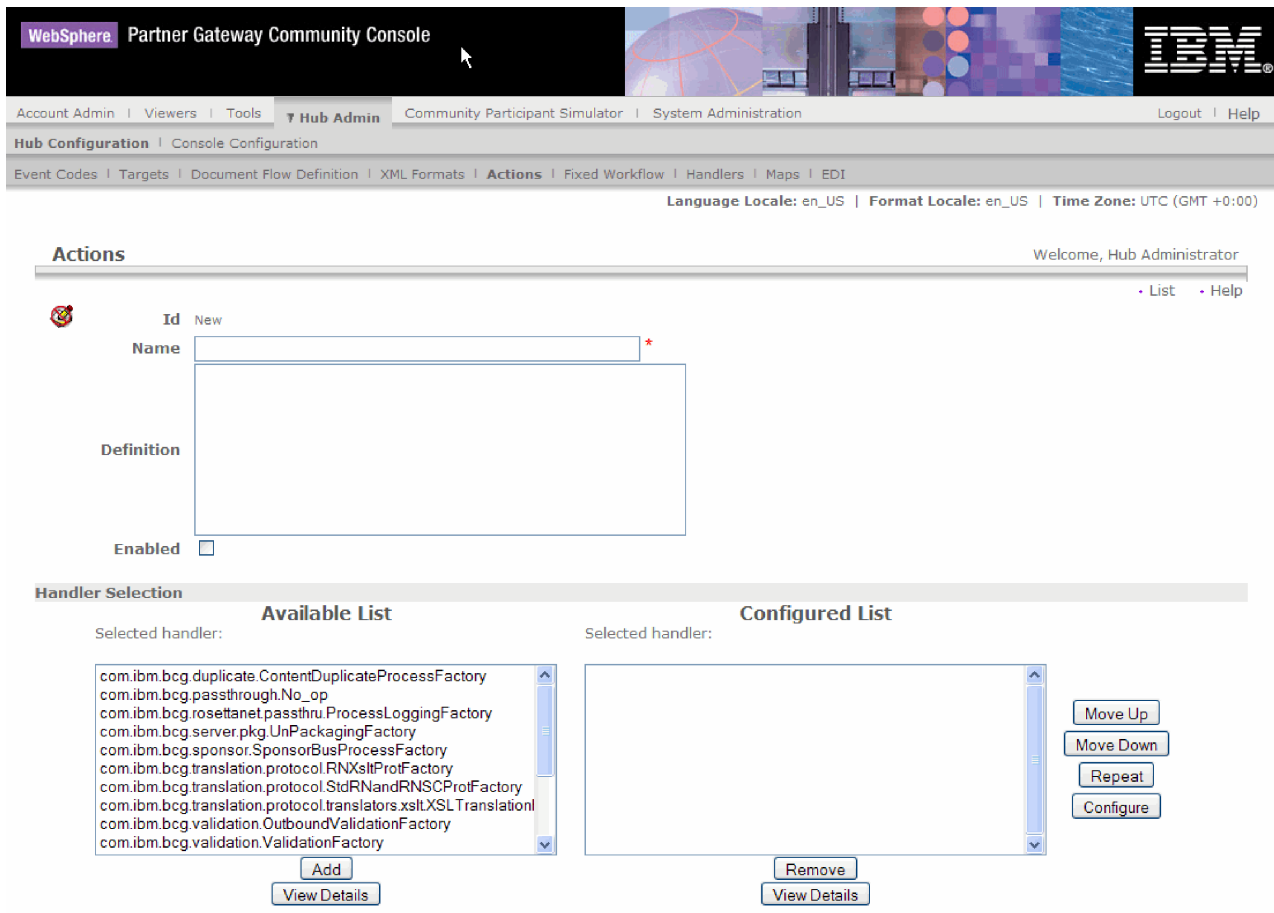


Figure 9. Creating an action by configuring a sequence of steps

You can also create multiple actions by using the same set of steps but by specifying a different sequence. Note that reusability of steps depends on their intended use and their dependency on other steps.

While running the action (the variable workflow), the BPE runs these steps one after the other in the sequence these steps are specified for this action. Steps of an action implement the `BusinessProcessInterface` class. The BPE runs the process method of the steps. After running each step, the BPE logs the events generated by this process method. The BPE checks the status of the business document. If its status is marked as failed, the BPE fails the flow of business document. The next step is run only if the business document status is not marked as failed.

Typically steps include the following types:

Validation Checking the form of the business document. For example, an XML document can be validated against an XML schema.

Transformation Changing the form of the business document. For example, an XML document can be transformed into a different XML document using XSLT.

Translation Changing the entire format of a business document from one type to another. For example, an XML document can be transformed into CSV (comma separated value) format.

Note: These steps are typical examples only. The actual steps depend on your business protocol requirements.

Creating steps

To create a step:

1. Create a class that implements `BusinessProcessFactoryInterface`. This class is factory class for constructing objects of type `BusinessProcessInterface`, which represents the steps of variable workflow.
2. Implement the `BusinessProcessFactoryInterface.getBusinessProcess` method. This method constructs an object of type `BusinessProcessInterface`, which can process the business document.
3. Implement the `BusinessProcessFactoryInterface.returnBusinessProcess` method. This factory can reuse or discard the `BusinessProcessInterface` object that is being returned.
4. Create a class that implements `BusinessProcessInterface`. This class is the actual step.
5. Implement the `BusinessProcessInterface.process` method. Implement the processing logic of the step here. This method also performs the following actions:
 - a. Add events to the `BusinessDocumentInterface` object. You can do this by calling the `addEvent` method. These events will be visible in the Community Console with this business document. For a list of events that you can add in this step, see “Events” on page 110.
 - b. Update the status of the `BusinessDocumentInterface` object. If there were any errors, mark `BusinessDocumentInterface` as failed by calling the `setDocumentState` method with the `BCGDocumentConstants.BCG_DOCSTATE_FAILED` argument.
6. Implement the `BusinessProcessInterface.reset` method. If this factory is caching `BusinessProcessInterface` objects, it can call this method to reset the state of a `BusinessProcessInterface` object. You can then reuse the `BusinessProcessInterface` object.
7. Create a deployment descriptor for this step. For information on how to deploy your step, see “Development and deployment” on page 63.
8. Use the Community Console to upload your step. Click **Import** on the Handler List page as shown in Figure 10 on page 55, and then upload the step on the Import Handler page as shown in Figure 11 on page 56.

WebSphere Partner Gateway Community Console

Account Admin | Viewers | Tools | **Hub Admin** | Community Participant Simulator | System Administration | Logout | Help

Hub Configuration | Console Configuration

Event Codes | Targets | Document Flow Definition | XML Formats | Actions | Fixed Workflow | **Handlers** | Maps | EDI

Action | Target | Gateway | Fixed Workflow

Language Locale: en_US | Format Locale: en_US | Time Zone: UTC (GMT +0:00)

Handler List

Welcome, Hub Administrator

- Import
- Handler Types
- Help



























	Handler Type	Classname	Provider
 	ACTION.DUPLICATECHECK	com.ibm.bcg.duplicate.ContentDuplicateProcessFactory	Product
 	ACTION.TRANSFORMATION	com.ibm.bcg.outbound.OutboundDocFactory	Product
 	ACTION.TRANSFORMATION	com.ibm.bcg.passthrough.No_op	Product
 	ACTION.TRANSFORMATION	com.ibm.bcg.rosettanet.passthru.ProcessLoggingFactory	Product
 	ACTION.TRANSFORMATION	com.ibm.bcg.server.pkg.UnPackagingFactory	Product
 	ACTION.TRANSFORMATION	com.ibm.bcg.sponsor.SponsorBusProcessFactory	Product
 	ACTION.TRANSFORMATION	com.ibm.bcg.translation.protocol.RNXsltProtFactory	Product
 	ACTION.TRANSFORMATION	com.ibm.bcg.translation.protocol.StdRNandRNSCProtFactory	Product
 	ACTION.TRANSFORMATION	com.ibm.bcg.translation.protocol.translators.xslt.XSLTranslationFactory	Product
 	ACTION.VALIDATION	com.ibm.bcg.validation.OutboundValidationFactory	Product
 	ACTION.VALIDATION	com.ibm.bcg.validation.ValidationFactory	Product
 	ACTION.VALIDATION	com.ibm.bcg.edi.business.process.EDISourceValidationFactory	Product
 	ACTION.VALIDATION	com.ibm.bcg.edi.business.process.EDITargetValidationFactory	Product

Figure 10. Opening the Import Handler page

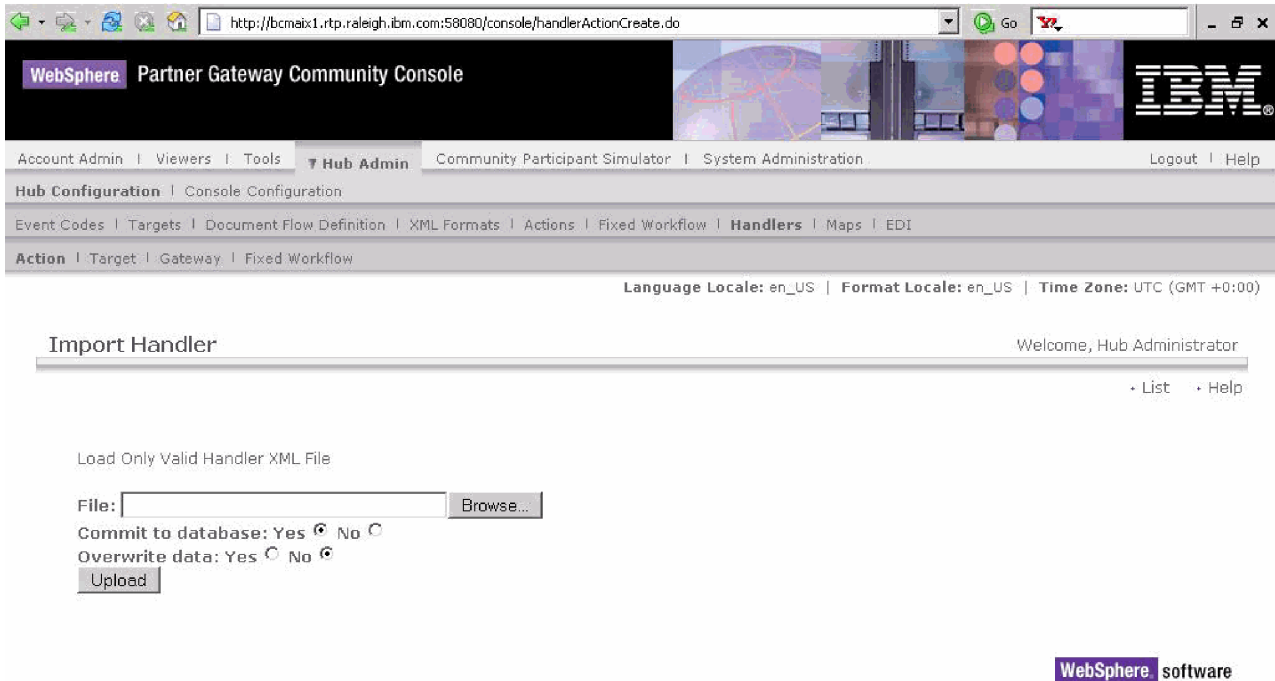


Figure 11. Uploading a step

Now you can use this step for creating your actions.

Actions supplied by WebSphere Partner Gateway

WebSphere Partner Gateway ships with seventeen predefined actions. Some, but not all, of these actions and the steps that make them up are available for you to customize. A list of the supplied actions and the degree they can be utilized for user-customized actions follows.

Pass through

This action can be copied and modified. Steps can be pre-pended or appended to the action sequence.

HubOwner cancellation of RN process

This action cannot be copied and modified. It is specific to the RosettaNet protocol.

RN pass through with process logging

This action can be copied and modified. You can append steps to the action sequence.

Bidirectional translation of RN and RNSC

This action cannot be copied and modified. It is used for RNIF messages.

Bidirectional translation of RN and XML

This action cannot be copied and modified. It is used for RNIF messages.

Bidirectional translation of custom XML with validation

This action can be copied and modified. User-defined steps can be substituted for the following three supplied steps: ValidationFactory, XSLTTranslationFactory, and OutboundValidationFactory. Additional steps can be pre-pended or appended. The supplied steps perform the following actions:

ValidationFactory	Validates the received custom XML document
XSLTTranslationFactory	Transforms the received XML document into its outbound XML format
OutboundValidationFactory	Validates the transformed document

The steps cannot be used in other user actions outside the context of a copied action.

Bidirectional translation of custom XML with duplicate check and validation

This action can be copied and modified. User-defined steps can be substituted for the following three supplied steps: ValidationFactory, XSLTTranslationFactory, and OutboundValidationFactory. Additional steps can be pre-pended or appended. The supplied steps perform the following actions:

ValidationFactory	Validates the received custom XML document.
XSLTTranslationFactory	Transforms the received XML document into its outbound XML format.
OutboundValidationFactory	Validates the transformed document.

The steps cannot be used in other user actions outside of the context of a copied action.

Bidirectional translation of owner custom XML to RN with duplicate check and validation

This action cannot be copied or modified. It is specific to RNIF messages.

Custom XML pass through with duplicate check and validation

This action can be copied and modified. Additional steps can be pre-pended or appended.

Custom XML pass through with duplicate check

This action cannot be copied and modified. Additional steps can be pre-pended or appended.

Custom XML pass through with validation

This action can be copied and modified. A user-defined step can be substituted for the ValidationFactory step.

The ValidationFactory step validates the received custom XML document.

EDI Interchange De-envelope

This action cannot be copied and modified. The supplied steps perform the following actions:

de-enveloper	De-envelopes an EDI Interchange.
--------------	----------------------------------

EDI Validate and Transform

These actions can be copied and modified. The supplied steps perform the following actions:

SourceEDIVValidation	Validates an EDI transaction.
EDITransformation	Transforms an EDI transaction.

XML Transform and EDI Validate

These actions can be copied and modified. The supplied steps perform the following actions:

XMLTransformation	Transforms an XML document into an EDI document.
TargetEDIVValidation	Validates the EDI document.

ROD Transform and EDI Validate

These actions can be copied and modified. The supplied steps perform the following actions:

RODTransformation	Transforms an ROD document into an EDI document.
TargetEDIVValidation	Validates the EDI document.

Overview for creating handlers in fixed outbound workflow

The last step of fixed inbound workflow determines the connection. The connection gives the variable workflow to run on this business document and the "To" packaging and protocol to be used to send the business document to the destination trading partner.

After running the variable workflow, the BPE runs the fixed outbound workflow. The protocol packaging step in the fixed outbound workflow packages the business document in the "To" packaging as determined by the connection.

The protocol packaging step consists of a series of handlers, the sequence of which is configured in the WebSphere Partner Gateway Community Console. While running the steps, the BPE runs these handlers one after the other until one of the handlers determines that it can process the business document. The BPE invokes this handler to process the business document. After the process method runs, the BPE logs the events generated by this process method, and then checks the status of the business document. If its status is marked as failed, the BPE fails the flow of business document.

After running the fixed outbound workflow, the BPE gives the packaged business document to the Delivery Manager. The Delivery Manager sends the business document to the partner as configured in the "To" gateway of the connection.

Protocol packaging handlers

A protocol packaging handler packages a business document. Depending on business protocol requirements and the trading partner agreement (TPA) between the sending and receiving trading partners, the outgoing business document might have to be assembled, encrypted, signed, or compressed. The protocol packaging handler determines whether it can handle the business document. If it can, it packages the business document as expected by the business protocol for which it

is designed. Additionally, if the business protocol requires transport headers, it can also specify them in metadata defined by WebSphere Partner Gateway.

WebSphere Partner Gateway provides handlers for this step for RNIF, backend integration, AS, and NONE packaging. If a requirement exists to support a packaging protocol not currently supported by WebSphere Partner Gateway, you can develop a protocol packaging handler.

Depending on business protocol requirements, the protocol packaging handler might perform one or more of the steps:

- Assembling** If the business protocol requires the message to be packaged as different parts, such as payload, attachments, and so forth
- Encrypting** If the packaging type requires encryption
- Signing** If the packaging type requires signatures
- Compressing** If the packaging type requires compression

These steps are not exhaustive and might not apply to all the business protocols.

Important::

- WebSphere Partner Gateway provides a security service API that you can use for decryption and signature verification.
- Define the packaging and version associated with this handler in the WebSphere Partner Gateway Community Console on the Manage Document Flow Definitions page.

Implementing protocol packaging handlers

To implement a protocol packaging handler:

1. Create a handler class that implements `BusinessProcessHandlerInterface`.
2. Implement the `BusinessProcessHandlerInterface.init` method. Use this method to initialize your handler. Note that the handler can have configuration properties that can be configured in the Community Console.
3. Implement the `BusinessProcessHandlerInterface.applies` method. The business document is passed as an argument of type `BusinessDocumentInterface` to this method. In this method, the handler determines whether it can process the business document. To determine this, look at the following metadata defined by WebSphere Partner Gateway:
 - `BCGDocumentConstant.BCG_TOPPackageCD`
 - `BCGDocumentConstant.BCG_TOPPackageVersion`
 - `BCGDocumentConstant.BCG_TOPProtocolCD`
 - `BCGDocumentConstant.BCG_TOPProtocolVersion`

To obtain the metadata, use the `BusinessDocumentInterface.getAttribute` method.

Notes:

- The handler can use various mechanisms to determine whether it can process this business document. For example, it can do a quick scan of business document.
- Define the packaging and protocol being processed by this handler in the Community Console on the Manage Document Flow Definitions page.

If the handler can process this document, the `applies` method returns `true`; otherwise it returns `false`.

4. Implement the `BusinessProcessHandler.process` method. The business document is passed as an argument of type `BusinessDocumentInterface` to this method. This method performs the following actions:
 - a. Package the business document so that other steps and workflows can process it. If the handler is changing the contents of business document, the `BusinessDocumentInterface` class is updated by calling the `setDocument` method.
 - b. Set metadata required by WebSphere Partner Gateway on the `BusinessDocumentInterface` object by calling the `setAttribute` method. The following constants are defined in the `BCGDocumentConstant` class:

Protocol attribute name	Description
<code>BCGDocumentConstants.BCG_OUTBOUNDTRANSPORTHEADERS</code>	Outbound transport headers that are used by the sender, when it transfers the document over a specified transport. The value for this attribute is a <code>HashMap</code> object that contains the list of transport headers. For example, HTTP Sender uses this attribute to set the HTTP headers.

- c. Add events to the `BusinessDocumentInterface` object by calling the `addEvent` method. These events will be visible in the Community Console with this business document. For a list of events that you can add in this step, see “Events” on page 110.
 - d. Update the status of the `BusinessDocumentInterface` object. If there were any errors, mark `BusinessDocumentInterface` as failed by calling the `setDocumentState` method with `BCGDocumentConstants.BCG_DOCSTATE_FAILED`.
5. Define the packaging implemented by this handler as shown in Figure 12 on page 61.

