

IBM WebSphere Adapters
Version 7 Release 5 Fix Pack 3 (7.5.0.3)

*IBM WebSphere Adapter for Email User
Guide
Version 7 Release 5 Fix Pack 3
(7.5.0.3)*



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Note

Before using this information and the product it supports, read the information in "Notices" on page 219.

November 2012

This edition applies to Version 7, Release 5, Fix Pack 3 (7.5.0.3) of IBM WebSphere Adapter for Email and to all subsequent releases and modifications until otherwise indicated in new editions.

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Chapter 1. Overview of WebSphere Adapter for Email

With WebSphere® Adapter for Email, you can create integrated processes that can exchange information using email, without special coding.

For example, you can use the adapter to send general broadcast e-mails to a group of addresses or to send a notification email to a single address that an action has taken place, such as a customer record update in a database. The adapter can also forward information received in an email message to IBM® Business Process Manager or WebSphere Enterprise Service Bus and use it to initiate a service (for example, to initiate a customer record update).

Suppose a company uses email as its principal communication tool for most of its business operations. A new product is coming out and the marketing team wants to notify all of their IBM Business Partners before information is made available to the public. You can use WebSphere Adapter for Email to send an email broadcasting the new release date to a large group of email addresses. Or, imagine that a customer sends an email to a company to notify it that their address has changed. In this case, you can use the adapter to send the address change request to an application that tracks addresses, and then returns an email to the customer with notification that the address change request is complete.

The adapter is imported and configured in a module that is created in IBM Integration Designer and deployed to IBM Business Process Manager or WebSphere Enterprise Service Bus. After the configuration is completed, the adapter acts like a service provider in part of a service-oriented architecture (SOA) implementation, providing operations to send and receive emails. Client applications interact with the module instead of directly with the mail server. This configuration enables the authentication details (such as user name and password) that you provide when you set up a module to be shielded from the client applications and services outside of the module. The adapter exposes a service interface that hides the mechanics of how the data or operations are obtained or used.

The benefit of creating the module with the external service wizard in IBM Integration Designer is that it becomes a reusable unit that can perform a specific inbound or outbound service. Each module uses a consistent interface and standard business objects, so that the applications consuming the service do not have to understand the lower-level details of the mail server.

Hardware and software requirements

The hardware and software requirements for WebSphere Adapters are provided on the IBM Support website.

To view hardware and software requirements for WebSphere Adapters, see <http://www.ibm.com/support/docview.wss?uid=swg27006249>.

Additional information

The following links provide additional information you might need to configure and deploy your adapter:

- The compatibility matrix for WebSphere Business Integration Adapters and WebSphere Adapters identifies the supported versions of required software for your adapter. To view this document, go to the WebSphere Adapters support page: <http://www.ibm.com/support/docview.wss?uid=swg27006249>.
- Technotes for WebSphere Adapters provide workaround and additional information that are not included in the product documentation. To view the technotes for your adapter, go to the following Web page, select the name of your adapter from the **Product category** list, and click the search icon: <http://www.ibm.com/support/search.wss?tc=SSMKUK&rs=695&rank=8&dc=DB520+D800+D900+DA900+DA800+DB560&dtm>.

Technical overview of WebSphere Adapter for Email

WebSphere Adapter for Email enables email connectivity between IBM Business Process Manager or WebSphere Enterprise Service Bus and one or more mail servers. The adapter itself is housed within an adapter module that you create using the external service wizard in IBM Integration Designer. Each module performs an outbound or inbound service, such as retrieving emails from a mail server or sending emails to a group of recipients.

A module encapsulates the service in a reusable unit and consists of both a project in IBM Integration Designer and a unit of deployment which is an enterprise archive (EAR) file to IBM Business Process Manager or WebSphere Enterprise Service Bus. The module is packaged and deployed to IBM Business Process Manager or WebSphere Enterprise Service Bus as an enterprise archive (EAR) file.

In the simplest implementation, you can use the adapter to send emails to one or more email addresses. This process is referred to as outbound communication because the adapter is part of a module designed to send emails out to a mail server. You can also use the adapter to poll a mail server for incoming emails, and then send the information found in the email to a service. The service consumes the information forwarded by the adapter to complete a task. This process is called inbound communication.

In more complicated implementations, you use a number of individual modules (designed for inbound and outbound communication) together to initiate an automated flow of operation, and then send an email notification to an email address to confirm that an action is completed. Similarly, you can create an inbound module that listens for incoming email events on the mail server that match certain criteria (for example, e-mails with a specific word in the subject field) and forwards only those email events to the service.

The adapter sends and receives emails to or from different mail servers by using the SMTP email protocol for all outbound communication and either the IMAP or POP3 email protocol for inbound communication. Depending on what inbound protocol your mail server supports, you can select between IMAP and POP3 when you create your inbound module.

Outbound processing

WebSphere Adapter for Email supports outbound request processing. When the adapter receives a request in the form of a business object from a service, it processes the request and creates an email message. The adapter then sends the email message to a mail server.

Outbound processing begins with the adapter receiving a request in the form of a business object from a service. Business objects represent data that the adapter needs to create an email and each one might include, among other things, attachments, and email addresses for where the email is to be sent. When a request is received by the adapter, the adapter takes the information stored in the business object and creates an email. This email is then forwarded to the mail server for distribution.

The following illustration shows how the adapter and module (which encapsulates the service in a reusable unit) function together as part of an outbound service. A module created for outbound processing receives the business object, the business object is turned into an email by the adapter, and then the adapter sends the email to the mail server for distribution.

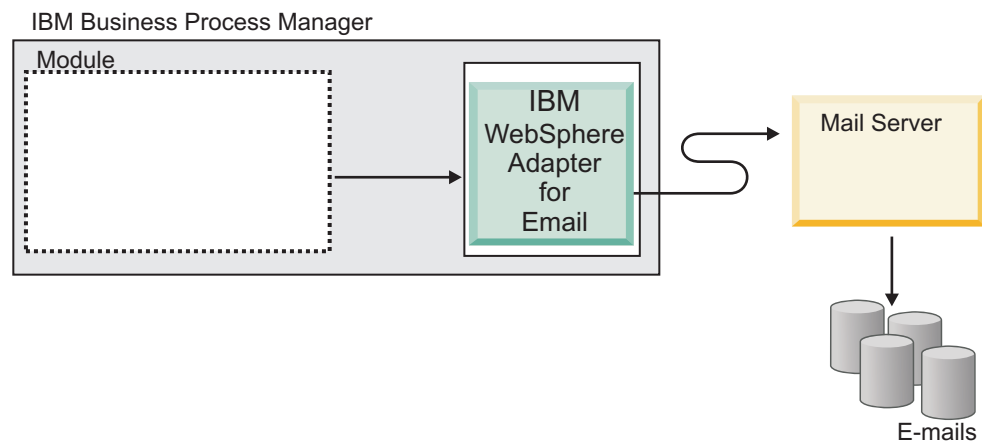


Figure 1. Adapter as part of an outbound SOA implementation

Each outbound module contains components that form a service, including an import. An import is a component, but without an implementation that is used to identify the services outside the module, making them callable from within the module. To communicate with references (for calling interfaces), imports require enterprise information system (EIS) binding information, to specify how the data is to be transported from the module. The assembly editor in IBM Integration Designer sets up the import and the EIS binding.

The following illustration shows a more detailed view of the module in an outbound implementation. The I and R symbols within the illustration represent interfaces and references. Interfaces dictate to the users of a service, in this case the import, how the component can be used. Interfaces are specification of the operations performed by a component. The operations are createCustomer, createAddress, and createEmail for outbound communication. References declare the interface that your service component is going to call. Each component in your module has one or more references. When you write your implementation for your service component using the assembly editor in IBM Integration Designer, you call a reference instead of directly calling the component. This implementation allows you to reassemble components in the future because you have not built dependencies into the code.

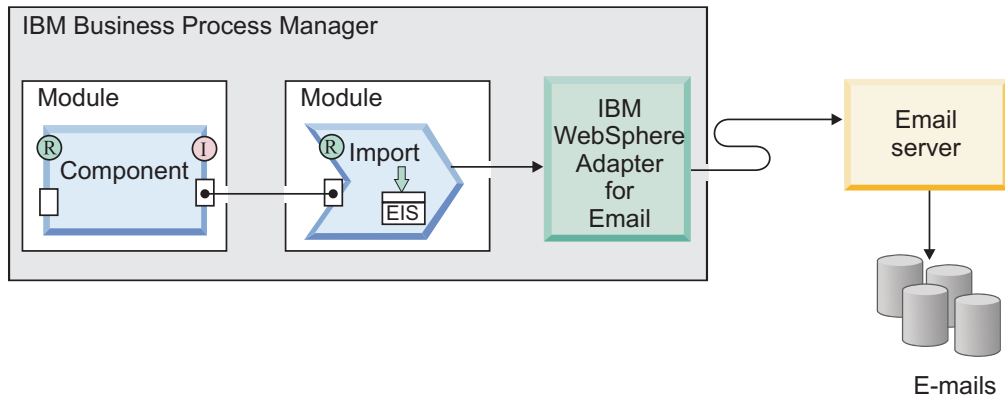


Figure 2. Outbound communication showing the import

During outbound processing, the adapter itself does not create emails. Instead, it converts the information received in a business object to a message that mail servers supporting the RFC822 format can understand.

Note: This process is not visible to you. It is only mentioned because the term "RFC822 format" appears in the reference section in regard to the email headers the adapter supports.

When a mail server receives an email message from the adapter, the mail server converts the message to an email and sends it to all email addresses listed in the To, Cc, and Bcc fields. If the adapter cannot send the message successfully to the server, it logs the following information:

- the MailSendFault fault for all non-connection related exceptions,
- for all other cases, the EmailOutboundCreateException exception with an appropriate error message indicating the reason for the failure.

Outbound data transformation

During outbound communication, the adapter transforms business objects into multipart MIME email messages.

While the adapter uses an adapter-specific data binding and data handlers to accomplish it, the actual transformation is external to the adapter and performed by IBM Business Process Manager or WebSphere Enterprise Service Bus. The data bindings and data handlers that the adapter uses to compose an email from the corresponding attributes in a business object are configured through the external service wizard in IBM Integration Designer.

Data bindings

Data bindings are essentially maps that define how a business object is to be formatted. Data bindings are responsible for reading the fields in a business object and filling the corresponding fields in an email.

During outbound communication, the data binding takes the following fields from a business object and populates the equivalent fields in an email with their values:

- Headers
- Mail content
- Attachment

For data that does not require transformation, the adapter conducts the pass-through processing, where data such as attachments pass through the system without being altered.

The adapter uses one of the three data bindings during outbound communication. Each data binding corresponds to a business object structure or data type selected in the external service wizard. The following table lists these data bindings and describes their usage. A more detailed description of each data binding is provided in the sections that follow the table.

Table 1. Outbound data bindings

Data binding	Usage
Email simple data binding	Used for the simple alert email data type
Email wrapper data binding	Used for the generic email and the generic email with business graph data types
Email fixed structure data binding	Used with the user-defined data type
Email data binding	Used only with version 6.0.2 business objects for compatibility with earlier versions

Email simple data binding

The email simple data binding is the default data binding for the simple alert email data type in the external service wizard. This data binding corresponds to the simple alert email business object structure that is described in this documentation.

Email wrapper data binding

The email wrapper data binding is the default data binding for both the Generic email and Generic email with business graph data types in the external service wizard. This data binding corresponds to the email business object structure.

Email fixed structure data binding

The email fixed structure data binding is the default data binding for the user-defined data type in the external service wizard. This data binding corresponds to a specific business object structure defined by a user. With this data binding, the order of the attachments is significant. The attachments must be in the same order as the attributes in the business object. This data binding retains the order.

Email data binding

This data binding is used exclusively for compatibility with business objects created in version 6.0.2 or earlier. This data binding supports the five-level business object structure used in version 6.0.2 of the adapter.

Data handlers

In addition to the data bindings, data transformation requires the use of a data handler. Data handlers are converters of data from one format to another. Data handlers perform the conversions between a business object and a particular MIME format. Data handlers are provided by IBM Business Process Manager or WebSphere Enterprise Service Bus.

For data that does not need to be transformed, such as some attachments, the adapter can be configured to conduct what is called pass-through processing. In pass-through processing, data passes directly from the business object to the email without being altered.

Character encoding

To send globalized characters in email messages, you set encoding values for headers, mail content, and attachment business objects. For all data types except the simple alert email data type, you can set encoding values at two levels: in the Encoding attribute of the business object or in the Encoding property of the data binding in the data binding properties.

- For the simple alert email data type, you set the encoding value in the Encoding attribute of the SimpleAlertEmail business object.
- For the generic email data type, you set the encoding value in the Encoding property of the data binding (EmailWrapperDataBinding) or in the Encoding property of the wrapper business object (email business object). The encoding property in the data handler configuration must have the same value that is specified in the data binding.
- For the user-defined data type, you set the encoding value in the Encoding property of the wrapper business object (email business object) or in the Encoding property of the data binding (EmailFixedStructureDataBinding). The encoding property in the data handler configuration must have the same value that is specified in the data binding.

During pass-through processing, the adapter uses the encoding value that is set in the business object. When data transformation is required, the adapter uses the value that is set in the individual data binding.

In both pass-through and non pass-through scenarios, the headers are encoded with same encoding value such as the mailContent.

Inbound processing

WebSphere Adapter for Email supports inbound processing of email events. Inbound event processing means that the adapter polls the mail server at specified intervals for new emails that are ready for processing. When the adapter detects an event that is ready to be processed, it converts the event data into a business object and sends it to the consuming service.

During inbound processing, the adapter polls the mail server for new emails, which are called events. When the adapter detects a new event, it reads the email and creates a business object to represent the email content. The adapter then forwards the business object to the export which is an exposed interface from a service component architecture (SCA) module that offers a business service to the outside world. Business objects carry the information the adapter takes from an email. By converting emails to business objects and forwarding them to a service, the services using your adapter module do not have to deal directly with the mail server. It is the adapter that polls for events, changes them to a format the consuming services can understand (business objects), and then forwards them to the export for delivery to the services that consume them.

The following illustration shows at a high level how the adapter functions as part of an inbound service in a service-oriented architecture (SOA) implementation. The adapter polls the mail server for incoming events, converts them into business objects, and then the adapter sends them to a consuming service.

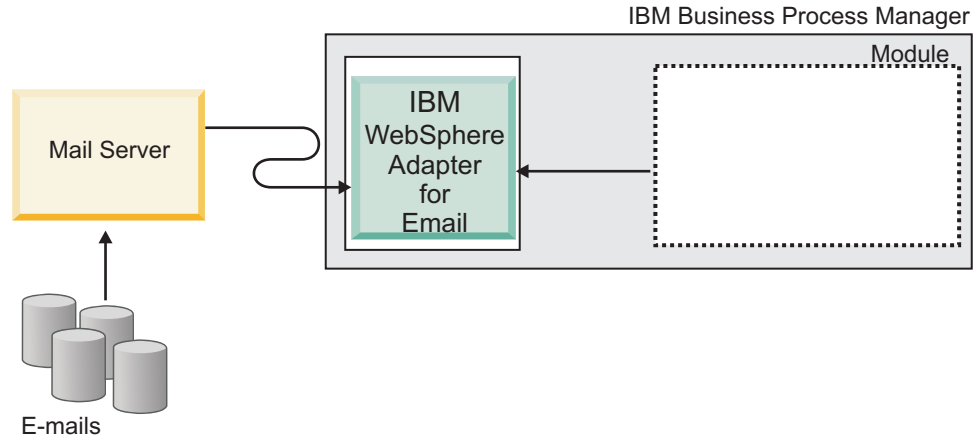


Figure 3. Adapter as part of an inbound SOA implementation

Each inbound module contains components that form a service, including an export. An export is a component, but without an implementation. Exports allow components in a module to provide their services to external clients. Exports require an EIS binding, which specifies the means of transporting the data from the modules. The assembly editor in IBM Integration Designer sets up the export, lists the supported bindings, and simplifies its creation. For inbound requests, business objects are essentially the logical graphical representation of the content of an incoming email, that appears as output from the export that represents the module in the assembly diagram.

The following illustration shows a more detailed view of the module in an inbound implementation. The I and R symbols within the illustration represent interfaces and references. Interface is a specification of the operations performed by a component. For inbound communication, it is limited to the Read operation. The interface dictates to the users of a service component, in this case the export, how the component can be used. A reference declares the interface that your service component is going to call. Each component in your module has one or more references. When you write the implementation for your service component using the assembly editor in IBM Integration Designer, you call a reference instead of directly calling the component. This implementation allows you to reassemble components in the future because you have not built dependencies into the code.

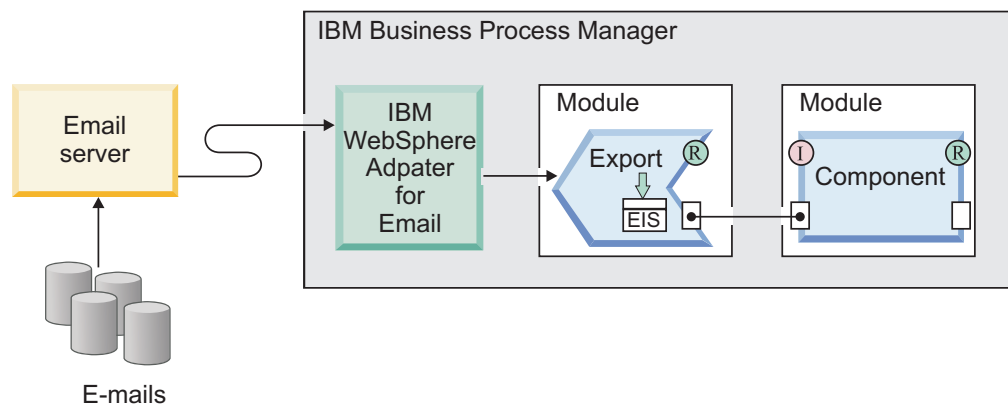


Figure 4. Inbound communication showing the export

Supported inbound protocols

The adapter supports two different inbound email protocols: POP3 and IMAP. With each, the adapter polls the mail server at a specified interval for inbound events (emails) and when an email is detected on the mail server, the adapter converts it to a business object. The adapter considers any email in the specified inbox folder on the mail server that is ready for processing an event.

Depending on your mail server, you might be able to choose the inbound email protocol that the adapter can use. Differences between the protocols and a description of how the adapter works with each protocol are noted in Table 2 and the sections that follow.

Table 2. Differences between the IMAP and POP3 protocols

IMAP	POP3
Supports the existence of multiple mail folders on a mailbox.	Supports only one mailbox (named Inbox) per user.
Allows a copy of the email to remain on the mail server after the client receives the email.	Supports a view-once-only feature on the server. The mail is deleted from the mail server after the client receives a copy of it.

Inbound communications with IMAP

If you use the IMAP protocol for your inbound communication, the following steps are performed:

1. The adapter polls the mail folders at regular intervals and logs any unread emails as events in the event store. You can use the activation specification `PollFolders` property to customize the list of folders that are searched by the adapter.

Note: If you specify multiple mail server folders for the mail server account in the `PollFolders` property, the adapter polls all mail server folders sequentially.

2. Search criteria determines which events are picked up from the mail server. The adapter picks up all events that match the search criteria. If no search criteria is specified, the adapter picks up all unread emails.
3. The adapter writes all polled events to the staging directory. After an event is written to the staging directory, it is deleted from the mail server.
4. The adapter transforms each event into an email business object. The headers, email body content, and mail attachments are recorded within the business object.
5. The email business object is sent to the export.
6. After it has been processed, the adapter deletes processed emails from the staging directory and archives them (if archiving is selected).

Note: If the archive file naming pattern activation specification property is specified, the file names conform to the pattern.

Inbound communications with POP3

If you use the POP3 protocol for your inbound communication, the adapter performs the following steps during inbound operations (from the mail server to the service):

1. Polls the Inbox folder on the mail server for inbound events (new emails). When it finds an email, it logs it as a new event in the event table.

Note: If you specify search criteria, all unread emails that fit the search criteria are picked up by the adapter. If no search criteria are specified, the adapter picks up all unread emails.

2. Writes new events to the staging directory as files and then deletes them from the mail server.
3. Converts the email into a business object. Headers, email body content, and mail attachments are recorded within the business object.
4. Sends the business object to the export.
5. Deletes all processed email from the staging directory and archives them if the archiving property is configured.

Note: If the archive file naming pattern property is specified, the file names conform to the pattern. If it is not specified, the name remains the same as it is in the staging directory.

Inbound data transformation

During inbound communication, the adapter transforms multipart MIME email messages into business objects.

Data bindings

While the adapter uses an adapter-specific data binding and data handlers for inbound data transformation, this actual transformation is external to the adapter and provided by IBM Business Process Manager or WebSphere Enterprise Service Bus. The data bindings and data handlers that the adapter uses to read the contents of an email and fill the corresponding attributes in a business object are configured using the external service wizard in IBM Integration Designer.

To take fields from an email and populate a business object, the adapter needs a data binding. Data bindings are maps that define how a business object is to be formatted. Data bindings are responsible for reading the fields in an email and populating the corresponding fields in a business object.

During inbound communication, the data binding takes the following fields from an email and populates the parent email business object attributes with their values:

- Headers
- Mail content
- Attachment

For data that does not require transformation, the adapter conducts a pass-through processing, where data such as attachments pass through the system without being altered.

To transform data in the form of emails coming into the adapter, the adapter uses one of the three data bindings. The following table lists these data bindings and their usage. A more detailed description of each data binding is provided in the sections that follow the table.

Table 3. Inbound data bindings

Data binding	Usage
“Email wrapper data binding”	Default data binding
“Email fixed structure data binding”	Used with the user-defined type business objects
“Email data binding”	Used with the version 6.0.2 business objects

Email wrapper data binding

The email wrapper data binding is the default data binding for both the Generic email and Generic email with Business Graph data types in the external service wizard. This data binding corresponds to the email business object structure.

Email fixed structure data binding

The email fixed structure data binding is the default data binding for the user-defined data type in the external service wizard. This data binding corresponds to a specific business object structure defined by a user. With this data binding, the order of the attachments is significant. The attachments must be in the same order as the attributes in the business object. This data binding retains the order.

Email data binding

This data binding is used exclusively for compatibility with business objects created in version 6.0.2 or earlier. This data binding supports the five-level business object structure used in version 6.0.2 of the adapter.

Data handlers

In addition to the data bindings, data transformation requires the use of a data handler. Data handlers change data from one format to another. Data handlers perform the conversions between a particular MIME format and a business object. Data handlers are provided by IBM Business Process Manager or WebSphere Enterprise Service Bus.

For data that does not need to be transformed, such as some attachments, the adapter can be configured to conduct a pass-through processing. During pass-through processing, data passes directly from the email to the business object without being altered.

Event store

The event store is a persistent cache where event records are saved until the polling adapter can process them.

The adapter uses an event store to track the inbound events that come into the system. When a new email is found in the polling folder, the adapter updates the status of the corresponding event in the event store. For recovery purposes, the adapter continually maintains the status of the event in the event store until the event is delivered to IBM Business Process Manager or WebSphere Enterprise Service Bus. If the adapter is abruptly terminated, the adapter uses the event store to determine which events have and have not been processed.

An event store is not required for the adapter to process inbound requests. The adapter creates an event store:

- when the module is deployed to the runtime environment. It can happen if the event persistence feature is configured in the external service wizard.
- if it detects that an event store does not exist for the inbound module in the database.

Each event store created by the adapter is associated with a specific inbound module. The adapter does not support multiple adapter modules pointing to the same event store.

Business objects

A business object is a structure that consists of data, the action to be performed on the data, and additional instructions, if any, for processing the data. The data can represent anything from a customer record to an email attachment. The adapter uses business objects to either obtain information from an email or to produce an email.

How the adapter uses business objects

The adapter during the outbound processing receives a business object from a service. It then creates an email from the details it finds in the business object and sends the email message to the mail server for distribution. For inbound processing, this process happens in reverse. The adapter takes information from an email, converts it to a business object, and forwards it to a service.

How data is represented in business objects

Business objects are created using either the business object editor or external service wizard in IBM Integration Designer. As shown in the following illustration, a business object consists of a set of fields and a type of data, such as a string or integer. The business object shown in the figure is a customer business object that records name, address, and telephone number information for a customer record. This example uses string values, but many other values are supported by the business object editor.

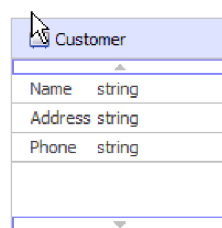


Figure 5. Customer business object

A field might, in turn, be another business object. For example, the following illustration shows a customer business object that contains another business object. Here, a company that sells pet-related items might want to keep a track of names and species information of the pets that belongs to its customers. The Pet business object stores the name and species information for one customer pet.

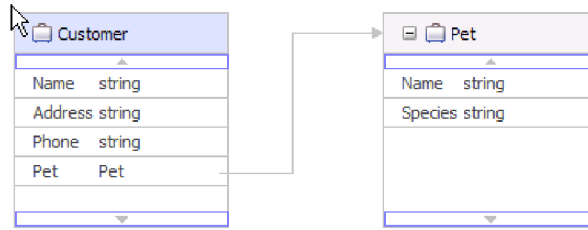


Figure 6. Customer business object with child Pet business object

Each business object is associated with an operation. The operation in turn is associated with the wrapper. The operation tells the adapter what to do with the wrapper business objects. The following operations are examples of Create operations used by the adapter to create emails during the outbound communication:

- Create Customer
- Create Address

No matter what name you give an operation for your module, the adapter performs the CreateEmail operation.

For inbound communications, Emit is the only supported operation. This operation is used to take information from an email and convert it to business objects.

During adapter configuration, you can optionally choose to generate a business graph. In version 6.0.2, each top-level business object is contained in a business graph, which includes a verb that an application can use in version 6.0.2 to specify additional information about the operation to be performed. In version 7.5.0.2 and later releases, business graphs are optional; they are required only when you are adding business objects to a module created with a version of IBM Integration Designer earlier than version 7.5.0.2. If business graphs exist, they are processed, but the verb is ignored.

How business objects are created

Business objects and their wrapper objects are created by the external service wizard from XSD files either imported from another module or created with IBM Integration Designer business object editor. For any business object structure except the simple alert email structure, you must create or import the XSD files you want the adapter to make into business objects before you run the external service wizard. If transformation is needed, a business object that maps to the email body or an attachment that needs transformation must exist. A generic email business object is available for pass-through operations. Or, if only a simple alert email is needed (no attachments), the adapter provides a simple alert email structure with standard headers as another option.

You create business objects for your module with the external service wizard launched from IBM Integration Designer. If you define XSD files using the business object editor before starting the external service wizard, the adapter creates business objects from these schemas.

Custom wrapper business objects

Custom wrapper business objects are user-defined wrapper business objects that contain protocol-specific information and content. To use custom business objects,

you must first create business object schema files (XSD files) by using the IBM Integration Designer business object editor. You can then use the external service wizard to generate business objects from the XSD files. A custom wrapper business object can be created from an existing business object or from XSD files.

Custom wrapper business objects are useful if you have an existing map or mediation that expects a business object to have a protocol-specific wrapper. The custom wrapper business object does not allow child objects of anyType. Using anyType objects restricts you from using maps and mediation wiring, because you must write programs or code to fetch business objects from the anyType field. You must write such code if child objects of anyType are allowed, because the business object type being set on the anyType field is unknown.

WebSphere Application Server environment variables

WebSphere Application Server environment variables can be used in the external service wizard to specify directory values. You can now change any string property values in inbound and outbound configuration by only changing the environment variables.

When you configure the adapter for inbound or outbound processing using the external service wizard, you set values for various required local files and directories. You can later change these values in the deployed application from the IBM Business Process Manager or WebSphere Enterprise Service Bus Process Administrative Console.

Starting with IBM Business Process Manager or WebSphere Enterprise Service Bus Version 6.1.0, instead of hardcoding values for directories and files, you can declare them as WebSphere Application Server environment variables and specify the environment variable names when you run the external service wizard. When you deploy your application, the environment variable name is replaced with the actual value and used by the adapter. If you want to change the property value, you can change the environment variable in the IBM Business Process Manager or WebSphere Enterprise Service Bus Process Administrative Console.

WebSphere Application Server environment variables can be used for all string property values (not Boolean or integer variables) that are set in inbound and outbound configurations.

When you create a WebSphere Application Server environment variable, you specify:

- The name of the environment variable, for example, ARCHIVE_FOLDER.
- The value that the symbolic name represents, for example: C:\email\ArchiveFolder.
- The scope for the environment variable, which determines the level at which the environment variable is visible in the Process Administrative Console. The scope level can be server, node, or cell:
 - Server scope limits visibility to the named server. The server scope is the most specific scope for defining environment variables.
 - Node scope limits visibility to all the servers on the named node. The Node is the default scope level.
 - Cell scope limits visibility to all servers on the named cell.

The external service wizard

The external service wizard provides a blueprint to create services from existing elements like business objects.

Use the external service wizard to configure your adapter before it is deployed to IBM Business Process Manager or WebSphere Enterprise Service Bus. Using the external service wizard, you can create business object schema files (XSD files), build service descriptions, define connection properties for the mail server, and generate business objects that contain everything the adapter needs to conduct inbound and outbound communication.

You can use the external service wizard to generate business objects from the XSD files. The external service wizard builds the service descriptors that are adapter-specific artifacts used in import, export, and WSDL files. Also, you define the connection properties by typing the name or IP address of the mail server and the user ID and password needed to access it. The external service wizard then generates the business objects through which WebSphere Adapter for Email provides operations to send and receive emails.

Chapter 2. Planning for adapter implementation

You need to consider various factors before setting up and using the WebSphere Adapter for Email. For example, before you configure the adapter, consider whether to set up the adapter in a clustered environment, in which the workload of the server is distributed across multiple machines. Also, if you are migrating from an earlier version of WebSphere Adapter for Email, perform any migration tasks.