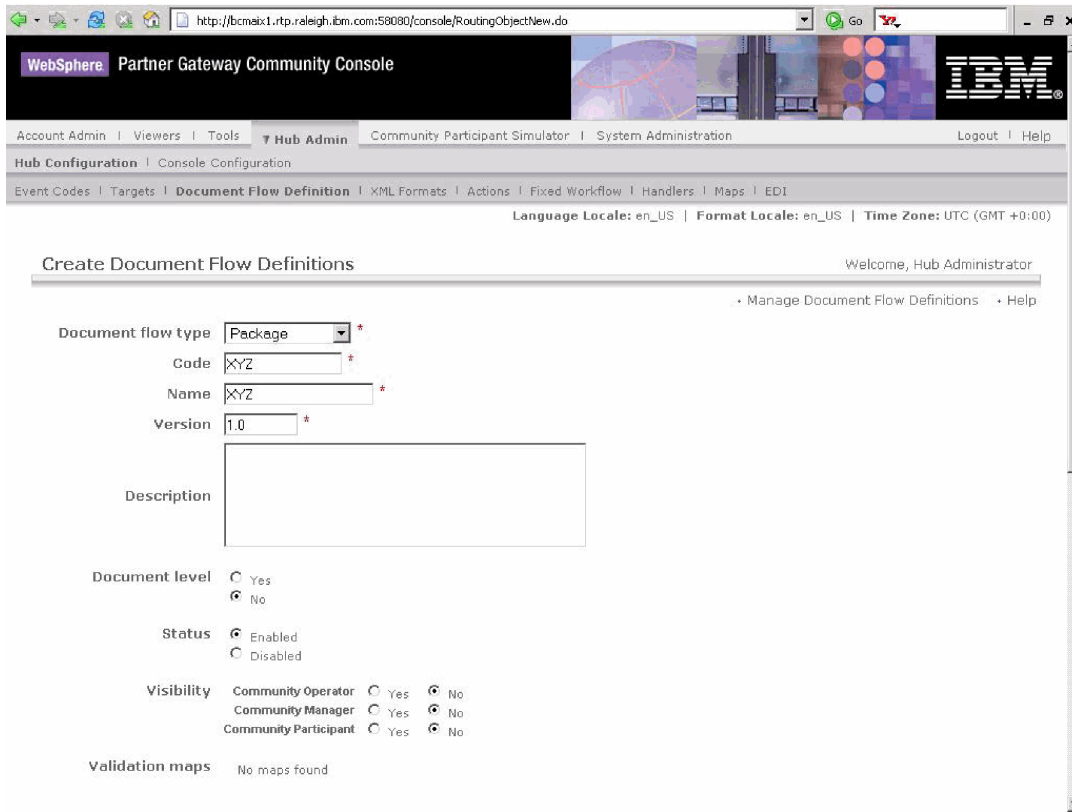


Figure 12. Defining a protocol packaging handler

6. Create a deployment descriptor for this handler. See “Development and deployment” on page 63.

7. Use the Community Console to upload your handler as shown in Figure 13.

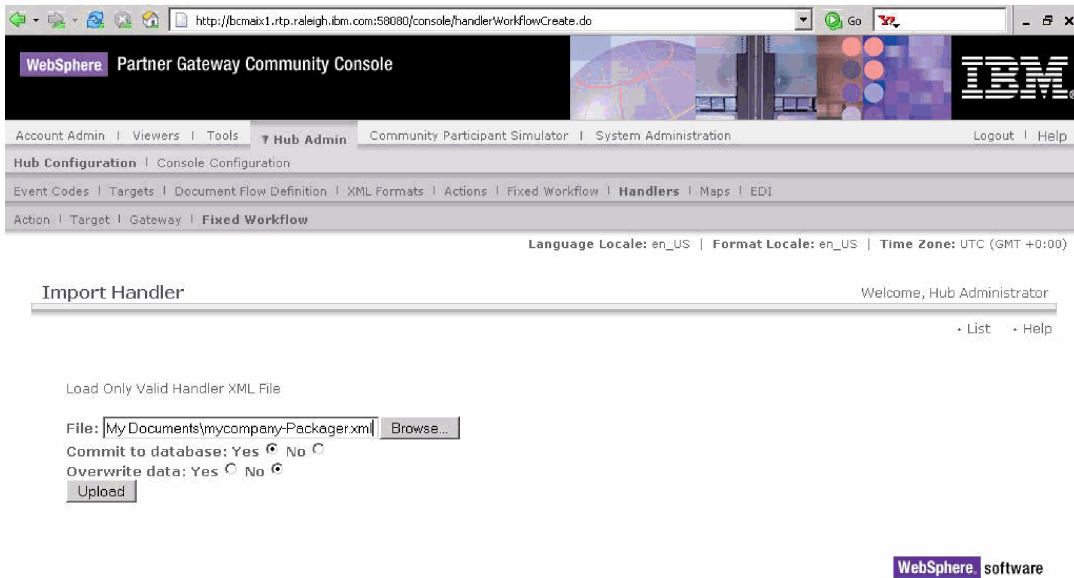


Figure 13. Uploading the protocol packaging handler

- Configure your handler. Specify the sequence in which to call your handler, as shown in Figure 14.

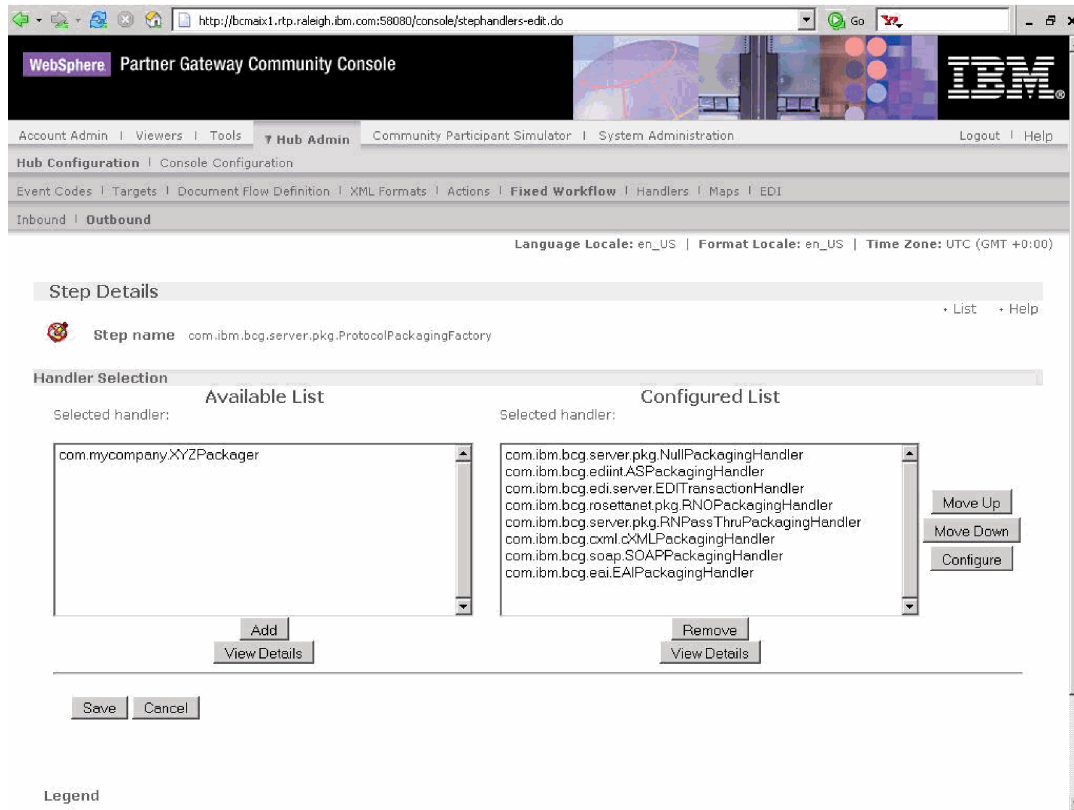


Figure 14. Configuring the protocol packaging handler

Development and deployment

The following sections describe development and deployment for both user-created handlers in fixed workflows and user-created steps in variable workflow.

Development environment

The workflow development API relies on classes and interfaces from three packages:

- `com.ibm.bdg.bcgdk.workflow`
- `com.ibm.bdg.bcgdk.common`
- `com.ibm.bdg.bcgdk.services`

These packages are part of the `bcgSDK.jar` file, which is found among the WebSphere Partner Gateway installable files in the following directories:

- `ProductDir\router\lib`
- `ProductDir\receiver\lib`
- `ProductDir\console\lib`

In all deployed instances, the `bcgSDK.jar` file must be available in the application server classpath and not in the module classpath.

For development, the bcgsdk.jar file must be included in the build path of the project that contains the user exit classes, that is, in the classpath.

Deployment and packaging

Make all user-created code available to the run-time environment. Package and deploy user-created code in one of the following ways:

- Placed in a JAR file in `\<receiver or router>\lib\userexits`
- Added as classes in `\<receiver or router>\lib\userexits\classes`

Adding the JAR or class files to the run-time environment makes the handler available only if the Fixed Workflow or Variable Workflow (Action) is configured to be used by the run-time environment. Handlers are configured for use like the other product-provided handlers. To configure them you must first make them known to the Community Console by importing their definitions in the Community Console through an XML descriptor file.

To import a Fixed Workflow handler, click **Hub Admin > Hub Configuration > Handlers > Fixed Workflow > Import**.

To import a Variable Workflow (Action) handler, click **Hub Admin > Hub Configuration > Handlers > Action > Import**. One of the descriptors is the handler type. Only defined handler types are allowed. To view a list of allowed handler types, click **Hub Admin > Hub Configuration > Handlers > Handler Types >**.

Descriptor file definition for a workflow handler

The workflow handler descriptor file uses the bcghandler.xsd schema. The following example presents a brief outline for each of the elements in the descriptor file:

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- Copyright (c) 2004 IBM Corp. - All Rights Reserved.-->
<!-- IBM makes no representations or warranties about the suitability of -->
<!-- this program, either express or implied, including but not limited to -->
<!-- the implied warranties of merchantability, fitness for a particular -->
<!-- purpose, or non-infringement. -->
<tns:HandlerDefinition
  xmlns:tns="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external"
  xmlns:tns2="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external/types"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external
  bcghandler.xsd http://www.ibm.com/websphere/bcg/2004/v0.1/import/external/types
  bcgimport.xsd">
  <tns:HandlerClassName>com.mycompany.WorkHandler</tns:HandlerClassName>
  <tns:Description>My companies handler.</tns:Description>
  <tns:HandlerTypes>
  <tns:HandlerTypeValue>ACTION.VALIDATION</tns:HandlerTypeValue>
  </tns:HandlerTypes>
  <tns:HandlerAttributes>
  <tns2:ComponentAttribute>
  <tns2:AttributeName>Attribute 1</tns2:AttributeName>
  </tns2:ComponentAttribute>
  <tns2:ComponentAttribute>
  <tns2:AttributeName>Attribute 2</tns2:AttributeName>
  <tns2:AttributeDefaultValue>Attribute2DefaultValue</tns2:AttributeDefaultValue>
  </tns2:ComponentAttribute>
  </tns:HandlerAttributes>
</tns:HandlerDefinition>
```

HandlerClassName

The full class name of the handler implementation.

Description

General description for the handler.

HandlerTypes

The handler types for the workflow step that this handler can be used with.

HandlerTypeValue

The HandlerType value that corresponds to the workflow step type. For Fixed Inbound Workflow the allowable types are:

- FIXEDWORKFLOW.PROTOCOL.UNPACKAGING
- FIXEDWORKFLOW.PROTOCOL.PARSE

For Fixed Outbound Workflow the allowable type is:

- FIXEDWORKFLOW.PROTOCOL.PARSE

For Variable Workflow the allowable types are:

- ACTION.VALIDATION
- ACTION.TRANSFORMATION
- ACTION.DUPLICATECHECK

HandlersAttributes (optional)

Any attributes that this handler can have.

ComponentAttribute

An attributes name and default values that are used to provide configuration information to the handler at runtime.

AttributeName

The name of a specific attribute.

AttributeDefaultValue (optional)

The attribute's default value.

Chapter 5. APIs and example code for workflow handlers and steps

This chapter provides an annotated list of the APIs provided for developing custom handlers for fixed inbound and outbound workflow and for steps that can be assembled into actions for variable workflow. It also includes lists for utility, security, and other common classes shared across components.

The following classes and interfaces are documented:

From **com.ibm.bcg.bcgdk.workflow**

- “BusinessProcessFactoryInterface” on page 69
- “BusinessProcessInterface” on page 70
- “BusinessProcessHandlerInterface” on page 71
- “AttachmentInterface” on page 72
- “BusinessProcessUtil” on page 75

From **com.ibm.bcg.bcgdk.services**

- “SecurityServiceInterface” on page 77
- “MapServiceInterface” on page 83
- “SignInfo” on page 85
- “BCGSecurityException” on page 87

From **com.ibm.bcg.bcgdk.common**

- “Context” on page 89
- “Config” on page 90
- “BusinessDocumentInterface” on page 92
- “BCGException” on page 98
- “BCGUtil” on page 99
- “EventInfo” on page 101
- “BCGDocumentConstants” on page 105

And for workflow events

- “Events” on page 110

Brief examples of code and pseudocode outlining the implementation of sample protocol processing and protocol unpackaging handlers, and validation and transformation steps are also included. More complete code examples of validation and transformation steps are available in the delivery image in the `DevelopmentKits/UserExits/samples/` directory. More information about these examples can be found in the product readme file.

From `com.ibm.bcg.bcgdk.workflow`

These classes and interfaces are directly associated with the workflow stage of processing:

- “`BusinessProcessFactoryInterface`” on page 69
- “`BusinessProcessInterface`” on page 70
- “`BusinessProcessHandlerInterface`” on page 71
- “`AttachmentInterface`” on page 72
- “`BusinessProcessUtil`” on page 75

BusinessProcessFactoryInterface

Each variable workflow step must implement this factory interface. It has the following methods:

- `getBusinessProcess`
- `returnBusinessProcess`

Method

`getBusinessProcess`

Method description

Gets an instance of `BusinessProcessInterface`. The factory class constructs the `BusinessProcess` instance by calling the appropriate constructor, based on the configuration information that is passed in. The factory might cache `BusinessProcess` objects, which this method returns the from the cache.

Syntax

```
public BusinessProcessInterface getBusinessProcess(  
    Context context,  
    Config workflowConfig,  
    BusinessDocumentInterface bDoc)
```

Parameters

<code>context</code>	The context associated with this flow
<code>workflowConfig</code>	Configuration details as specified in the Community Console
<code>bDoc</code>	The business document being processed

Method

`returnBusinessProcess`

Method description

Returns a `BusinessProcessInterface` object to the factory. This method is called by the BPE. The factory resets `BusinessProcess`. For subsequent `getBusinessProcess` calls, the factory can cache instances of `BusinessProcessInterface`.

Syntax

```
public void returnBusinessProcess(BusinessProcessInterface bp)
```

Parameters

<code>bp</code>	The business process to be returned
-----------------	-------------------------------------

BusinessProcessInterface

Each variable workflow step must implement this interface. The factory produces an instance of the `BusinessProcess` class. This class runs the actual business logic on the document. It has the following methods:

- `process`
- `reset`

Method

`process`

Method description

Runs the business logic on the business document that is passed in.

Syntax

```
public BusinessDocumentInterface process(  
    Context context,  
    BusinessDocumentInterface bDoc)
```

Parameters

<code>context</code>	The context associated with this flow
<code>bDoc</code>	The business document being processed

Method

`reset`

Method description

Resets the `BusinessProcess` class. This method is called by `BusinessProcessFactory`.

Syntax

```
public boolean reset()
```

Parameters

None

BusinessProcessHandlerInterface

Handlers for fixed inbound and fixed outbound workflow must implement this interface. It has the following three methods:

- `init`
- `applies`
- `process`

Method

`init`

Method description

Initializes the handler by reading the configuration properties in the `Config` object.

Syntax

```
public void init(Context context,  
                 Config config)
```

Parameters

<code>context</code>	The context associated with this flow
<code>config</code>	Configuration information set by the Community Console

Method

`applies`

Method description

Determines whether the handler can process the business document. If it can process it, the handler returns `true`; otherwise, it returns `false`.

Syntax

```
public boolean applies(BusinessDocumentInterface bDoc)
```

Parameters

<code>bDoc</code>	The business document being processed
-------------------	---------------------------------------

Method

`process`

Method description

This method is called only if the `applies` method returned `true`. In this method, the handler performs its respective processing.

Syntax

```
public BusinessDocumentInterface process(BusinessDocumentInterface bDoc)
```

Parameters

<code>bDoc</code>	The business document being processed
-------------------	---------------------------------------

AttachmentInterface

This is a utility interface for handling attachments. It has the following ten methods:

- `setContentType`
- `getContentType`
- `setDescription`
- `getDescription`
- `setURI`
- `getURI`
- `setEncoding`
- `getEncoding`
- `setFile`
- `getFile`

Method

`setContentType`

Method description

Sets the content type of the attachment

Syntax

```
public void setContentType(String contentType)
```

Parameters

`contentType` The content type

Method

`getContentType`

Method description

Retrieves the content type of the attachment

Syntax

```
public String getContentType()
```

Parameters

None

Method

`setDescription`

Method description

Sets a string describing the attachment

Syntax

```
public void setDescription(String desc)
```

Parameters

desc The description of the attachment

Method

getDescription

Method description

Retrieves the description

Syntax

```
public String getDescription()
```

Parameters

None

Method

setURI

Method description

Sets a URI for the attachment

Syntax

```
public void setURI(String URI)
```

Parameters

URI The Uniform Resource Identifier (URI)

Method

getURI

Method description

Retrieves the URI

Syntax

```
public String getURI()
```

Parameters

None

Method

setEncoding

Method description

Sets the attachment's character encoding

Syntax

```
public void setEncoding(String encoding)
```

Parameters

encoding The encoding of the attachment

Method

getEncoding

Method description

Retrieves the attachment's character encoding

Syntax

```
public String getEncoding()
```

Parameters

None

Method

setFile

Method description

Sets a file for the attachment

Syntax

```
public void setFile(File file)
```

Parameters

file The name of the file that will contain the attachment

Method

getFile

Method description

Retrieves the file

Syntax

```
public File getFile()
```

Parameters

None

BusinessProcessUtil

This is a utility class provided by WebSphere Partner Gateway. It has the following methods:

- getSecurityService
- getMapService

Method

getSecurityService

Method description

Retrieves a security service implementation of WebSphere Partner Gateway

Syntax

```
public SecurityServiceInterface getSecurityService()
```

Parameters

None

Method

getMapService

Method description

Retrieves a map service implementation of WebSphere Partner Gateway

Syntax

```
public MapServiceInterface getMapService()
```

Parameters

None

From `com.ibm.bcg.bcgdk.services`

The following interfaces and classes allow general access to security and mapping services:

- “SecurityServiceInterface” on page 77
- “MapServiceInterface” on page 83
- “SignInfo” on page 85
- “BCGSecurityException” on page 87

SecurityServiceInterface

This interface provides utility methods for the following security features:

- Encryption (encryptBytes method)
- Decryption (decryptBytes method)
- Digital signature generation (signMessage method)
- Digital signature verification (verifySignature method)
- Message digest generation (generateDigest method)

You can obtain an instance of the implementation of this interface as follows:

```
SecurityServiceInterface securityService =  
com.ibm.bcg.bcgdk.workflow.BusinessProcessUtil.getSecurityService();
```

Method

encryptBytes

Method description

This method encrypts the given data by using the given algorithm that uses the currently valid certificate of the to-partner specified in the business document. Encryption is done in accordance with the PKCS #7 standard described in *PKCS #7: Cryptographic Message Syntax*, section 10.

The method has two forms. One takes input as a byte array. The other takes input as an InputStream object.

Syntax

Byte array input

```
public byte[]  
encryptBytes(BusinessDocumentInterface businessDocument,  
             byte[] inBuf,  
             String encryptionAlg)  
throws BCGSecurityException
```

InputStream input

```
public InputStream  
encryptBytes(BusinessDocumentInterface businessDocument,  
             InputStream inStream,  
             String encryptionAlg)  
throws BCGSecurityException
```

Parameters

Byte array input

businessDocument

contains the participant's business ID in the BCG_PKG_TOBUSINESSID or BCG_TOBUSINESSID attributes. The participant's business ID is used to obtain the participant's encryption certificates.

inBuf

The data to be encrypted.

encryptionAlg

The encryption algorithm to use. The encryption algorithm must be one of the algorithm names defined in this class. The key length used for RC2 is 128.

InputStream input

businessDocument

contains the participant's business ID in the BCG_PKG_TOBUSINESSID or BCG_TOBUSINESSID attributes.

inStream The InputStream from which to read the data to be encrypted.

encryptionAlg

The encryption algorithm to use. The encryption algorithm must be one of the algorithm names defined in this class. The key length used for RC2 is 128.

Returns

Byte array input

Encrypted data that is PKCS7 EnvelopedData in encoded form.

InputStream input

InputStream for the encrypted data. The encrypted data is PKCS7 EnvelopedData in encoded form.

Throws

com.ibm.bcg.bcgdk.services.BCGSecurityException - if any exception occurs.

Method

decryptBytes

Method description

This method decrypts the given encrypted data. It expects the encrypted data to be in an encoded form of PKCS #7 EnvelopedData. So encryption must be done in accordance with the PKCS #7 standard described in *PKCS #7: Cryptographic Message Syntax*, section 10.

The method has two forms. One takes input as a byte array. The other takes input as an InputStream object.

Syntax

Byte array input

```
public byte[]
decryptBytes(BusinessDocumentInterface businessDocument,
             byte[] inBuf,
             String algName)
throws BCGSecurityException
```

InputStream input

```
public InputStream
decryptBytes(BusinessDocumentInterface businessDocument,
             InputStream inStream,
             String algName)
throws BCGSecurityException
```

Parameters

Byte array input

<code>businessDocument</code>	The business document.
<code>inBuf</code>	The data to be decrypted as an encoded form of PKCS #7 EnvelopedData.
<code>algName</code>	The encryption algorithm that is expected to be used for decryption. This algorithm must match one contained in the EnvelopedData object.

InputStream input

<code>businessDocument</code>	The business document.
<code>inStream</code>	The InputStream from where the data to be decrypted is read. Encode data to be decrypted in the form of PKCS #7 EnvelopedData.
<code>algName</code>	The encryption algorithm that is expected to be used for decryption. This algorithm must match one contained in the EnvelopedData object.

Returns

Decrypted data.

Throws

`com.ibm.bcg.bcgdk.services.BCGSecurityException` - if any exception occurs.

Method

`signMessage`

Method description

This method generates a signature for the given data. The signature is in the form of an encoded PKCS #7 ContentInfo object that contains a PKCS #7 SignedData object.

The method has two forms. One takes input as a byte array. The other takes input as an InputStream object.

Syntax

Byte array input

```
public SignInfo
signMessage(BusinessDocumentInterface businessDocument,
            byte[] data,
            String micAlg)
            throws BCGSecurityException
```

InputStream input

```
public SignInfo
signMessage(BusinessDocumentInterface businessDocument,
            InputStream inStream,
            String micAlg)
            throws BCGSecurityException
```

Parameters

Byte array input

businessDocument

The business document.

data

The data to be signed.

micAlg

The digest algorithm to be used: SHA1 or MD5.

InputStream input

businessDocument

The business document.

InputStream

The InputStream from which to read the data to be signed.

micAlg

The digest algorithm to be used: SHA1 or MD5.

Returns

SignInfo or null if an error occurs. Signature is in the form of encoded PKCS #7 ContentInfo object that contains a PKCS #7 SignedData object.

Throws

com.ibm.bcg.bcgdk.services.BCGSecurityException - if any exception occurs.

Method

verifySignature

Method description

This method verifies the signature for the given message. The signature is verified by using the signature verification certificate of the sender participant.

The method has two forms. One takes input as a byte array. The other takes input as an InputStream object.

Syntax

Byte array input

```
public SignInfo
```

```
verifySignature(BusinessDocumentInterface businessDocument,  
                byte[] signature,  
                byte[] messageContent,  
                String senderId,  
                String signatureAlgo)  
throws BCGSecurityException
```

InputStream input

```
public SignInfo
```

```
verifySignature(BusinessDocumentInterface businessDocument,  
                byte[] signature,  
                InputStream messageStream,  
                String senderId,  
                String signatureAlgo)  
throws BCGSecurityException
```

Parameters

Byte array input

businessDocument

The business document.

signature The signature bytes expected to be encoded in the PKCS #7 SignedData object.

messageContent The message to verify against.

senderId The business ID of the trading partner that the content is from.

signatureAlgo The signature algorithm to use.

InputStream input

businessDocument The business document.

signature The signature bytes expected to be encoded in the PKCS #7 SignedData object.

messageStream The InputStream from which to read the message to verify against.

senderId The business ID of the trading partner that the content is from.

signatureAlgo The signature algorithm to use.

Returns

SignInfo or null if an error occurs. Signature is in the form of encoded PKCS #7 ContentInfo object that contains a PKCS #7 SignedData object.

Throws

com.ibm.bcg.bcgdk.services.BCGSecurityException - if any exception occurs.

Method

generateDigest

Method description

This method calculates a digest of a specified message by using a specified algorithm.

The method has two forms. One takes input as a byte array. The other takes input as an InputStream object.

Syntax

Byte array input

```
public byte[] generateDigest(byte[] data,
                             String alg)
    throws BCGSecurityException
```

InputStream input

```
public byte[] generateDigest(java.io.InputStream inStream,
                             String alg)
    throws BCGSecurityException
```

Parameters

Byte array input

`data` The data whose digest you want to be calculated.

`alg` The digest algorithm to be used: SHA1 or MD5.

InputStream input

`inStream` The InputStream from which data whose digest is to be calculated can be obtained.

`alg` The digest algorithm to be used: SHA1 or MD5.

Returns

Digest as a byte array.

Throws

`com.ibm.bcg.bcgdk.services.BCGSecurityException` - if any exception occurs.

Constants

These constants define encryption and signature types:

```
public final String BCG_ENC_ALG_DES="3des"  
public final String BCG_ENC_ALG_RC2 = "RC2"  
public final String BCG_ENCRYPT_ALG_DESEDE = "DESede"  
public final String BCG_SIGN_ALG_SHA1 = "sha1"  
public final String BCG_SIGN_ALG_MD5 = "md5"
```

Fields

The following fields are used by `SecurityServiceInterface` methods:

BCG_ENCRYPT_ALG_DES

```
public static final java.lang.String BCG_ENCRYPT_ALG_DES  
Encryption algorithm DES
```

BCG_ENCRYPT_ALG_DESEDE

```
public static final java.lang.String BCG_ENCRYPT_ALG_DESEDE  
Encryption algorithm DESede
```

BCG_ENCRYPT_ALG_RC2

```
public static final java.lang.String BCG_ENCRYPT_ALG_RC2  
Encryption algorithm RC2
```

BCG_ENCRYPT_ALG_AES

```
public static final java.lang.String BCG_ENCRYPT_ALG_AES  
Encryption algorithm AES
```

BCG_ENCRYPT_ALG_3DES

```
public static final java.lang.String BCG_ENCRYPT_ALG_3DES  
Encryption algorithm 3DES, same as DESede
```

BCG_SIGN_ALG_SHA1

```
public static final java.lang.String BCG_SIGN_ALG_SHA1  
SHA1 algorithm used for generating digest and signing
```

BCG_SIGN_ALG_MD5

```
public static final java.lang.String BCG_SIGN_ALG_MD5  
MD5 algorithm used for generating digest and signing
```

MapServiceInterface

This interface provides access to validation and transformation maps. There are four methods, as follows:

- `getFromValidationMap`
- `getToValidationMap`
- `getTransformationMap`
- `getDTDOrXSD`

Method

`getFromValidationMap`

Method description

Retrieves the appropriate “From” validation map. The “From” validation map is the validation map associated with the connection’s “From” document flow definition. Steps of the action can call this method to obtain the validation map associated with an incoming document. The “From” validation maps can be uploaded from the Community Console.

Syntax

```
public byte[] getFromValidationMap(Context context,  
                                   BusinessDocumentInterface document)
```

Parameters

<code>context</code>	The context associated with this flow
<code>document</code>	The business document

Method

`getToValidationMap`

Method description

Retrieves the appropriate “To” validation map. The “To” validation map is the validation map associated with the connection’s “To” document flow definition. If the steps of the action are transforming an incoming business document into another business document, they can call this method to obtain the validation map associated with the transformed document. The “To” validation maps can be uploaded from the Community Console.

Syntax

```
public byte[] getToValidationMap(Context context,  
                                   BusinessDocumentInterface document)
```

Parameters

<code>context</code>	The context associated with this flow
<code>document</code>	The business document

Method

`getTransformationMap`

Method description

Retrieves the appropriate transformation map associated with the connection. When you create the participant connection in the Community Console, you can select the transformation map that you want to use for the connection.

Syntax

```
public byte[] getTransformationMap(Context context,  
                                  BusinessDocumentInterface document)
```

Parameters

context	The context associated with this flow
document	The business document

Method

```
getDTDOrXSD
```

Method description

Retrieves the appropriate XSD or DTD file. When you want to validate the document against more than one schema, the action steps can call this method to obtain the schemas one by one.

All the schemas for an XML document are loaded in WebSphere Partner Gateway. To validate a document using the parser, you need its schema. This first schema references additional schemas, which are also loaded in WebSphere Partner Gateway. To obtain these schemas, pass the schema name to `getDTDOrXSD`

Syntax

```
public byte[] getDTDOrXSD(string dtdOrXsdName)
```

Parameters

dtdOrXsdName	The name of the XSD or DTD file
document	The business document

SignInfo

This object holds signature information that is used by `SecurityServiceInterface`. The `SignInfo` object methods are as follows:

- `detachedSignature`
- `getData`
- `getDigest`
- `getDigestAlgoName`

Method

`detachedSignature`

Method description

Constructs `SignInfo` with a detached signature, digest, and the algorithm name.

Syntax

```
public SignInfo(byte[] detachedSignature, byte[] digest, String digestAlgoName)
```

Parameters

`digestAlgoName`
The digest algorithm name

Method

`getData` `getDetachedSignature`

Method description

Returns the data contained in this `SignInfo` object.

Syntax

```
public byte[] getData()
```

Parameters

None

Method

`getDigest`

Method description

Returns the digest contained in this `SignInfo`.

Syntax

```
public byte[] getDigest()
```

Parameters

None

Method

`getDigestAlgoName`

Method description

Returns the digest algorithm name contained in this SignInfo object.

Syntax

```
public String getDigestAlgoName()
```

Parameters

None

BCGSecurityException

If there are any errors, the security service API throws this exception.

Constructor

`BCGSecurityException`

Constructor description

The constructor has two forms. One constructs an exception object with null as its detail message. The other constructs an exception object with a specified detail message.

Syntax

Without a detail message

`BCGSecurityException()`

With a detail message

`BCGSecurityException(String s)`

Parameters

Without a detail message

- None

With a detail message

`s` The detail message

From com.ibm.bcg.bcgdk.common

These are general utility classes and interfaces common to all stages of WebSphere Partner Gateway processing:

- “Context” on page 89
- “Config” on page 90
- “BusinessDocumentInterface” on page 92
- “BCGException” on page 98
- “BCGUtil” on page 99
- “EventInfo” on page 101
- “BCGDocumentConstants” on page 105

Context

This class, which contains information about the context associated with this flow. has two methods:

- getContext
- setContext

Method

getContext

Method description

Gets the named context

Syntax

```
public Object getContext(String contextName)
```

Parameters

contextName The name of the context

Method

setContext

Method description

Sets the named context

Syntax

```
public void setContext(String contextName, Object context)
```

Parameters

contextName The name of the context
context The context associated with this flow

Config

This class holds configuration information. The class is used in receiver, workflow, and sender APIs and has four methods:

- getName
- getAttribute
- setAttribute
- getAttributes

Note: This class is not thread safe.

Method

getName

Method description

Retrieves the name. If called on the configuration of the receiver's target, this method returns the name of the target.

Syntax

```
public String getName()
```

Parameters

None

Method

getAttribute

Method description

Retrieves the value of a configuration property

Syntax

```
public Object getAttribute(String name)
```

Parameters

name The name of the property

Method

setAttribute

Method description

Sets the value of a configuration property

Syntax

```
public void setAttribute(String name, Object value)
```

Parameters

name The name of the property

value The value to be set

Method

`getAttributes`

Method description

Retrieves a collection of all the properties

Syntax

```
public Map getAttributes()
```

Parameters

None

BusinessDocumentInterface

This interface represents the business document that is being processed. It has 18 methods:

- `getDocumentUUID`
- `getDocumentParentUUID`
- `createFile`
- `getDocument`
- `setDocument`
- `getOriginalFile`
- `getDocumentState`
- `setDocumentState`
- `addEvents`
- `getEvents`
- `clearEvents`
- `getAttribute`
- `setAttribute`
- `getTempObject`
- `setTempObject`
- `getAttachments`
- `addAttachment`
- `getTransportHeaders`

Method

`getDocumentUUID`

Method description

Retrieves the universally unique ID (UUID) associated with this document

Syntax

```
public String getDocumentUUID()
```

Parameters

None

Method

`getDocumentParentUUID`

Method description

Retrieves the universally unique ID (UUID) associated with this document's parent

Syntax

```
public String getDocumentParentUUID()
```

Parameters

None

Method

`createFile`

Method description

Creates a file. You can call this method if you need to create additional files during the flow of a business document. For example, in the case of a synchronous response received by the sender, the sender can call this method to create a file to store the response.

Syntax

```
public File createFile()
```

Parameters

None

Method

`getDocument`

Method description

Retrieves a file reference for the business document

Syntax

```
public File getDocument()
```

Parameters

None

Method

`setDocument`

Method description

Sets the file reference for the business document

Syntax

```
public void setDocument(File document)
```

Parameters

`document` The business document

Method

`getOriginalFile`

Method description

Gets the file reference for the original business document file that created the business document object

Syntax

```
public File getOriginalFile()
```

Parameters

None

Method

getDocumentState

Method description

Gets the state of this business document. It can return one of the following states:

- BCGDocumentConstants.BCG_DOCSTATE_FAILED
- BCGDocumentConstants.BCG_DOCSTATE_IN_PROCESS
- BCGDocumentConstants.BCG_DOCSTATE_SENT

Syntax

```
public String getDocumentState()
```

Parameters

None

Method

setDocumentState

Method description

Sets the state of the business document object to one of the following states:

- BCGDocumentConstants.BCG_DOCSTATE_FAILED
- BCGDocumentConstants.BCG_DOCSTATE_IN_PROCESS
- BCGDocumentConstants.BCG_DOCSTATE_SENT

Syntax

```
public String setDocumentState(String state)
```

Parameters

state The state to be set

Method

addEvents

Method description

Adds events to be associated with this document. These events will be displayed in the event viewer and the document viewer

Syntax

```
public void addEvents(EventInfo[] events)
```

Parameters

events The array of EventInfo objects to be added

Method

getEvents

Method description

Retrieves the array of EventInfo objects associated with this document

Syntax

```
public EventInfo[] getEvents()
```

Parameters

None

Method

clearEvents

Method description

Clears the events associated with this business document object

Syntax

```
public void clearEvents()
```

Parameters

None

Method

getAttribute

Method description

Gets the named attribute. Used to retrieve information such as packaging name and version, and so forth. For list of available attributes refer to "BCGDocumentConstants" on page 105.

Syntax

```
public Object getAttribute(String attrName)
```

Parameters

attrName The name of the attribute requested

Method

setAttribute

Method description

Sets the named attribute on this document. For list of available attributes refer to "BCGDocumentConstants" on page 105.

Syntax

```
public void setAttribute(String attrName, Object attrValue)
```

Parameters

<code>attrName</code>	The name of the attribute to be set
<code>attrValue</code>	The value to be set

Method

`getTempObject`

Method description

Retrieves a temporary object associated with this flow

Syntax

```
public Object getTempObject(String objectName)
```

Parameters

<code>objectName</code>	The name of the requested object
-------------------------	----------------------------------

Method

`setTempObject`

Method description

Sets a temporary object associated with this flow

Syntax

```
public void setTempObject(String objectName, Object objectValue)
```

Parameters

<code>objectName</code>	The name of the object to be set
<code>objectValue</code>	The value to be set

Method

`getAttachments`

Method description

Retrieves the list of attachments for this document

Syntax

```
public ListIterator getAttachments()
```

Parameters

None

Method

`addAttachment`

Method description

Adds an attachment to this document

Syntax

```
public void addAttachment(AttachmentInterface attachment)
```

Parameters

attachment The attachment to be added

Method

```
getTransportHeaders
```

Method description

Retrieves the transport headers that were set by the receiver. The method return type is `java.util.HashMap`.

Syntax

```
public ListIterator getTransportHeaders()
```

Parameters

None

BCGException

This is an exception thrown from various APIs.

Constructor

BCGException

Constructor description

The object can be initialized in two different ways. The first constructs a new exception with null as its detail message. The second constructs a new exception with the specified detail message.

Syntax

```
public class BCGException extends Exception {}
```

Without a detail message

```
public BCGException
```

With a detail message

```
public BCGException(String s)
```

Parameters

Without a detail message

- None

With a detail message

s The detail message

BCGUtil

This class provides three utility methods and defines some common constants. The methods include:

- generateUUID()
- logEvent
- trace

The constants include:

- BCG_TRACE_SEVERITY_DEBUG = "Debug"
- BCG_TRACE_SEVERITY_INFO = "Info"
- BCG_TRACE_SEVERITY_WARNING = "Warning"
- BCG_TRACE_SEVERITY_ERROR = "Error"
- BCG_TRACE_SEVERITY_CRITICAL = "Critical"

Method

generateUUID()

Method description

Generates a UUID

Syntax

```
public String generateUUID()
```

Parameters

None

Method

logEvent

Method description

Logs the event so that it can be viewed from the Community Console

Syntax

```
public boolean logEvent(EventInfo eventInfo)
```

Parameters

eventInfo The event information

Method

trace

Method description

Traces a message in WebSphere Partner Gateway log files

Syntax

Without exception object

```
public void trace(String severity, String category, String msg)
```

With exception object

```
public void trace(String severity, String category, String msg, Throwable t)
```

Parameters

Without exception object

severity A constant indicating severity level.

category The affected module name.

msg The trace message.

With exception object

severity A constant indicating severity level.

category The affected module name.

msg The trace message.

t The exception.

Constants

These constants indicate trace severity levels:

```
public static final String BCG_TRACE_SEVERITY_DEBUG = "Debug"  
public static final String BCG_TRACE_SEVERITY_INFO = "Info"  
public static final String BCG_TRACE_SEVERITY_WARNING = "Warning"  
public static final String BCG_TRACE_SEVERITY_ERROR = "Error"  
public static final String BCG_TRACE_SEVERITY_CRITICAL = "Critical"
```

EventInfo

This class stores event information that will be logged by the `logEvent` method. The event will be associated with a business document and will be visible in the Community Console. It can be initialized in five ways. It includes the following methods:

- `getEventCode`
- `getBusinessDocument`
- `getDocumentParentUUID`
- `getDocumentUUID`
- `getParams`
- `getStackTrace`
- `getSourceClass`
- `setSourceClass`
- `setFaultType`
- `getFaultType`

The class also defines four constants:

- `FAULTTYPE_UNKNOWN`
- `FAULTTYPE_SOURCE`
- `FAULTTYPE_TARGET`
- `FAULTTYPE_SYSTEM`

Constructors

The object can be initialized in five distinct ways:

- **With a business document**

This method can be used by workflow handlers, action steps, senders, and their handlers.