Before you begin

Before you begin to set up and use the adapter, you must possess a thorough understanding of business integration concepts, the capabilities, and requirements of the integration development tools and runtime environment that you are going to use, and the mail server environment where you build and use the solution.

To configure and deploy WebSphere Adapter for Email you must understand and be familiar with the following concepts, tools, and tasks:

- The business requirements of the solution you are building.
- The mail server's security and configuration needs.
- Business integration concepts and models, including the Service Component Architecture (SCA) programming model.
- The capabilities and requirements of IBM Business Process Manager or WebSphere Enterprise Service Bus. You must know how to configure and administer the host server and how to use the Process Administrative Console to set and modify property definitions, configure connection factories, and manage events.
- The tools and capabilities provided by IBM Integration Designer. You must know how to use these tools to create modules, wire and test components, and complete other integration tasks.

Security

WebSphere Adapter for Email supports user name and password authentication methods of Java™ 2 as implemented in J2C. By supporting authentication, the adapter provides protection for sensitive user data in log and trace files. Java 2 has other security methods, such as Kerberos, which is not supported. The authentication details are configured using the external service wizard. Secure Sockets Layer (SSL) can be configured to protect the integrity of information being passed between the mail server and the adapter and, for users who require it, the adapter can be configured to run in support of the Federal Information Processing Standard (FIPS) 140.

Antivirus software

If an antivirus program is running on your system (the system on which the adapter is deployed or the one that hosts the mail server), the adapter might fail to send outbound emails. It happens because some types of antivirus software have auto protection turned on for Internet email protection. When auto protection is turned on, the antivirus software might treat open connections to a mail server as malicious attacks and block all emails using that connection. Because the adapter

maintains the connections to the mail server in the pool, it does not close any of the connections. It might result in the antivirus program blocking all email from the adapter.

By default, the **Select when antivirus or firewall software is running** check box in the connection properties window of the external service wizard is selected. This means that the adapter will close the connection after each outbound request.

Support for protecting sensitive user data in log and trace files

You can configure the adapter to prevent sensitive or confidential data, in the log and trace files, from being viewed by users without authorization.

Log and trace files for the adapter can contain data from your mail server, which might contain sensitive or confidential information. Sometimes these files might be seen by individuals without authorization to view sensitive data. For example, a support specialist must use the log and trace files to troubleshoot a problem.

To protect the data in such situations, the adapter lets you specify whether you want to prevent confidential user data from displaying in the adapter log and trace files. You can select this option in the external service wizard or change the `HideConfidentialTrace` property. When this property is enabled, the adapter replaces the sensitive data with XXX's.

See “Managed connection factory properties” on page 179 for information about this optional property.

The following types of information are considered potentially sensitive data and are disguised:

- The contents of a business object
- The contents of the object key of the event record
- User name, Password, Environment, and Role
- The URL used to connect to the mail server

The following types of information are not considered user data and are not hidden:

- The contents of the event record that are not part of the event record object key, for example, the `XID`, event ID, business object name, and event status
- Business object schemas
- Transaction IDs
- Call sequences

Configuring Secure Socket Layers

Data that travels across a network can be intercepted by third parties. When this data includes private information such as passwords or credit card numbers, steps must be taken to make this data unintelligible to unauthorized users. Using Secure Sockets Layer (SSL), you protect the integrity of information passed between the mail server and the adapter.

Before you begin

To enable SSL, the following prerequisites must be satisfied:

- The mail server must support secure IMAP, POP3, and SMTP communication using SSL
- The mail server must have its own private key and certificate
- An email client must be installed

About this task

E-mails passing through the mail server are vulnerable to third-party interference when SSL is not configured for use with the adapter. Using SSL prohibits data from being modified either intentionally or unintentionally during transport and protects data from being intercepted. It is effective because it uses several cryptographic processes, such as public key cryptography for authentication with the mail server and secret key cryptography and digital signatures for privacy and data integrity. SSL allows the adapter to authenticate the identity of the mail server and, when necessary, for the mail server to authenticate the identity of the mail client.

Procedure

1. Set the email client truststore.

A truststore helps an email client decide what it can trust. When SSL is configured, IBM Business Process Manager or WebSphere Enterprise Service Bus sends its certificate to the email client for verification. The email client verifies the certificate to ascertain that it is communicating with the intended mail server. To enable this verification process, the certificate of the mail server must be present in the client's truststore. Use the following steps to set up the email client truststore.

 - a. In IBM Integration Designer, right-click the server and click **Run Process Administrative Console**.
 - b. Expand **Security**.
 - c. Select **SSL certificate and key management**.
 - d. Under Related items, select **Key stores and certificates**.
 - e. Select **NodeDefaultTrustStore**.

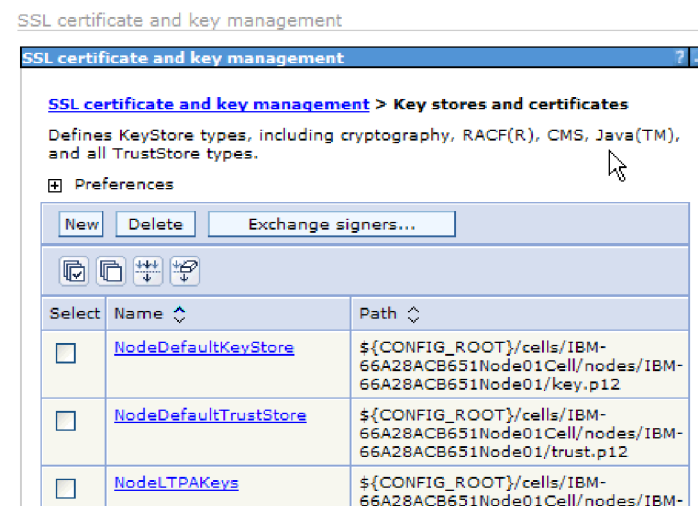


Figure 7. Selecting NodeDefaultTrustStore

- f. Under Additional properties, select **Signer certificates**.
- g. Click **Add**.

- h. In the **Alias** field, type the certificate name.

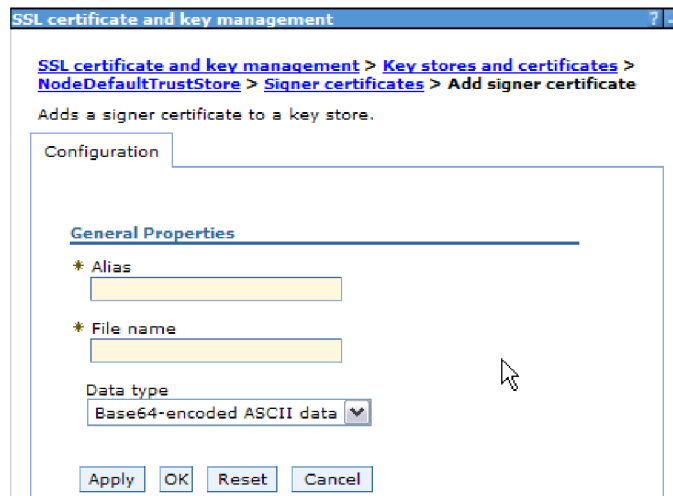


Figure 8. Adding signer certificate properties for the mail server certificate

- i. In the **File name** field, type the full path of the mail server certificate.
 - j. Click **OK**.
2. Configure SSL properties for the adapter.
 - a. In the external service wizard, set **enableSSL** to True. By default, **enableSSL** is set to False.
 - b. When using SSL for inbound communication, set the port number to 993 if you are using the IMAP email protocol and 995 if you are using the POP3 email protocol. For outbound communication using the SMTP email protocol, set the port number to 465.

Configuring the module for federal information processing standard 140

The Federal Information Processing Standard 140 (FIPS) is a United States government standard for cryptographic features like encryption, decryption, hashing (message digests), Secure Sockets Layer, Transport Layer Security, Internet Protocol security, Secure Shell, signatures, key exchange, and key or certificate generation used in software products and modules. For users working with the United States government who must conform to the FIPS standard, the adapter can be configured to run in FIPS mode.

About this task

Configuring the module to run in FIPS mode restricts the adapter to working with modules whose cryptographic features comply with FIPS approved methods and providers. From an adapter perspective, running in FIPS mode restricts the adapter to using the Transport Layer Security (TLS) security protocol based on Secure Sockets Layer (SSL).

Restriction: WebSphere Adapter for Email cannot connect to Microsoft Exchange Server 2003 when FIPS (SSL 3.1 and TLS 1.0) is configured for inbound communication. The adapter generates exceptions during startup. Currently there

are no known workaround to configure WebSphere Adapter for Email for use with Microsoft Exchange Server 2003 in the FIPS mode. Version 7.5.0.3 of the adapter was tested with SurgeMail 3.8 for FIPS.

To run the adapter in FIPS mode, you must instruct the adapter to use the IBM Java Secure Socket Extension (IBMJSSE2) provider package. The IBMJSSE2 provider is the preregistered Java Secure Socket Extension provider in the `java.security` file in IBM SDK, version 5.0. IBMJSSE2 uses FIPS-approved packages.

When in FIPS 140-2 mode, IBM WebSphere Adapter for Email uses the FIPS 140-2 approved cryptographic provider(s); IBMJCEFIPS (certificate 376) and IBMJSSEFIPS (certificate 409). The certificates are listed in the NIST website at <http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401val2011.htm>

Complete the following steps to run the adapter in FIPS mode.

Procedure

1. In the IBMJSSE2 provider, set the `com.ibm.jsse2JSSEFIPS` property to `True`.
2. Set the following security properties so the IBMJSSE2 provider can handle all JSSE requests.
 - a. Set the `ssl.SocketFactory.provider` property to `com.ibm.jsse2SSLSocketFactoryImpl`.
 - b. Set the `ssl.ServerSocketFactory.provider` property to `com.ibm.jsse2SSLServerSocketFactoryImpl`.
3. In the `java.security` properties file, add the IBMJCEFIPS provider `com.ibm.crypto.fips.provider.IBMJCEFIPS` to the provider list above the IBMJCE provider. Follow the `security.provider.n=providername` format where *n* denotes the order of the provider. The provider with a value of 1 is considered before the provider with a value of 2. Do not remove the IBMJCE provider.
4. From the IBM Business Process Manager or WebSphere Enterprise Service Bus administrative console, set the system properties which are listed under the Java virtual machine (JVM) properties. Follow the `-Dpropertyname=propertyvalue` format.
5. Set security properties in the `java.security` file (in the *IBM Business Process Manager or WebSphere Enterprise Service Bus Java virtual machine/lib/security* directory).

Required folders for inbound processing

Several folders are required for activities such as archiving and storage before you run the adapter for inbound processing.

Required folders for inbound communication

Before running the adapter, you must create one or more poll folders on your mail server and a staging folder where the adapter saves all polled emails as files. These folders are required and neither type are created by the adapter. Also, to use the archiving functionality of the adapter to store successfully processed and failed email events you must create an archive folder and a failed event folder.

The adapter requires that there be a folder on the local drive that holds emails marked in progress in the event store. This folder is called the staging directory in the external service wizard. Because the adapter does not create a staging directory, you must create it before you start the external service wizard.

Required folders for archiving

You can configure the adapter to save, or archive copies, of both successful and failed emails by using the ArchiveFolder property. To use this property, you must create both of the following folders before you run the adapter.

- Archive folder – A file system folder where the adapter archives successful emails.
- Failed event folder – A file system folder where the adapter archives failed emails.

When the ArchiveFolder property is specified, all successfully processed mail is moved into the archive folder from the staging folder. If you leave this property blank all successfully processed mail is deleted from the staging folder.

If the FailedEventsFolder property is specified, all unsuccessfully processed mail is moved into the failed events folder from the staging folder. If you leave this property blank, all failed mail is deleted from the staging folder.

For more information about either of these folder properties, see the section on activation specification properties in the reference section of this documentation.

Using WebSphere Application Server environment variables

Instead of specifying the folder names when you run the external service wizard, you can use WebSphere Application Server environment variables. Refer more information about environment variables at: “WebSphere Application Server environment variables” on page 13.

User authentication

The adapter supports several methods for supplying the user name and password that are needed to connect to the mail server. By understanding the features and limitations of each method, you can pick a method that provides the appropriate level of security and convenience for your application.

To integrate an adapter into your application, you must provide the user name and password for the adapter to use at run time on IBM Business Process Manager or WebSphere Enterprise Service Bus to connect to mail server to process outbound requests and inbound events.

At run time, the adapter needs to provide the user name and password to connect to the mail server. To connect without user intervention, the adapter must access a saved copy of the user information. In a server environment, there are several methods for saving user information. You can configure the adapter to get your user information, through any of the following methods:

- Adapter properties
- Data source
- J2C authentication alias

Saving the user name and password in adapter properties is a direct way to provide this information at run time. You provide this user name and password when you use the external service wizard to configure your module. Although directly specifying the user name and password seems the most straightforward method, it has important limitations. Adapter properties are not encrypted; the password is stored as clear text in fields that are accessible to others on the server.

Also, when the password changes, you must update the password in all instances of the adapter that access that mail server. This includes the adapters embedded in application EAR files and adapters that are separately installed on the server.

Using a data source allows you to use a connection already established for another application. For example, if multiple applications access the same database with the same user name and password, the applications can be deployed using the same data source. The user name and password can be known only to the first person who deploys an application to that data source or who defines a data source separately.

Using a J2C authentication data entry, or authentication alias, created with the Java Authentication and Authorization Service (JAAS) feature of Java EE security is a robust, secure way to deploy applications. An administrator creates the authentication alias that is used by one or more applications that need to access a system. The user name and password must be known only to that administrator, who can change the password in a single place, when a change is required.

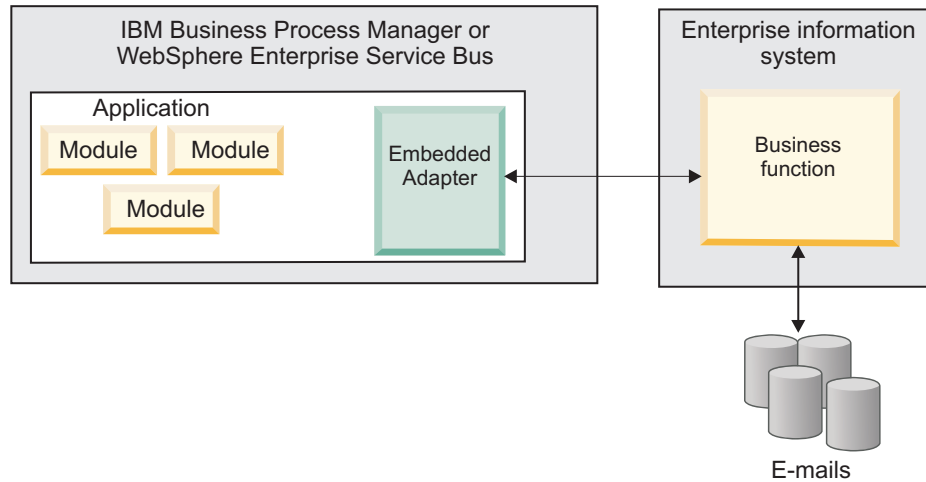
Deployment options

There are two ways to deploy the adapter. You can either embed it as part of the deployed application, or you can deploy it as a stand-alone RAR file. The requirements of your environment affect the type of deployment option you choose.

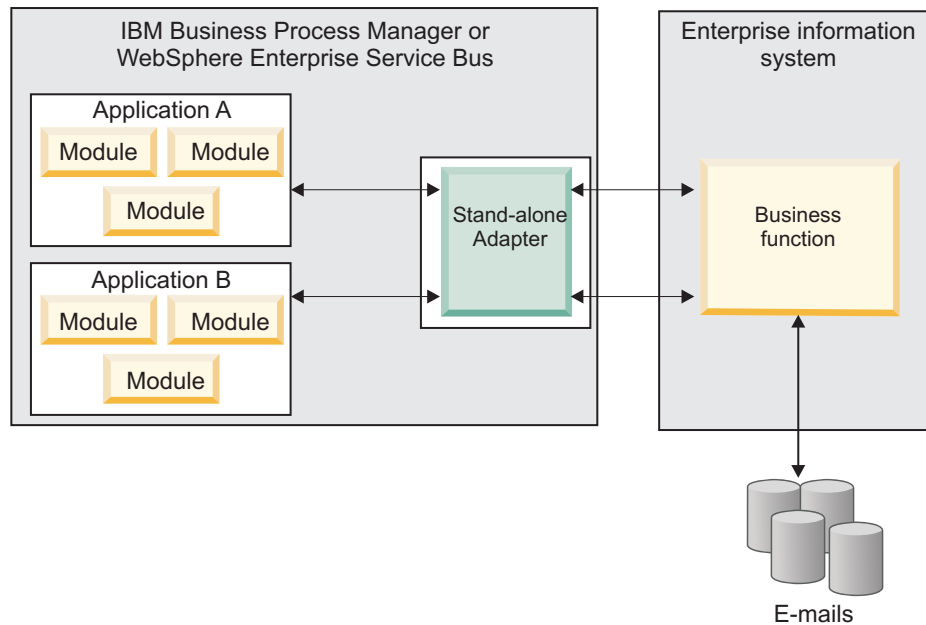
The following are the deployment options:

- **With module for use by single application:** With the adapter files embedded in the module, you can deploy the module to any application server. Use an embedded adapter when you have a single module using the adapter or if multiple modules need to run different versions of the adapter. Using an embedded adapter enables you to upgrade the adapter in a single module without the risk of destabilizing other modules by changing their adapter version.
- **On server for use by multiple applications:** If you do not include the adapter files in a module, you must install them as a stand-alone adapter on each application server where you want to run the module. Use a stand-alone adapter when multiple modules can use the same version of the adapter and you want to administer the adapter in a central location. A stand-alone adapter can also reduce the resources required by running a single adapter instance for multiple modules.

An embedded adapter is bundled within an enterprise archive (EAR) file and is available only to the application with which it is packaged and deployed.



A stand-alone adapter is represented by a stand-alone resource adapter archive (RAR) file, and when deployed, it is available to all deployed applications in the server instance.



While creating the project for your application using IBM Integration Designer, you can choose how to package the adapter [either bundled with the (EAR) file or as a stand-alone (RAR) file]. Your choice affects how the adapter is used in the run time environment and how the properties for the adapter are displayed on the administrative console.

Choosing either to embed an adapter with your application or to deploy the adapter as a stand-alone module depends on how you want to administer the adapter. If you want a single copy of the adapter and do not care about disruption to multiple applications when you upgrade the adapter, then you would be more likely to deploy the adapter as a stand-alone module.

If you plan to run multiple versions, and if you care more about potential disruption when you upgrade the adapter, you would be more likely to embed the adapter with the application. Embedding the adapter with the application allows you to associate an adapter version with an application version and administer it as a single module.

Considerations for embedding an adapter in the application

Consider the following items if you plan to embed the adapter with your application:

- An embedded adapter has class loader isolation.
A class loader affects the packaging of applications and the behavior of packaged applications deployed on run time environments. *Class loader isolation* means that the adapter cannot load classes from another application or module. Class loader isolation prevents two similarly named classes in different applications from interfering with each other.
- Each application in which the adapter is embedded must be administered separately.

Considerations for using a stand-alone adapter

Consider the following items if you plan to use a stand-alone adapter:

- Stand-alone adapters have no class loader isolation.
Because stand-alone adapters have no class loader isolation, only one version of any defined Java artifact is run and the version and sequence of that artifact is undetermined. For example, when you use a stand-alone adapter there is only *one* resource adapter version, *one* adapter foundation class (AFC) version, or *one* third-party JAR version. All adapters deployed as stand-alone adapters share a single AFC version, and all instances of a defined adapter share the code version. All adapter instances using a given third-party library must share that library.
- If you update any of these shared artifacts, all applications using the artifacts are affected.
For instance, if you have an adapter that is working with server version X, and you update the version of the client application to version Y, your original application might stop working.
- Adapter Foundation Classes (AFC) is compatible with previous versions, but the latest AFC version must be in every RAR file that is deployed in a stand-alone manner.
If more than one copy of any JAR file is in the class path in a stand-alone adapter, the one that is used is random; therefore, they all must be the latest version.

Considerations while deploying adapters with different versions

When you install multiple adapters with different versions of CWYBS_AdapterFoundation.jar, and if a lower version of the CWYBS_AdapterFoundation.jar is loaded during run time, the adapter returns the ResourceAdapterInternalException error message, due to a version conflict. For example, when you install Oracle E-Business Suite adapter version 7.0.0.3 and WebSphere Adapter for Email version 7.5.0.3, the following error message is displayed "The version of CWYBS_AdapterFoundation.jar is not compatible with IBM WebSphere Adapter for Email" as IBM WebSphere Adapter for Email loads file:/C:/IBM/WebSphere/ProcServer7/profiles/ProcSrv01/installedConnectors/

CWYOE_OracleEBS.rar/CWYBS_AdapterFoundation.jar with version 7.0.0.3. However, the base level of this jar required is version 7.5.0.3. To overcome this conflict, you must migrate all adapters to the same version level.

There are occasions when you work with embedded adapters that do not need a client-server communication, stand-alone adapters that need a server connection, or a hybrid mix of adapter connections.

The following scenarios cover the different behaviors of AFC version conflict detection, when you are deploying two or more adapters and at least one of the adapter version is 7.5 or higher.

Deploying a stand-alone Adapter

1. Install WebSphere Adapter for Flat Files version 7.0.1.0 through the IBM Business Process Manager administrative console.
2. Install WebSphere Adapter for SAP Software version 7.5.0.0 through the administrative console.
3. Create ActivationSpec for an ALE pass-through inbound operation.
4. Create an application in IBM Integration Designer for a stand-alone ALE pass-through inbound operation.
5. Install and start the application through the administrative console.
6. Verify the error.

Note: An error message is generated in the log/trace area of IBM Business Process Manager, to indicate an AFC version conflict.

Deploying an embedded Adapter

1. Import a build of WebSphere Adapter for FTP version 7.0.1.0, using a RAR file.
2. Create a FTP Inbound EMD operation.
3. Import a build of WebSphere Adapter for Oracle E-Business Suite version 7.5.0.0, using a RAR file.
4. Create an Oracle inbound EMD operation, in the same module where you have created the FTP Inbound EMD operation.
5. Deploy the module to IBM Business Process Manager.
6. Check the trace.

At step 5, the deployment fails. At step 6, you get an internal error message due to the AFC version conflict.

Note: To avoid a name conflict between the business object generated by the two adapters, generate the artifacts into different folders.

Deploying a combination of stand-alone and embedded Adapters

1. Install WebSphere Adapter for JDBC version 7.0.1.0 through the IBM Business Process Manager administrative console.
2. Create an ActivationSpec for a JDBC inbound operation.
3. Create an application in IBM Integration Designer for a JDBC inbound operation, for the stand-alone Adapter deployment.
4. Deploy the JDBC inbound application and trigger your inbound events.
5. Create an application in IBM Integration Designer for a WebSphere Adapter for SAP Software version 7.5.0.0 inbound embedded Adapter deployment.

6. Deploy an SAP inbound application, and trigger your inbound events.

Note: You can resolve the AFC version conflict by using different class loaders for the stand-alone and embedded deployments. With this approach, the migration process handles different CWYBS_AdapterFoundation.jar files and do not conflict with each other. You can start both JDBC and SAP inbound applications successfully, and process Inbound events without exception.

For further assistance, visit <http://www.ibm.com/support/docview.wss?uid=swg27006249>.

WebSphere Adapters in clustered environments

You can improve adapter performance and availability by deploying a module on a clustered server environment. Clusters are groups of servers that are managed together to balance workloads and to provide high availability and scalability.

The module you deployed is replicated across all servers in a cluster, regardless of whether you deploy the module using a stand-alone or an embedded adapter. The following IBM products support WebSphere Adapters in a clustered environment:

- IBM Business Process Manager or WebSphere Enterprise Service Bus
- WebSphere Application Server Network Deployment
- WebSphere Extended Deployment

To deploy and configure WebSphere Adapter for Email in a clustered environment, see: “Deploying the module in a clustered environment” on page 121. When you set up a server cluster, you create a Deployment Manager profile. The HAManager, a subcomponent of the Deployment Manager, notifies the Java Platform, Enterprise Edition (JEE) Connector Architecture (JCA) container to activate an adapter instance. For information about creating clustered environments, see the following link: http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5mx/index.jsp?topic=/com.ibm.wbpm.imuc.z.doc/topics/tins_zos_create_cluster.html.

Using WebSphere Extended Deployment, you can optionally enhance the performance of adapter instances in your clustered environment. WebSphere Extended Deployment extends the WebSphere Application Server Network Deployment capabilities by using a dynamic Workload Manager instance instead of a static Workload Manager. The dynamic Workload Manager instance can optimize the performance of adapter instances in the cluster by dynamically balancing the load of the requests. It means that application server instances can be automatically stopped and started based on the load variations, allowing systems with different capacities and configurations to handle load variations evenly. For information about the benefits of WebSphere Extended Deployment, see <http://publib.boulder.ibm.com/infocenter/wxdinfo/v6r1m1/index.jsp>.

In clustered environments, adapter instances can handle both inbound and outbound processes.

Restriction: During inbound communication WebSphere Adapter for Email is not able to switch polling between a IBM Business Process Manager or WebSphere Enterprise Service Bus cluster backup node and the cluster's primary node when each node is installed on a different operating system. For example, if the adapter starts polling on a primary Windows node, it cannot switch to a backup UNIX node because it cannot process the Windows path used for the directory storing in progress events.

High availability for inbound processes

Inbound processes are based on events triggered as a result of updates to data in the mail server. WebSphere Adapter for Email is configured to detect updates by polling an event table. The adapter then publishes the event to its endpoint.

Important: In a clustered environment, the event directory must be on a shared file system and not local to any of the cluster machines.

When you deploy a module to a cluster, the Java Platform, Enterprise Edition (JEE) Connector Architecture (JCA) container checks the `enableHASupport` resource adapter property. If the value for the `enableHASupport` property is true, which is the default setting, all of the adapter instances are registered with the `HAManager` with a policy 1 of N. This policy means that only one of the adapter instances starts polling for events. Although other adapter instances in the cluster are started, they remain dormant with respect to the active event until the active adapter instance finishes processing the event. If the server on which the polling thread was started shuts down for some reason, an adapter instance that is running on one of the backup servers is activated.

Note: In the active-passive configuration mode of the adapters, the endpoint application of the passive adapter instance also listens to the events/messages even if the `enableHASupport` property is set to True. This is because the `alwaysactivateAllMDBs` property in the JMS activation specification is set to True. To stop the endpoint application of the passive adapter instance from listening to the events, you must set the `alwaysactivateAllMDBs` property value to False. For more information, see “Disabling end point applications of the passive adapter” on page 152.

Important: Do not change the setting of the `enableHASupport` property.

High availability for outbound processes

In clustered environments, multiple adapter instances are available to perform outbound process requests. So, if your environment has multiple applications that interact with WebSphere Adapter for Email for outbound requests, then you might improve performance by deploying the module to a clustered environment. In a clustered environment, multiple outbound requests can be processed simultaneously, so that they are not attempting to process the same record.

If multiple outbound requests are attempting to process the same record, such as a Customer address, the workload management capability in WebSphere Application Server Network Deployment distributes the requests among the available adapter instances in the sequence they were received. As a result, these types of outbound requests in a clustered environment are processed in the same manner as in a single server environment: one adapter instance processes only one outbound request at a time. For more information about workload management, see the following link: http://publib.boulder.ibm.com/infocenter/wasinfo/v8r0/index.jsp?topic=/com.ibm.websphere.nd.doc/info/ae/ae/trun_wlm.html.

Migrating to version 7.5.0.3 of WebSphere Adapter for Email

By migrating to version 7.5.0.3 of WebSphere Adapter for Email, you automatically upgrade from the previous version of the adapter. Additionally, you can migrate your applications that embed an earlier version of the adapter, so that the applications can use features and capabilities present in version 7.5.0.3.

Migration considerations

WebSphere Adapter for Email version 7.5.0.3 may have some features and updates that might affect your existing adapter applications. Before migrating applications that use WebSphere Adapter for Email, you must consider some factors that might affect your existing applications.

Compatibility with earlier versions

WebSphere Adapter for Email version 7.5.0.3 is fully compatible with the custom business objects (XSD files) and data bindings that are created using the adapter version 6.1.x, version 6.2.x, version 7.0.x, version 7.5.0, and version 7.5.0.2 and enables the existing business objects and data bindings to work well in the latest version of the adapter.

Because version 7.5.0.3 of WebSphere Adapter for Email is fully compatible with version 6.1.x, version 6.2.x, version 7.0.x, version 7.5.0, and version 7.5.0.2, any of your applications that used previous versions of WebSphere Adapter for Email run unchanged when you upgrade to version 7.5.0.3. However, if you want your applications to use features and functionality present in version 7.5.0.3 of the adapter, perform the migration of the artifacts as well as the upgrade of the adapter.

The migration wizard replaces (upgrades) version 6.1.x, version 6.2.x, version 7.0.x, version 7.5.0, or version 7.5.0.2 of the adapter with version 7.5.0.3 and enables version 7.5.0.3 features and functionality for use with your applications.

Note: The migration wizard does not create components or modify existing components, such as mappers and mediators to work with version 7.5.0.3 of the adapters. If any of your applications embed an adapter that is version 7.5.0.2 or earlier and you are upgrading to version 7.5.0.3, and you want your applications to take advantage of the features and functions in version 7.5.0.3, you might need to change those applications.

If the artifacts within a module have inconsistent versions, the entire module is marked as unavailable for migration and cannot be selected. Version inconsistencies are recorded in the workspace log, as they indicate that a project might be corrupted.

The adapter migration wizard in IBM Integration Designer Version 7.5.1 only supports the migration of adapters from version 6.1.x, version 6.2.x, version 7.0.x, version 7.5.0, and version 7.5.0.2 to version 7.5.0.3. It does not support the adapter migration from lower versions to any of the versions before version 7.5.0.3.