```
public EventInfo(java.lang.String eventCode,  
                 BusinessDocumentInterface document,  
                 java.lang.String[] params)
```

- **With a business document and an exception or error**

This method can be used by workflow handlers, action steps, senders, and their handlers when an exception or error occurs.

```
public EventInfo(java.lang.String eventCode,  
                 BusinessDocumentInterface document,  
                 java.lang.String[] params,  
                 java.lang.Throwable t)
```

- **With a document UUID**

This method can be used by a receiver and its handlers.

```
public EventInfo(java.lang.String eventCode,  
                 java.lang.String documentUUID,  
                 java.lang.String[] params)
```

- **With a document UUID and an error or exception**

This method can be used by the receiver and its handlers when an exception or error occurs.

```
public EventInfo(String eventCode, String documentUUID, String[] params,  
                 Throwable t)
```

- **With a document UUID and document parent UUID**

```
public EventInfo(java.lang.String eventCode,  
                 java.lang.String documentUUID,  
                 java.lang.String documentParentUUID,  
                 java.lang.String[] params)
```

Method

getEventCode

Method description

Retrieves the event code

Syntax

```
public String getEventCode()
```

Parameters

None

Method

getBusinessDocument

Method description

Retrieves the business document

Syntax

```
public BusinessDocument getBusinessDocument()
```

Parameters

None

Method

getDocumentParentUUID

Method description

Retrieves the document parent Universal Unique Identifier (UUID)

Syntax

```
public java.lang.String getDocumentParentUUID()
```

Parameters

None

Method

getDocumentUUID

Method description

Retrieves the document UUID

Syntax

```
public String getDocumentUUID
```

Parameters

None

Method

getParams

Method description

Retrieves the parameter array

Syntax

```
public String[] getParams()
```

Parameters

None

Method

getStackTrace

Method description

Retrieves the stack trace

Syntax

```
public Throwable getStackTrace()
```

Parameters

None

Method

getSourceClass

Method description

Retrieves the source class

Syntax

```
public String getSourceClass()
```

Parameters

None

Method

setSourceClass

Method description

Sets the source class

Syntax

```
public void setSourceClass(String sourceClass)
```

Parameters

sourceClass
The source class

Method

setFaultType

Method description

Sets the fault type. See Constants.

Syntax

```
public void setFaultType(String faultType)
```

Parameters

faultType
The fault type

Method

getFaultType

Method description

Retrieves the fault type. See Constants.

Syntax

```
public String getFaultType()
```

Parameters

None

Constants

These constants are used to define fault types:

```
public static final String FAULTTYPE_UNKNOWN = "0"  
public static final String FAULTTYPE_SOURCE = "1"  
public static final String FAULTTYPE_TARGET = "2"  
public static final String FAULTTYPE_SYSTEM = "3"
```

BCGDocumentConstants

This class sets constants.

Constants

This section describes the following types of constants:

- Constants used in protocol unpackaging and protocol packaging
- Constants used in protocol processing and protocol packaging
- Sender status constants
- Document state constants
- Receiver constants

Constants used in protocol unpackaging and protocol packaging steps

The following general constants are used in the protocol unpackaging and protocol packaging steps:

```
public static final String BCG_FRPACKAGINGCD = "FromPackagingName";
    The attribute to which the received packaging name is set when WebSphere
    Partner Gateway receives a document. Define the receiving packaging name in
    the Community Console. This constant is set in the transport unpackaging step
    in the workflow.
```

```
public static final String BCG_FRPACKAGINGVER = "FromPackagingVersion";
    The attribute to which the received content packaging version is set when
    WebSphere Partner Gateway receives a document. The received packaging
    version must be defined in the Community Console. This constant is set in the
    transport unpackaging step in the workflow.
```

```
public static final String BCG_TOPACKAGINGCD = "ToPackagingName";
    The "To" packaging code that is associated with the document flow.
```

```
public static final String BCG_TOPACKAGINGVER = "ToPackagingVersion";
    The "To" packaging version that is associated with the document flow.
```

```
public static final String BCG_PKG_INITBUSINESSID =
"PackageInitPartnerBusinessId";
    The initiating business ID at the packaging level. This is set in the transport
    protocol unpackaging step in the workflow.
```

```
public static final String BCG_PKG_FRBUSINESSID =
"PackageFromPartnerBusinessId";
    The "From" business ID at the package level. For example, for AS2 the "From"
    business ID is available in the AS2-From HTTP header. This constant is set in
    the transport protocol unpackaging step in the fixed inbound workflow
```

```
public static final String BCG_PKG_TOBUSINESSID =
"PackageToPartnerBusinessId";
    The "To" business ID at the package level. For example, for AS2 the "To"
    business ID is available in the AS2-To HTTP header. This constant is set in the
    transport protocol unpackaging step in the fixed inbound workflow.
```

Constants used in protocol processing and protocol packaging steps

The following constants are used in the protocol processing and protocol packaging steps:

```

public static final String BCG_FRBUSINESSID = "FromPartnerBusinessId";
    The "From" business ID obtained from the protocol message and set onto
    BusinessDocument in the protocol parsing step.

public static final String BCG_INITBUSINESSID =
"InitiatingPartnerBusinessId";
    The initiating-partner business ID that is obtained from the protocol.

public static final String BCG_TOBUSINESSID = "ToPartnerBusinessId";
    The "To" business ID that is obtained from the protocol message and set onto
    BusinessDocument in the protocol parsing step.

public static final String BCG_FRPROTOCOLCD = "FromProtocolName";
    The received protocol namecode that is obtained from the document, for
    example, XML/EDI. Define this namecode in the Community Console. This
    constant is set in the protocol processing step in the workflow.

public static final String BCG_FRPROTOCOLVER = "FromProtocolVersion";
    The received protocol version. Define this version in the Community Console.
    This constant is set in the protocol processing step in the workflow.

public static final String BCG_FRPROCESSCD = "FromProcessCode";
    The "From" process code name. For example, in RNIF this value is set to 3A4,
    and the version is set to V02.02. Set this constant in the protocol processing
    step in the workflow. Define this constant in the Community Console in the
    Document Flow Definitions column of the Manage Document Flow Definitions
    page by clicking Package > Protocol > DocumentFlow.

public static final String BCG_FRPROCESSVER = "FromProcessVersion";
    The "From" process version, which is set in the protocol processing step in the
    workflow. Define this constant in the Community Console in the Document
    Flow Definitions column of the Manage Document Flow Definitions page by
    clicking Package > Protocol > DocumentFlow.

public static final String BCG_TOPROTOCOLCD = "ToProtocolName";
    The target protocol name. This channel is set by CheckChannel fixed inbound
    workflow after it identifies the participant connection and is used by the
    handlers protocol packaging step.

public static final String BCG_TOPROTOCOLVER = "ToProtocolVersion";
    The "To" protocol version.

public static final String BCG_TOPROCESSCD = "ToProcessCode";
    The "To" process code name. For example, in RNIF this value is set to 3A4 and
    the version is set to V02.02. Define this constant in the Community Console in
    the Document Flow Definitions column of the Manage Document Flow
    Definitions page by clicking Package > Protocol > DocumentFlow.

public static final String BCG_TOPROCESSVER = "ToProcessVersion";
    The "To" process code version. For example, in RNIF this value is set to 3A4,
    and the version is set to V02.02. Define this constant in the Community
    Console in the Document Flow Definitions column of the Manage Document
    Flow Definitions page by clicking Package > Protocol > DocumentFlow.

public static final String BCG_DESTINATION = "DestinationType";
    The destination type that will be used in the workflow and in senders.

public static final String BCG_OUTBOUNDTRANSPORTHEADERS =
"OutboundTransportHeaders";
    The outbound transport headers attribute that is used by the sender to set the
    transport headers when it transfers the document over a specified transport.
    The value for this attribute is a HashMap object that contains the list of

```

transport headers. For example, an HTTP sender uses this attribute to set the HTTP headers. This attribute is set in the handlers that are configured for the protocol packaging step in the fixed outbound workflow.

Sender status constants

The following constants handle sender status:

```
public static final String BCG_SENT_STATUS_SUCCESS = "sent";
```

The status that the sender sets in a `SenderResult` object when the sender successfully sends a document.

```
public static final String BCG_SENT_STATUS_FAILED = "failed";
```

The status that the sender sets in a `SenderResult` object when the sender fails while sending a document.

Document state constants

The following constants pertain to the document state:

```
public static final String BCG_DOCSTATE_FAILED = "Failed";
```

The document state, set to "failed", if any error occurs while the document is being processed by the handler in the workflow steps. The document state when an error occurs while the handler is processing the document in workflow steps or actions.

```
public static final String BCG_DOCSTATE_IN_PROCESS = "In Process";
```

The document state, set to "In Process", in `BusinessDocumentInterface` when the workflow handler or action is processing a document.

```
public static final String BCG_DOCSTATE_SENT = "Sent";
```

The document state, set to "Sent", in the `BusinessDocumentInterface` in the workflow steps. If a workflow step sets this state on a business document, further steps and workflows will not be performed and this business document will not be sent to Document Manager. Basically, this will end the flow of the business document and so this document will *not* be sent to the trading partner.

Receiver constants

If a sender is introducing a response file into the flow by setting a response document on `SenderResult`, the sender can optionally set the attributes described in this section. The following are receiver constants:

```
public static final String BCG_RCVD_DOC_TIMESTAMP =
```

```
"ReceivedDocumentTimestamp";
```

The time stamp of the received document. When a receiver receives a business document, the receiver sets this attribute on the receiver document. The value of this attribute gives the time stamp of the received document.

```
public static final String BCG_RCVD_CONTENT_LENGTH = "content-length";
```

The content length of the received document. When a receiver receives a business document, the receiver sets this attribute on the receiver document. The sender also sets this on the business document when it receives the synchronous response. The value of this attribute gives the content size of the received document. This attribute is required for the Community Console to display the document size.

```
public static final String BCG_RCVD_MSG_LNGTH_INC_HDRS =
```

```
"MsgLengthInHeaders";
```

The message length of the received document. When a receiver receives a business document, the receiver sets this attribute on the received document. The sender also sets this on the business document when it receives the

synchronous response. The value of this attribute gives the size of the content and headers from the received document. This attribute is required for the Community Console to display the document size.

```
public static final String BCG_RCVD_CONTENT_TYPE = "content-type";
```

The content type of the received document. When a receiver receives a business document, the receiver sets this attribute on the received document. The sender also sets this on the business document when it receives the synchronous response. This attribute is required for the Community Console to display the document size.

```
public static final String BCG_RCVR_DESTINATION = "ReceiverDestinationType";
```

The attribute that is set by receivers on a ReceiverDocumentInterface object when a document is received from a target. This target is associated with a destination type such as production and test. The destination type is configured for the target, and you can read it from the receiver configuration by using the BCGDocumentConstants.BCG_TARGET_DESTINATION attribute.

This attribute might be set by a sender if it is doing a synchronous request response. If the sender is introducing a response file into the flow by setting the response document on SenderResult, the sender is required to set the BCG_RCVR_DESTINATION attribute in SenderResult. If this attribute is not set, the flow of response document will fail in the Document Manager. This attribute can be set by copying the BCG_RCVR_DESTINATION attribute from the request business document that it is sending.

```
public static final String BCG_TARGET_STATUS = "ACTIVESTATUSCD";
```

The name of a reserved attribute that determines whether the target of a receiver is enabled or disabled. If enable equals 1, the target is enabled; otherwise, it is disabled. You can read the target status from the target configuration by using the BCGDocumentConstants.BCG_TARGET_STATUS attribute.

```
public static final String BCG_TARGET_DESTINATION = "DESTNAME";
```

The name of a reserved attribute that determines the target destination type from a targetConfig object such as production or test.

```
public static final String BCG_RCVD_IPADDRESS = "FromIPAddress";
```

The host IP address where a document is received. When a receiver receives a business document, it can set this attribute on the received document.

```
public static final String BCG_INBOUND_TRANSPORT_CHARSET = "InboundTransportCharset";
```

The character set that is obtained from the transport headers. This is set by the receiver when it receives the request. For example, the HTTP receiver checks for charset in the content-type header and sets it on the receiver document as the value of this attribute.

```
public static final String BCG_INBOUND_CHARSET = "InboundCharset";
```

The character set that is used for the inbound document.

```
public static final String BCG_REQUEST_URI = "requestURI";
```

The URI from which the receiver has received the request. When a receiver receives a business document, it set this attribute on the receiver document. Targets are configured with this URI in the Community Console and associated with a destination type such as production or test.

Other constants

Following are other constants:


```
public static final String BCG_GET_SYNC_RESPONSE =
"GetSynchronousResponse";
```

A flag set by the handler in the protocol unpacking, protocol parsing, or protocol packaging step. If the handler determines that the received request requires a synchronous response from the target, it sets this attribute to true. The sender checks this flag; if it is set to true, the sender retrieves the synchronous response from the target.

```
public static final String BCG_RESPONSE_STATUS = "ResponseStatus";
```

If a response needs to be sent synchronously by the receiver to a trading partner, this contains the one-line response. It can be set by a sender on a response business document. For example, for an HTTP receiver, the value of this attribute can be a number such as 200, 404, or 500, which are HTTP transport status codes. Receivers can either use this response or specify another response.

```
public static final String BCG_REPLY_TO_DOC_ID = "ReplyToDocID";
```

The request document ID that is present in the response document. The response document is considered a response to this request document.

```
public static final String BCG_REPLY_TO_DOC_UUID = "ReplyToMessageId";
```

The attribute to which SenderFrameWork sets the UUID of the request business document in the response business document. This is used to correlate the request-response in the process engine.

```
public static final String BCG_DOCID = "DocumentId";
```

The document ID from the business document payload.

```
public static final String BCG_TARGET_TRANSPORTTYPE =
"TargetTransportType";
```

This constant can be used to determine the target transport type from a target configuration object such as JMSReceiver or CustomReceiver.

```
public static final String BCG_TRUE = "true";
```

This constant can be used to set the value to true for any attribute that requires a boolean value. For example. the attribute BCG_TRUE can be used to set the value of BCG_GET_SYNC_RESPONSE to true.

```
public static final String BCG_FALSE = "false";
```

This constant can be used to set the value to false for any attribute that requires a boolean value. For example. the attribute BCG_FALSE can be used to set the value of BCG_GET_SYNC_RESPONSE to false.

```
public static final String BCG_OUT_DOC_FILENAME = "X-out-filename";
```

This constant can be used to set or access the output file name in the business document. For example, you can write a pre-process handler, set the output file name to user defined, and then configure it with the File Sender. When File Sender writes the document to the target location, it is written with the name that was set to the OUT_DOC_FILENAME attribute.

Events

The following sections list events available for workflow execution flow:

Events that can be logged from the protocol unpacking handler

Informational events

BCG240607 - Unpackaging Business Process Entrance

Event text: Packaging business process (*{0}*) entrance
{0} Unpackaging BusinessProcess class name

BCG240608 - Unpackaging Business Process Exit

Event text: Packaging business process (*{0}*) exit
{0} Unpackaging BusinessProcess class name

Warning events

BCG240609 - Unpackaging warning

Event text: Unpackaging warning - *{0}*
{0} Unpackaging warning information

Error events

BCG240610 - Unpackaging Error

Event text: Unpackaging Error - *{0}*
{0} Unpackaging error information

BCG210014 - Error Unpackaging Mime Message

Event text: Failed to unpackage a MIME multipart document: *{0}*
{0} Exception message

Events that can be logged from the protocol processing handler

Informational events

BCG240612 - Protocol Parse Business Process Entrance

Event text: Protocol Parse business process (*{0}*) entrance
{0} Protocol Parse BusinessProcess class name

BCG240613 - Protocol Parse Business Process Exit

Event text: Protocol parse business process (*{0}*) exit
{0} BusinessProcess class name

Warning events

BCG240614 - Protocol parse warning

Event text: Protocol parse warning - *{0}*
{0} Protocol parsing warning information

Error events

BCG240615 - Protocol parse error

Event text: Protocol parse error: - *{0}*
{0} Protocol parse error message

Events that can be logged from user-defined actions and steps

Informational events

BCG200002 - Protocol Transformer Entrance

Event text: Protocol transformer business process (*{0}*) entrance.

{0} Class name

BCG200003 - Protocol Transformer Exit

Event text: Protocol transformer business process (*{0}*) exit.

{0} Class name

BCG200004 - Document Successfully Transformed

Event text: *{0}* - Class name.

{0} A string constructed from the "From" protocol name <protocol name, protocol version> and the "To" protocol <protocol name, protocol version>

BCG230000 - Validation Business Process Entrance

Event text: Validation business process (*{0}*) entrance.

{0} Validation class name

BCG230003 - Validation Business Process Exit

Event text: Validation business process (*{0}*) exit.

{0} Validation class name

BCG230005 - Validation Successful

Event text: Validation *{0}* successful.

{0} Validation class name

Warning events

BCG230008 - Validation Warning

Event text: *{0}*.

{0} Any validation-level warning message

Error events

BCG200005 - Document Transformation Failure

Event text: Document failed transformation due to *{0}*

{0} Exception message

BCG200009 - Failed to parse the document

Event text: Failed to parse: *{0}*

{0} A list of parser errors

BCG230001 - Field Validation failed

Event text: Field Validation Error: *{0}*

{0} A field validation error

BCG230007 - Validation Business Process Factory Error

Event text: *{0}*

{0} The error message that occurred in the validation step

BCG230010 - Data Validation Error

Event text: Document failed data validation: *{0}*

{0} A list of errors as a String object

Events that can be logged from the protocol packaging handler

Informational events

BCG240603 - Packaging Business Process Entrance

Event text: Packaging business process ({0}) entrance
{0} Packaging BusinessProcess class name

BCG240604 - Packaging Business Process Exit

Event text: Packaging business process ({0}) exit
{0} BusinessProcess class name

Warning events

BCG240605 - Packaging warning

Event text: Packaging warning - {0}
{0} Packaging warning information

Error events

BCG240606 - Packaging Error

Event text: Packaging Error - {0}
{0} Packaging error information

Security and other events

Error events

BCG240417 - Decryption failure

Event text: {0}
{0} Decryption failure message

BCG240418 - Digest Generation Failure

Event text: {0}
{0} Digest failure message

BCG240419 - Unsupported Signature format (signed receipt protocol is not pkcs7-signature)

Event text: {0}
{0} Exception message containing the signature format

BCG240420 - Unsupported Signature algorithm (the Signature algorithm is not MD5 or SHA1)

Event text: {0}
{0} Exception message including signature algorithm

BCG240421 - Unexpected Error

Event text: {0}
{0} Exception message

BCG240424 - Insufficient message security error

Event text: {0}
{0} Details of what is missing; for example, a message indicating that the received document is encrypted but the partner agreement requires it to be encrypted and signed

Example handlers and steps implementation outline

The following code and pseudocode provide example implementations for fixed-workflow handlers and variable-workflow steps.

Protocol processing handler

This section provides an outline of a handler implementation for processing a fixed-inbound protocol; in this case, a handler to support CSV processing. You must add protocol-specific code.