Deciding whether to upgrade or to upgrade and migrate

The default processing of the migration wizard is to perform an upgrade of the adapter and to migrate the application artifacts so that the applications can use features and functions in version 7.5.0.3 of the adapter. When you choose to upgrade the adapter by selecting a project, the wizard automatically selects the associated artifacts for migration.

If you decide that you want to upgrade the adapter from version 6.1.x, version 6.2.x, version 7.0.x, version 7.5.0, or version 7.5.0.2 to version 7.5.0.3, but you do not want to migrate the adapter artifacts, you can do so by clearing the adapter artifacts from the appropriate area of the migration wizard.

Running the migration wizard without selecting any adapter artifacts installs and upgrades your adapter. As the artifacts are not migrated, your applications cannot take advantage of the features and capabilities that exist in version 7.5.0.3 of the adapter.

Migrating multiple adapters referred within a project

When a module contains one or more connector projects, each of which references to different adapters (for example, a module project that contains connector projects referring to JDBC and SAP adapters), the migration wizard identifies the artifacts belonging to each adapter and migrates these artifacts without disrupting the artifacts of other adapters.

When you select the module project and launch the migration wizard:

- The **Source connector** field lists the connector projects with the selected module project.
- The **Dependent artifact projects** area lists only the selected module project.

If you select the connector project and launch the migration wizard:

- The **Source connector** field lists only the selected connector project.
- The **Dependent artifact projects** area lists all projects which reference the selected connector project, including the module project.

Run the migration wizard in a test environment

Because adapter migration might require you to change those applications that use version 7.5.0.3 of WebSphere Adapter for Email, you must always perform the migration in a development environment first and test your applications before deploying the application to a production environment.

The migration wizard is fully integrated with the development environment.

Fault processing when migrating to version 7.0

Fault processing in version 7.0 depends upon the type of fault configuration done in the previous version. If the user manually configures business faults in version 6.2 then the faults are automatically configured in version 7.5.0.3. In case no fault is configured in version 6.2, then the user needs to manually configure the faults after migrating to version 7.5.0.3, as per the steps described in the following section.

Performing the migration

You can migrate a project or EAR file to version 7.5.0.3 using the adapter migration wizard. When the tool is finished, the migration is complete and you can work in the project or deploy the module.

Before you begin

Review the information in *Migration considerations*.

About this task

To perform the migration in IBM Integration Designer, complete the following steps.

Note: After migration is complete, the module is no longer compatible with previous versions of the IBM Business Process Manager or WebSphere Enterprise Service Bus runtimes or IBM Integration Designer.

The following steps describe how to run the adapter migration wizard from the connector project menu while in the Java EE perspective in IBM Integration Designer.

Procedure

1. Import the PI (project interchange) file for an existing project into the workspace.

Note: Ensure that you do not modify the contents of the RAR or copy the adapter JAR file outside the connector project.

2. When projects are created in an earlier version of IBM Integration Designer, the Workspace Migration wizard starts automatically and selects the projects to migrate. Follow the wizard and complete the workspace migration. For more information, see <http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5m1/topic/com.ibm.wbpm.wid.imuc.doc/topics/tmigrscart.html>.
3. Change to the Java EE perspective.
4. Right-click the module and select **Migrate connector project**. For example, the adapter RAR module.

You can also launch the adapter migration wizard in the following ways:

- Right-click the project in the Java EE perspective and select **Migrate adapter artifacts**.
 - From the Problems view, right-click a migration-specific message and select **Quick Fix** to correct the problem.
5. In the Select Projects window, perform the following steps:
 - a. The **Source connector** field displays the name of the connector project that you are migrating. If you are migrating a module project, this field lists all the connector projects in the module project. Select the source project from the list. For more information, see “Migrating multiple adapters referred within a project” on page 28.
 - b. The **Target connector** field displays the name of the connector to which you are migrating. If you are working with more than one adapter version, this list displays the names of all the compatible connectors. Select the connector you want to migrate.
 - c. The **Target version** field displays the version corresponding to the target connector that you selected in the previous step.
 - d. The **Dependent artifacts project** area lists the adapter artifacts that are migrated. If you are migrating a module project, this area lists only the selected module project. If you are migrating a connector project within the module project, this area lists all projects which reference the selected connector project, including the module project. By default, all the dependent artifact projects are selected. If you do not select a dependent artifact project, that project is not migrated. You can migrate any project that you have not selected at a later time. Previously migrated projects, projects with a current version, and projects that contain errors are unavailable for migration and are not selected. For more information, see “Upgrading but not migrating a project” on page 30.
 - e. Click **Next**. A warning window is displayed with the message, “Properties that are not supported in this version of the target adapter will be removed during the migration”.

- f. Click **OK**.
6. In the Review Changes window, review the migration changes that occur in each of the artifacts that you are migrating. To view the details, expand each node by clicking the + sign.
7. To complete the migration:
 - Click **Finish**.
 - If the files that need to be updated during migration are in read-only mode, you will be unable to click on the **Finish** button. To view these files, click **Next**. The Update Read-only files window displays the read-only files. To update these files and continue with the migration, click **Finish**. To exit the wizard without migrating the adapter, click **Cancel**.

Before running the migration process, the wizard performs a backup of all projects affected by the migration. The projects are backed up to a temporary folder within the workspace. If the migration fails for any reason, or if you decide to cancel the migration before it completes, the wizard deletes the modified projects and replaces them with the projects stored in the temporary folder.

Upon completing the migration successfully, all backed up projects are deleted.

8. If you are migrating an EAR file, optionally create a new EAR file with the migrated adapter and artifacts, and deploy it to IBM Business Process Manager or WebSphere Enterprise Service Bus. For more information about exporting and deploying an EAR file, see the topics devoted to it in this documentation.

Results

The project or EAR file is migrated to version 7.5.0.3. You do not need to run the external service wizard after exiting the adapter migration wizard.

Upgrading but not migrating a project

You can upgrade the adapter from an earlier version, to version 7.5.0.3 while choosing not to migrate the adapter project artifacts.

About this task

Running the migration wizard without selecting any adapter artifacts installs and upgrades your adapter. As the artifacts are not migrated, your applications cannot take advantage of the features and capabilities that exist in version 7.5.0.3 of the adapter.

Procedure

1. Import the PI (project interchange) file into the workspace.
2. When projects are created in an earlier version of IBM Integration Designer, the Workspace Migration wizard starts automatically and selects the projects to migrate. Follow the wizard and complete the workspace migration. For more information, see <http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5m1/topic/com.ibm.wbpm.wid.imuc.doc/topics/tmigrscart.html>.
3. In the Java EE perspective, right-click the project name and click **Migrate connector project**. The **Adapter Migration** wizard is displayed.
4. In the Select Projects window, clear the dependent artifact projects, and click **Next**. A warning window is displayed with the message, "The properties that are not supported in the version of the target adapter will be removed during the migration."

5. Click **OK**.
6. In the Review Changes window, review the migration changes that occur during updating the project. To view the details, expand each node by clicking the + sign.
7. To complete the migration:
 - Click **Finish**.
 - If the files that need to be updated during migration are in read-only mode, you will be unable to click on the **Finish** button. To view these files, click **Next**. The Update Read-only files window displays the read-only files. To update these files and continue with the migration, click **Finish**. To exit the wizard without migrating the adapter, click **Cancel**.

Results

The project can now be used with WebSphere Adapter for Email, version 7.5.0.3.

Migrating WebSphere Business Integration applications

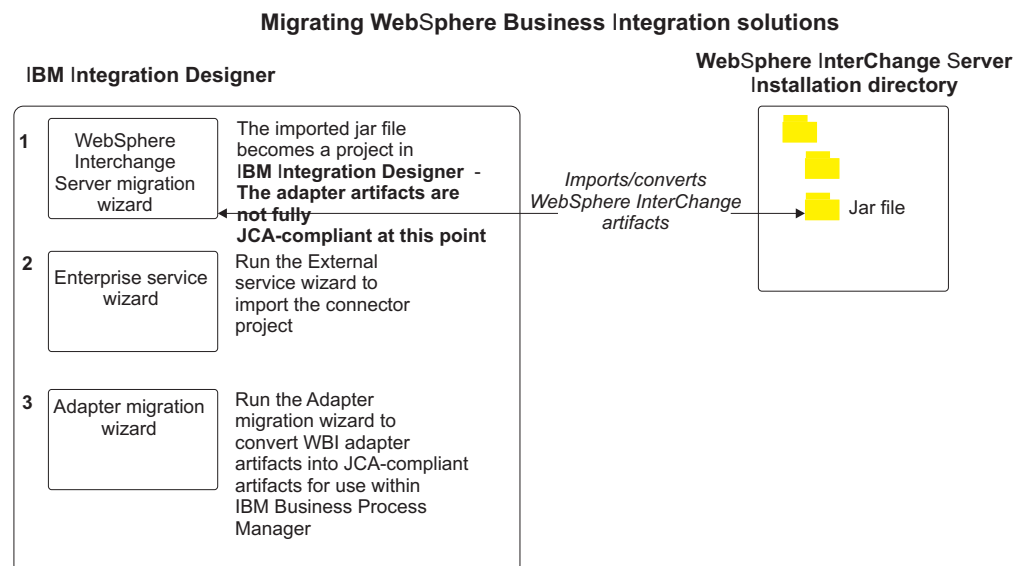
You need to migrate the WebSphere Business Integration applications so that they become compatible with Version 7.5.0.3 of your adapter.

About this task

Migrating WebSphere Business Integration applications for use with Version 7.5.0.3 of your WebSphere adapter is a multistep process. First, the artifacts from WebSphere InterChange Server are migrated and converted. A project is then created for the artifacts in IBM Integration Designer. In the remaining steps, the adapter-specific artifacts are migrated and converted into the JCA-compliant format supported by Version 7.5.0.3 of the adapter.

Example

The following diagram shows the wizards that you use to migrate WebSphere Business Integration solutions from WebSphere InterChange Server, so that these applications can be used with Version 7.5.0.3 of your adapter.



Migrating applications from WebSphere InterChange Server

To use Version 7.5.0.3 of WebSphere Adapter for Email with applications from WebSphere InterChange Server, you need to migrate the application artifacts and convert them so that they can be deployed and run on IBM Business Process Manager or WebSphere Enterprise Service Bus. Understanding this task at a high level helps you perform the steps that are needed to accomplish the task.

The following figure illustrates the flow of the migration task. The steps that follow the figure describe this task at a high level only. See the topics following this roadmap for the details on how to perform each of these steps.

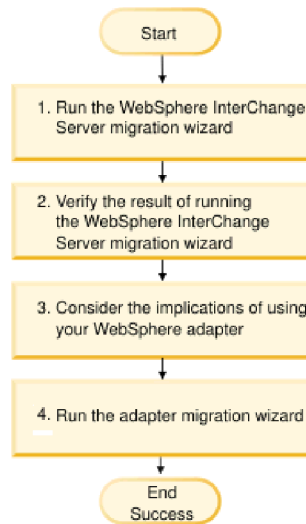


Figure 9. Roadmap for migrating applications from WebSphere InterChange Server

Migrating applications from WebSphere InterChange Server

This task consists of the following steps:

1. Run the WebSphere InterChange Server migration wizard.
The WebSphere InterChange Server migration wizard moves the application artifacts into IBM Integration Designer. The migrated adapter artifacts are not fully JCA-compliant at the completion of this task.
2. Verify that the WebSphere InterChange Server migration is successful.
Review all messages from the Migration results window and take action if required.
3. Consider the implications of using Version 7.5.0.3 of WebSphere Adapter for Email.
In addition to considerations for migrating WebSphere InterChange Server applications, you need to consider how Version 7.5.0.3 of WebSphere Adapter for Email works with the migrated applications. Some of the adapter operations supported by WebSphere InterChange Server applications might be supported and implemented differently with Version 7.5.0.3 of the adapter.
4. Run the adapter migration wizard.
Run the adapter migration wizard to update adapter-specific artifacts such as the schemas and service definition files (.import, .export, and .wsdl files) for use with Version 7.5.0.3 of the adapter.

Migration considerations for WebSphere Business Integration adapters

By migrating to WebSphere Adapter for Email Version 7.5.0.3, you have an adapter that is compliant with the Java Platform, Enterprise Edition (JEE) Connector Architecture (JCA) and designed specifically for service-oriented architecture.

Application artifacts

Before running the adapter migration wizard, use the WebSphere InterChange Server migration wizard to generate the application artifacts for the WebSphere Business Integration adapter, including the business objects, maps, and collaborations. Then you can run the adapter migration wizard to update the adapter-specific artifacts such as the schemas and service definition files (.import, .export, and .wsdl) so that they are suitably converted into a format that is compliant with JCA.

Run the migration wizard in a test environment first

Because migrating from a WebSphere Business Integration adapter to WebSphere Adapter for Email might require changes to the applications that use Version 7.5.0.3 of WebSphere Adapter for Email, always perform the migration in a development environment first and test your applications before deploying the application to a production environment.

Migrating application artifacts from WebSphere InterChange Server

To migrate the application artifacts into IBM Integration Designer, run the WebSphere InterChange Server migration wizard. The wizard imports and converts most of the artifacts into a format that is compatible with IBM Business Process Manager or WebSphere Enterprise Service Bus.

Before you begin

Launch the WebSphere InterChange Server migration wizard from within IBM Integration Designer to migrate the application artifacts from WebSphere InterChange Server format into artifacts that are compatible with IBM Business Process Manager or WebSphere Enterprise Service Bus.

For information about how to prepare to migrate artifacts from WebSphere InterChange Server and for detailed instructions on performing the migration and verifying that the migration was successful, see <http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5m1/index.jsp?topic=/com.ibm.wbpm.wid.imuc.doc/topics/twics.html>.

About this task

Running WebSphere InterChange Server migration wizard might not fully convert adapter-specific artifacts (such as service descriptors, service definitions, and business objects) into IBM Business Process Manager or WebSphere Enterprise Service Bus compatible artifacts. To complete the migration of adapter-specific artifacts, run the adapter migration wizard after you have successfully run the WebSphere InterChange Server migration wizard.

Note: While you run the WebSphere InterChange Server migration wizard, ensure that you set each connector in the repository to the same adapter version.

Results

The project and application artifacts are migrated and converted into IBM Business Process Manager compatible artifacts.

What to do next

Run the adapter migration wizard to migrate the adapter-specific artifacts.

Migrating adapter-specific artifacts

After a project is created for the artifacts in IBM Integration Designer, you can migrate the project using the adapter migration wizard. The adapter migration wizard updates adapter-specific artifacts such as the schemas and service definition files (.import, .export, and .wsdl) for use with version 7.5.0.3 of the adapter. When you finish running the adapter migration wizard, the migration is complete and you can work in the project or deploy the module.

Before you begin

Before running the adapter migration wizard, do the following steps:

- Review the information in “Migration considerations” on page 27.
- Run the WebSphere InterChange Server migration wizard to migrate the project and convert data objects for use with IBM Business Process Manager or WebSphere Enterprise Service Bus.

About this task

After migration is complete, the module will work only with Version 7.5.0.3 of your adapter.

To perform the migration in IBM Integration Designer, complete the following steps.

Procedure

1. Import the PI (project interchange) file for an existing project into the workspace.
2. When projects are created in an earlier version of IBM Integration Designer, the Workspace Migration wizard starts automatically and selects the projects to migrate. Follow the wizard and complete the workspace migration. For more information, see <http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5m1/topic/com.ibm.wbpm.wid.imuc.doc/topics/tmigrscart.html>.
3. Change to the Java EE perspective.
4. Right-click the connector project and select **Migrate connector project**.
You can also launch the adapter migration wizard by using the right-click option and selecting the module project in the Java EE perspective and selecting **Migrate adapter artifacts**.

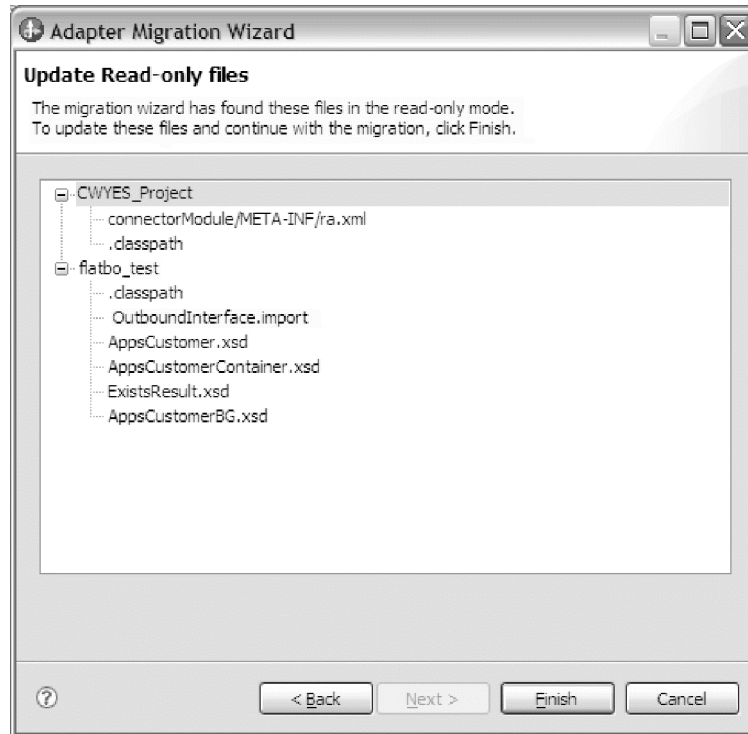
Note:

If the adapter type (for example, CICS/IMS adapter) is not supported by the migration wizard, the **Migrate connector project** and **Migrate adapter**

artifacts menus are not available for selection. If the adapter project is of the latest version and the module projects referencing this adapter project are also of the latest version, these menus are disabled.

When you launch the migration wizard from the connector project while in the Java EE perspective, by default all the dependent artifact projects are selected. If you do not select a dependent artifact project, that project is not migrated.

5. In the Select Projects window, perform the following steps:
 - a. The **Source connector** field displays the name of the connector project that you are migrating. Select the source project from the list.
 - b. The **Target connector** field displays the name of the connector to which you are migrating. If you are working with more than one adapter version, this list displays the names of all the compatible connectors. Select the connector to which you want to migrate.
 - c. The **Target version** field displays the version corresponding to the target connector you selected in the previous step.
 - d. The **Dependent artifacts project** area lists the adapter artifacts that are migrated.
 - e. Review the tasks and warnings presented on the welcome page, and click **Next**. A warning window is displayed with the message, "The properties that are not supported in the version of the target adapter are removed during the migration."
 - f. Click **OK**.
6. In the Review Changes window, review the migration changes that occur in each of the artifacts that you are migrating. To view the details, expand each node by clicking the + sign.
7. To complete the migration:
 - Click **Finish**.
 - If the files that need to be updated during migration are in read-only mode, you will be unable to click on the **Finish** button. To view these files, click **Next**. The Update Read-only files window displays the read-only files. To update these files and continue with the migration, click **Finish**. To exit the wizard without migrating the adapter, click **Cancel**.

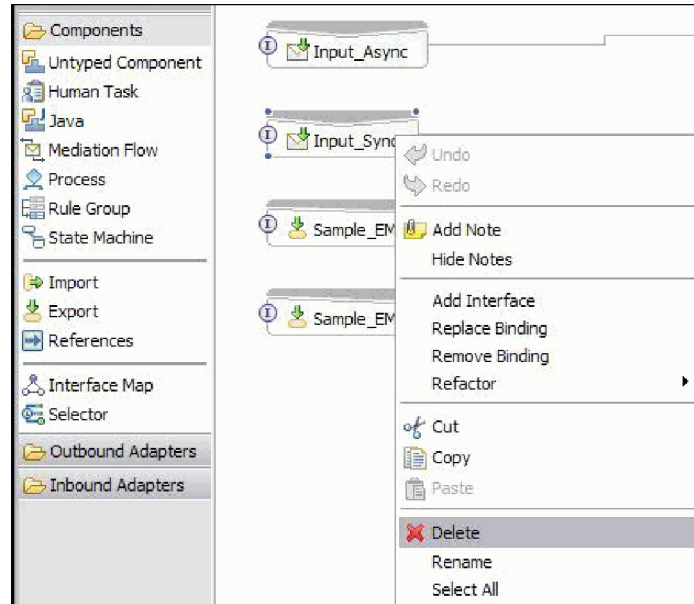


Before performing the migration process, the wizard backs up all projects affected by the migration. The projects are backed up to a temporary folder within the workspace. If the migration fails for any reason, or if you decide to cancel the migration before it completes, the wizard deletes the modified projects and replaces them with the projects stored in the temporary folder.

8. Select **Project > Clean**, to refresh and rebuild the workspace for the changes to take effect.

Note: The `inProgressFolder` property in WebSphere Adapter for Email does not have an equivalent property in WebSphere Business Integration Adapter for e-Mail. You must specify the value for the `inProgressFolder` property manually after running the migration wizard.

9. On successful migration, all backed up projects are deleted. Remove the Sync inbound flow manually as this flow is not used by the adapter. From the migrated project, select the `Input_Sync` inbound flow, right-click, and select **Delete**.



10. If you are migrating an EAR file, create a new EAR file with the migrated adapter and artifacts, and deploy it to IBM Business Process Manager or WebSphere Enterprise Service Bus. For information about exporting and deploying an EAR file, see “Deploying the module for production” on page 117.

Results

The project is migrated to Version 7.5.0.3. You do not need to run the external service wizard after exiting the adapter migration wizard.

Changes to the import, export, and WSDL files after migration

When the WebSphere InterChange Server migration wizard moves the application artifacts into IBM Integration Designer, changes made are reflected in the service definition files: the import, export, and WSDL files.

The migrated adapter artifacts are not fully JCA-compliant at the completion of this task. You can complete the migration of the adapter-specific artifacts (such as service descriptors, service definitions, and business objects) to a JCA compatible format by running the adapter migration wizard.

Changes to the import file

During migration, the affected module artifacts are migrated to an import file. The existing JMS Binding property is changed to the EIS Binding property in the import file. The other property details added in the import file include information about the data binding configuration, changes to the connection information in the Managed Connection Factory properties, and several new method bindings.

Changes to the export file

During migration, the affected module artifacts are migrated to an export file. The existing JMS Binding property is changed to the EIS Binding property in the export file. The other property details added in the export file include information about the data binding configuration, changes to the connection information in the

Activation Specification properties, and several new method bindings.

Changes to the WSDL file after migration

During migration, the affected module artifacts are migrated to corresponding WSDL files that include EMail specific service description WSDL artifacts. The service description files become JCA compatible. The WSDL files have an input and output type for each operation. Both the inbound and outbound operations work on their specific input types to produce corresponding output types after the operations are performed.

Note:

- When you migrate multiple top level inbound business objects in the project, only the first top-level business object inbound feature works correctly. For the other top level inbound business object to work correctly, you must manually modify the "emit + [verb name] + after image + [business object name]" method in the `Input_Processing.java` and `Input_Async_Processing.java` class to call the correct destination services.
- The WebSphere Business Integration Adapter for e-Mail properties that are either not valid or not supported by WebSphere Adapter for Email are removed from the migrated artifacts.

Chapter 3. Samples and tutorials

To help you use WebSphere Adapters, samples and tutorials are available from the Business Process Management Samples and Tutorials website.

You can access the samples and tutorials in either of the following ways:

- From the welcome page of IBM Integration Designer, click **Go to Samples and Tutorials**. In the Samples and Tutorials pane, under More samples, click **Retrieve**. Browse the displayed categories to make your selection.
- From the Business Process Management Samples and Tutorials website:
<http://bpmwikilogin.blueworkslive.com/accounts/login/>.

Chapter 4. Configuring the module for deployment

To configure the adapter so that it can be deployed on IBM Business Process Manager or WebSphere Enterprise Service Bus, use IBM Integration Designer to create a module, which is exported as an EAR file when you deploy the adapter. You then specify the business objects you want to build and the system on which you want to build them.

Roadmap for configuring the module

Before you can use WebSphere Adapter for Email in a runtime environment, you must configure the module. Understanding this task at a high level helps you perform the steps that are needed to accomplish the task.

You configure the module for WebSphere Adapter for Email by using IBM Integration Designer. The following figure illustrates the flow of the configuration task, and the steps that follow the figure describe this task at a high level only. For details about how to perform each of these steps, see the topics following this roadmap.

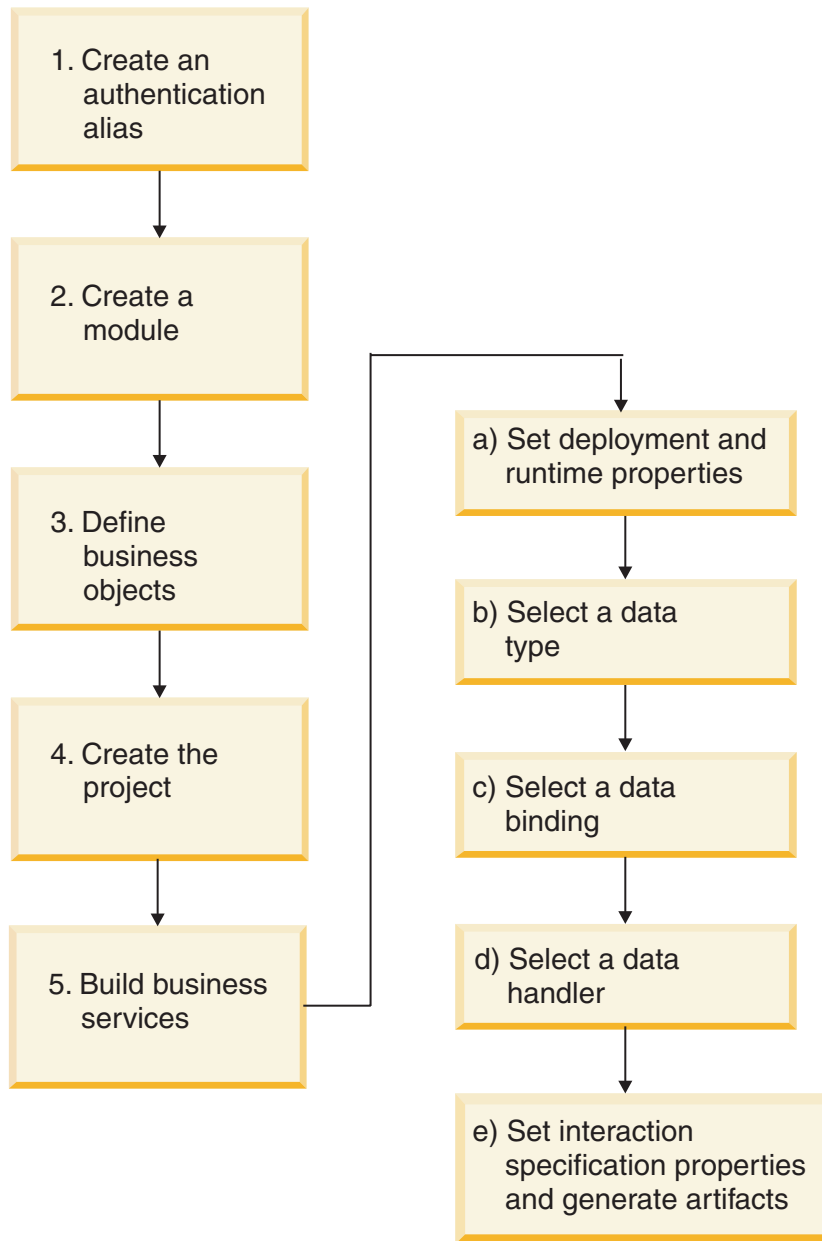


Figure 10. Roadmap for configuring the module

Configuring the module

This task consists of the following steps.

Note: These steps assume that you are using user-defined business objects that require data transformation. If you are using generic business objects, which do not require data transformation, some of the following steps are ignored. For example, you do not need to select a data binding and a data handler.

1. Create an authentication alias to access the mail server. Perform this step using the Process Administrative Console.
2. Create a module in IBM Integration Designer.

Note: You create business objects in the module.

3. Define the business objects to be used by the project.
4. Create a project, which is used to organize the files associated with the adapter by using the external service wizard in IBM Integration Designer.
5. Build business services by running the external service wizard from IBM Integration Designer, then perform the following steps:
 - a. Specify the following deployment and runtime properties:
 - Connection properties
 - Security properties
 - Deployment options
 - Function selector - Inbound only
 - b. Select a data type and name the operation associated with this data type. For each operation, specify the following information:
 - The operation kind, for example, Create, Append, Exists.
 - Specify whether the operation is pass-through or user defined.
 - c. Select the data binding. Each data type has an equivalent data binding used to read the fields in a business object and fill the corresponding fields in a file.
 - d. Select the data handler that is going to perform the conversions between a business object and a native format.
 - e. Specify interaction specification property values and generate artifacts. The output from running the external service wizard is saved to a business integration module, which contains the business object or objects, and the import or export file.

Configuring the mail server to work with the adapter

Before working with the adapter, you must install and configure a mail server according to its user manual. The information about how to connect to the mail server (such as user names, passwords, and port) is required by the external service wizard in IBM Integration Designer when you create your adapter module.

Creating an authentication alias

An authentication alias is a feature that encrypts the passwords used by the adapter to access the mail server. You can gain a greater level of security by using an authentication alias to configure the adapter, instead of typing the user ID and password directly.

Before you begin

To create an authentication alias, you must have access to the IBM Business Process Manager or WebSphere Enterprise Service Bus Process Administrative Console.

Note: Using the authentication alias is the default choice in the external service wizard.

The following procedure shows you how to gain access to the Process Administrative Console through IBM Integration Designer. If you are using the Process Administrative Console directly (without going through IBM Integration Designer), log in to the Process Administrative Console and skip to step 2 on page 44

About this task

Using an authentication alias eliminates the need to store the password in clear text in an adapter configuration property, where it might be visible to others.

To create an authentication alias, use the following procedure.