```
public class MyCSVProtocolProcess implements BusinessProcessHandlerInterface {

    public boolean applies(BusinessDocumentInterface document) {
        // do quick scan of the file contents to determine if it is CSV file
        // if it is then set from_protocol = "CSV_PROTOCOL"
        if (from_protocol.equals("CSV_PROTOCOL"))
            return true;

        return false;
    }

    public BusinessDocumentInterface process(BusinessDocumentInterface document) {
        try {
            String[] params;

            // obtain the file contents in a String
            StringTokenizer tokenizer = new StringTokenizer(fileContents, ",");
            String fromBusinessId = tokenizer.nextToken();
            if (fromBusinessId == null) {
                params = new String[1];
                params[0] = "From business ID not available.";
                EventInfo event = new EventInfo("BCG240614", document, params);
                document.addEvent(event);
            }
            String toBusinessId = tokenizer.nextToken();
            String customerId = tokenizer.nextToken();
            String customerName = tokenizer.nextToken();
            String documentType = tokenizer.nextToken();
            String documentVersion = tokenizer.nextToken();

            ...
            // trace-obtained information
            ...

            document.setValue(BCGDocumentConstants.BCG_FRBUSINESSID, fromBusinessId);
            document.setValue(BCGDocumentConstants.BCG_TOBUSINESSID, toBusinessId);
            document.setValue(BCGDocumentConstants.BCG_FRPROTOCOLCD, "CSV_PROTOCOL ");
            document.setValue(BCGDocumentConstants.BCG_FRPROTOCOLVER, "1.0");
            document.setValue(BCGDocumentConstants.BCG_FRPROCESSCD, documentType);
            document.setValue(DocumentConstant.BCG_FRPROCESSVER, documentVersion);

            ...

        } catch (Exception e) {
            params = new String[1];
            params[0] = "Error in MyCSVProtocolProcess";
            EventInfo event = new EventInfo("BCG240615", document, params, e);
            document.addEvent(event);
            document.setDocumentState(BCGDocumentConstants.BCG_DOCSTATE_FAILED);
        }
        return document;
    }
}
```

Protocol unpackaging handler

This section provides an outline of a fixed inbound protocol unpackaging handler implementation; in this case a handler to support custom XML packaging from WebSphere Commerce Business Edition. You must add protocol-specific code.

```
public class MyProtocolUnPackagingHandler
implements BusinessProcessHandlerInterface {

public boolean applies(BusinessDocumentInterface document) {
// do quick scan of the file contents, transport headers to determine
// if it is "MY_PACKAGE". if it is then set from_package = "MY_PACKAGE"
if (from_package.equals("MY_PACKAGE"))
return true;

return false;
}

public BusinessDocumentInterface process(BusinessDocumentInterface document) {

// from your packaging, obtain package level routing information

try {
String[] params;

// obtain routing information from your packaging
...

// trace-obtained information
...

// set routing information on the document
document.setValue(BCGDocumentConstants.BCG_PKG_FRBUSINESSID, fromBusinessId);
document.setValue(BCGDocumentConstants.BCG_PKG_TOBUSINESSID, toBusinessId);
document.setValue(BCGDocumentConstants.BCG_PKG_INITBUSINESSID, customerId);
document.setValue(BCGDocumentConstants.BCG_FRPACKAGINGCD, "MY_PACKAGE");
document.setValue(BCGDocumentConstants.BCG_FRPACKAGINGVER, "1.0");

...

} catch (Exception e) {
params = new String[1];
params[0] = "Error in MyProtocolUnPackagingHandler";
EventInfo event = new EventInfo("BCG240610", document, params, e);
document.addEvent(event);
document.setDocumentState(BCGDocumentConstants.BCG_DOCSTATE_FAILED);
}
return document;
}
}
```

Transformation step

This section provides an outline of a variable workflow step implementation; in this case, a step to transform a document from one format to another. The sample includes code and pseudocode for the BusinessProcessFactory and BusinessProcess implementation. You must add protocol-specific code.

Factory implementation:

```
public class MyTransformationBusinessProcessFactory implements
    BusinessProcessFactoryInterface {

    public BusinessDocumentInterface getBusinessProcess(Context context,
        Config config, BusinessDocumentInterface document) {
        // Can use any configuration values from config as necessary. These
        // are set via the Community Console.
        MyTransformationBusinessProcess bp = new MyTransformationBusinessProcess();

        // Set any items in this class as specific to the implementation
        // between the factory and the business process class.
        return bp;
    }

    public void returnBusinessProcess(BusinessProcessInterface bp) {
        // if not reusing Business Processes then do nothing.
    }
}
```

Business process implementation:

```
public class MyTransformationBusinessProcess implements BusinessProcessInterface {

    public BusinessDocumentInterface process (BusinessDocumentInterface document,
        Context context) {

        String[] params;
        try {
            // trace relevant information. log relevant events.
            ...

            // obtain transformation map
            MapService mapService = BusinessProcessUtil.getMapService();
            byte[] transformationMap = mapService.getTransformationMap (bDoc, context);

            // Get the Business document file.
            File sourceFile = document.getDocument();

            // create a new file to store your transformed document
            File targetFile = document.createFile();

            // read business data from the source. write your logic to transform
            // the source to target. store your target business data into target file

            ...

            // store the transformed target file into business document.
            document.setDocument(targetFile);

        } catch(Exception ex) {
            params = new String[1];
            params[0] = "Error in MyTransformationBusinessProcess: " + ex.getMessage();
            EventInfo event = new EventInfo("BCG_200005", document, params, e);
            document.addEvent(event);
            document.setDocumentState(BCGDocumentConstants.BCG_DOCSTATE_FAILED);
        }

        return document;
    }
}
```

```
    }  
    public boolean reset() {  
        /* reset internal variables. */  
        ...  
    }  
}
```

Chapter 6. Customizing senders

When a WebSphere Partner Gateway receiver component receives a business document from a trading partner, the sequence of steps is as follows:

1. The document processor component unpackages the business document in accordance with the business protocol for that document type.
2. The participant connection determines how the document will be processed and routed.
3. The document is processed and packaged according to the business protocol requirements of the "To" protocol and the "To" packaging specified by the participant connection.
4. The Delivery Manager picks up the business document and sends it to the trading partner. The "To" gateway determined from the participant connection gives the configuration to use for sending the packaged business document to the recipient trading partner.
5. The Delivery Manager invokes the Receiver Framework to send the document. The Receiver Framework manages the senders and sending of the document.
6. The sender performs the actual sending of the packaged business document to the target trading partner.

The sender is responsible for sending the packaged business documents to the target trading partner. If the business protocol requires such action, the sender can synchronously receive the response business document for the document it is sending. The sequence is as follows:

1. The sender receives the response business document according to the business protocol semantics.
2. If the sender obtains the response business document, the sender introduces the document into the system.
3. After the response document is introduced into the system, the WebSphere Partner Gateway document processor processes the document like any other business document.
4. The document processor unpackages the response document, using the participant connection to look up information for the document.
5. The response business document is processed and packaged according to the business protocol requirements of the "To" protocol and the "To" packaging given by the participant connection.
6. The Delivery Manager picks up the business document and sends it to the trading partner.
7. If the response document is in response to a request document that was synchronously received by the receiver, the Delivery Manager gives this document to the receiver. In this case, the receiver sends the response to the waiting trading partner.

If the request document was not synchronously received, the Delivery Manager processes the response document the same way that it processed the request document.

The sender handles the final stage in the data flow of WebSphere Partner Gateway. It picks up documents from the BPE, packages them, and sends them to their

destinations, based on information in the Community Console-configured gateway. In the case of a synchronous request, it can also process the response document.

This chapter describes sender customization and the processing done by senders. You can customize the sending of documents in either of two ways:

- By creating new senders
- By creating new sender handlers

The chapter describes both ways of customizing senders:

- “Overview for creating new senders”
- “Overview for creating new sender handlers” on page 119

An additional section describes development and deployment issues:

- “Development and deployment” on page 120

The API list and example code follows in the next chapter.

Overview for creating new senders

Senders are transport-specific. WebSphere Partner Gateway ships with senders for FTP/S, JMS, File, SMTP, and HTTP/S transports. To add a new capability to the WebSphere Partner Gateway system, such as a WAP transport, you can write your own senders, using an API provided with WebSphere Partner Gateway. You can use the Community Console to associate these new senders with transports and integrate them into the processing flow. This section describes the process of developing a new sender in the following topics:

- “The Sender/Sender Framework flow”
- “Sender architecture” on page 119

The Sender/Sender Framework flow

The nature of the processing flow on the sender side of WebSphere Partner Gateway is in part dictated by the needs of the particular situation and transport, but certain basic tasks must always be done. This section describes those tasks at a high level.

1. **Deliver** After processing the document, the Business Processing Engine (BPE) delivers it to the Delivery Manager. The Delivery Manager determines the configured “To” gateway for the participant connection associated with this document flow, and then invokes the Sender Framework to send the document to the target trading partner.
2. **Preprocess** From the gateway configuration, the Sender Framework determines the configured preprocessing handlers. These handlers, which have been configured for this gateway, can be user-defined or supplied by WebSphere Partner Gateway. The document is passed as input to the first handler, the returned processed document is fed as input to the next handler, and so on until one of the handlers accepts it. This handler is invoked to preprocess the document.
3. **Initialize the sender** The Sender Framework determines the sender for this gateway. It initializes the sender by calling its `init` method. The sender initializes itself with the gateway configuration.
4. **Send the document** The Framework calls the sender’s `send` method. The sender creates a `SenderResult` object to store transmission and status information and sends the message, using the destination specified in the gateway configuration.

5. **Set synchronous response** The `GET_SYNC_RESPONSE` attribute can be set on the business document by any of the workflow steps and the handlers. If the `GET_SYNC_RESPONSE` attribute on the business document is set to true, the sender can obtain the response business document synchronously. It stores the response business document on the file system. The sender constructs `SenderResult` and updates it appropriately with the transmission status, message, and response details.
6. **Postprocess** From the gateway configuration, the Sender Framework determines the configured postprocessing handlers. These handlers, which have been configured for this gateway, can be user-defined or supplied by WebSphere Partner Gateway. `SenderResult` is passed as input to the first handler, the returned `SenderResult` document is fed as input to the next handler, and so on until one of the handlers accepts it. This handler is invoked to postprocess the response.
7. **Process the response** The Sender Framework processes the response, appropriately updating the status of the request business document that was sent. If the sender obtained a business document response, the Sender Framework introduces the business document into the system. This business document flows through the system like any other business document.

Sender architecture

Sender development is based on two major parts:

- The sender itself, represented in the API by the `SenderInterface` interface
- `SenderFramework`, a class that WebSphere Partner Gateway supplies to manage the sender

The sender is responsible for actually sending the message to the destination, and for creating and initially populating the `SenderResult` object. In the case of a synchronous request, the sender also writes the response document to a file and places a reference to the File object in the `SenderResult` object. The Framework is responsible for preprocessing and postprocessing documents and for instantiating and utilizing the sender.

Overview for creating new sender handlers

The `SenderFramework` can invoke handlers at two stages during the sender processing flow: preprocessing and postprocessing. These stages are also referred to as *configuration points*. Preprocessing refers to what occurs before the request document is given to the sender to be sent to its destination and postprocessing occurs after the request document has been sent to its destination and the `SenderResult` object has been created to document the request's status.

WebSphere Partner Gateway ships with a number of predefined handlers, but you can also develop your own, if you have specific needs not satisfied by the delivered handlers. If a request document comes from a preferred trading partner, for example, a custom preprocessing handler can be written to determine the partner's status and set the transport headers accordingly. After the handlers are written and deployed, you need to configure them by using the Community Console, just as you configure handlers supplied by WebSphere Partner Gateway. For further information on this process, see the *Hub Configuration Guide*.

Development and deployment

The following sections describe development and deployment for both user-created senders and user-created handlers.

Development environment

The sender and sender handler development API relies on classes and interfaces from this package: `com.ibm.bcg.bcgdk.gateway`

This package is part of the `bcgsdk.jar` file, which is found among the WebSphere Partner Gateway installable files in the following directories:

- `ProductDir\router\lib`
- `ProductDir\receiver\lib`
- `ProductDir\console\lib`

In all deployed instances, this JAR file must be available in the application server classpath and not in the module classpath.

For development, the `bcgsdk.jar` file must be included in the build path of the project that contains the user exit classes, that is, in the classpath.

Deployment and packaging (senders)

All user-created code needs to be made available to the run-time environment. For use during runtime, package and deploy user-created code in one of the following ways:

- Placed in a JAR file in `\<receiver or router>\lib\userexits`
- Added as classes in `\<receiver or router>\lib\userexits\classes`

Adding the JAR or class files to the run-time environment makes them available only if the transport or handler is configured to be used by the run-time environment. Sender transports and handlers are configured for use like the other product-provided transports and handlers. To configure them, you must first make them known to the Community Console. You do this by importing their definitions into the Community Console by means of an XML descriptor file.

To import a sender transport, click **Account Admin > Profiles > Gateways > Manage Transport Types**.

To import a sender transport handler, click **Hub Admin > Hub Configuration > Handlers > Gateway > Import**. One of the descriptors is the handler type. Only defined handler types are allowed and are based on the transport gateway configuration points. For user-defined transports, the transport descriptor file must be imported first to provide the handler type.

Descriptor file definition for a sender transport

The sender transport descriptor file uses the `bcgateway.xsd` schema. Following is a brief outline for each of the elements in the descriptor file based on the following example:

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- Copyright (c) 2004 IBM Corp. - All Rights Reserved.-->
<!-- IBM makes no representations or warranties about the suitability of -->
<!-- this program, either express or implied, including but not limited to -->
<!-- the implied warranties of merchantability, fitness for a particular -->
<!-- purpose, or non-infringement. -->
```

```

<tns:GatewayDefinition
  xmlns:tns="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external"
  xmlns:tns2="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external/types"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external
bcggateway.xsd http://www.ibm.com/websphere/bcg/2004/v0.1/import/external/types
bcgimport.xsd ">
<tns:GatewayClassName>com.mycompany.MyHTTPGateway</tns:GatewayClassName>
<tns:Description>My companies HTTP Gateway</tns:Description>
<tns:TransportTypeName>MYHTTP</tns:TransportTypeName>
<tns:TransportAttributes>
<tns2:ComponentAttribute>
<tns2:AttributeName>Timeout</tns2:AttributeName>
<tns2:AttributeDefaultValue>300</tns2:AttributeDefaultValue>
</tns2:ComponentAttribute>
</tns:TransportAttributes>
<tns:GatewayConfigurationPoints>
<tns:Postprocess>GATEWAY.POSTPROCESS.MYHTTP</tns:Postprocess>
</tns:GatewayConfigurationPoints>
</tns:GatewayDefinition>

```

GatewayClassName

The full class name of the sender implementation

Description

General description for the transport

TransportTypeName

The name that will appear in the Transport list in the Console Target List page

TransportAttributes

(optional) Any attributes that this transport can have

ComponentAttribute

An attribute's name and default values that are used to provide configuration information to the target at runtime

AttributeName

The name of a specific attribute

AttributeDefaultValue

(optional) The attribute's default value

GatewayConfigurationPoints

(optional) The names of the configuration points that this transport might have

Preprocess

GATEWAY.PREPROCESS.*xxx*, the name of a preprocessing configuration point being defined, where *xxx* is the value of the TransportTypeName attribute

Postprocess

GATEWAY.POSTPROCESS.*xxx*, the name of a postprocessing configuration point being defined, where *xxx* is the value of the TransportTypeName attribute

Any handlers defined for this sender transport must match one of these GatewayConfigurationPoints values.

Descriptor file definition for a sender transport handler

The sender transport handler descriptor file uses the bcghandler.xsd schema. The following example presents a brief outline for each of the elements in the descriptor file:

```

<?xml version="1.0" encoding="UTF-8"?>
<tns:HandlerDefinition
  xmlns:tns="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external"
  xmlns:tns2="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external/types"

```

```

xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.ibm.com/websphere/bcg/2004/v0.1/import/external
bcghandler.xsd http://www.ibm.com/websphere/bcg/2004/v0.1/import/external/types
bcgimport.xsd ">
<tns:HandlerClassName>com.mycompany.SenderHandler</tns:HandlerClassName>
<tns:Description>My company's handler for my business protocol and multiple
transports.</tns:Description>
<tns:HandlerTypes>
<tns:HandlerTypeValue>GATEWAY.POSTPROCESS.MYHTTP</tns:HandlerTypeValue>
<tns:HandlerTypeValue>GATEWAY.POSTPROCESS.JMS</tns:HandlerTypeValue>
</tns:HandlerTypes>
<tns:HandlerAttributes>
<tns2:ComponentAttribute>
<tns2:AttributeName>Attribute 1</tns2:AttributeName>
</tns2:ComponentAttribute>
<tns2:ComponentAttribute>
<tns2:AttributeName>Attribute 2</tns2:AttributeName>
<tns2:AttributeDefaultValue>Attribute2DefaultValue</tns2:AttributeDefaultValue>
</tns2:ComponentAttribute>
</tns:HandlerAttributes>
</tns:HandlerDefinition>

```

HandlerClassName

The full class name of the handler implementation.

Description

General description of the handler.