Procedure

1. Start the Process Administrative Console.
To start the Process Administrative Console through IBM Integration Designer, perform the following steps:
 - a. In the Business Integration perspective of IBM Integration Designer, click the **Servers** tab.
 - b. If the server does not show a status of **Started**, right-click the name of the server (for example, **WebSphere Process Server**) and click **Start**.
 - c. Right-click the name of the server and select **Administration > Run Process Administrative Console**.
 - d. Log on to the Process Administrative Console. If your Process Administrative Console requires a user ID and password, type the ID and password and click **Log in**. If the user ID and password are not required, click **Log in**.
2. In the Process Administrative Console, click **Security > Secure administration, applications, and infrastructure**.
3. Under **Authentication**, click **Java Authentication and Authorization Service > J2C authentication data**.
4. Create an authentication alias:
 - a. In the list of J2C authentication aliases that is displayed, click **New**.
 - b. In the **Configuration** tab, type the name of the authentication alias in the **Alias** field.
 - c. Type the user ID and password that are required to establish a connection to the mail server.
 - d. Optionally type a description of the alias.
 - e. Click **OK**.
The newly created alias is displayed.
The full name of the alias contains the node name and the authentication alias name you specified. For example, if you create an alias on the node widNode with the name ProductionServerAlias, then the full name is widNode/ProductionServerAlias. This full name is the one you use in subsequent configuration windows.
 - f. Click **Save**.

Results

You created an authentication alias, which you can use when you configure the adapter properties.

Creating the module

A module encapsulates the service in a reusable unit and consists of both a project in IBM Integration Designer and a unit of deployment to IBM Business Process Manager or WebSphere Enterprise Service Bus. The module is packaged and deployed to IBM Business Process Manager or WebSphere Enterprise Service Bus as an enterprise archive (EAR) file.

Procedure

1. If IBM Integration Designer is not currently running, start it now.
 - a. Click **Start > Programs > IBM > IBM Integration Designer > IBM Integration Designer *version***, where *version* is the version of the IBM Integration Designer.
 - b. If you are prompted to specify a workspace, either accept the default value or select another workspace.
The workspace is a directory where IBM Integration Designer stores your project.
 - c. Optional: When the IBM Integration Designer window is displayed, click **Go to the Business Integration perspective**.
2. Right-click in the Business Integration section of the IBM Integration Designer window.

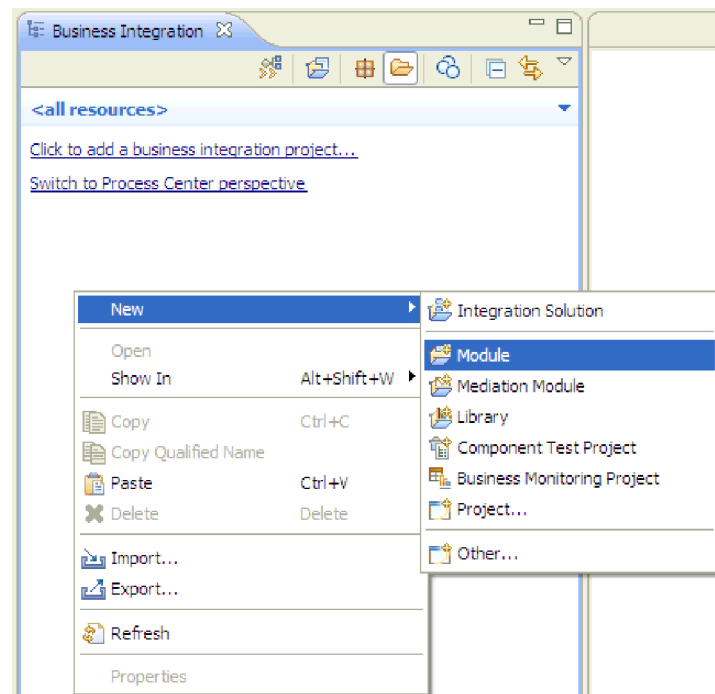


Figure 11. Business Integration section of the window

3. In the New Module window, type a name for the module in the **Module Name** field. For example, to configure a module for outbound processing, type Outbound as the module name. Click **Finish**.

Results

A new module is listed in the Business Integration window.

What to do next

Define business objects for the module.

Defining WebSphere Application Server environment variables

Use the Process Administrative Console of IBM Business Process Manager or WebSphere Enterprise Service Bus to define WebSphere Application Server environment variables.

About this task

To define a WebSphere Application Server environment variable, use the following procedure:

Procedure

1. Start the Process Administrative Console.
2. Select **Environment > WebSphere Variables**.
3. Select the scope for the environment variable. The scope specifies the level at which the resource definition is visible on the Process Administrative Console panel. The possible values are *server*, *node*, and *cell*. In the following figure, the scope is defined at the cell level as `Cell=Dmgr1Cell`.

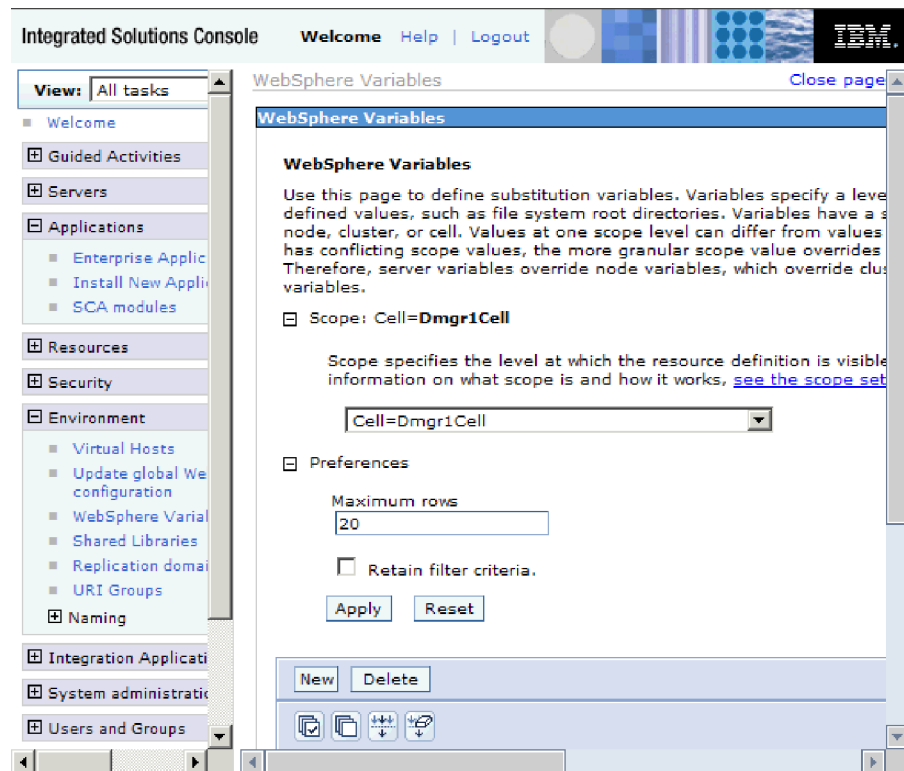


Figure 12. Setting the scope for the environment variable

4. Click **New** and provide a name and a value for the environment variable. The name is the symbolic name that represents a physical path. The value is the absolute path that the variable represents. In this example, the name is `ARCHIVE_FOLDER` and the value is `C:/email/ArchiveFolder`. You can use the **Description** field, which is optional, to describe the purpose of the variable.

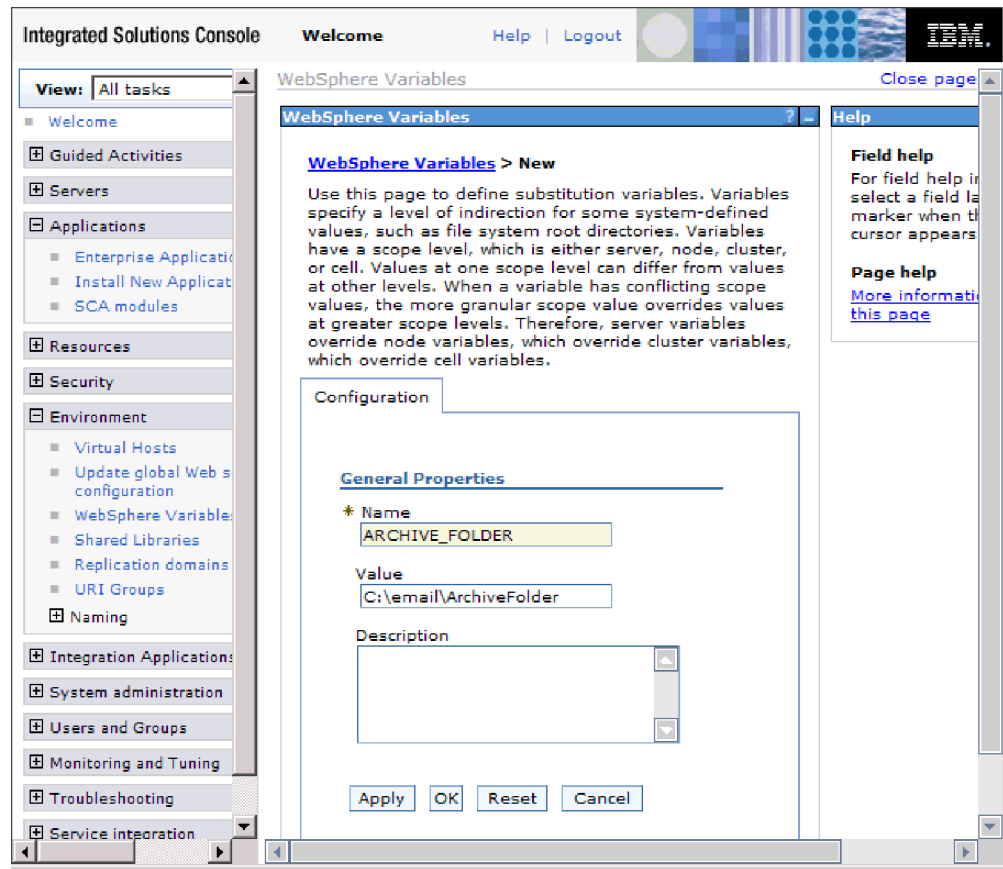


Figure 13. Providing a name and a value for the environment variable

5. Click **OK** to save the changes.

Results

An environment variable called `ARCHIVE_FOLDER` is defined, with the value `C:/email/ArchiveFolder` and a scope of `Cell=Dmgr1Cell`. You can use it in the external service wizard whenever you specify the event directory.

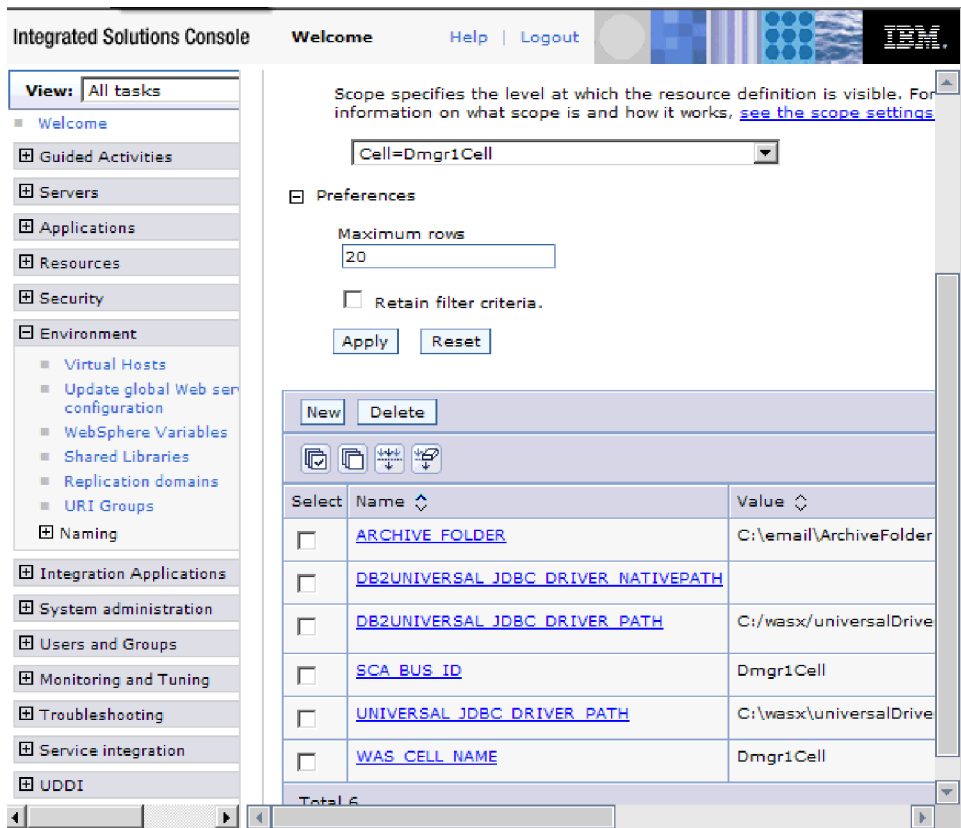


Figure 14. The new environment variable ARCHIVE_FOLDER displayed in the WebSphere Variables window

What to do next

Define business objects for the module.

Defining business objects

Create business objects or import predefined business objects that is to be used by the module. WebSphere Adapter for Email uses business objects to either obtain information from an email or to produce an email.

About this task

You use the business object editor to create new business objects or import predefined business objects.

Note: These steps must only be used for payload business objects (such as Customer and Order) and not for top-level email business objects (wrappers). Wrapper business objects are created by the external service wizard.

Procedure

- To create new business objects, complete these steps.
 1. Expand the new module in the Business Integration section of the IBM Integration Designer window.
 2. Right-click the **Data Types** folder and select **New > Business Object**.
 3. In the Business Object window, type a name in the **Name** field.

4. Click **Finish**. The new business object is added to the **Data Types** folder.
 5. Click the **Add a field to a business object** icon and add the necessary fields to the business object.
 6. Click the Save icon.
 7. Repeat the previous steps for each business object that you want to create.
- To import predefined business objects, complete these steps.
 1. Expand the new module located inside of the Business Integration section of the IBM Integration Designer window.
 2. Right-click the **Data Types** folder and select **Import**.
 3. In the Select window, expand **General** and click **File System**.
 4. Click **Next**.
 5. Browse to the directory with the XSD file and click **OK**.
 6. Select one or more business object XSD files and click **Finish**.

Results

The new business objects are defined.

What to do next

Create a project, which is used to organize the files associated with the adapter.

Creating a simple service with the adapter pattern wizard

Adapter patterns provide a quick and easy way of creating a simple service with an adapter.

Before you begin

To use the WebSphere Adapter for Email pattern wizard, you must create a module for the service.

About this task

The following adapter pattern is available for WebSphere Adapter for Email:

Table 4. Adapter pattern

Adapter pattern	Description
Simple outbound email pattern	The "create an outbound Email service to send mail" pattern creates a service that sends simple email messages using a mail server.

In this example, create an outbound service that creates simple alert emails and send them to a mail server for distribution.

Complete the following steps to create this service with the adapter pattern wizard.

Procedure

1. Right-click the module within the **Business Integration** section of the IBM Integration Designer window and select **New > External Service**. The Select the Service Type or Registry window opens.

2. Select **Simple: Create an outbound e-mail service to send mail** and click **Next**.

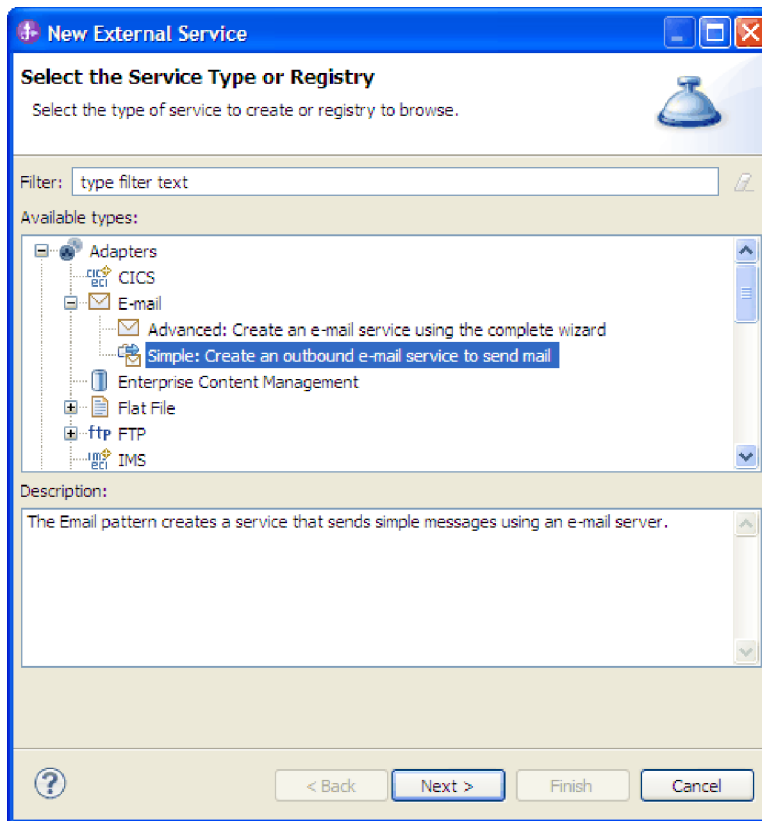


Figure 15. Select the Service Type or Registry window

3. In the E-mail service name window, change the name to something meaningful such as EmailOutboundInterface and click **Next**.

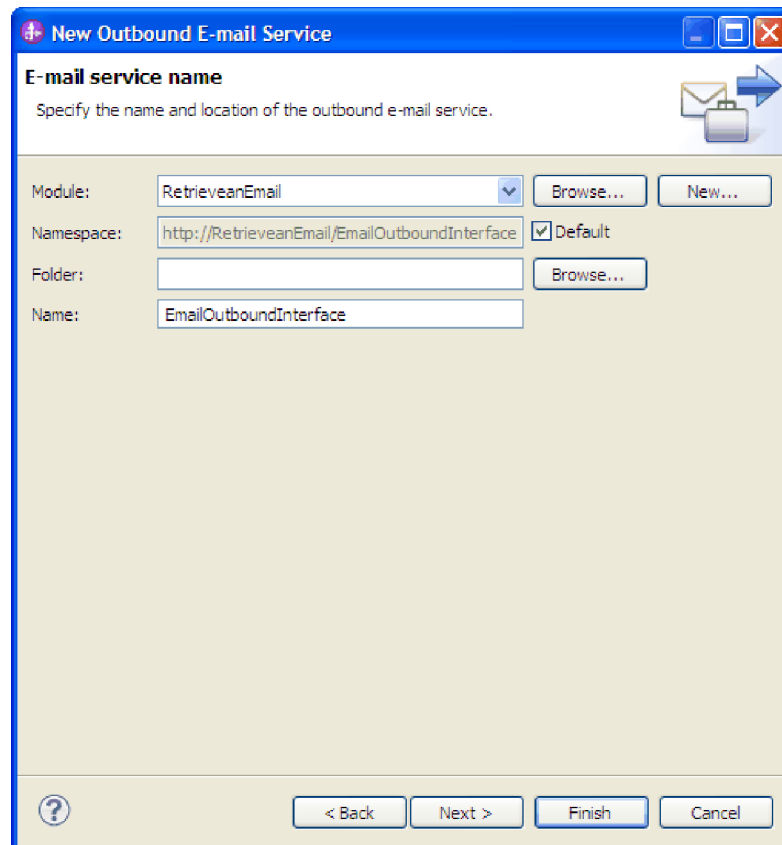


Figure 16. E-mail service name window

4. In the E-mail Server window, specify both the **E-mail server host name** and the **Port** fields. For example, connecting to local host on port 25. Click **Next**.
5. In the E-mail server security credential window, select either **No security**, **Using an existing JAAS alias** or **Using user name and password** and click **Next**.

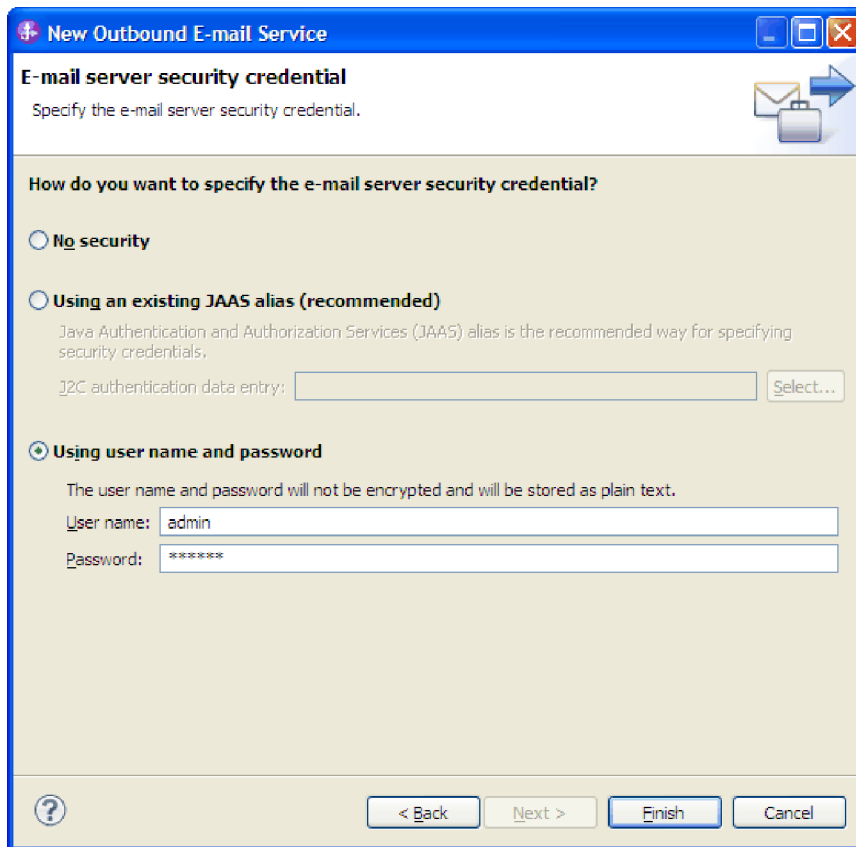


Figure 17. E-mail server security credential window

Results

The outbound service is created, which includes the following artifacts:

Table 5. Artifacts for the outbound service

Artifact	Name	Description
Import	EmailOutboundInterface	The import exposes the module internally, in this case, to the mail server.
Interface	EmailOutboundInterface	This interface contains the operation that can be started.
Operation	createEmail	createEmail is the only operation in the interface.

Starting the external service wizard

To begin the process of creating and deploying a module, you start the external service wizard in IBM Integration Designer. The wizard creates a project that is used to organize the files associated with the module.

Before you begin

Make sure that you gather the information to establish a connection to the mail server. For example, you need the name or IP address of the mail server and the user ID and password to access it.

About this task

Start the external service wizard to create a project for the adapter in IBM Integration Designer. If you have an existing project, you can select it instead of having the wizard create one.

To start the external service wizard and create a project, use the following procedure.

Procedure

1. To start the external service wizard, go to the Business Integration perspective of IBM Integration Designer, and then click **File > New > External Service**.
2. In the External service window, expand **Adapters** and select **Email**, which is the type of adapter you want to create. Then click **Next**.
3. In the Select an Adapter window, select the adapter name to create a project, or select an existing project to reuse it.
 - To create a project, perform the following steps:
 - a. Select **IBM WebSphere Adapter for Email (IBM : *version*)**, where *version* is the version of the adapter you want to use and click **Next**.
 - b. In the Adapter Import window, provide details about the project you want to create.
 - 1) In the **Connector project** field, optionally specify a different name for the project.
 - 2) In the **Target runtime** field, select the server (for example, **IBM Business Process Manager**).
 - 3) Click **Next**.
 - To select an existing project, select the project folder under **IBM WebSphere Adapter for Email (IBM : *version*)**, where *version* is the version of the adapter you want to use and click **Next**.

Results

For a new project, the project is created and is listed in the Business Integration perspective. The wizard creates the adapter artifacts in the specified project.

Configuring the module for outbound processing

To configure a module to use the adapter for outbound processing, use the external service wizard in IBM Integration Designer to build business services, specify data transformation processing, and generate the business object definitions and related artifacts.

Configuring the module using the simple email data type

To configure a module for outbound processing using the simple email data type, use the external service wizard in IBM Integration Designer to build business services and generate business object definitions and related artifacts.

Setting deployment and runtime properties for simple email data type

To select and configure your module for outbound or inbound communication with the mail server, you specify the configuration properties using the external service wizard in IBM Integration Designer. Then, configure the managed connection factory properties. Managed connection factory properties are stored in

the business object and contain the information the adapter needs to make the connection between the outbound module and the mail server.

Before you begin

To perform this task, you must create a module. The module name is displayed in the Project Explorer view of IBM Integration Designer.

About this task

To set connection properties, follow this procedure. For more information, see “Managed connection factory properties” on page 179.

Procedure

1. In the Select the Processing Direction window, select **Outbound** and click **Next**. The Specify the Security and Configuration Properties window is displayed.

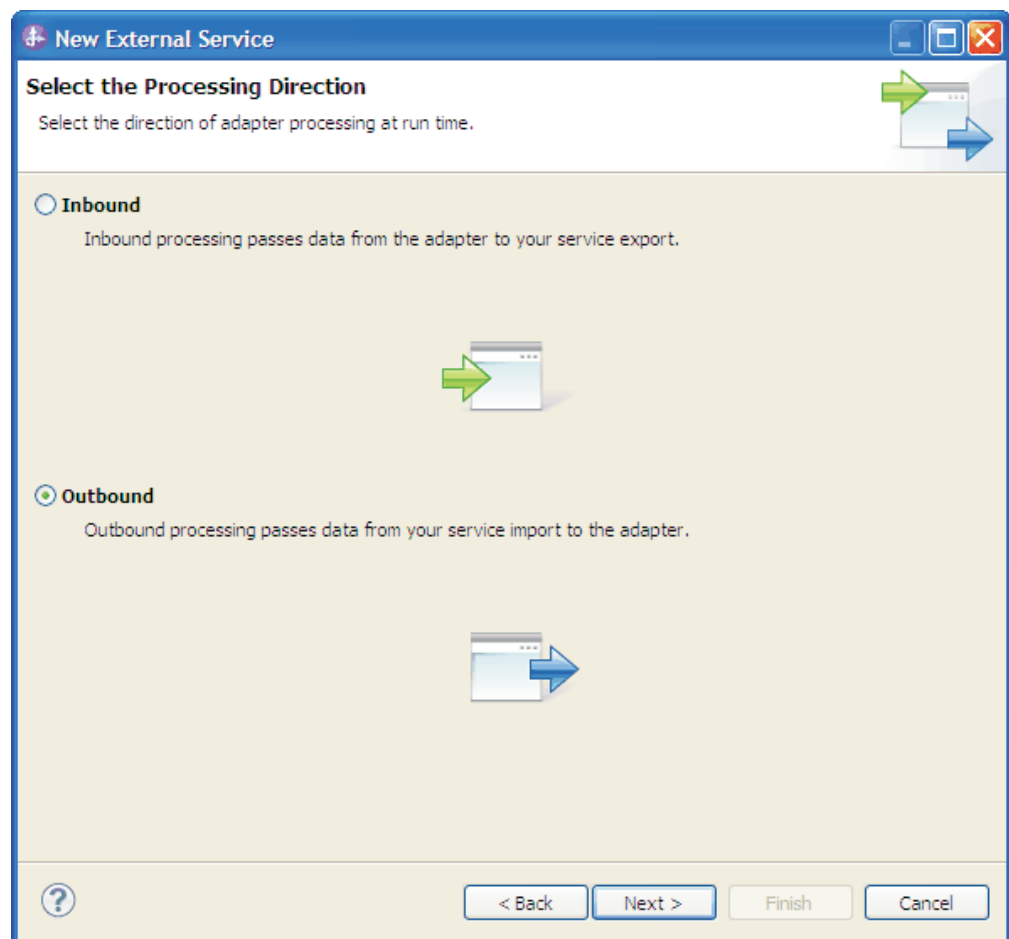


Figure 18. Choosing inbound or outbound in the external service wizard

2. In the **Deploy connector project** field, specify whether to include the adapter files in the module. Select one of the following values:
 - **With module for use by single application:** With the adapter files embedded in the module, you can deploy the module to any application server. Use an embedded adapter when you have a single module using the adapter or if multiple modules need to run different versions of the adapter. Using an

embedded adapter enables you to upgrade the adapter in a single module without the risk of destabilizing other modules by changing their adapter version.

- **On server for use by multiple applications:** If you do not include the adapter files in a module, you must install them as a stand-alone adapter on each application server where you want to run the module. Use a stand-alone adapter when multiple modules can use the same version of the adapter and you want to administer the adapter in a central location. A stand-alone adapter can also reduce the resources required by running a single adapter instance for multiple modules.
3. Under the **E-mail system connection information**, type the **Host name**. The properties in this window correspond to the managed connection factory properties. For detailed information about these properties, see “Managed connection factory properties” on page 179.