HandlerTypes

The handler types with which the handler can be used. For transports, the handler type corresponds to the GatewayConfigurationPoint values defined for that transport. To see a list of the currently defined transport handler types, click **Hub Admin > Hub Configuration > Handlers > Gateway > HandlerTypes**.

HandlerTypeValue

The HandlerType value that corresponds to the GatewayConfigurationPoints value. A handler can be associated with more than one transport type.

HandlersAttributes

(optional) Any attributes that this handler can have.

ComponentAttribute

An attribute's name and default values that are used to provide configuration information to the handler at runtime.

AttributeName

The name of a specific attribute.

AttributeDefaultValue

(optional) The attribute's default value.

Chapter 7. APIs and example code for senders and sender handlers

This chapter provides an annotated listing of the APIs provided for developing custom senders and sender handlers. The following classes and interfaces are documented:

- “SenderInterface” on page 124
- “SenderResult” on page 126
- “SenderPreProcessHandlerInterface” on page 130
- “SenderPostProcessHandlerInterface” on page 132
- “BCGSenderException” on page 134
- “Events” on page 135
- See also the listings in the Workflow API chapter for more utility, security, and other classes shared across components.

Brief examples of code and pseudocode are also included:

- “Implementation outlines for an example sender” on page 136

SenderInterface

Each sender must implement this interface. It has the following methods:

- `init`
- `send`
- `cancel`

Method

`init`

Method description

Initializes the sender, based on the contents of the `deliveryConfig` object, which contains gateway configuration information

Syntax

```
public void init (Context context, Config deliveryConfig)
    throws BCGSenderException
```

Parameters

`context` Flow information associated with this sender

`deliveryConfig` Gateway configuration details as specified in the Community Console

Method

`send`

Method description

Called by the `SenderFramework`. It sends the document to the destination using the information specified in the `deliveryConfig` object. It creates and updates the `SenderResult` object with delivery status, WebSphere Partner Gateway transport headers, and, in the case of a synchronous flow, the response document. If delivery fails, the sender may try transport retries.

Syntax

```
public SenderResult send(BusinessDocumentInterface document)
```

Parameters

`document` The business document being sent

Method

`cancel`

Method description

Called by the `SenderFramework`. Stops message delivery and any transport retries.

Syntax

```
public SenderResult cancel()
```


Parameters

None

SenderResult

The SenderResult object is created by the sender, based on this provided class. It holds meta-information on the status of the request business document, and, in the case of a synchronous flow, a reference to the File object containing the response document. It contains the following methods:

- addEvent
- getEvents
- setSendStatus
- getSendStatus
- setResponseDocument
- getResponseDocument
- setTransportStatusCode
- getTransportStatusCode
- setTransportHeaders
- getTransportHeaders
- setAttribute
- getAttribute
- get Attributes

Method

addEvent

Method description

Adds an event to the SenderResult object

Syntax

```
public void addEvent(EventInfo eventInf)
```

Parameters

EventInfo	A specialized class from the <code>com.ibm.bcg.bcgdk.common</code> package, used to hold event information throughout the WebSphere Partner Gateway system. The <code>addEvent</code> method implementation only accepts <code>EventInfo</code> as a single parameter, not as an array. <code>EventInfo</code> is documented in the Workflow API chapter under “From <code>com.ibm.bcg.bcgdk.common</code> ” on page 88.
-----------	--

Method

getEvents

Method description

Retrieves the events set in this object

Syntax

```
public EventInfo[] getEvents()
```

Parameters

None

Method

`setSendStatus`

Method description

Sets the delivery status. which can be success or failure based on transmission status.

Syntax

```
public void setSendStatus(String status)
```

Parameters

`status` The appropriate status

Method

`getSendStatus`

Method description

Retrieves the delivery status

Syntax

```
public String getSendStatus()
```

Parameters

None

Method

`setResponseDocument`

Method description

Sets the file that holds the response document.

Syntax

```
public void setResponseDocument(File responseFile)
```

Parameters

`responseFile` The File object where the response document is stored

Method

`getResponseDocument`

Method description

Retrieves the File object which holds the response document

Syntax

```
public File getResponseDocument()
```

Parameters

None

Method

`setTransportStatusCode`

Method description

Sets the transport return status code (like HTTP 200 OK)

Syntax

```
public void setTransportStatusCode(Object transportStatusCode)
```

Parameters

`transportStatusCode`
The status code

Method

`getTransportStatusCode`

Method description

Retrieves the transport return status code

Syntax

```
public Object getTransportStatusCode()
```

Parameters

None

Method

`setTransportHeaders`

Method description

Sets these headers upon receiving a synchronous response.

Syntax

```
public void setTransportHeaders(HashMap transportHeaders)
```

Parameters

`transportHeaders`
The HashMap that contains the transport headers

Method

`getTransportHeaders`

Method description

Retrieves the transport headers set by the sender

Syntax

```
public HashMap getTransportHeaders()
```

Parameters

None

Method

```
setAttribute
```

Method description

Sets attributes specific to WebSphere Partner Gateway. These attributes contain headers specific to senders. They are used by the Framework as input into the metadata file: delivery duration, transport status description, and so forth.

Syntax

```
public void setAttribute(String name, Object obj)
```

Parameters

name	The name of the object that stores the attributes
obj	The object

Method

```
getAttribute
```

Method description

Retrieves the attributes specific to WebSphere Partner Gateway

Syntax

```
public Object getAttribute()
```

Parameters

None

Method

```
getAttributes
```

Method description

Retrieves HashMap of all attributes set

Syntax

```
getAttributes()
```

Parameters

None

SenderPreProcessHandlerInterface

This interface describes the methods that all preprocessing handlers must implement:

- `init`
- `applies`
- `process`

Method

`init`

Method description

Initializes the handler by reading the configuration properties in the `Config` object

Syntax

```
public void init(Context context, Config handlerConfig)
    throws BCGSenderException
```

Parameters

`context` The name of an object that contains run-time context information for this interface

`handlerConfig` The object that stores configuration information

Method

`applies`

Method description

Determines whether the handler can process the business document

Syntax

```
public boolean applies(BusinessDocumentInterface doc)
    throws BCGSenderException
```

Parameters

`doc` The business document that is being processed

Method

`process`

Method description

Called by `SenderFramework` to preprocess the request. This method updates the `BusinessDocument` class.

Syntax

```
public BusinessDocumentInterface process(BusinessDocumentInterface doc)
    throws BCGSenderException
```

Parameters

doc The business document that is being processed

SenderPostProcessHandlerInterface

This interface describes the methods that all postprocessing handlers must implement:

- `init`
- `applies`
- `process`

Method

`init`

Method description

Initializes the handler by reading the configuration properties in the `Config` object

Syntax

```
public void init(Context context, Config handlerConfig)
    throws BCGSenderException
```

Parameters

`context` The name of an object that contains run-time context information for this interface

`handlerConfig` The object that stores configuration information

Method

`applies`

Method description

Determines whether the handler can process the business document

Syntax

```
public boolean applies(BusinessDocumentInterface doc)
    throws BCGReceiverException
```

Parameters

`doc` The business document that is being processed

Method

`process`

Method description

`SenderFramework` calls this method to process the delivery response and updates the `SenderResult` object with processing information.

Syntax

```
public SenderResult process(SenderResult response,
    BusinessDocumentInterface doc)
    throws BCGReceiverException
```


Parameters

response	The SenderResult object to be updated
doc	The business document that is being processed

BCGSenderException

If errors occur, sender APIs generate this exception.

Events

Following is a list of events available for the sender execution flow:

Informational events

BCG240616 - Sender Entrance

Event text: Sender *{0}* entrance
{0} Sender class name

BCG240617 - Sender Exit

Event text: Sender(*{0}*) exit
{0} Sender class name

BCG250007 - Document Delivered

Event text: Document was delivered successfully, response: *{0}*
{0} Target response status

Warning events

BCG240618 - Sender warning

Event text: Sender warning -*{0}*
{0} Sender warning information

Error events

BCG250008 - Document Delivery Failed

Event text: Document delivery to participant gateway failed: *{0}*
{0} Response status and error message

BCG250011 - First Delivery Attempt Failed

Event text: First delivery attempt failed for message *{0}* due to *{1}*, on gateway *{2}*.
{0} Message ID
{1} Failure reason
{2} Target name

BCG250012 - Delivery Retry Failed

Event text: *{0}* retry *{1}* for message *{2}* failed due to *{3}*, on gateway *{4}*.
{0} Transport or gateway
{1} Retry number
{2} Message UUID
{3} Failure reason
{4} Target name

Implementation outlines for an example sender

The following code and pseudocode outline example implementations for senders.

Example sender

This section contains an outline of a sender handler implementation. You should add protocol-specific code.

```
public class CustomJMSSender implements SenderInterface {

    SenderResult result = new SenderResult();
    Config deliveryConfig;

    public CustomJMSSender() {
        ...
    }

    public void init(Context context, Config deliveryConfig)
    throws BCGSenderException {

        // initialization code
        // deliveryConfig gives the gateway configuration
        this.deiveryConfig = deliveryConfig;

        // initialize sender using gateway configuration.
        ...
    }

    public SenderResult send(BusinessDocumentInterface document) {
    try {
        // Obtain configuration information from gateway configuration.
        // from the configuration and document, determine destination details
        // for sending like queue names, JMS connection details, retries,
        // business protocol specific transport headers and so forth.
        ...

        // get the document to send
        File documentFile = document.getDocument();

        // read the file contents.
        // establish transport connection. construct transport message.
        // send the transport message. perform retries if error.
        ...

        // check if response is desired
        String syncResp = document.getAttribute(
        BCGDocumentConstants.BCG_GET_SYNC_RESPONSE);

        if (syncResp.compareToIgnoreCase("true")){
            // read the response from the response queue
            ...

            // create response file
            File responseFile = document.createFile();

            // store the response on to file system
            ...

            // set the response in the result
            result.setResponse(responseFile);
        }

        // close transport connection
        ...

        // set the send status
```

```

result.setSendStatus(BCGDocumentConstants.BCG_SENT_STATUS_SUCCESS);
} catch(Exception ex) {
//create an event and add to the sender result
String[] params = new String[1];
params[0] = "CustomJMSSender.send failure: " + ex.getMessage();
EventInfo eventInfo = EventInfo("BCG250008", document, params);
result.addEvent(eventInfo);
result.setSendStatus(BCGDocumentConstants.BCG_SENT_STATUS_FAILED);
}
return result;
}

public SenderResult cancel(){
// if currently sending a document, cancel the sending.
// update the send status appropriately.
...

return result;
}
}

```

Chapter 8. End-to-end flow: an overview for using user exits

This chapter describes end-to-end flow of the business document through WebSphere Partner Gateway when user exits are involved. At a high level, a WebSphere Partner Gateway receiver receives a document from the sending trading partner. The receiver introduces the document into the document processor. The BPE component of the document processor performs business-protocol-specific processing on this business document by executing the workflows and their steps. BPE packages the business document and delivers it to the Delivery Manager component, which invokes the sender to send the business document to the receiving trading partner.

The user exit capabilities of WebSphere Partner Gateway let you develop business protocols. Each business protocol can have its unique requirements:

- The business protocol can involve synchronous and asynchronous document flows. For example, RNIF supports synchronous and asynchronous document exchange.
- Each business protocol can involve a sequence of one or more business document flows that can be related or associated to each other. For example, in cXML a given request document can have multiple asynchronous responses.

Synchronous and asynchronous flows

WebSphere Partner Gateway supports synchronous and asynchronous flows with sending and receiving trading partners. Synchronous interaction involves response business documents. This means that if a sending trading partner invokes WebSphere Partner Gateway synchronously, it expects a business-protocol-level synchronous response. Similarly, if WebSphere Partner Gateway invokes a receiving trading partner synchronously, it expects a synchronous business-protocol-level response. Note that synchronous and asynchronous interactions are dictated by the business protocol requirements and trading partner agreements. Synchronous interactions depend on the nature of the transports used as well. For example, in the case of HTTP, send the response in the same HTTP connection.

This section explains how you can use the user exit capabilities of WebSphere Partner Gateway to develop synchronous and asynchronous flows. The following table lists the various types of document flows that can be supported between a sending trading partner, WebSphere Partner Gateway, and a receiving trading partner.

Table 1. Types of document flows

Sending trading partner	WebSphere Partner Gateway	Receiving trading partner
A. Sends a business document (asynchronous)	<ol style="list-style-type: none"> 1. WebSphere Partner Gateway receiver receives the business document. SyncCheck handler returns false for this business document. Receiver introduces the document into document processor. (Receiver and receiver handlers). 2. WebSphere Partner Gateway unpackages the document and parses the document to determine participant connection. (Un-packaging handler, protocol processing handler). This also determines sending and receiving trading partners for this document. 3. WebSphere Partner Gateway performs business protocol specific processing on the request business document. (Actions and their steps). 4. WebSphere Partner Gateway packages the business document in the packaging determined by the participant connection, as expected by receiving trading partner. (Protocol Packaging handler). 5. WebSphere Partner Gateway sends the document to receiving trading partner asynchronously. (Sender and handlers). 	Receives the business document (asynchronous)
B. Sends a business document (asynchronous)	<p>The processing steps are the same as in A above. However, the protocol packaging handler sets the BCGDocumentConstants.BCG_GET_SYNC_RESPONSE attribute on the business document, which causes the sender to send the request document synchronously to the receiving trading partner. The sender waits to receive the response business document.</p> <p>The response business document received by the sender is introduced into the Document Manager by the Delivery Manager. This document is processed like any other document.</p>	

Table 1. Types of document flows (continued)

Sending trading partner	WebSphere Partner Gateway	Receiving trading partner
<p>C. Sends the request business document synchronously to WebSphere Partner Gateway. Synchronously receives response business document from WebSphere Partner Gateway.</p>	<p>The processing steps are the same as in A above. However, the protocol packaging handler sets the BCGDocumentConstants.BCG_GET_SYNC_RESPONSE attribute on the business document, making the sender send the request document synchronously to the receiving trading partner. The sender waits to receive the response business document.</p> <p>Note the following points in this scenario:</p> <ul style="list-style-type: none"> • The sending trading partner of the response document is the trading partner who received the request business document. • The receiving trading partner of response document is the trading partner who sent the request business document. <p>After the sender receives the response business document, it is processed as follows:</p> <ol style="list-style-type: none"> 1. SenderFramework introduces the response business document into the Document Manager. 2. The unpacking handler unpackages the document, and the protocol processing handler parses the response document to determine the participant connection. 3. WebSphere Partner Gateway performs business-protocol-specific processing (actions and their steps) on the response business document. 4. The protocol packaging handler packages the response business document in the packaging as expected by the receiving trading partner and determined by the participant connection for this document. 5. Since the request document was received synchronously by the WebSphere Partner Gateway receiver, the response is sent by the receiver (and postprocessing handler) to the trading partner. 	<p>Receives the business document (synchronous). Responds synchronously with business document.</p>

Note: If an error occurs during the flow of either the request or the response business document, any of the user exits can set the BCGDocumentConstants.BCG_RESPONSE_STATUS attribute on the business document object. Set the value of this attribute with the error status to be sent synchronously to the trading partner who sent the request document.

Associated document

Each business protocol can involve a sequence of one or more business document flows that can be related or associated to each other. For example, in cXML a given request document can have multiple asynchronous responses. WebSphere Partner Gateway provides the capability to view associated documents. The document viewer for WebSphere Partner Gateway displays all the business documents that flow through the system. If a particular document has associated documents, they are displayed in the associated document section of the document viewer. A document can have one or more associated documents.

Note: A synchronous response for a given document is considered an associated document. Synchronous responses are also displayed in the associated document section of the document viewer.

If the business protocol has the concept of associated documents, you can use user exits to provide information to WebSphere Partner Gateway so that for a given business document, the WebSphere Partner Gateway document viewer can display associated documents in the associated document section. The user exits need to have their own mechanism to determine whether the business document which they are currently processing is associated with any other business document flow. If it is, a user exit can set one of the following attributes on the business document:

- BCGDocumentConstants.BCG_REPLY_TO_DOC_ID: Set this attribute to the document ID of the business document associated with this document flow.
- BCGDocumentConstants.BCG_REPLY_TO_DOC_UUID: Set this attribute to the UUID (parent UUID) of the business document associated with this document flow.

These attributes can be set in handlers of the workflow steps or in the steps of the actions. After executing the flow for this business document, WebSphere Partner Gateway will see whether any of these attributes are set. If they are, WebSphere Partner Gateway updates WebSphere Partner Gateway activity logs so that the document viewer can display the association correctly, as shown in the following figure:

The screenshot shows the 'Document Details' window. At the top, it says 'Welcome, Hub Administrator' and has links for 'List' and 'Help'. Below this, it displays 'File Name:', 'Reference Id: 110314630937092A535Bba655e52c7601c1804921d7d60100d82e34bb097fef', and 'Document ID: -'. A table shows document flow information with columns: 'Doc Time Stamp', 'Gateway Type', 'Connection Document Flow', and 'Status'. Below this, there are two sub-tables for source and target details. The 'Associated Documents' section at the bottom contains a table with columns: 'Participants', 'Time Stamps', 'Document Flow', and 'Status'.

Doc Time Stamp	Gateway Type	Connection Document Flow	Status
-	Production		

Source	In Time Stamp	Source Business ID	Source Document Flow
hubmgr 0.682 kb	12/15/04 9:31:49 PM	813813813	customXML 1.0: customXML customXML 1.0
Target	End State Time Stamp	Target Business ID	Target Document Flow
bcmsrv2 0.415 kb	12/15/04 9:31:50 PM	602602602	customXML 1.0: customXML customXML 1.0

Participants	Time Stamps	Document Flow	Status
	Source: bcmsrv2	In: 12/15/04 9:27:10 PM	
	Target: hubmgr	Out: 12/15/04 9:27:11 PM	
	Source: hubmgr	In: 12/15/04 9:31:49 PM	
	Target: bcmsrv2	Out: 12/15/04 9:31:50 PM	

Figure 15. Document Details window displaying associated documents

Chapter 9. Troubleshooting user exits

This chapter highlights some common situations in setting up and using user exits where troubleshooting might be necessary.

Setting up logging

The trace method of the BCGUtil class in the `com.ibm.bcg.bcgdk.common` package is used to set up logging of internal activity for the entire document flow. Full documentation of the method is located in “BCGUtil” on page 99. The following is an example code snippet that sets up logging in an XML translation step in variable workflow:

```
BCGUtil bcgUtil = new BCGUtil ();
:
:
:
    bcgUtil.trace(BCGUtil.BCG_TRACE_SEVERITY_DEBUG,
                  "CustomXMLTranslation",
                  "The Schema is present",
                  null)
```

Receiver logs can be found at:

ProductDir/was/profiles/bcgreceiver/logs/bcg_receiver.log

Fixed and variable workflow and sender logs (grouped together as part of the Router component) can be found at:

ProductDir/was/profiles/bcgdocmgr/logs/bcg_router.log

By default, debug logging is not enabled. To turn it on, a property in the log4j properties file must be set. The properties file for receivers can be found at:

ProductDir/receiver/lib/config/receiver-was.logging.properties

The properties files for router components can be found at:

ProductDir/router/lib/config/router-was.logging.properties

In both cases, the property that needs to be set is the `log4j.rootCategory` property. By default this is set at `error`, `RollingFile`. This value needs to be changed to `debug`, `RollingFile`. For the change to be effective, you must restart the server.