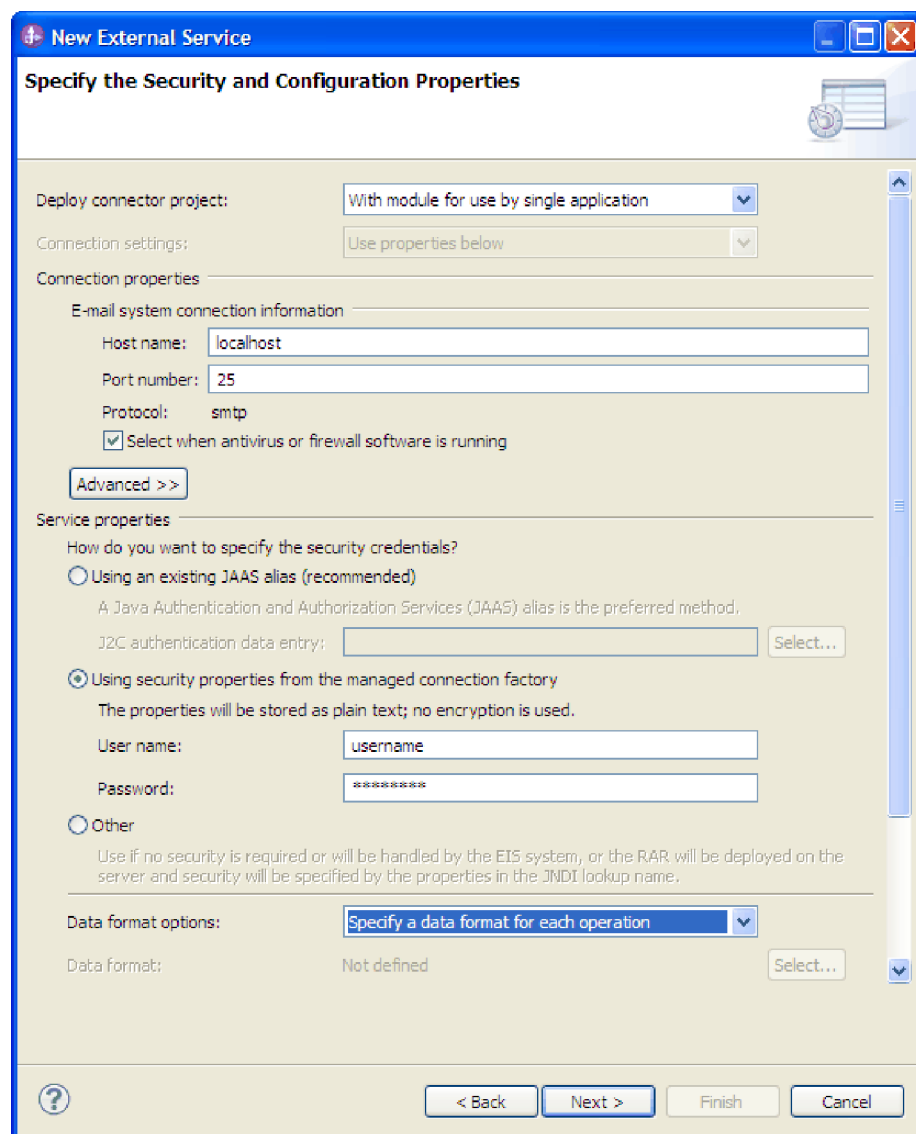


Figure 19. Security and configuration properties window

4. Type the **Port number**. The default value for the SMTP protocol is 25. If your SMTP mail server is listening on a different port number, change this value.

5. Clear the **Select when antivirus or firewall software is running** check box if you do not want the adapter to close the managed connection after each outbound request. If an antivirus program or firewall is running on your system (the machine on which the adapter is deployed or the one that hosts the mail server) and this check box is cleared, the adapter might fail to send outbound emails. Leaving this check box selected is recommended.
6. Optional: Click **Advanced** and expand the **Additional properties**, **Logging and tracing**, or **Bidi properties** sections as needed.
 - **Additional properties**
 - a. Select **Enable transport security (SSL)** check box to specify if secure socket layers are enabled for outbound communication. For more information, see “Secure connection (SSL) (enableSSL)” on page 185.
 - b. In the **Alternate e-mail ID in case of delivery failure** field, specify an alternate email address to receive undeliverable mail notifications. This email address can be a different email address than the one you specified in the From email address. For more details about this property, see “Alternate email ID in case of delivery failure” on page 183.
 - c. In the **Maximum retries in case of system connection failure** field, type the number of times the adapter tries the connection before reporting a polling error. For more information, see “Maximum retries on connection failure (connectionRetryLimit)” on page 183.
 - d. In the **Connection retry interval (in milliseconds)** field, specify the time interval between the attempts to reconnect to the mail server if the connection fails. For more information, see “Retry interval if connection fails (in milliseconds) entities” on page 182.
 - **Logging and tracing**
 - a. If you have multiple instances of the adapter, expand **Logging and tracing** and enter a value in the **Adapter ID** field that is unique for this instance. For more information about this property, see “Resource adapter properties” on page 186.
 - b. If you want to mask certain information so that the information is not displayed in the logs or traces, select **Disguise user data as "XXX" in log and trace files**. For more information, see “Disguise user data as "XXX" in log and trace files (HideConfidentialTrace) ” on page 182.
 - **Bidi properties**
 - a. Select the **Bidi transformation** check box to specify bidirectional format. For more information about setting the **Bidi properties**, refer to the “Globalization” on page 212 section.
7. In **Service properties**, specify how you want the adapter to connect to the mail server by selecting any one of these authentication methods.
 - To use a J2C authentication alias, click **Using an existing JAAS alias (recommended)** and type the name of the alias in the **J2C Authentication data entry** field. You can either specify an existing authentication alias or create one at any time before deploying the module. The name is case-sensitive and includes the node name.
 - To use the security properties from the managed connection specification, click **Using security properties from the managed connection factory** and enter the following information:
 - In the **User name** field, type the user name for the mail server.
 - In the **Password** field, type the password for the mail server.

Note: The security properties are not encrypted and stored as plain text. If you are using an authentication alias, a user name and password are not necessary. During outbound communication, you do not need to enter a user name and password because a mail server uses an anonymous user name and password to send the emails.

- To administer the user name and password from another mechanism, click **Other**.
8. Optional: Select the **Change logging properties for wizard** check box, if you want to define the level of logging for this module.
 9. For **Data format**, select **Specify a data binding for each operation**. Although the default value is **Use a data binding configuration for all operations**, select **Specify a data binding for each operation**, because the adapter has a different data binding for each supported business object. These data bindings have different properties, and are configured differently.

Important: Do not click **Next** in this window until you complete the steps to create a data binding or browse for an existing one.

What to do next

Select the data type and operation name.

Selecting a data type and operation name

Use the external service wizard to select a data type and name the operation associated with this data type. For outbound communication, the external service wizard gives you the choice of four different data types: simple email, generic email, generic email with business graph, and user-defined type. Each data type corresponds to a business object structure.

Before you begin

You must have specified the connection properties for the adapter to connect to the mail server before you can specify the operation and data type for the module.

About this task

To select a data type and name the operation associated with it, follow this procedure.

Procedure

1. In the Add, Edit, or Remove Operations window, click **Add** to create an operation.
2. In the Specify the I/O Properties window, select the **simple e-mail** from **The data type for the input operation** list and click **Next**. For more information about data types and the types of emails they create, see the business object structures section in this documentation.

Note: You can select the **Enable response on delivery** check box to configure the outbound response from the mail server.

3. In the Specify the I/O Properties window, type an **Operation name**.

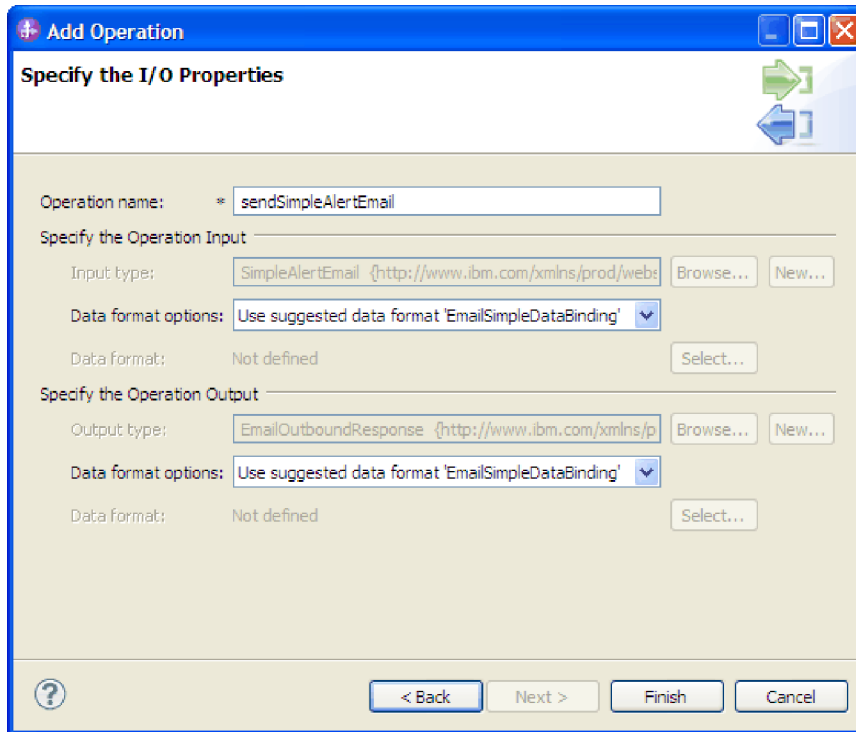


Figure 20. Naming the operation

Type a meaningful name for the operation, for example, sendSimpleAlertEmail. For more information about the types of operations the adapter can perform, see the topic on Supported Operations in this documentation.

Note: Names cannot contain spaces.

4. The external service wizard defaults to the correct data binding, EmailSimpleDataBinding.
5. Click **Finish**.

Results

A data type is defined for the module and the operation associated with this data type is named.

What to do next

Specify interaction specification properties and generate artifacts for the module.

Setting interaction specification properties and generating the service

Interaction properties are optional. If you choose to set them, the values you specify are displayed in the import file. The import file is generated when the adapter creates artifacts for the module and contains the operation for the top-level business object.

Before you begin

To set interaction specification properties and generate artifacts for your module, you must have specified the data type and operation name.

About this task

Interaction specification properties do not take precedence over request business object attributes, except for the user name and password properties. User name and password values specified in the interaction specification properties take precedence over values set in the managed connection factory properties. To set interaction specification properties and generate artifacts, follow this procedure. For more information, see “Interaction specification properties” on page 188.

Procedure

1. Optional: To set interaction specification properties, complete these steps:
 - a. Click **Advanced**.

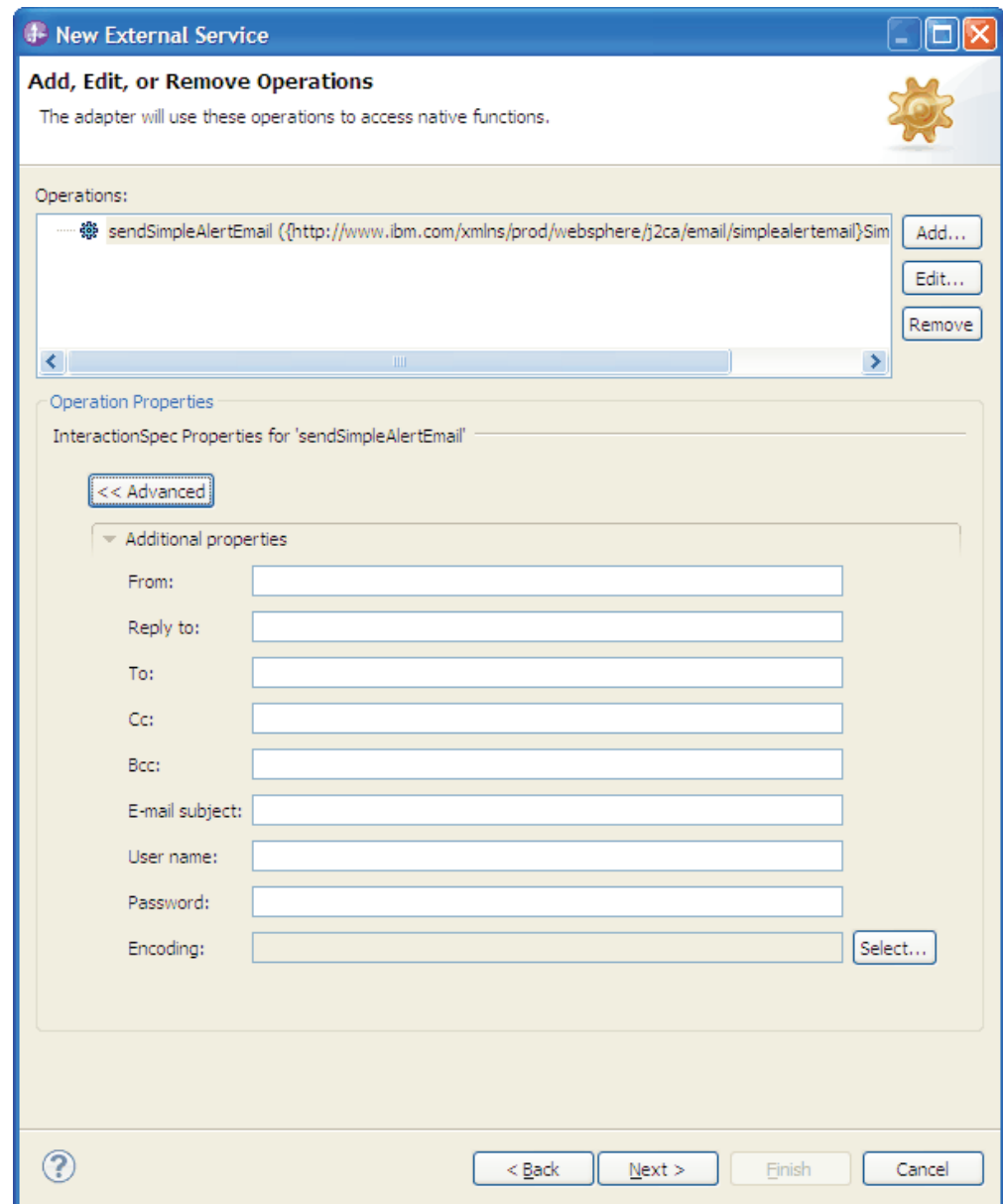


Figure 21. Setting interaction specification properties

- b. Type values for any fields you want to set as defaults.

- c. Optional: In the **EnvelopeForm** field, type an email address to receive undeliverable mail notifications on a different email address than the Form email address. For more details about this property, see “Interaction specification properties” on page 188.
- d. Click **Next**.
2. In the Specify the Name and Location window, select the **Module** from the list. For example, Outbound for outbound processing.
3. Optional: Name the **Folder** to store the artifacts.
4. Type a **Name** for the interface. This name displays in the IBM Integration Designer assembly diagram.
5. Optional: Type a **Description**.
6. Click **Finish**. The interface is displayed in IBM Integration Designer assembly diagram.

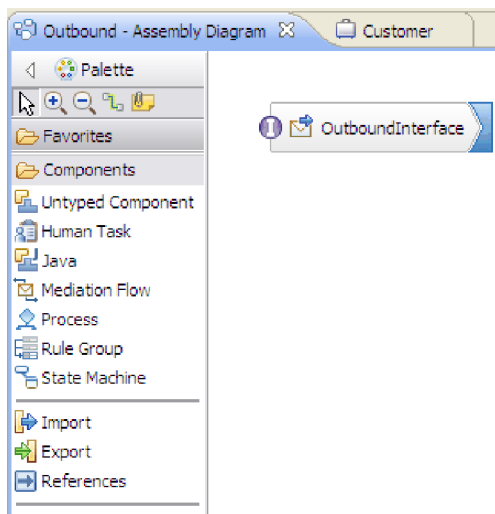


Figure 22. Interface in IBM Integration Designer

The business object you created is also displayed in a different tab.

Results

IBM Integration Designer generates the artifacts and an import. The outbound artifacts that are created are visible in the IBM Integration Designer Project Explorer under your module.

What to do next

Deploy the module for either testing or production.

Configuring the module using the generic email data type

To configure a module for outbound processing using the generic email data type, use the external service wizard in IBM Integration Designer to build business services, specify data transformation processing, and generate business object definitions and related artifacts.

Setting deployment and runtime properties for generic email data type

To select and configure your module for outbound or inbound communication with the mail server, you specify the configuration properties using the external service wizard in IBM Integration Designer. Then, configure the managed connection factory properties. Managed connection factory properties are stored in the business object and contain the information the adapter needs to make the connection between the outbound module and the mail server.

Before you begin

To perform this task, you must create a module. The module name appears in the Project Explorer view of IBM Integration Designer.

About this task

To set connection properties, follow this procedure. For more information, see “Managed connection factory properties” on page 179.

Procedure

1. In the Select the Processing Direction window, select **Outbound** and click **Next**. The Specify the Security and Configuration Properties window is displayed.

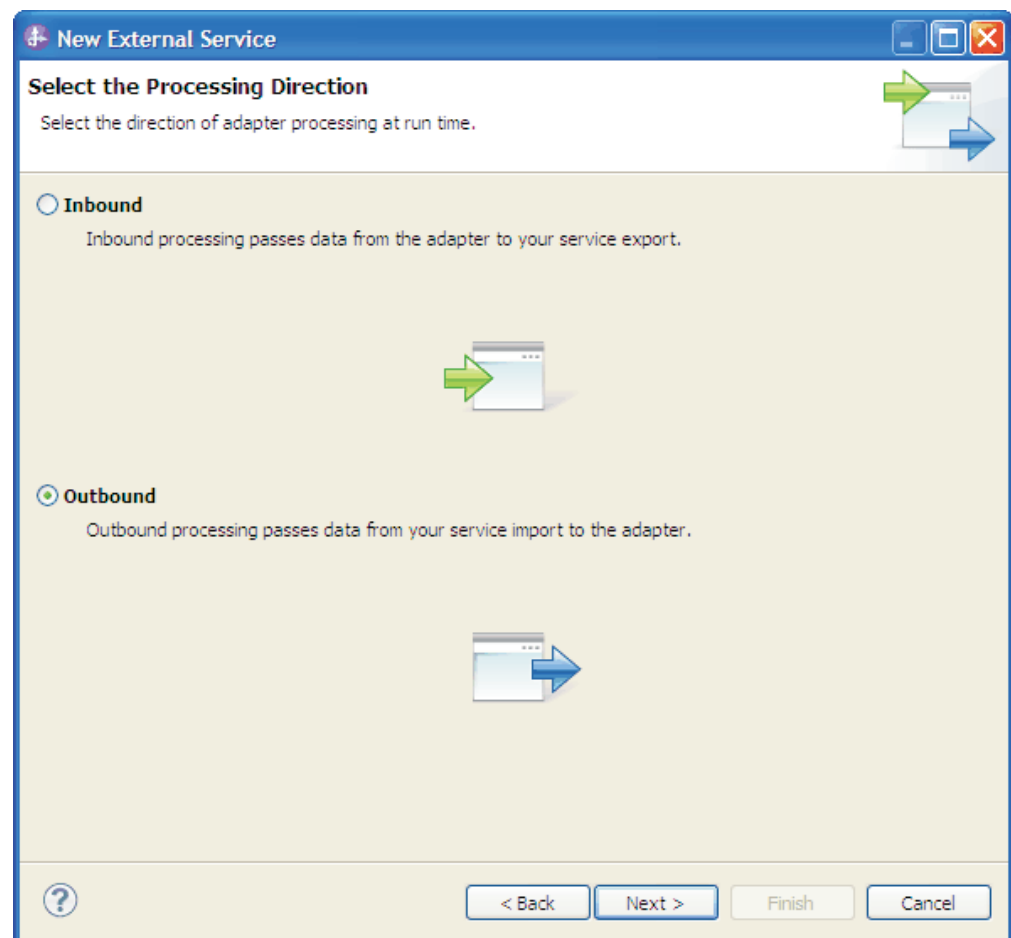


Figure 23. Choosing inbound or outbound in the external service wizard

2. In the **Deploy connector project** field, specify whether to include the adapter files in the module. Select one of the following values:
 - **With module for use by single application:** With the adapter files embedded in the module, you can deploy the module to any application server. Use an embedded adapter when you have a single module using the adapter or if multiple modules need to run different versions of the adapter. Using an embedded adapter enables you to upgrade the adapter in a single module without the risk of destabilizing other modules by changing their adapter version.
 - **On server for use by multiple applications:** If you do not include the adapter files in a module, you must install them as a stand-alone adapter on each application server where you want to run the module. Use a stand-alone adapter when multiple modules can use the same version of the adapter and you want to administer the adapter in a central location. A stand-alone adapter can also reduce the resources required by running a single adapter instance for multiple modules.
3. Under the **E-mail system connection information**, type the **Host name**. The properties in this window correspond to the managed connection factory properties. For detailed information about these properties, see “Managed connection factory properties” on page 179.

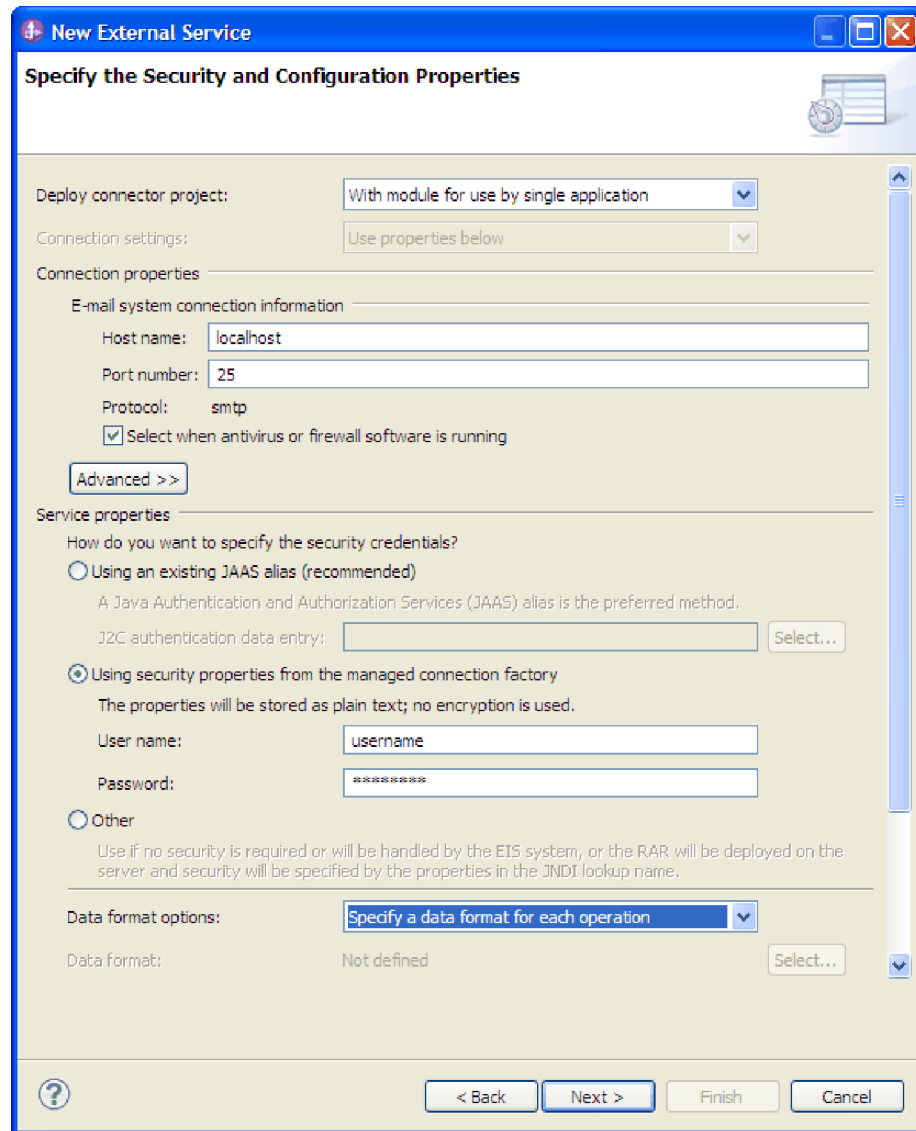


Figure 24. Security and configuration properties window

4. Type the **Port** number. The default value for the SMTP protocol is 25. If your SMTP mail server is listening on a different port number, change this value.
5. Clear the **Select when antivirus or firewall software is running** check box if you do not want the adapter to close the managed connection after each outbound request. If an antivirus program or firewall is running on your system (the machine on which the adapter is deployed or the one that hosts the mail server) and this check box is cleared, the adapter might fail to send outbound emails. Leaving this check box selected is recommended.
6. Optional: Click **Advanced** and expand the **Additional properties, Logging and tracing**, or **Bidi properties** sections as needed.
 - **Additional configuration**
 - a. Select **Enable transport security (SSL)** check box to specify if secure socket layers are enabled for outbound communication. For more information, see “Secure connection (SSL) (enableSSL)” on page 185.
 - b. In the **Alternate e-mail ID in case of delivery failure** field, specify an alternate email address to receive undeliverable mail notifications. This

email address can be a different email address than the one you specified in the From email address. For more details about this property, see “Alternate email ID in case of delivery failure” on page 183.

- c. In the **Maximum retries in case of system connection failure** field, type the number of times the adapter tries the connection before reporting a polling error. For more information, see “Maximum retries on connection failure (connectionRetryLimit)” on page 183.
 - d. In the **Connection retry interval (in milliseconds)** field, specify the time interval between the attempts to reconnect to the mail server if the connection fails. For more information, see “Retry interval if connection fails (in milliseconds) entities” on page 182.
- **Logging and tracing**
 - a. If you have multiple instances of the adapter, expand **Logging and tracing** and enter a value in the **Adapter ID** field that is unique for this instance. For more information about this property, see “Resource adapter properties” on page 186.
 - b. If you want to mask certain information so that the information is not displayed in the logs or traces, select **Disguise user data as "XXX" in log and trace files**. For more information, see “Disguise user data as "XXX" in log and trace files (HideConfidentialTrace) ” on page 182.
 - **Bidi properties**
 - a. Select the **Bidi transformation** check box to specify bidirectional format. For more information about setting the **Bidi properties**, refer to the “Globalization” on page 212 section.
7. In **Service properties**, specify how you want the adapter to connect to the mail server by selecting any one of these authentication methods.
 - To use a J2C authentication alias, click **Using an existing JAAS alias (recommended)** and type the name of the alias in the **J2C Authentication data entry** field. You can either specify an existing authentication alias or create one at any time before deploying the module. The name is case-sensitive and includes the node name.
 - To use the security properties from the managed connection specification, click **Using security properties from the managed connection factory** enter the following information:
 - In the **User name** field, type the user name for the mail server.
 - In the **Password** field, type the password for the mail server.

Note: The security properties are not encrypted and stored as plain text. If you are using an authentication alias, a user name and password are not necessary. During outbound communication, you do not need to enter a user name and password because a mail server uses an anonymous user name and password to send the emails.

 - To administer the user name and password from another mechanism, click **Other**.
 8. Optional: Select the **Change logging properties for wizard** check box, if you want to define the level of logging for this module.
 9. For **Data format**, select **Specify a data binding for each operation**. Although the default value is **Use a data binding configuration for all operations**, select **Specify a data binding for each operation**, because the adapter has a different data binding for each supported business object. These data bindings have different properties, and are configured differently.

Important: Do not click **Next** in this window until you complete the steps to create a data binding or browse for an existing one.

What to do next

Select the data type and operation name.

Selecting a data type and operation name

Use the external service wizard to select a data type and name the operation associated with this data type. For outbound communication, the external service wizard gives you the choice of four different data types: simple email, generic email, generic email with business graph, and user-defined type. Each data type corresponds to a business object structure.

Before you begin

You must specify the connection properties for the adapter to connect to the mail server. You have chosen to specify a data binding for each operation.

About this task

To select a data type and name the operation associated with it, follow this procedure.

Procedure

1. In the Add, Edit, or Remove Operations window, click **Add** to create an operation.
2. In the Specify the I/O Properties window, select a data type from **The data type for the input operation** list. The **Generic e-mail business object** and **Generic e-mail business object with business graph** are the available generic email data types. Click **Next**. For more information about data types and the types of emails they create, see the business object structures section in this documentation.

Note: You can select the **Enable response on delivery** check box to configure the outbound response from the mail server.

3. In the Specify the I/O Properties window, type an **Operation name**.

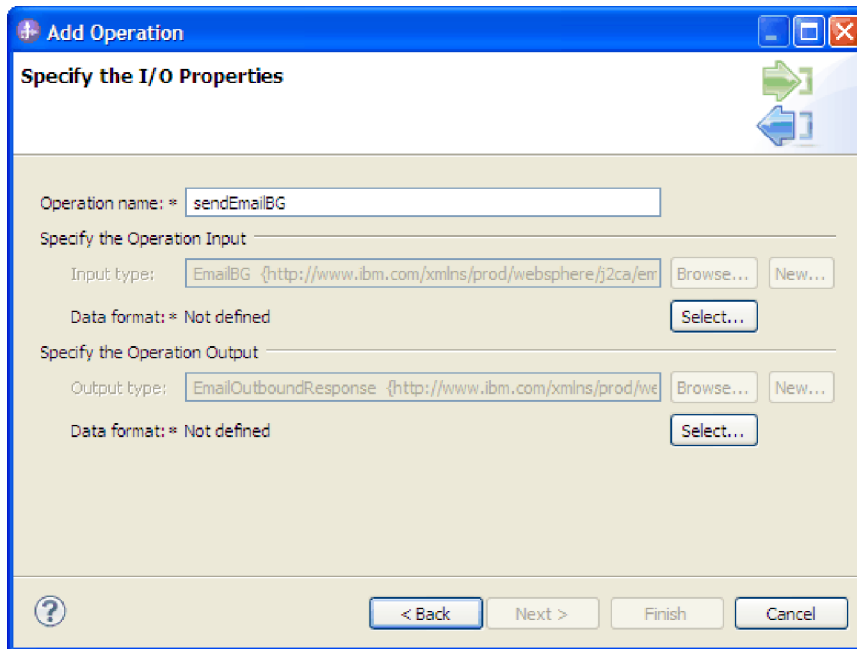


Figure 25. Naming the operation

Type a meaningful name for the operation. To use this module to create and send e-mails constructed using information supplied in customer business objects, name it something like sendEmailBG. For more information about the types of operations the adapter can perform, see the topic on Supported Operations in this documentation.

Note: Names cannot contain spaces.

Results

A data type is defined for the module and the operation associated with this data type is named.

What to do next

Browse for or create a data binding for the module.

Configuring the data binding

Data bindings read the fields in a business object and fill the corresponding fields in an email. In the external service wizard, you add a data binding to your module and configure it to correspond with your data type. This way, the adapter knows how to populate the fields in an email with information it receives in the business object.

Before you begin

You must enter service configuration properties for the connection to the mail server. You have defined the data type for the module and named the operation associated with this data type. You have chosen to specify a data binding for each operation.

About this task

To browse for or create a data binding for the module, follow this procedure.

Note: You can configure the data bindings before running the external service wizard using IBM Integration Designer. To configure the data bindings, select **New > Configure Binding Resource** in IBM Integration Designer and complete the data binding windows described in this documentation.

Procedure

1. In the Specify the I/O Properties window, click **Select** next to the **Data format** field.
2. In the Select a Data Format Transformation window, select the **Use existing data format transformation from the list** option. From the list, select **EmailWrapperDataBinding**. To configure a custom data binding, select the **Select your custom data format transformation from the workspace** option. Click **Next**.

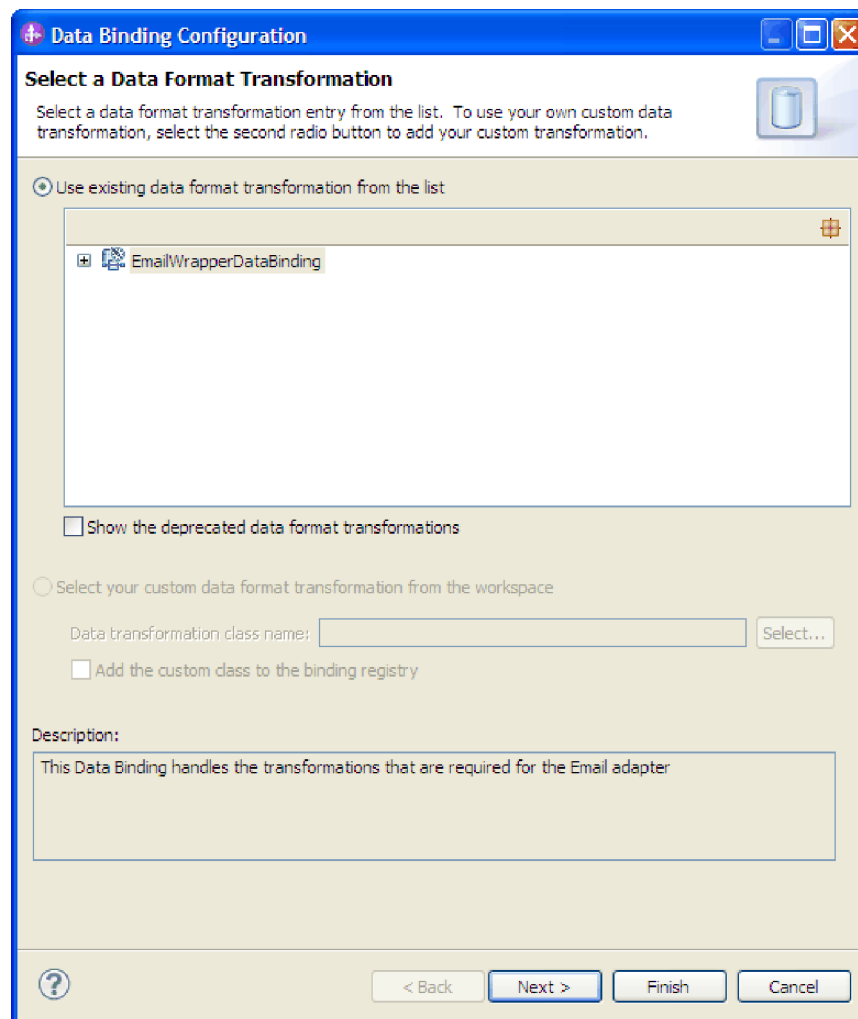


Figure 26. Selecting the data binding

3. In Specify the Data Transformation Properties window, click **Next**.

Note: This window is used for configuring the data handlers.

4. In Configure a New Data Transformation window, provide the data binding configuration details.
 - a. In the Configure a New Data Transformation window, the **Module** defaults to the module name you typed earlier in the wizard. To use a different module that you want to create a data binding for, select **New** to create a module.

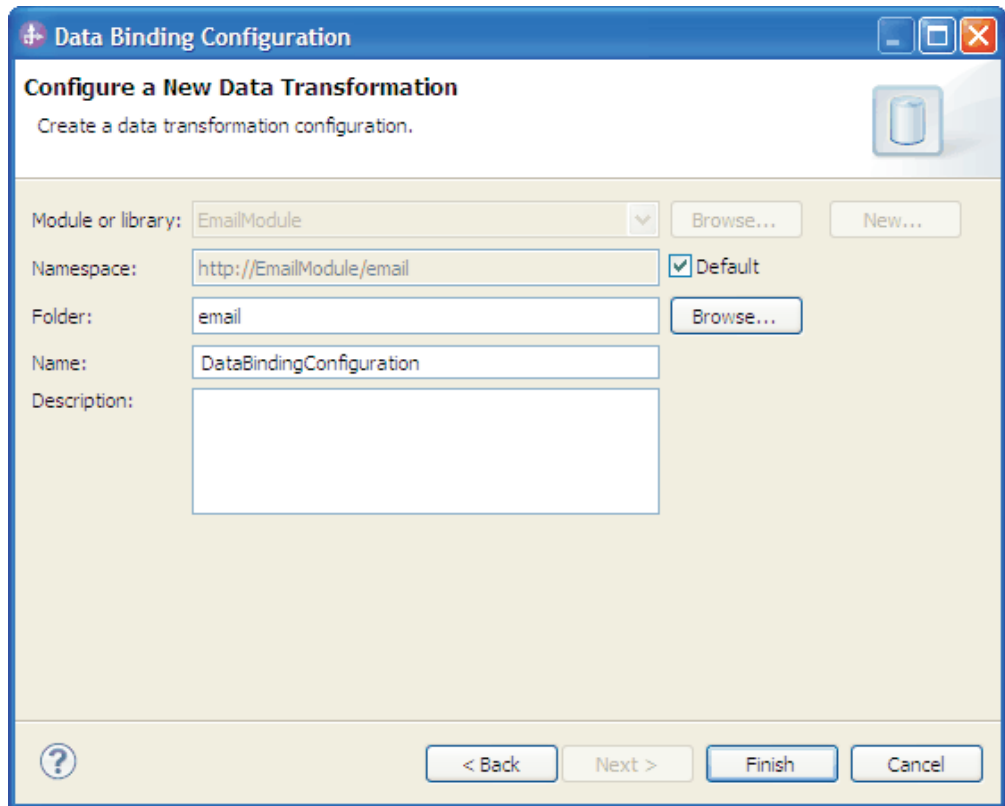


Figure 27. Naming the data binding configuration

- b. If you want to select a new folder for the artifact, click **Browse** and select a new folder location. If you do not browse for a new folder location, the artifacts are created in the root directory for the module.
 - c. Type a **Name** for the data binding configuration and click **Finish**.

Results

A data binding is configured for use with the module.

What to do next

Specify data binding properties.

Configuring business object properties and data handlers

When you intend to use a data type that contains business objects, you must specify properties for those business objects. Completing this step does not add child business objects to the email parent object. Rather, it tells the adapter how to process particular types of business objects. Data handlers perform the conversions between a business object and a particular MIME format.

Before you begin

You must create a data binding before specifying business object properties and data handlers for the module. Also, you must predefine business objects using IBM Integration Designer Business Object Editor. If you stop the wizard here to create business objects, you must start the wizard steps from the beginning and your work is not saved.

Note: Data handlers can be configured before running the external service wizard using IBM Integration Designer. To do this configuration, select **New > Configure Binding Resource** in IBM Integration Designer and complete the data handler windows described in this documentation.

About this task

To specify business object properties and data handlers, follow this procedure.

Note: For operations that do not require data transformation (pass-through operations), you do not need to fill out this window. Click **Finish** and complete the data binding configuration wizard.

Procedure

1. In Specify the Data Transformation Properties window, click **Add** to add business object types to the data binding description.
2. In the Add/Edit properties window, ensure that **DataHandler** is selected in the **Binding type** field.
3. In the **Business object type** field, click **Browse** for existing business objects or **New** to create a business object. These business objects must be imported to IBM Integration Designer before you start the external service wizard. Selecting business objects here does not physically add child business objects. Adding business objects at this stage in the wizard tells the adapter that you are going to use certain business object types with your module. It enables the adapter to know what data binding to apply to any child business objects it processes.

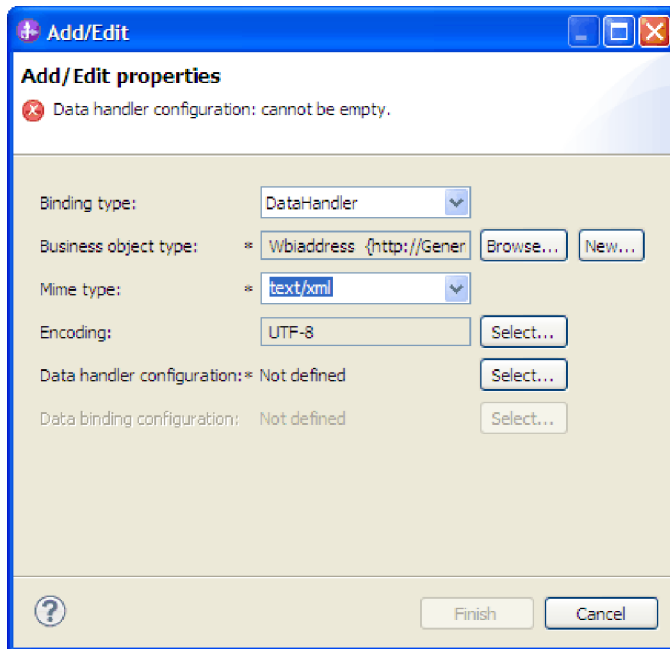


Figure 28. Adding or editing business object data binding properties

Note: The encoding specified for configuring the XML data handler for mime type (text/xml) must have the same value that is specified for **Encoding** in the EmailWrapperDataBinding properties.

4. If you selected **Browse** for the **Business object type** field, select a data type from the Data Type Selection window and click **OK**.
5. If you selected **New** for the **Business object type** field, complete the following steps.

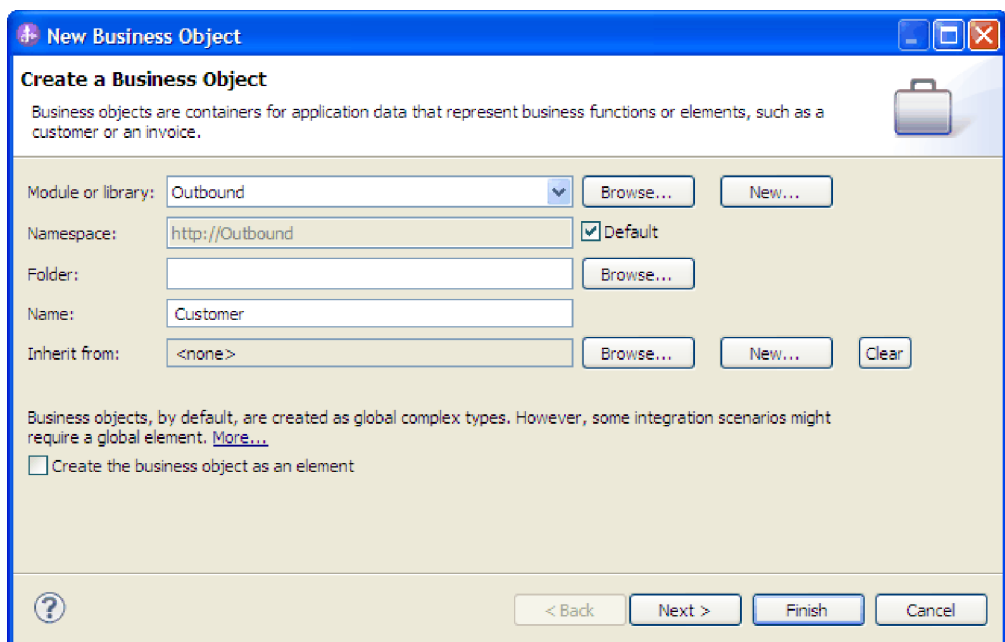


Figure 29. Specifying business object properties for the module

- a. Select the **Module** from the list. If the correct module is not shown, **Browse** for it or click **New** to create a module.
- b. Optional: Type a **Folder** name or **Browse** for the folder on your local drive where business object schema files (XSD files) generated by the external service wizard are stored.
- c. Type a **Name** for the business object.
- d. If you do not want to populate the business object with fields from one or more existing business objects, click **Finish**.
- e. If you want to populate the business object with fields from one or more existing business objects, click **Next**.

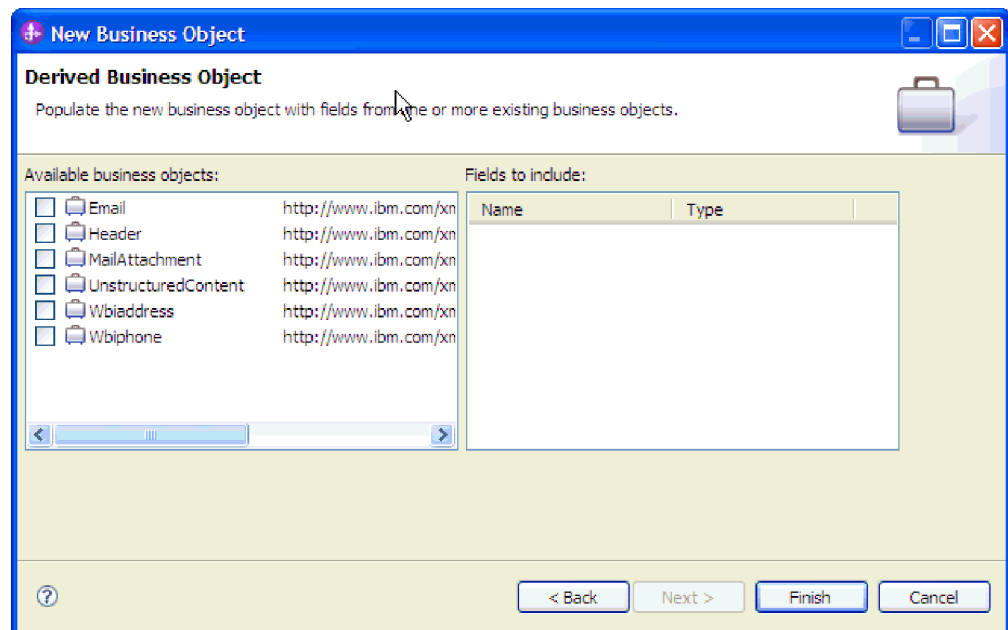


Figure 30. Deriving business object fields from an existing business object

- f. Select the correct business object and click **Finish**. The **Business object type** in the Add/Edit properties window is populated.
6. In the Add/Edit properties window, select a **Mime type** such as **text/xml** or **text/html** for your business object. The mime type corresponds to the data handler that is used by the adapter to perform data transformation from one format to another. This step enables the adapter to decide which format it must convert the content to when it encounters the business object.
7. In the **Encoding** field, click **Select** if you want to choose a different encoding value.
8. In the **Data handler configuration** field, click **Select**. Complete the following steps to create and configure a data handler.
 - a. In the Select a Data Format Transformation window, click **Use existing data format transformation from the list** option. Select **XML** data handler from the list and click **Next**.

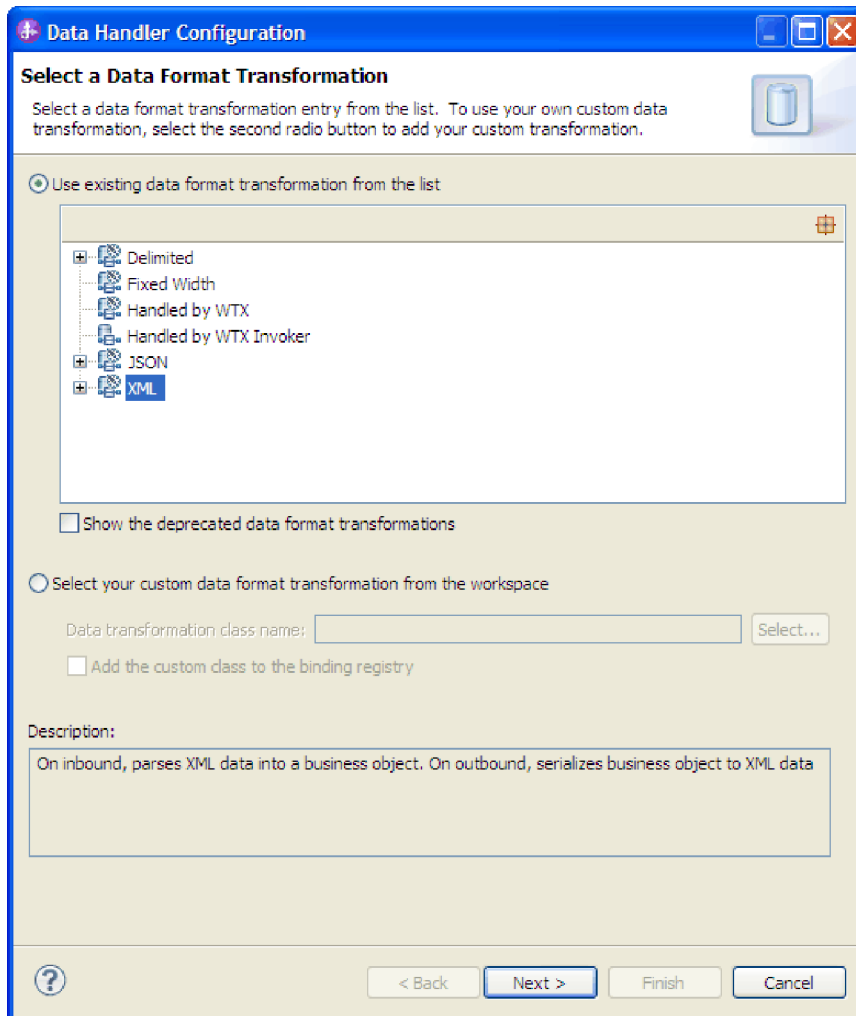


Figure 31. Selecting the data handler configuration type

Note: The **Select your custom data format transformation from the workspace** option is available for advanced users who want to use a custom data handler. A custom data handler placed in the class path, shows when this option is selected.

9. In the Specify the Data Transformation Properties window, select the **Encoding** value, and click **Next**. This value indicates the type of character encoding the adapter uses during data transformation. For more information about the encoding property, see “Email business object properties” on page 162.
10. In the Configure a New Data Transformation window, select the **Module** from the list. If the correct module is not appearing, click **New** to create a new one.
 - a. Optional: Type a **Folder** name to specify a folder for the artifacts.
 - b. Leave the default data handler **Name** or type a new one and click **Next**.

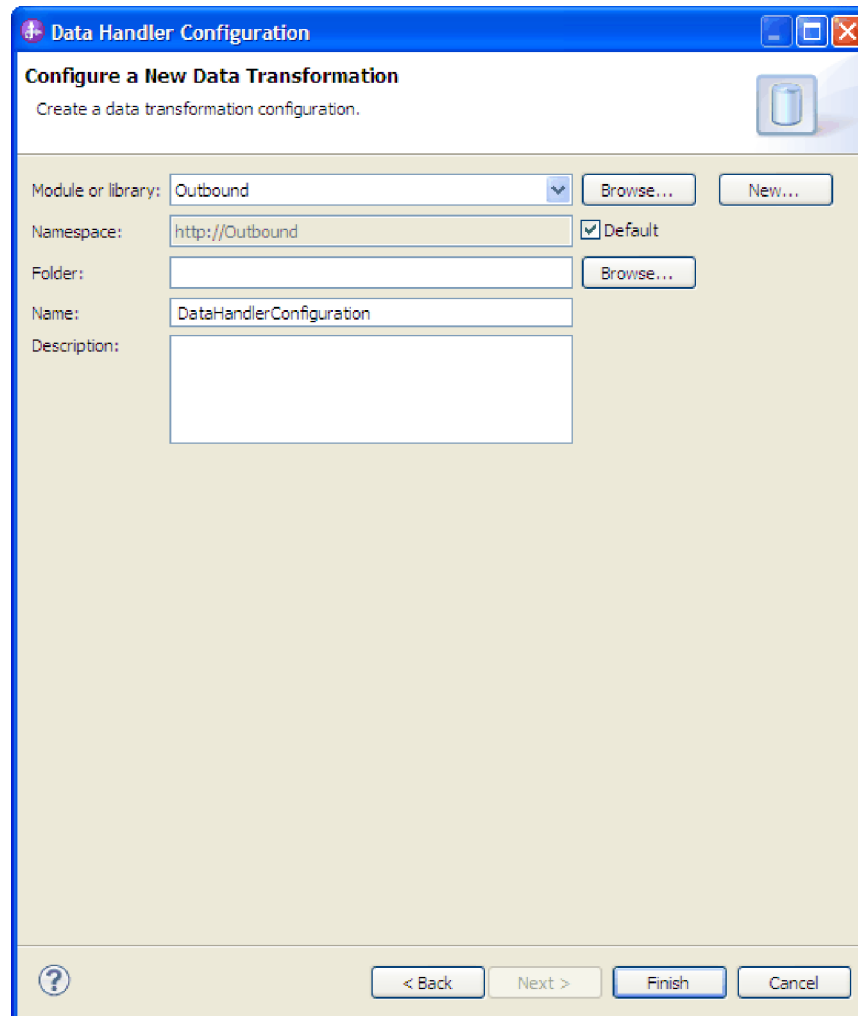


Figure 32. Creating a data handler

- c. Click **Finish**.
11. In the Add/Edit Properties window, click **Finish**.
12. Optional: If you want to add another business object type to the module, click **Add** in the Specify the Data Transformation Properties window. Repeat the steps in this topic to specify business object properties and a data handler for each business object.

Results

Business object properties and their data handlers are created.

What to do next

Set interaction specification properties and generate artifacts for your module.

Setting interaction specification properties and generating the service

Interaction properties are optional. If you choose to set them, the values you specify are displayed in the import file. The import file is generated when the adapter creates artifacts for the module and contains the operation for the top-level business object.

Before you begin

To set interaction specification properties and generate artifacts for your module, you must configure data bindings and selected business objects.

About this task

Interaction specification properties do not take precedence over request business object attributes, except for the user name and password properties. User name and password values specified in the interaction specification properties take more precedence over values set in the managed connection factory properties. To set interaction specification properties and generate artifacts, follow this procedure. For more information, see “Interaction specification properties” on page 188.

Procedure

1. Optional: To set interaction specification properties complete these steps:
 - a. Click **Advanced**.

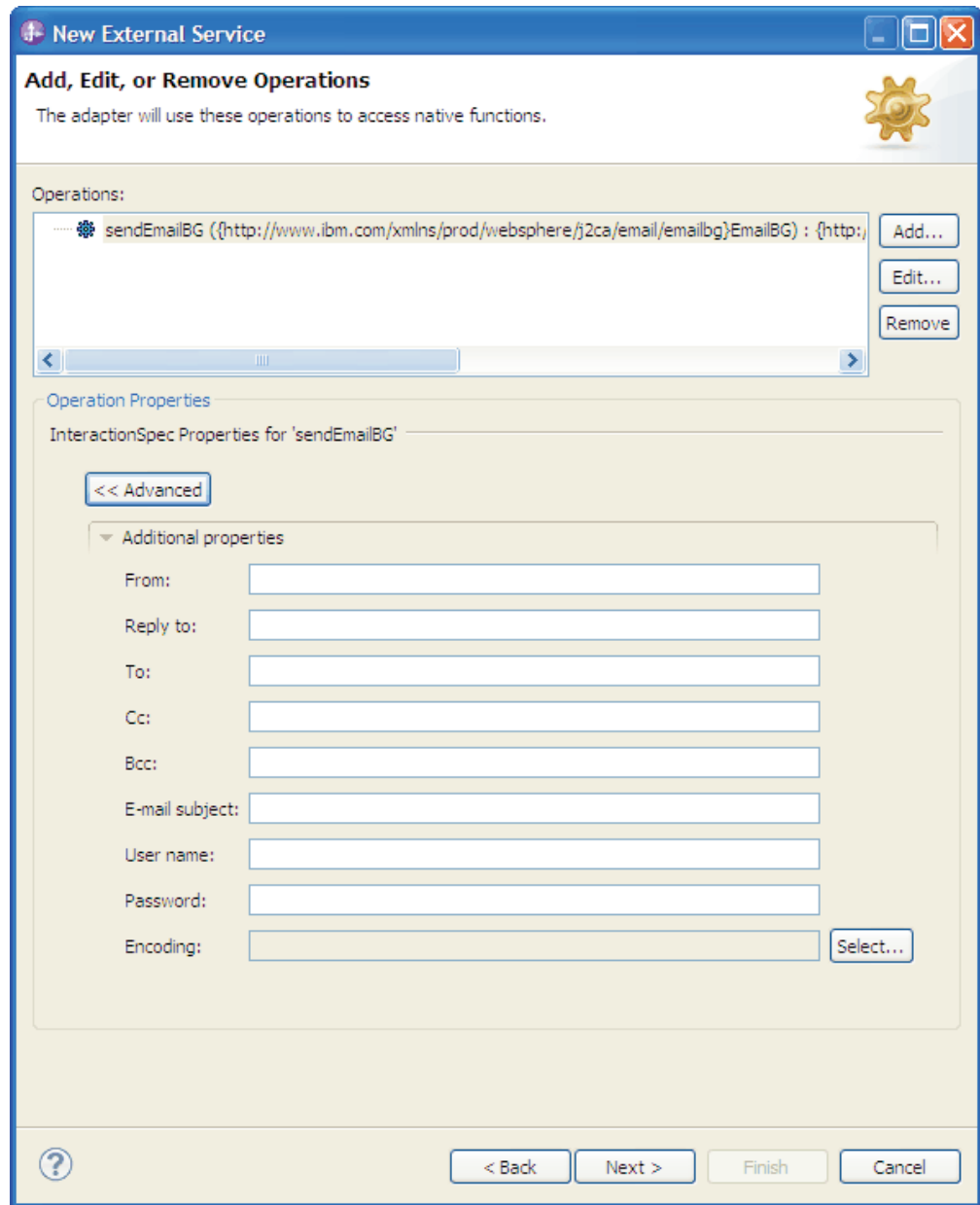


Figure 33. Setting interaction specification properties

- b. Type values for any fields you want to set as defaults.
 - c. Click **Next**.
2. In the Specify the Name and Location window, select the **Module** from the list. For example, EmailModule for outbound processing.

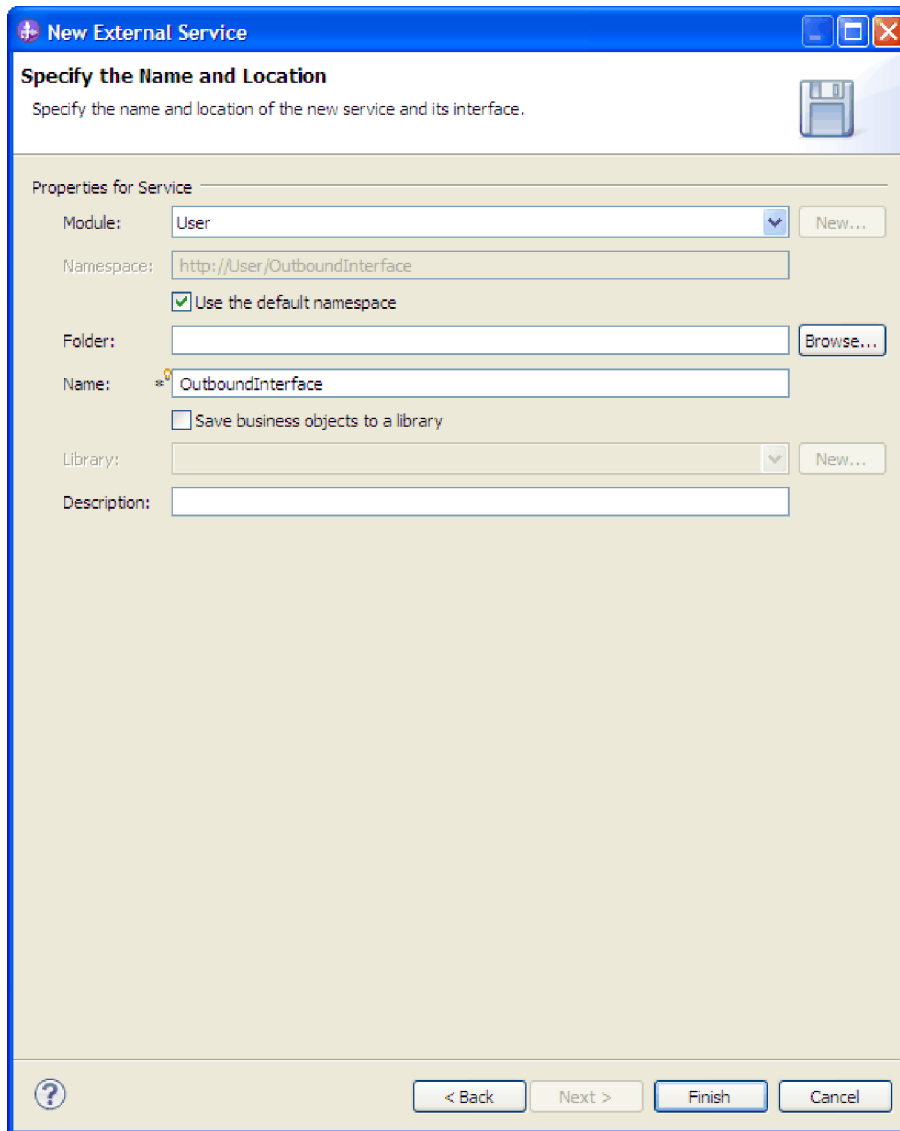


Figure 34. Naming the artifact

3. Optional: Name the **Folder** that is used to store the artifacts.
4. Type a **Name** for the interface. This name appears in the IBM Integration Designer assembly diagram.
5. Optional: Type a **Description**.
6. Click **Finish**. The interface is displayed in IBM Integration Designer assembly diagram.