Common sources of error

Following are four general types of errors commonly encountered in setting up user exits, and the steps to take to correct them.

File location errors

It is crucial that the WebSphere Partner Gateway system be able to find the user exit classes. A Class Not Found exception in either log can occur if:

- The user exit class files are not loaded in the classpath

Or

- The user exit class files are not present as specified in the package hierarchy designated in the XML file that you must upload through the Community Console.

Additional file location problems can arise if, in a multi-box, split topology setup, the appropriate user exits are not deployed with all instances of receivers or routers, as necessary.

Resolution Make sure that the class files are properly loaded in the classpath and that the exact name and location of the user exit class files match the details specified during the upload of the XML descriptor files through the Community Console. Make sure all appropriate files exist in all appropriate places.

Handler failure errors

Failure of a preprocessing handler in the receiver component or of either type of handler in the sender component, or failure in an unpacking, protocol processing, or packaging handler in the router component will produce an error in the appropriate logs and in the Community Console. Turning on Debug mode will produce a more detailed error report. The error will result in the message or business document not being processed further, and, in the case of an HTTP receiver preprocessing failure, a 500 response code being sent back to the initiating host.

Resolution Correct the problem in the user exit code, reload the class files, and restart the component

Processing mode errors

When a document protocol supports synchronous processing, the defined target *must* have a SyncCheck handler specified. If the protocol does not support synchronous processing, a postprocess handler must *not* be specified.

Resolution Make sure that the user exits you specify are appropriate for the defined processing mode

File update errors

You can update user exit information in the system in either of two ways:

- Update the class files (or JARs) themselves
- Update the XML descriptor files

If you update the class files, restart the appropriate components to make sure that the changes are effective. Uploading new XML descriptor files for existing user exits (assuming that the files have the same name and designate the same class) immediately changes whatever attributes and attribute values that are set. In this case, any documents that are processed after the new descriptor files are uploaded will be processed as described in those new files.

Resolution Updating class files requires a component restart to be effective; updating XML descriptor files takes effect immediately

Part 2. Customizing WebSphere Partner Gateway: administrative APIs and external event delivery

WebSphere Partner Gateway allows a hub administrator to use a newly established application program interface (API) to accomplish certain common administrative tasks programmatically, using a simple XML based HTTP POST mechanism. WebSphere Partner Gateway allows events, both document-related and general system-based, to be delivered to an external JMS queue as well as sent to the internal WebSphere Partner Gateway event store.

The following chapters document these features.

Chapter 10. Using the administrative API

This chapter describes the administrative APIs, which allow certain Hub administrative functions to be executed programmatically. It is divided into two sections:

- “Understanding the administrative API”
- “The administrative API” on page 148

Understanding the administrative API

The administrative API for WebSphere Partner Gateway allows certain common administrative functions to be carried out without using the Community Console GUI.

Note: The Community Console must be running for API calls to be processed, and the API functionality must have been turned on in the GUI before the calls are made. For more information using the GUI to turn the APIs on, see the *WebSphere Partner Gateway Hub Configuration Guide*

A method is called by sending an HTTP POST request with an appropriate XML document as the body. This request is directed to a servlet running on the console instance, at the relative URL of `/console/bcgppublicapi`.

In general, the XML request document includes the following data:

- User information (this is the same information used when logging in the Community Console and must be provided with every request, as there is no notion of session management)
 - User name
 - Password
 - Partner login name
- API information
 - Method name, usually an action given as a concatenated noun and verb, for example, `ParticipantCreate`
 - Parameters, usually an item, for example, `Partner`

The following eleven methods are supported:

- “ParticipantCreate” on page 149
- “ParticipantUpdate” on page 151
- “ParticipantSearchByName” on page 153
- “ParticipantAddBusinessId” on page 154
- “ParticipantRemoveBusinessId” on page 155
- “ContactCreate” on page 156
- “ListTargets” on page 163
- “ListParticipantCapabilities” on page 160
- “ListParticipantConnections” on page 162
- “ListTargets” on page 163
- “ListEventDefinitions” on page 164

The system processes the request and returns the response (or exception) XML synchronously, that is, on the same HTTP connection. Each method has a corresponding response. Using an API produces the same internal process that using the Community Console does. If a particular operation that is executed in the Community Console generates events, that operation executed in the API generates the same events.

“The administrative API” section that follows describes these APIs in detail. More detail can be gathered by looking in the `$(WBICINSTALLROOT)/publicapi` directory at the two provided schemas:

- `bcgpublicapi_v0.1.xsd` The API signatures
- `bcgpublicapi_vocabulary_v0.1.xsd` The vocabulary from which the schema is constructed

In addition to the actual response, the servlet itself also provides standard HTTP status codes, as specified in Table 2.

Table 2. Servlet status codes

HTTP status code	Situation in which this code is returned
500	<ul style="list-style-type: none"> • Request XML cannot be parsed. • There is an error in processing the request. • There is an internal error.
405	<ul style="list-style-type: none"> • An HTTP request other than POST has been received. The servlet supports only the POST method.
200	<ul style="list-style-type: none"> • The API has been successfully executed.
501	<ul style="list-style-type: none"> • An unimplemented request has been received. • The administrative API has not been turned on.

Security is provided by the use of SSL and, optionally, Client Authorization. Data, but not the elements of the API itself, can be localized, based on the locale, as long as character encoding is set to UTF-8, which is the standard expected encoding.

The administrative API

This section outlines the structure of the eleven XML method calls and their responses, and the exception XML that is used to report errors. The general structure of the XML is as follows:

- The root element is always a `BCGPublicAPI` element
- The first child of the root in a request document is the `<MethodName>` element.
 - The first child of the `<MethodName>` element is the `UserInfo` element. This element contains your (the user making the request) Community Console login information. You must have permissions that are adequate for the task being attempted.
 - The second child of the `<MethodName>` element represents any input parameters.
- The first child of the root in a response document is the `<MethodName>Response` element. This element represents results of the execution of the request API.
- The first child of the root in an exception document is a `BCGPublicAPIException` element.

ParticipantCreate

Adds a participant to the hub community. Participants are the companies that do business with the community manager through the hub community. Once connected, participants can exchange electronic business documents with the community manager.

Root element

BCGPublicAPI

First child element

ParticipantCreate

First child of ParticipantCreate

UserInfo element. This is the same information used to log in the Community Console. It contains three elements:

- **UserName** The Community Console login user name
- **Password** The Community Console login password
- **ParticipantLogin** The participant (company) login name

Second child of ParticipantCreate

ParticipantCreateInfo element. Contains seven elements:

- **ParticipantLogin** The participant's login name
- **ParticipantName** The name the participant wants displayed to the hub community
- **ParticipantType** Defines the participant's function in the community. Available values are *Community Operator*, *Community Manager*, and *Community Participant*
- **ParticipantStatus** Enabled or Disabled. If disabled, the participant is not visible in search criteria and drop-down lists. The default value is *Enabled*
- **CompanyURL** The URL of the participant's Web site. This is an optional element.
- **ClassificationId** Identifies the participant's role. Available values are *Supplier*, *Contract Manufacturer*, *Distributor*, *Logistic Provider*, and *Other*. This is an optional element.
- **Password** The password this participant will use to access the system

ParticipantCreateResponse

Response document for the ParticipantCreate method.

Root element

BCGPublicAPI

First child element

ParticipantCreateResponse

First child of ParticipantCreateResponse

ParticipantCreateResponseInfo element. Contains seven elements:

- **ParticipantId** An internal numeric ID that identifies the participant to the system
- **ParticipantLogin** The participant's login name
- **ParticipantName** The name the participant wants displayed to the hub community

- **ParticipantType** Defines the participant's function in the community. Available values are `Community Operator`, `Community Manager`, and `Community Participant`.
- **ParticipantStatus** `Enabled` and `Disabled`. If disabled, the participant is not visible in search criteria and drop-down lists.
- **CompanyURL** The URL of the participant's Web site. This is an optional element.
- **ClassificationId** Identifies the participant's role. Available values are `Supplier`, `Contract Manufacturer`, `Distributor`, `Logistic Provider`, and `Other`. This is an optional element.

ParticipantUpdate

Updates the participant's profile in the system.

Root element

BCGPublicAPI

First child element

ParticipantUpdate

First child of ParticipantUpdate

UserInfo element. This is the same information used to log in the Community Console. It contains three elements:

- UserName The Community Console login user name
- Password The Community Console login password
- ParticipantLogin The participant (company) login name

Second child of ParticipantUpdate

ParticipantUpdateInfo element. Contains 6 elements:

- ParticipantId An internal numeric ID that identifies the participant to the system
- ParticipantName The name the participant wants displayed to the hub community
- ParticipantType Defines the participant's function in the community. Available values are Community Operator, Community Manager, and Community Participant.
- ParticipantStatus Available values are Enabled and Disabled. If disabled, the participant is not visible in search criteria and drop-down lists.
- CompanyURL The URL of the participant's Web site. This is an optional element
- ClassificationId Identifies the participant's role. Available values are Supplier, Contract Manufacturer, Distributor, Logistic Provider, and Other. This is an optional element.

ParticipantUpdateResponse

Response document for the ParticipantUpdate method.

Root element

BCGPublicAPI

First child element

ParticipantUpdateResponse

First child of ParticipantUpdateResponse

ParticipantUpdateResponseInfo element. Contains seven elements:

- ParticipantId An internal numeric ID that identifies the participant to the system
- ParticipantLogin The participant's login name
- ParticipantName The name the participant wants displayed to the hub community
- ParticipantType Defines the participant's function in the community. Available values are Community Operator, Community Manager, and Community Participant.

- **ParticipantStatus** Available values are Enabled and Disabled. If disabled, the participant is not visible in search criteria and drop-down lists.
- **CompanyURL** The URL of the participant's Web site. This is an optional element.
- **ClassificationId** Identifies the participant's role. Available values are Supplier, Contract Manufacturer, Distributor, Logistic Provider, and Other. This is an optional element.

ParticipantSearchByName

Searches for participant profiles by display name.

Root element

BCGPublicAPI

First child element

ParticipantSearchByName

First child of ParticipantSearchByName

UserInfo element. This is the same information used to log in the Community Console. It contains three elements:

- UserName The Community Console login user name
- Password The Community Console login password
- ParticipantLogin The participant (company) login name

Second child of ParticipantSearchByName

ParticipantName element The name the participant wants displayed to the hub community

ParticipantSearchByNameResponse

Response document for the ParticipantSearchByName method.

Root element

BCGPublicAPI

First child element

ParticipantSearchByNameResponse

First child element of ParticipantSearchByNameResponse

Participants element

Zero or more children of Participants

ParticipantInfo. Contains five elements:

- ParticipantId An internal numeric ID that identifies the participant to the system
- ParticipantLogin The participant's login name.
- ParticipantName The name the participant wants displayed to the hub community
- ParticipantType Defines the participant's function in the community. Available values are Community Operator, Community Manager, and Community Participant.
- ParticipantStatus Available values are Enabled and Disabled. If disabled, the participant is not visible in search criteria and drop-down lists.

ParticipantAddBusinessId

Adds a business ID to the participant's profile.

Root element

BCGPublicAPI

First child element

ParticipantAddBusinessId

First child of ParticipantAddBusinessId

UserInfo element. This is the same information used to log in the Community Console. It contains three elements:

- **UserName** The Community Console login user name
- **Password** The Community Console login password
- **ParticipantLogin** The participant (company) login name

Second child of ParticipantAddBusinessId

ParticipantAddBusinessIdInfo element. Contains three elements:

- **ParticipantId** An internal numeric ID that identifies the participant to the system
- **BusinessId** The DUNS, DUNS+4, or Freeform number that the system uses for routing. DUNS numbers must equal nine digits, and DUNS+4 must equal 13 digits. Freeform ID numbers accept up to 60 alphabetic, numeric, and special characters.
- **BusinessIdType** The type of ID being used. Available values are DUNS, DUNS+4, and Freeform

ParticipantAddBusinessIdResponse

Response document for the ParticipantAddBusinessId method.

Root element

BCGPublicAPI

First child element

ParticipantAddBusinessIdResponse

First child element of ParticipantAddBusinessIdResponse

ParticipantAddBusinessIdResponseInfo Contains four elements

- **BusinessIdentifierId** An internal numeric ID that identifies the business ID to the system
- **ParticipantId** An internal numeric ID that identifies the participant to the system
- **BusinessId** The DUNS, DUNS+4, or Freeform number that the system uses for routing. DUNS numbers must equal nine digits, and DUNS+4 must equal 13 digits. Freeform ID numbers accept up to 60 alphabetic, numeric, and special characters.
- **BusinessIdType** The type of ID being used. Available values are DUNS, DUNS+4, and Freeform

ParticipantRemoveBusinessId

Removes a business ID from the participant's profile.

Root element

BCGPublicAPI

First child element

ParticipantRemoveBusinessId

First child of ParticipantRemoveBusinessId

UserInfo element. This is the same information used to log in the Community Console. It contains three elements:

- UserName The Community Console login user name
- Password The Community Console login password
- ParticipantLogin The participant (company) login name

Second child of ParticipantRemoveBusinessId

BusinessIdentifierId An internal numeric ID that identifies the business ID to the system

ParticipantRemoveBusinessIdResponse

The response document for the ParticipantRemoveBusinessId method.

Root element

BCGPublicAPI

First child element

ParticipantRemoveBusinessIdResponse

ContactCreate

Creates a contact. Contacts are key personnel who receive notification when the system generates alerts as a result of specified events in the system.

Root element

BCGPublicAPI

First child element

ContactCreate

First child of ContactCreate

UserInfo element. This is the same information used to log in the Community Console. It contains three elements:

- **UserName** The Community Console login user name
- **Password** The Community Console login password
- **ParticipantLogin** The participant (company) login name

Second child of ContactCreate

ContactCreateInfo Contains thirteen elements:

- **ParticipantId** An internal numeric ID that identifies the participant to the system
- **GivenName** The contact's given name
- **FamilyName** The contact's family name
- **Address** The contact's address. This is an optional element.
- **ContactType** The contact's role. This is an optional element. Available values are:
 - Project Manager
 - Business Lead
 - Technical Lead
 - B2B Lead
 - Data Content Lead
 - Backend Application Lead
 - Network Firewall Lead
- **Email** The contact's e-mail address. This is an optional element.
- **Telephone** The contact's telephone number. This is an optional element.
- **FaxNumber** The contact's fax number. This is an optional element.
- **LanguageLocale** The contact's language locale. This is an optional element.
- **FormatLocale** Additional locale information for the contact. This is an optional element.
- **TimeZone** The contact's time zone. This is an optional element.
- **AlertStatus** Indicates whether the contact will receive alerts. Available values are `Enabled` and `Disabled`. The default is `Disabled`.
- **Visibility** Indicates the visibility. Available values are `Local` (restricted to the organization) and `Global` (the organization and the community manager). The default is `Local`.

ContactCreateResponse

The response document for the ContactCreate method.

Root element

BCGPublicAPI

First child element

ContactCreateResponse

First child of ContactCreateResponse

ContactCreateResponseInfo element. Contains fourteen elements:

- **ContactId** An internal numeric ID that identifies the contact to the system
- **ParticipantId** An internal numeric ID that identifies the participant to the system
- **GivenName** The contact's given name
- **FamilyName** The contact's family name
- **Address** The contact's address. This is an optional element.
- **ContactType**: The contact's role. This is an optional element. Available values are:
 - Project Manager
 - Business Lead
 - Technical Lead
 - B2B Lead
 - Data Content Lead
 - Backend Application Lead
 - Network Firewall Lead
- **Email** The contact's e-mail address. This is an optional element.
- **Telephone** The contact's telephone number. This is an optional element.
- **FaxNumber** The contact's fax number. This is an optional element.
- **LanguageLocale** The contact's language locale. This is an optional element.
- **FormatLocale** Additional locale information for the contact. This is an optional element.
- **TimeZone** The contact's time zone. This is an optional element.
- **AlertStatus** Indicates whether the contact will receive alerts. Available values are `Enabled` and `Disabled`. The default is `Disabled`.
- **Visibility**: Indicates the visibility. Available values are `Local` (restricted to the organization) and `Global` (the organization and the community manager). The default is `Local`.

ContactUpdate

Updates contact information.

Root element

BCGPublicAPI

First child element

ContactUpdate

First child of ContactUpdate

UserInfo element. This is the same information used to log in the Community Console. It contains three elements:

- **UserName** The Community Console login user name
- **Password** The Community Console login password
- **ParticipantLogin** The participant (company) login name

Second child of ContactUpdate

ContactUpdateInfo element. Contains thirteen elements:

- **ContactId** An internal numeric ID that identifies the contact to the system
- **GivenName** The contact's given name
- **FamilyName** The contact's family name
- **Address** The contact's address. This is an optional element.
- **ContactType** The contact's role. This is an optional element. Available values are:
 - Project Manager
 - Business Lead
 - Technical Lead
 - B2B Lead
 - Data Content Lead
 - Backend Application Lead
 - Network Firewall Lead
- **Email** The contact's e-mail address. This is an optional element.
- **Telephone** The contact's telephone number. This is an optional element.
- **FaxNumber** The contact's fax number. This is an optional element.
- **LanguageLocale** The contact's language locale. This is an optional element.
- **FormatLocale** Additional locale information for the contact. This is an optional element.
- **TimeZone** The contact's time zone. This is an optional element.
- **AlertStatus** Indicates whether the contact will receive alerts. Available values are `Enabled` and `Disabled`. The default is `Disabled`.
- **Visibility** Indicates the visibility. Available values are `Local` (restricted to the organization) and `Global` (the organization and the community manager). The default is `Local`.

ContactUpdateResponse

The response document for the ContactUpdate method.

Root element

BCGPublicAPI

First child element

ContactUpdateResponse

First child of ContactUpdateResponse

ContactUpdateResponseInfo element. Contains fourteen elements:

- ContactId An internal numeric ID that identifies the contact to the system
- ParticipantId An internal numeric ID that identifies the participant to the system
- GivenName The contact's given name
- FamilyName The contact's family name
- Address The contact's address. This is an optional element.
- ContactType The contact's role. This is an optional element. Available values are:
 - Project Manager
 - Business Lead
 - Technical Lead
 - B2B Lead
 - Data Content Lead
 - Backend Application Lead
 - Network Firewall Lead
- Email The contact's e-mail address. This is an optional element.
- Telephone The contact's telephone number. This is an optional element.
- FaxNumber The contact's fax number. This is an optional element.
- LanguageLocale The contact's language locale. This is an optional element.
- FormatLocale Additional locale information for the contact. This is an optional element.
- TimeZone The contact's time zone. This is an optional element.
- AlertStatus Indicates whether the contact will receive alerts. Available values are Enabled and Disabled. The default is Disabled.
- Visibility Indicates the visibility. Available values are Local (restricted to the organization) and Global (the organization and the community manager). The default is Local.