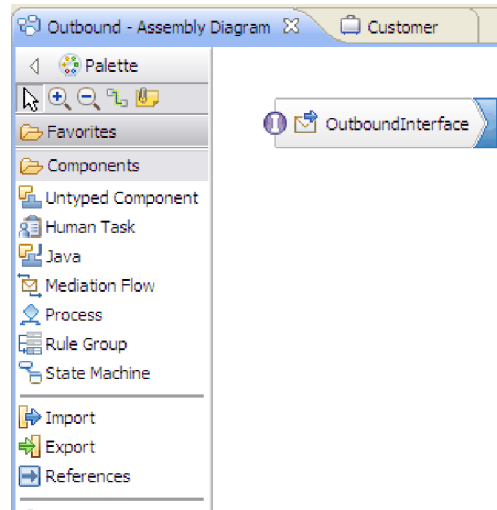


Figure 35. Interface in IBM Integration Designer

The business object you created is also displayed in a different tab.

Results

IBM Integration Designer generates the artifacts and an import. The outbound artifacts that are created are visible in the IBM Integration Designer Project Explorer under your module.

What to do next

Deploy the module for either testing or production.

Configuring the module using the user-defined data type

To configure a module for outbound processing using the user-defined data type, use the external service wizard in IBM Integration Designer to build business services, specify data transformation processing, and generate business object definitions and related artifacts.

About this task

You can create a custom data type and specify the required mail content and attachment business object information for the data type. To do this configuration, you need to create an inbound module with the user-defined data type using the `EmailFixedStructureDataBinding` data binding.

Setting deployment and runtime properties for user-defined data type

To select and configure your module for outbound or inbound communication with the mail server, you specify the configuration properties using the external service wizard in IBM Integration Designer. Then, configure the managed connection factory properties. Managed connection factory properties are stored in the business object and contain the information the adapter needs to make the connection between the outbound module and the mail server.

Before you begin

To perform this task, you must create a module. The module name is displayed in the Project Explorer view of IBM Integration Designer.

About this task

To set connection properties, follow this procedure. For more information, see “Managed connection factory properties” on page 179.

Procedure

1. In the Select the Processing Direction window, select **Outbound** and click **Next**. The Specify the Security and Configuration Properties window is displayed.

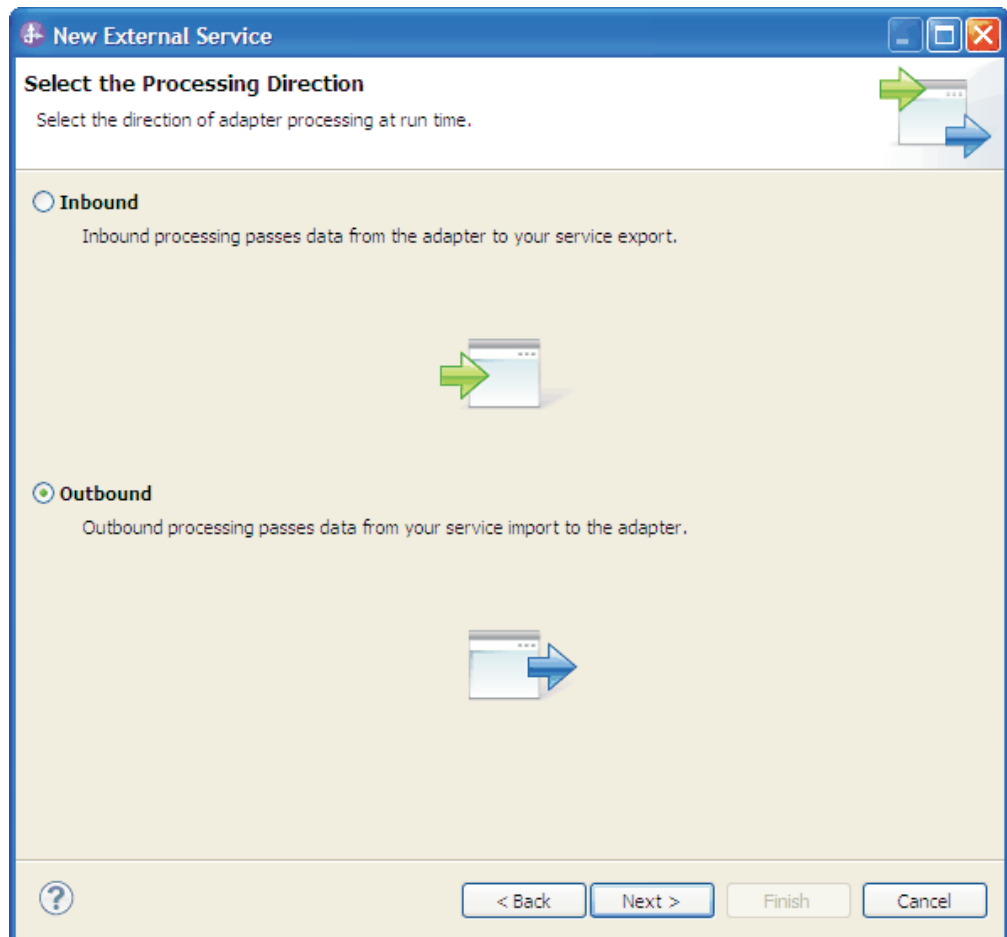


Figure 36. Selecting inbound or outbound in the external service wizard

2. In the **Deploy connector project** field, specify whether to include the adapter files in the module. Select one of the following values:
 - **With module for use by single application:** With the adapter files embedded in the module, you can deploy the module to any application server. Use an embedded adapter when you have a single module using the adapter or if multiple modules need to run different versions of the adapter. Using an embedded adapter enables you to upgrade the adapter in a single module without the risk of destabilizing other modules by changing their adapter version.

- **On server for use by multiple applications:** If you do not include the adapter files in a module, you must install them as a stand-alone adapter on each application server where you want to run the module. Use a stand-alone adapter when multiple modules can use the same version of the adapter and you want to administer the adapter in a central location. A stand-alone adapter can also reduce the resources required by running a single adapter instance for multiple modules.
3. Under the **E-mail system connection information**, type the **Host name**. The properties on this window correspond to the managed connection factory properties. For detailed information about these properties, see “Managed connection factory properties” on page 179.

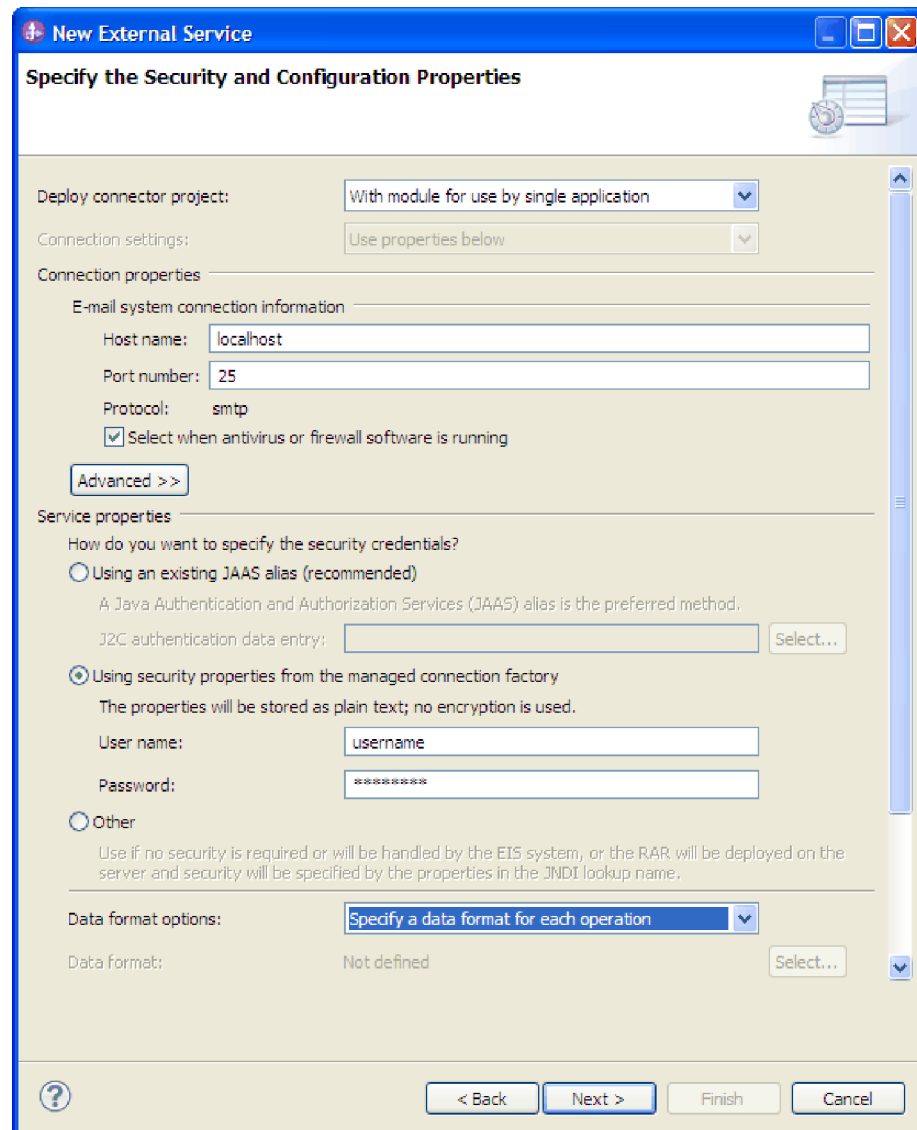


Figure 37. Security and configuration properties window

4. Type the **Port** number. The default value for the SMTP protocol is 25. If your SMTP mail server is listening on a different port number, change this value.
5. Clear the **Select when antivirus or firewall software is running** check box if you do not want the adapter to close the managed connection after each outbound request. If an antivirus program or firewall is running on your

system (the machine on which the adapter is deployed or the one that hosts the mail server) and this check box is cleared, the adapter might fail to send outbound emails. Leaving this check box selected is recommended.

6. Optional: Click **Advanced** and expand the **Additional properties**, **Logging and tracing**, or **Bidi properties** sections as needed.
 - **Additional configuration**
 - a. Select **Enable transport security (SSL)** check box to specify if secure socket layers are enabled for outbound communication. For more information, see “Secure connection (SSL) (enableSSL)” on page 185.
 - b. In the **Alternate e-mail ID in case of delivery failure** field, specify an alternate email address to receive undeliverable mail notifications. This email address can be a different email address than the one you specified in the From email address. For more details about this property, see “Alternate email ID in case of delivery failure” on page 183.
 - c. In the **Maximum retries in case of system connection failure** field, type the number of times the adapter tries the connection before reporting a polling error. For more information, see “Maximum retries on connection failure (connectionRetryLimit)” on page 183.
 - d. In the **Connection retry interval (in milliseconds)** field, specify the time interval between the attempts to reconnect to the mail server if the connection fails. For more information, see “Retry interval if connection fails (in milliseconds) entities” on page 182.
 - **Logging and tracing**
 - a. If you have multiple instances of the adapter, expand **Logging and tracing** and enter a value in the **Adapter ID** field that is unique for this instance. For more information about this property, see “Resource adapter properties” on page 186.
 - b. If you want to mask certain information so that the information is not displayed in the logs or traces, select **Disguise user data as "XXX" in log and trace files**. For more information, see “Disguise user data as "XXX" in log and trace files (HideConfidentialTrace) ” on page 182.
 - **Bidi properties**
 - a. Select the **Bidi transformation** check box to specify bidirectional format. For more information about setting the **Bidi properties**, see “Globalization” on page 212.
7. In **Service properties**, specify how you want the adapter to connect to the mail server by selecting any one of these authentication methods.
 - To use a J2C authentication alias, click **Using an existing JAAS alias (recommended)** and type the name of the alias in the **J2C Authentication data entry** field. You can either specify an existing authentication alias or create one at any time before deploying the module. The name is case-sensitive and includes the node name.
 - To use the security properties from the managed connection specification, click **Using security properties from the managed connection factory** enter the following information:
 - In the **User name** field, type the user name for the mail server.
 - In the **Password** field, type the password for the mail server.

Note: The security properties are not encrypted and stored as plain text. If you are using an authentication alias, a user name and password are not necessary. Also, for outbound communication you do not need to enter a

user name and password because a mail server uses an anonymous user name and password to send the emails.

- To administer the user name and password from another mechanism, click **Other**.
8. Optional: Select the **Change logging properties for wizard** check box, if you want to define the level of logging for this module.
 9. For **Data format**, select **Specify a data binding for each operation**. Although the default value is **Use a data binding configuration for all operations**, select **Specify a data binding for each operation**, because the adapter has a different data binding for each supported business object. These data bindings have different properties, and are configured differently.

Important: Do not click **Next** in this window until you complete the steps to create a data binding or browse for an existing one.

What to do next

Select the data type and operation name.

Selecting a data type and operation name

Use the external service wizard to select a data type and name the operation associated with this data type. For outbound communication, the external service wizard gives you the choice of four different data types: simple email, generic email, generic email with business graph, and user-defined type. Each data type corresponds to a business object structure. Use the user-defined data type if you want to configure your own business object wrapper instead of using the generic email business object.

Before you begin

You must specify the connection properties for the adapter to connect to the mail server. You have chosen to specify a data binding for each operation.

About this task

To select the user-defined data type, name the operation associated with it, create a wrapper business object, and specify child business objects, follow this procedure.

Procedure

1. In the Add, Edit, or Remove Operations window, click **Add** to create an operation.
2. In the Specify the I/O Properties window, select the **User defined email business object** from **The data type for the input operation** list and click **Next**. For more information about data types and the types of emails they create, see the business object structures section in this documentation.

Note: You can select the **Enable response on delivery** check box to configure the outbound response from the mail server.

3. In the Specify the I/O Properties window, type an **Operation name**.
4. Click **New** for the **Input type**.

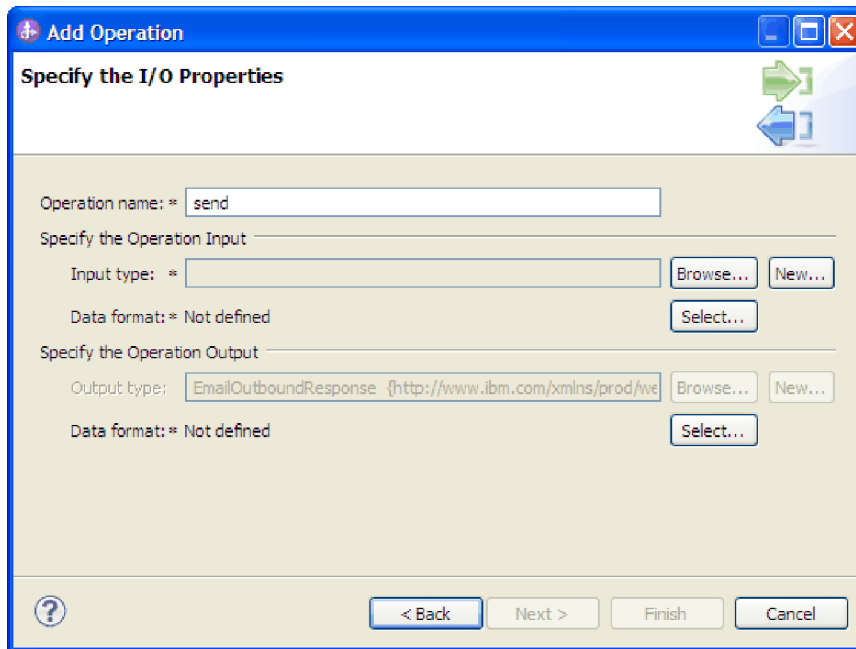


Figure 38. Selecting the input type

5. In Specify the Location window, provide the module name and the name of the folder where the wrapper business object (the input type) is to be generated. Click **Next**.
6. In Specify the Properties window, provide the wrapper **Business object name**.
 - a. Optional: Select the **Generate a business graph for the business object** check box.
 - b. Specify the properties for the email type. Click **Add** to add child business objects to the table.

You can generate the wrapper business object and specify the child business objects that are used inside the wrapper business object and specify which parts of the email you want to use (such as mailContent or attachment1).

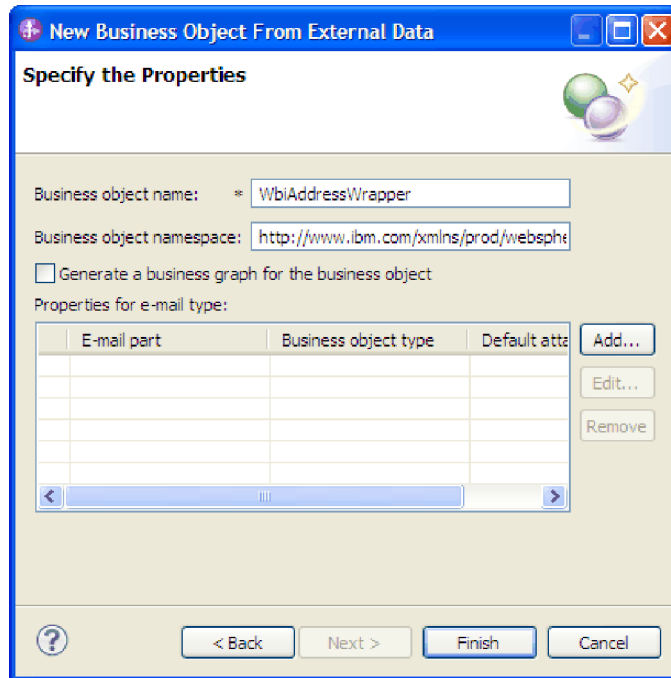


Figure 39. Specify the properties for the new business object

In the Add/Edit Properties window, select either the **mailContent** or the **Attachment1** as the email part. If you select the attachment1 part of the email, then you can also specify the default attachment name that is used with this business object.

Note: You can have a wrapper business object without having a mailContent business object, for example, if you are not sending any content in the email or if the email polled by the adapter does not have any content.

7. When you finish adding child business objects to the table, click **Finish**. For each business object you add, a row is created in the table. The following figure shows the generated wrapper business object.

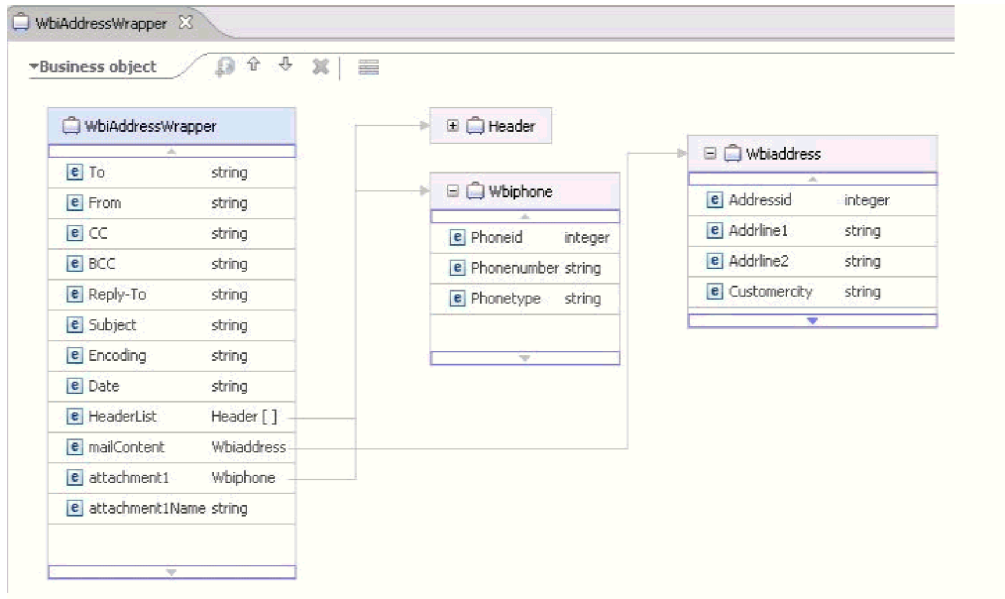


Figure 40. The generated wrapper business object

8. In the Specify the Properties window, click **Finish**.

Results

A data type is defined for the module and the operation associated with this data type is named. A wrapper business object is created, and the child business objects that are used inside the wrapper business object are specified.

What to do next

Generate the data binding configuration for the module.

Configuring the data binding

Data bindings read the fields in a business object and fill the corresponding fields in an email. In the external service wizard, you add a data binding to your module and configure it to correspond with your data type. This way, the adapter knows how to populate the fields in an email with information it receives in the business object.

Before you begin

You must enter service configuration properties for the connection to the mail server. You have defined the data type for the module and named the operation associated with this data type. You have chosen to specify a data binding for each operation.

About this task

To browse for or create a data binding for the module, follow this procedure.

Note: The user-defined data type can only be used in a data transformation (non pass-through) mode. You cannot use the unstructured content business object.

Note: Data bindings can be configured before running the external service wizard using IBM Integration Designer. To do this configuration, select **New > Configure Binding Resource** in IBM Integration Designer and complete the data binding windows described in this documentation.

Procedure

1. In the Specify the I/O Properties window, click **Select** next to the **Data format** field.
2. In the Select a Data Format Transformation window, select the **Use existing data format transformation from the list** option. From the list, select **EmailFixedStructuredDataBinding**. To configure a custom data binding, select the **Select your custom data format transformation from the workspace** option. A custom data binding, placed in the class path, shows when this option is selected. Click **Next**.

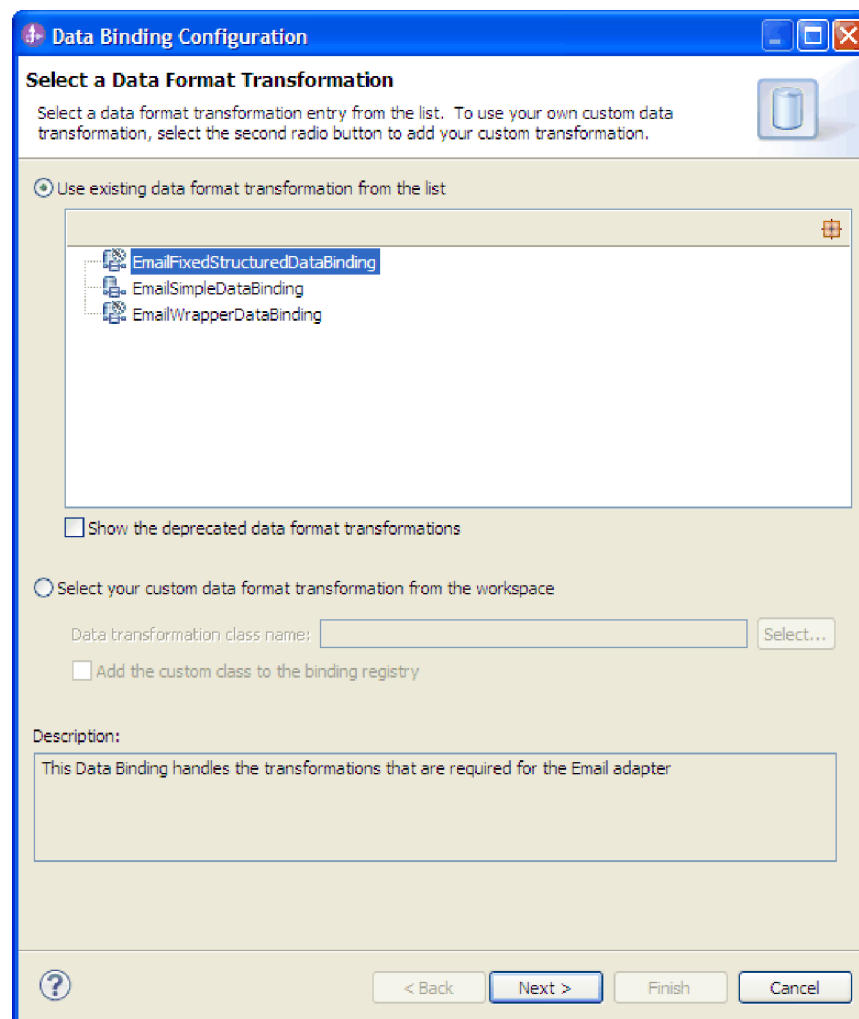


Figure 41. Selecting the data binding

Note: When you configure the **EmailFixedStructuredDataBinding**, you create a custom data type with the required mail content and the attachment business objects.

3. In Specify the Data Transformation Properties window, click **Next**.

Note: This window is used for configuring the data handlers.

4. In Configure a New Data Transformation window, provide the data binding configuration details.
 - a. In the Configure a New Data Transformation window, the **Module** defaults to the module name you typed earlier in the wizard. If you do not want to create a data binding for this module, select **New** to create a module.

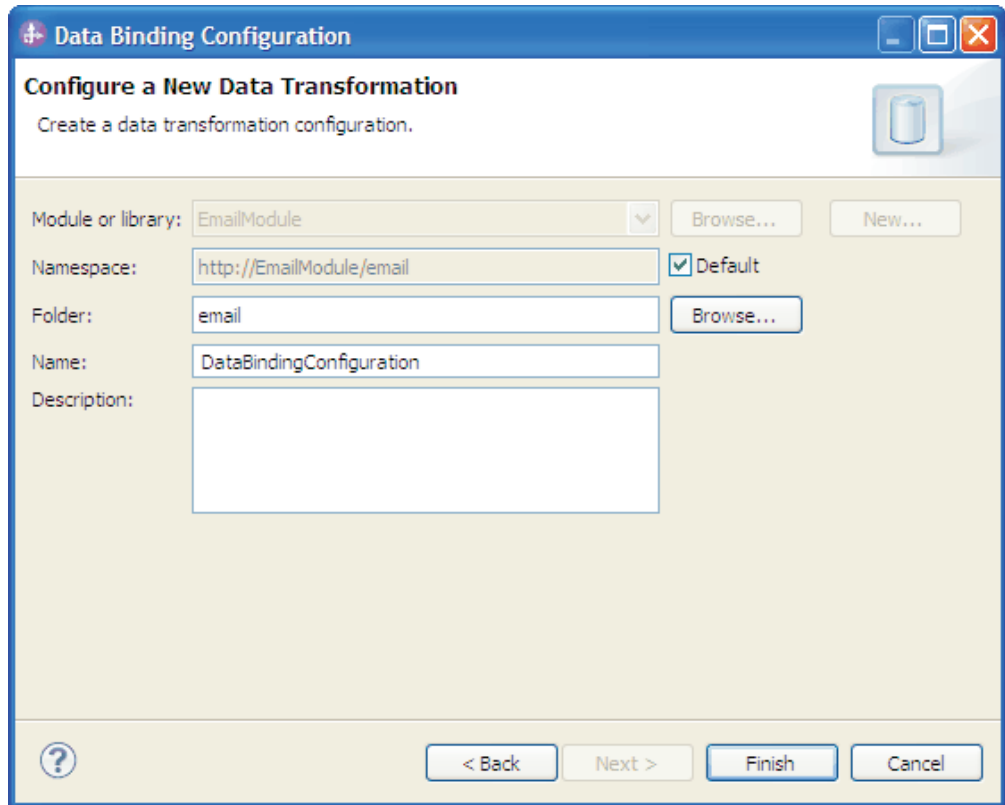


Figure 42. Naming the data binding configuration

- b. If you want to select a new folder for the artifact, click **Browse** and select a new folder location. If you do not browse for a new folder location, the artifacts are created in the root directory for the module.
 - c. Type a **Name** for the data binding configuration and click **Finish**.

Results

A data binding is configured for use with the module.

What to do next

Configure business object properties and data handlers.

Configuring business object properties and data handlers

When you intend to use a data type that contains business objects, you must specify properties for those business objects. Completing this step does not add child business objects to the email parent object. Rather, it tells the adapter how to process particular types of business objects. Data handlers perform the conversions between a business object and a particular MIME format.

Before you begin

You must create a data binding before specifying business object properties and data handlers for the module. Also, you must predefine business objects using IBM Integration Designer Business Object Editor. If you stop the wizard here to create business objects, you must start the wizard steps from the beginning and your work is not saved.

Note: Data handlers can be configured before running the external service wizard using IBM Integration Designer. To do this configuration, select **New > Configure Binding Resource** in IBM Integration Designer and complete the data handler windows described in this documentation.

About this task

To specify business object properties and data handlers, follow this procedure.

Procedure

1. In Specify the Data Transformation Properties window, select a row and click **Edit**.

Note: For the user-defined type, the following warning message displays if you click **Add** in this window. The **User cannot add new row to the table. Adapter has parsed your Input type and filled the table.** This warning appears because the adapter determines which business objects the data binding must know about and pre-filled the table. To provide values for the rest of the properties, select individual rows and click **Edit**.

Important: If you are repeating these steps to configure a child data binding for the user-defined data type, you cannot select between data handler and data binding when you click **Edit**. The binding type option (to select between data binding and data handler) does not function correctly for the EmailFixedStructuredDataBinding. To configure a child data binding for EmailFixedStructuredDataBinding, click the **Binding type** field and select **DataBinding**.

2. In the Add/Edit properties window, ensure that **DataHandler** is selected in the **Binding type** field.
3. In the **Business object type** field, click **Browse** for existing business objects or **New** to create a business object. Selecting business objects here does not physically add child business objects. Adding business objects at this stage in the wizard tells the adapter that you are going to use certain business object types with your module. It enables the adapter to know what data binding to apply to any child business objects it processes.
 - a. If you selected **Browse** for the **Business object type** field, select a data type from the Data type selection window and click **OK**.
 - b. If you selected **New** for the **Business object type** field, complete the following steps.