ListParticipantCapabilities

Queries a participant's functional capabilities

Root element

BCGPublicAPI

First child element

ListParticipantCapabilities

First child of ListParticipantCapabilities

UserInfo element. This is the same information used to log in the Community Console. It contains three elements:

- UserName The Community Console login user name
- Password The Community Console login password
- ParticipantLogin The participant (company) login name

Second child of ListParticipantCapabilities

ParticipantId An internal numeric ID that identifies the participant to the system

ListParticipantCapabilitiesResponse

The response document for the ListParticipantCapabilities method

Root element

BCGPublicAPI

First child element

ListParticipantCapabilitiesResponse

First child of ListParticipantCapabilitiesResponse

ParticipantCapabilities element.

Zero or more children of ParticipantCapabilities

ParticipantCapability element. Contains eight elements.

- CapabilityId An internal numeric ID that identifies this capability to the system
- ParticipantId An internal numeric ID that identifies this participant to the system
- ParticipantName The name the participant wants displayed to the hub community
- CapabilityRole The functional role the participant has in the system. Available values are:
 - Source
 - Target
 - SourceAndTarget
- CapabilityEnabled A Boolean value
- RoutingObjectRefId An internal numeric ID that identifies the routing object reference associated with this capability to the system
- RoutingObjectRefInfo Routing objects in WebSphere Partner Gateway are hierarchical. They are defined once, but can be referenced at multiple places. The routing object reference uniquely identifies where the routing objects are referenced. This is a complex type holding the following elements:

- RoutingObjectRefId An internal numeric ID of the routing object reference
- RoutingObjectId An internal numeric ID of the routing object referenced
- RoutingObjectName The name of the routing object
- RoutingObjectVersion The routing object version
- RoutingObjectType The type of this routing object localized into your (the user's) locale
- RoutingObjectTypeKey The key to the type of this routing object. For example: Package, Protocol, and so forth
- RoutingObjectEnabled A Boolean value
- RoutingObjectParentRefId The internal numeric ID of the parent routing object reference. This is an optional element.
- CapabilityChildren element. This is an optional element. Contains zero or more CapabilityChild elements. Each CapabilityChild element holds the same eight elements as the ParticipantCapability element.

ListParticipantConnections

Queries the participant's connections.

Root element

BCGPublicAPI

First child element

ListParticipantConnections

First child of ListParticipantConnections

UserInfo element. This is the same information used to log in the Community Console. It contains three elements:

- UserName The Community Console login user name
- Password The Community Console login password
- ParticipantLogin The participant (company) login name

Second child of ListParticipantConnections

SourceParticipantId An internal numeric ID that identifies the participant as a source to the system

Third child of ListParticipantConnections

TargetParticipantId An internal numeric ID that identifies the participant as a target to the system

ListParticipantConnectionsResponse

The response document for the ListParticipantCapabilities method

Root element

BCGPublicAPI

First child element

ListParticipantConnectionsResponse

First child of ListParticipantConnectionResponse

ParticipantConnections element.

Zero or more children of ParticipantConnections

ParticipantConnection element. Contains nine elements.

- ConnectionId An internal numeric ID that identifies this connection to the system
- SourceParticipantId An internal numeric ID that identifies the participant as a source to the system
- SourceCapabilityId An internal numeric ID identifies the source capability to the system
- TargetParticipantId An internal numeric ID that identifies the participant as a target to the system
- TargetCapabilityId An internal numeric ID that identifies the target capability to the system
- ActionId An internal numeric ID that identifies the action to the system
- ActionName The display name of the action
- TransformMapId An internal numeric ID that identifies the transform map associated with this action. This is an optional element.
- ConnectionEnabled A Boolean value

ListTargets

Queries for the targets configured on the system.

Root element

BCGPublicAPI

First child element

ListTargets

First child of ListTargets

UserInfo element. This is the same information used to log in the Community Console. It contains three elements:

- UserName The Community Console login user name
- Password The Community Console login password
- ParticipantLogin The participant (company) login name

ListTargetsResponse

The response document for the ListTargets method.

Root element

BCGPublicAPI

First child element

ListTargetsResponse

First child of ListTargetsResponse

Targets

Zero or more children of Targets

Target element. Contains six elements.

- TargetId An internal numeric ID that identifies the target to the system
- Description A string describing the target
- ClassName The name of the target class. This is an optional class.
- TransportType Name The transport type
- TargetAttributes A complex type holding zero or more TargetAttribute complex elements, each holding the following elements:
 - AttributeName The target attribute's name
 - AttributeValue The target attribute's value. This is an optional value.
- TargetConfigPoints There are three target configuration points: PreProcess, PostProcess, and SyncCheck. Each of them is represented by a complex type that holds the following elements:
 - ConfigPointName A complex type that holds a Handlers element, which is a complex type that holds zero or more Handler elements, each of which is a complex type that holds three elements:
 - ClassName The name of the handler class
 - HandlerType The handler type
 - HandlerAttributes A complex type that holds zero or more HandlerAttribute elements, each of which is a complex type that holds the following two elements:
 - AttributeName The attribute's name
 - AttributeValue The attribute's value. This is an optional element.

ListEventDefinitions

Queries for the events configured on the system.

Root element

BCGPublicAPI

First child element

ListEventDefinitions

First child of ListEventDefinitions

UserInfo element. This is the same information used to log in the Community Console. It contains three elements:

- UserName The Community Console login user name
- Password The Community Console login password
- ParticipantLogin The participant (company) login name

ListEventDefinitionsResponse

The response document for the ListEventsDefinitions method.

Root element

BCGPublicAPI

First child element

ListEventsDefinitionsResponse

First child of ListEventsDefinitionsResponse

EventDefinitions

Zero or more children of EventDefinitions

EventDefinition element. A complex type holding the following six elements. This is an optional element.

- EventCode The code for this event
- Event name The event's name
- InternalDescription A string with the event's internal specific description
- Visibility The event's visibility in the system. A complex type holding three elements.
 - CommunityManager A Boolean value
 - CommunityOperator A Boolean value
 - CommunityParticipant A Boolean value
- Severity The event's severity. Available values are:
 - Info
 - Debug
 - Warning
 - Error
 - Critical
- Alertable A Boolean value

BCGPublicAPIException

The response document in the case of an exception.

Root element

BCGPublicAPI

First child element

BCGPublicAPIException

First child of BCGPublicAPIException

ErrorMsg A string containing the error message

Chapter 11. Using external event delivery

WebSphere Partner Gateway generates and stores events as a way of monitoring the activity inside its system. Events are published to an internal queue from which the WebSphere Partner Gateway event server fetches them. The event server sends them to the internal event store. Events can also be delivered to an external JMS queue, where they can be fetched by other processes, such as monitoring applications. This chapter provides an overview of this process. It consists of two sections:

- “The external event delivery process”
- “The structure of delivered events” on page 169

The external event delivery process

The WebSphere Partner Gateway system has two different types of events: document events and message events.

Document events are events directly associated with a business document. The Business Processing Engine is responsible for publishing these events to a WebSphere Partner Gateway internal queue. In the case of either a Sent or a Failed document state, the Delivery Manager also publishes business document events to this queue.

Message events, on the other hand, are published by all components of WebSphere Partner Gateway. Message events are not necessarily related to a business document, although one or more message events can be associated with a business document.

Events that are published to the internal queue are sent by the event server to WebSphere Partner Gateway’s event store. You can have events delivered to an external JMS queue. Turning external delivery on and off and configuring the external queue are done in the Community Console. See the *WebSphere Partner Gateway Hub Configuration Guide* for help in setting up this up.

Events are delivered to the JMS queue in Common Base Event (CBE) XML format. CBE format is a part of a larger evolving IBM initiative, the Common Event Infrastructure (CEI), designed to standardize the handling of events across applications. CBE structure covers three basic types of information:

- CBE standard properties, consisting of details such as creation time, event type, source, severity, and so forth
- CBE context data, including information about the environment in which the event was generated
- CBE extended data, holding generic data that is specific to the event type

The specifics of the CBE format as it is used in external event delivery are detailed in “The structure of delivered events” on page 169.

If external delivery is turned on, all events are delivered to the external queue. The visibility flag, which limits which type of user can see which type of event in the

Community Console Event Viewer, is not used in external delivery. Event names and descriptions in external delivery are localized in the same manner as they are in the Event Viewer.

Incorrect JMS configuration and JMS provider problems can cause errors in external event delivery. If they are not detected on startup, and an external delivery error occurs, the following happens:

- Future event delivery is turned off.
- Events are redelivered upon system restart *only* if you reinitialize the system in one of the following ways:
 - By correcting and updating the JMS properties on the Event Publishing Properties window in the Community Console (see the *Hub Configuration Guide* and the Community Console online Help for more information)
 - By correcting the JMS provider issues and clicking **Save** on the Event Publishing Properties window in the Community Console
- An alert-able event is logged, so that the WebSphere Partner Gateway alert engine can produce an alert. If for some reason the alert event cannot be logged, however, the event is ignored. No retries for logging this event are made.
- Normal internal event processing continues normally.

The structure of delivered events

This section covers the CBE document structure of events delivered to the external JMS queue. Because the CBE event document structure is complex, the description of it is divided into two parts:

- “The basic CBE document structure”
- “CBE event structure for WebSphere Partner Gateway message events and business document events”

For the full canonic description of the CBE structure, see the schema file, located at `\B2BIntegrate\events\schemas\commonbaseevent1_0_1.xsd`. In the same directory there is an additional schema file, `eventdelivery.xsd`. This file defines a WebSphere Partner Gateway extension to the main schema, which defines the `OtherSituation` type of the `SituationType` type used in the `situation` element in the main schema. Further information on CBE and the schema can be found at the eclipse.org Web site, in the context of the Hyades project: www.eclipse.org/hyades/

The basic CBE document structure

The root element of a Common Base Event document is a `CommonBaseEvent` element. The children of the `CommonBaseEvent` are as follows:

- `contextDataElements`: Provides context for the event. It is an optional event. WebSphere Partner Gateway does not provide it.
- `extendedDataElements`: Captures information not captured directly by the basic CBE structure. It is an optional element provided by WebSphere Partner Gateway.
- `associatedEvents`: Captures associated events. It is an optional element not provided by WebSphere Partner Gateway.
- `reporterComponentId`: Specifies the component that reports the event. It is an optional element not provided by WebSphere Partner Gateway.
- `sourceComponentId`: Specifies the component that generated the event. It is a required element provided by WebSphere Partner Gateway.
- `msgDataElement`: Represents the data that is used to specify all of the related information that is associated with the message that this event holds. It is an optional element. It is generated for CBE events created for message events. For business document events, this element is *not* generated. WebSphere Partner Gateway always generates this element as follows:

```
<msgDataElement msgLocale="en-US"></msgDataElement>
```
- `situation`: Describes the type of situation that caused the event. It is a required element provided by WebSphere Partner Gateway.

CBE event structure for WebSphere Partner Gateway message events and business document events

This section provides an element by element description of the CBE elements supplied in the event documents generated by the WebSphere Partner Gateway external event delivery system. It includes a detailed list of the main elements' attributes. Some descriptions include a brief example of that element as it would appear in CBE XML for message and business document events, as appropriate.

The `CommonBaseEvent` element

This is the root element of all CBE event documents. The following table describes this element and its attributes.

Table 3. The CommonBaseEvent element

Property name	Description
Version	1.0.1 WebSphere Partner Gateway supports this version of the schema
localInstanceId	Unique identifier in the WebSphere Partner Gateway store: <ul style="list-style-type: none"> • Message events: the event ID of the source event • Business document events: the UUID of the business document
creationTime	Creation time of this CBE event: <ul style="list-style-type: none"> • Message events: the creation time of the event • Business document events: since logging time is not stored in business document, set to current time
severity	<ul style="list-style-type: none"> • Message events: <ul style="list-style-type: none"> – Debug: 8 – Information: 10 – Warn: 30 – Error: 50 • Business document events: business documents have no severity level, so this is set at 10 (Information)
priority	WebSphere Partner Gateway has no notion of priority. Always set at 50
msg	<ul style="list-style-type: none"> • Message event: description of this event is localized. • Business document event: not specified
repeatCount	Not specified by WebSphere Partner Gateway
elapsedTime	Not specified by WebSphere Partner Gateway
extensionName	Used to distinguish message events from business document events <ul style="list-style-type: none"> • Message event: BCG_EVENT • Business document event: BCG_BUSINESSDOCUMENT
sequenceNumber	Not specified by WebSphere Partner Gateway

The following sample illustrates the CommonBaseEvent element for a message event:

```
<cbe:CommonBaseEvent
  creationTime="2004-06-20T06:26:01"
  extensionName="BCG_EVENT"
  localInstanceId="1087712761674000C766F006F0178601DF89630A39DF6CA"
  msg="ASValidation"
  priority="50"
  severity="10"
  version="1.0.1"
  xsi:schemaLocation=
    "http://www.ibm.com/AC
    /commonbaseevent1_0_1commonbaseevent1_0_1.xsd">
:
:
</cbe:CommonBaseEvent />
```

This is a sample of the CommonBaseEvent element for a business document event:

```
<cbe:CommonBaseEvent
  creationTime="2004-06-20T06:26:02"
  extensionName="BCG_BUSINESSDOCUMENT"
  localInstanceId="1087712759944000C766F006F017860B7583EB51E26A336"
  priority="50"
  severity="10"
```

```

        version="1.0.1"
        xsi:schemaLocation="http://www.ibm.com/AC
            /commonbaseevent1_0_1 commonbaseevent1_0_1.xsd">
    :
    :
    <cbe:CommonBaseEvent />

```

The sourceComponentId element

This element specifies the component that generated the event. WebSphere Partner Gateway fills this in the normal CBE way. Please see the schema for more information.

The situation element

This element describes the type of situation that generated the event. The following table describes this element and its attributes.

Table 4. The situation element

Property name	Description
categoryName	OtherSituation
reasoningScope	INTERNAL
faultType	WebSphere Partner Gateway defines this attribute for OtherSituation in the eventdelivery.xsd file. Message events: <ul style="list-style-type: none"> • SOURCE • TARGET • SYSTEM • UNKNOWN Business document events: <ul style="list-style-type: none"> • UNKNOWN

This is an example of the situation element for a message event:

```

<cbe:situation categoryName="OtherSituation">
    <cbe:situationType
        reasoningScope="INTERNAL"
        xsi:type="cbe:OtherSituation">
        <bcg:faultType/>
    </cbe:situationType>
</cbe:situation>

```

The extendedDataElements element

This element captures information not captured directly by the basic CBE structure. The following three tables describe this element, its attributes, and its specialized child elements, covering message event extended elements and business document event extended elements:

Table 5. The extendedDataElements element

Property name	Description
name	Used to distinguish message events from business document events <ul style="list-style-type: none"> • Message event: BCG_EVENT • Business document event: BCG_BUSINESSDOCUMENT
type	WebSphere Partner Gateway sets this to noValue
children	One or more elements are created, depending on the type (message or business document) of event. Descriptions are in the following tables.

Table 6. Message event extended data elements

Name	Value
BCG_EVENTCD	Event code from the message event
BCG_HOSTIPADDRESS	Host IP address. Specified if available
BCG_PARTNERID1	Internal ID for participant. Specified if available
BCG_PARTNERID2	Internal ID for participant. Specified if available
BCG_STACKTRACE	Stack trace. Specified if available
BCG_FRIPADDRESS	From: IP address. Specified if available
BCG_PARENTBCGDOCID	Unique ID for parent business document. Specified if available
BCG_BCGDOCID	The ID of the business document with which this message event is associated Note: Monitoring applications can use this element for correlating this event with any associated business document
BCG_USERID	User ID. Specified if available
BCG_BUSINESSID1	From: business ID. Specified if available
BCG_INITBUSINESSID	Initiating business ID. Specified if available
BCG_INITASMESAGEID	Initiating AS message ID. Specified if available
BCG_BUSINESSID2	To: business ID. Specified if available

The following example shows a partial example of an extendedDataElements element in a message event.

```
<cbe:extendedDataElements name="BCG_EVENT" type="noValue">
  <cbe:values/>
    <cbe:children name="BCG_EVENTTIMESTAMP" type="string">
      <cbe:values>1087712761674</cbe:values>
    </cbe:children>
    <cbe:children name="BCG_PARENTBCGDOCID" type="string">
      <cbe:values>1087712759944000C766F006F017860B7583EB51E26A336</cbe:values>
    </cbe:children>
    <cbe:children name="BCG_ARGUMENTSTRING" type="string">
      <cbe:values>ASValidation</cbe:values>
    </cbe:children>
    <cbe:children name="BCG_HOSTIPADDRESS" type="string">
      <cbe:values>127.0.0.1</cbe:values>
    </cbe:children>
  :
  :
  :
</cbe:extendedDataElements>
```

Table 7. The business document event extended data elements

Attribute	Value
BCG_BCGDOCID	Business document's unique document ID
BCG_PARENTBCGDOCID	Document ID for parent business document. Specified if available
BCG_DOCLOCATION	Location of business document with complete path. Specified if available

Table 7. The business document event extended data elements (continued)

Attribute	Value
BCG_DOCSTATE	Current state of the business document: <ul style="list-style-type: none"> • DOC_IN_PROCESS = "In Process" • DOC_SENT = "Sent" • DOC_RECEIVED = "Received" • DOC_FAILED = "Failed"
BCG_DOCSIZE	Obtained from business document. Specified if available
Data related to business document	In addition, business document events can contain other information concerning: <ul style="list-style-type: none"> • routing related data • flow related data • business protocol related data <p>The name attribute of the child elements is set to one of the constants specified in the BCGDocumentConstants class. See "BCGDocumentConstants" on page 105 for further information. Specified only if available.</p>

A partial example of an extendedDataElements element in a business document event follows:

```

<cbe:extendedDataElements name="BCG_BUSINESSDOCUMENT" type="noValue">
  <cbe:values/>
    <cbe:children name="BCG_BCGDOCID" type="string">
      <cbe:values>1087712755684000C766F006F01786046684D6EAC6FAC22
      </cbe:values>
    </cbe:children>
    <cbe:children name="BCG_DOCLOCATION" type="string">
      <cbe:values>
        /opt/IBM/bcghub/common/data/Inbound/process
        /520/D9
        /1087712753565000C766F006F003149F07FF1FC6C41D8D9.ascontent
      </cbe:values>
    </cbe:children>
    <cbe:children name="BCG_PARENTBCGDOCID" type="string">
      <cbe:values>1087712753565000C766F006F003149F07FF1FC6C41D8D9
      </cbe:values>
    </cbe:children>
    <cbe:children name="BCG_DOCSTATE" type="string">
      <cbe:values>In Process</cbe:values>
    </cbe:children>
    <cbe:children name="BCG_DOCRESTARTED" type="string">
      <cbe:values>>false</cbe:values>
    </cbe:children>
    <cbe:children name="BCG_FRPARTNERTYPE" type="string">
      <cbe:values>0</cbe:values>
    </cbe:children>
    :
    :
    :
</cbe:extendedDataElements>

```

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