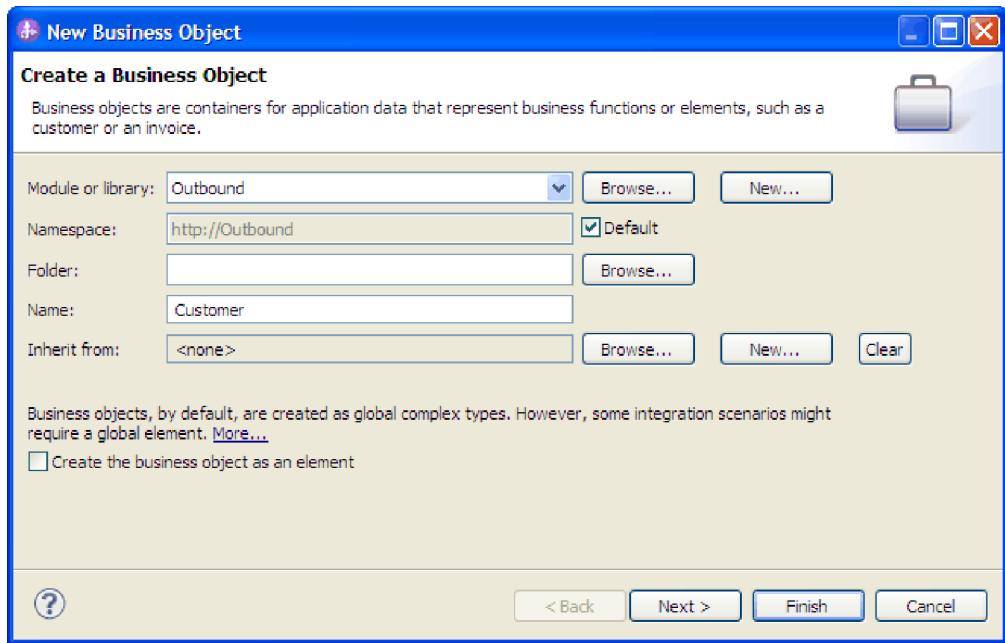


Figure 43. Specifying business object properties for the module

- c. Select the **Module**. If the correct module is not shown, **Browse** for it or click **New** to create a module.
- d. Optional: Type a **Folder** name or **Browse** for the folder on your local drive where business object schema files (XSD files) generated by the external service wizard are stored.
- e. Type a **Name** for the business object.
- f. If you do not want to populate the business object with fields from one or more existing business objects, click **Finish**.
- g. If you want to populate the business object with fields from one or more existing business objects, click **Next**.

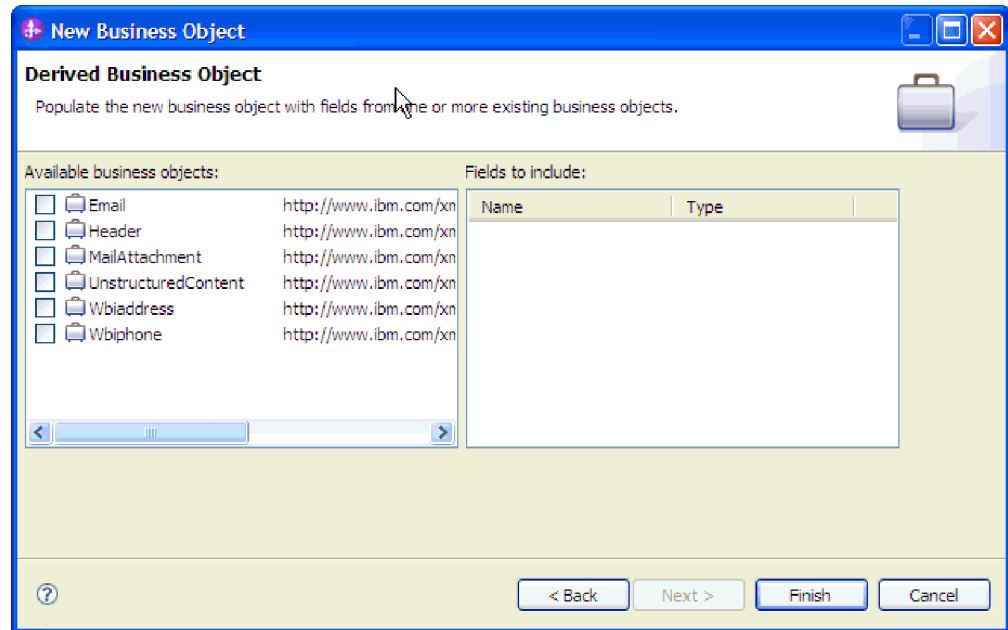


Figure 44. Deriving business object fields from an existing business object

- h. Select the correct business object and click **Finish**. The **Business object type** in the Add/Edit properties window is populated.
4. In the Add/Edit properties window, select a **Mime type** such as **text/xml** or **text/html** for your business object. The mime type corresponds to the data handler that is used by the adapter to perform data transformation from one format to another. This step enables the adapter to decide which format it must convert the content to when it encounters the business object.

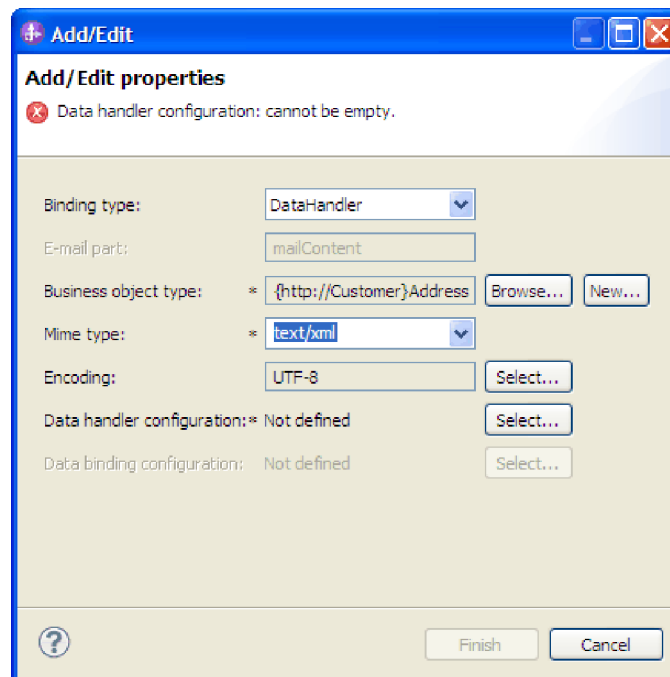


Figure 45. Adding or editing business object data binding properties

Note: The encoding specified for configuring the XML data handler for **Mime type** (text/xml) must have the same value that is specified for **Encoding** in the `EmailFixedStructuredDataBinding` properties.

5. In the **Encoding** field, click **Select** if you want to choose a different encoding value.
6. In the **Data handler configuration** field, click **Select**. Complete the following steps to create and configure a data handler.
 - a. From the **Use existing data format transformation from the list** option, select the **XML** data handler. Click **Next**.
The **Select your custom data format transformation from the workspace**

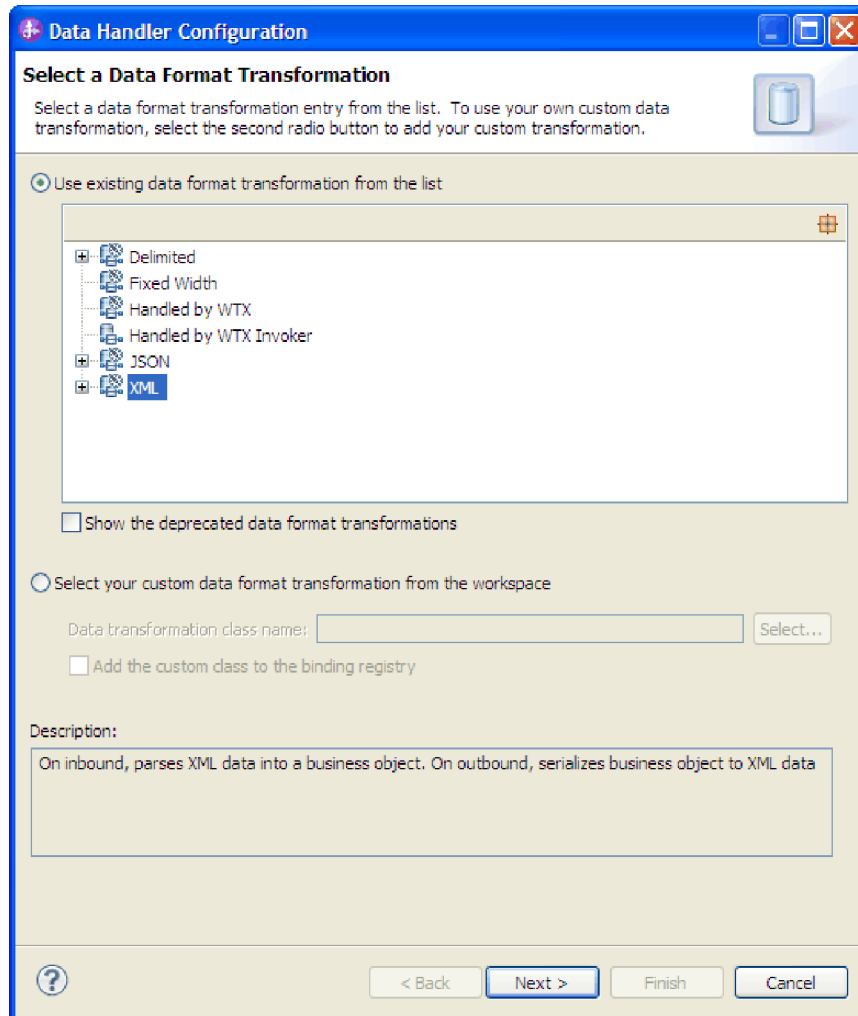


Figure 46. Selecting the data handler configuration type

option is available for advanced users who want to use a custom data handler. A custom data handler, placed in the class path, shows when this option is selected.

- b. In the Specify the Data Transformation Properties window, select an **Encoding** value. Click **Next**.

Note: This value indicates the type of character encoding the adapter uses during data transformation. For more information about the encoding property, see “Email business object properties” on page 162.

- c. In the Configure a New Data Transformation window, select the module. If the correct module is not appearing, click **New** to create a new one.
- d. Optional: Type a **Folder** name to specify a folder for the artifacts.
- e. Leave the default data handler **Name** or type a new one.

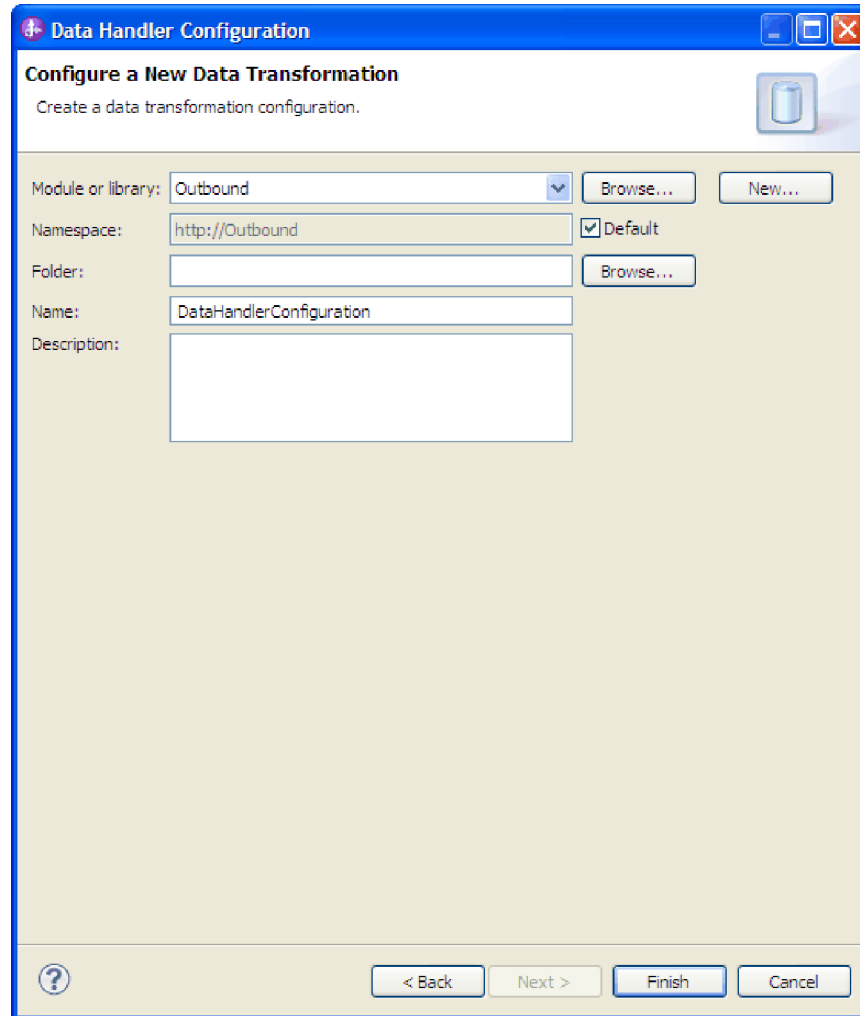


Figure 47. Creating a data handler

- f. Click **Finish**.
7. In the Add/Edit properties window, click **Finish**.

Results

Business object properties and their data handlers are created.

What to do next

Set interaction specification properties and generate artifacts for your module.

Setting interaction specification properties and generating the service

Interaction properties are optional. If you choose to set them, the values you specify are displayed in the import file. The import file is generated when the adapter creates artifacts for the module and contains the operation for the top-level business object.

Before you begin

To set interaction specification properties and generate artifacts for your module, you must configure data bindings and selected business objects.

About this task

Interaction specification properties do not take precedence over request business object attributes, except for the user name and password properties. User name and password values specified in the interaction specification properties take more precedence over values set in the managed connection factory properties. To set interaction specification properties and generate artifacts, follow this procedure. For more information, see “Interaction specification properties” on page 188.

Procedure

1. Optional: To set interaction specification properties complete these steps:
 - a. Click **Advanced**.

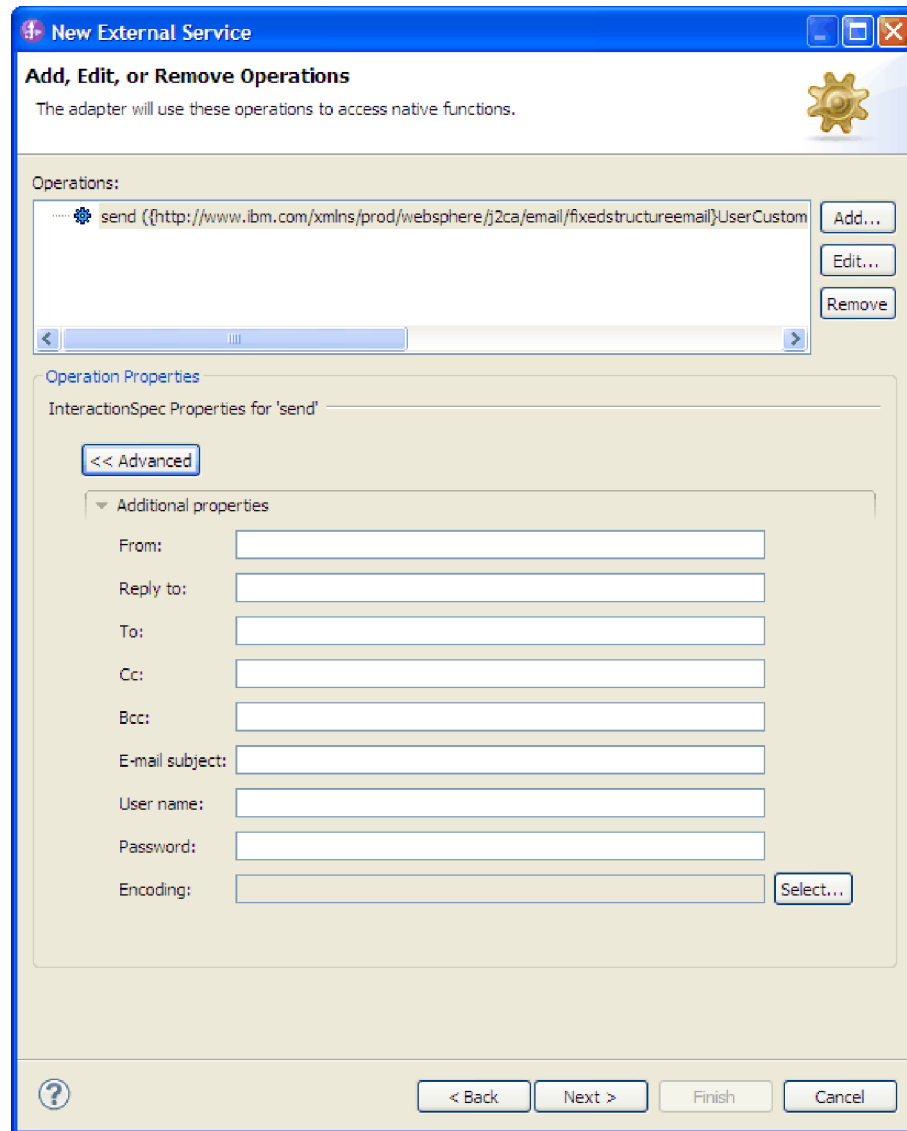


Figure 48. Setting interaction specification properties

- b. Type values for any fields you want to set as defaults.
 - c. Click **Next**.
2. In the Specify the Name and Location window, select the **Module**.

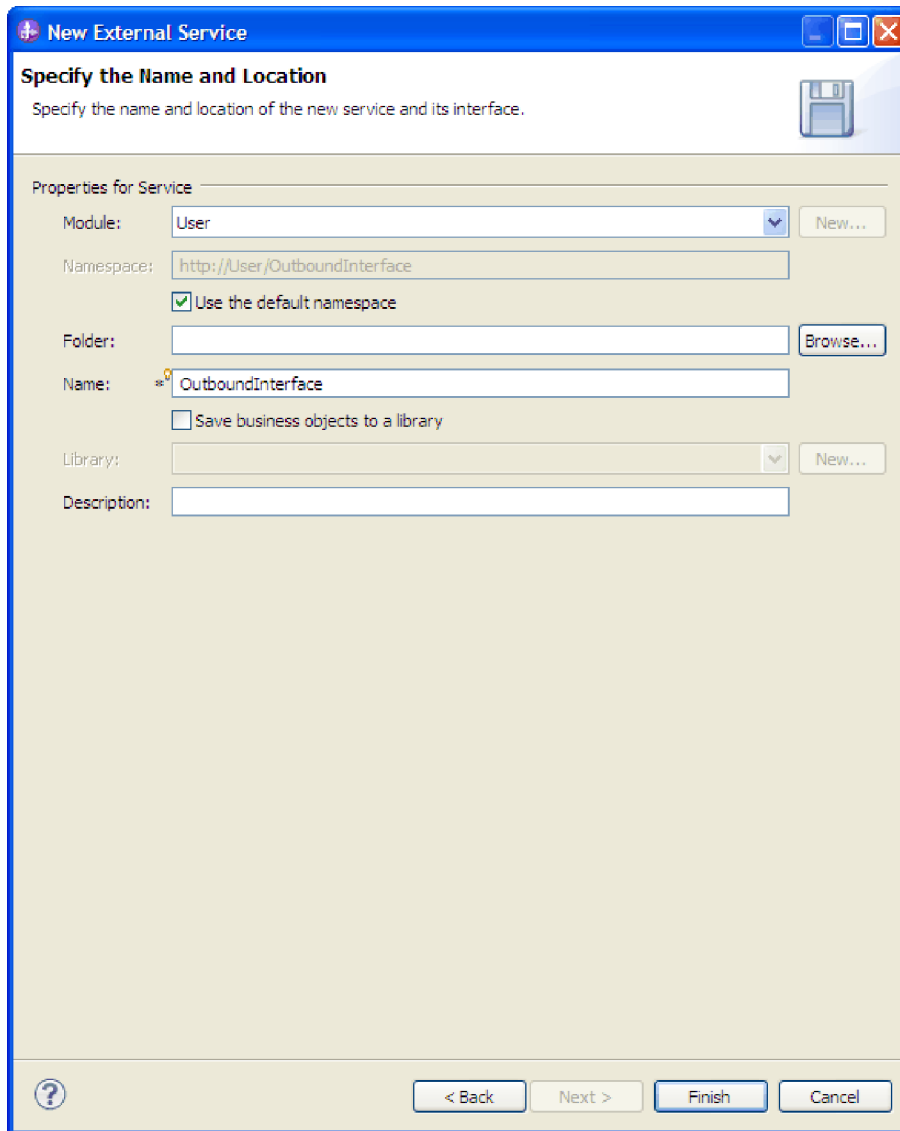


Figure 49. Naming the artifact

3. Optional: Name the **Folder** to store the artifacts.
4. Type a **Name** for the interface. This name displays in the IBM Integration Designer assembly diagram.
5. Optional: Type a **Description**.
6. Click **Finish**. The interface is displayed in IBM Integration Designer assembly diagram.

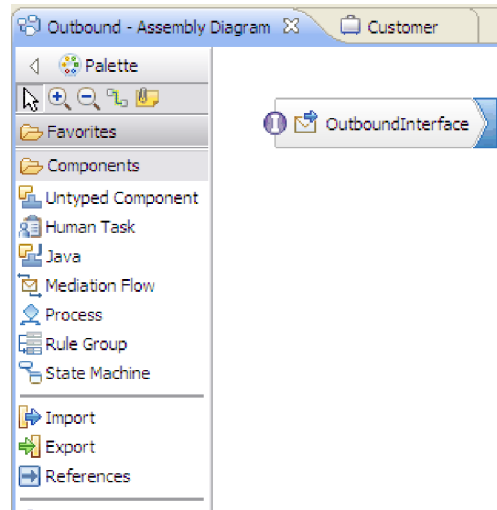


Figure 50. Interface in IBM Integration Designer

The business object you created is also displayed in a different tab.

Results

IBM Integration Designer generates the artifacts and an import. The outbound artifacts that are created are visible in the IBM Integration Designer Project Explorer under your module.

What to do next

Deploy the module for either testing or production.

Configuring the module for inbound processing

To configure a module to use the adapter for inbound processing, use the external service wizard in IBM Integration Designer to build business services, specify data transformation processing, and generate business object definitions and related artifacts.

Setting deployment and runtime properties for inbound processing

Using the external service wizard in IBM Integration Designer, select whether the module is used for outbound or inbound communication with the mail server. Then configure the connection properties. The connection properties are stored in the business object and contain the information that the adapter needs to make the connection between the inbound module and service.

Before you begin

Before you can set the connection properties in this section, you must create your module in IBM Integration Designer. It is displayed in the Business Integration pane below the adapter project. Also, you must create a staging directory on your local system for storing emails that is polled by the adapter but which are yet to be turned into business objects.

About this task

To set connection properties, follow this procedure. For more information, see “Activation specification properties” on page 195.

Procedure

1. In the Select the Processing Direction window, select **Inbound** and click **Next**. The Specify the Security and Configuration Properties window opens.

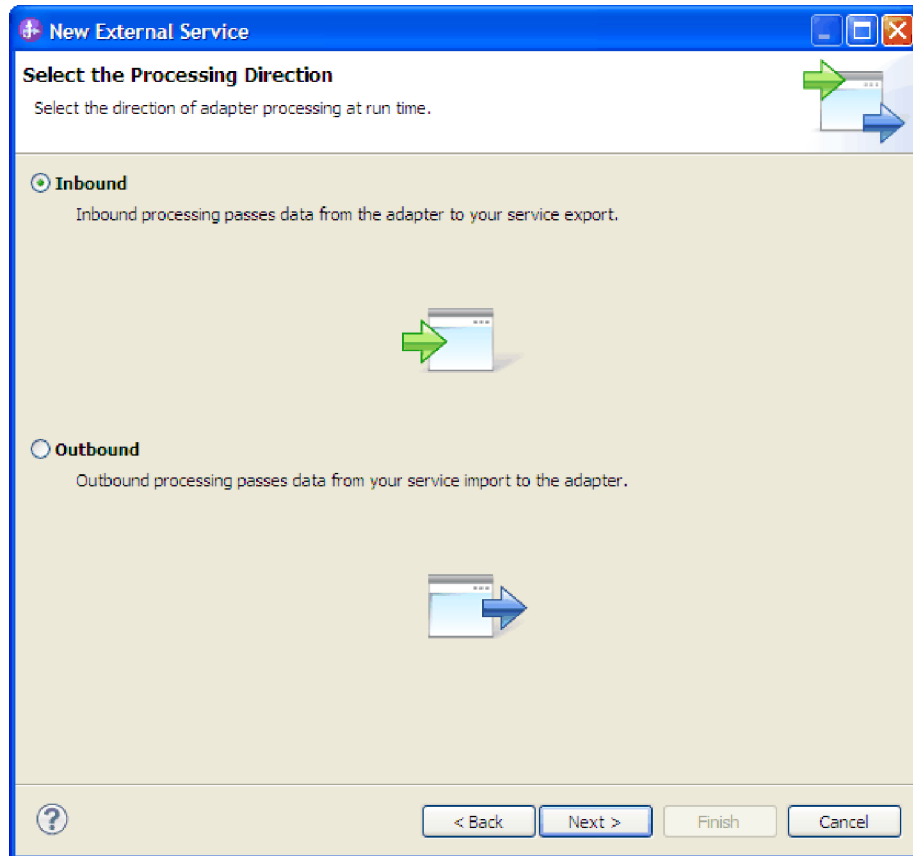


Figure 51. Choosing inbound or outbound in the external service wizard

2. In the **Deploy connector project** field, specify whether to include the adapter files in the module. Select one of the following values:
 - **With module for use by single application:** With the adapter files embedded in the module, you can deploy the module to any application server. Use an embedded adapter when you have a single module using the adapter or if multiple modules need to run different versions of the adapter. Using an embedded adapter enables you to upgrade the adapter in a single module without the risk of destabilizing other modules by changing their adapter version.
 - **On server for use by multiple applications:** If you do not include the adapter files in a module, you must install them as a stand-alone adapter on each application server where you want to run the module. Use a stand-alone adapter when multiple modules can use the same version of the adapter and you want to administer the adapter in a central location. A stand-alone adapter can also reduce the resources required by running a single adapter instance for multiple modules.

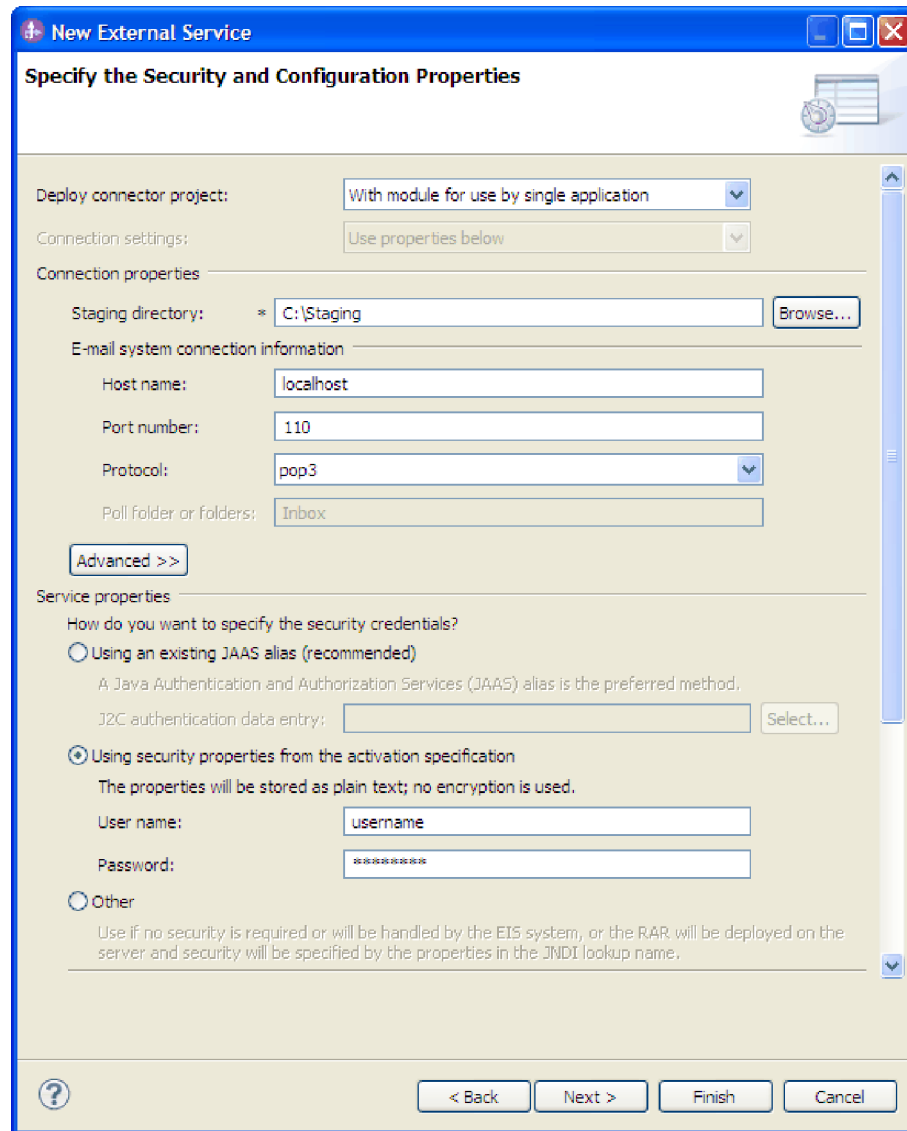


Figure 52. Specifying inbound connection properties

3. Browse for the **Staging Directory** you created on your local system. If you have not created a staging directory, create one and then restart the external service wizard.
4. Define the **Connection properties** for your module. For more details about these properties, see “Activation specification properties” on page 195.
 - a. Under the **E-mail system connection information**, type the **Host name**.
 - b. Type the **Port** number.
 - c. Optional: Select the email **Protocol**. For more information about the POP3 and IMAP email protocols, see “Supported inbound protocols” on page 8.
5. Click **Advanced** and specify values as needed. These include activation specification properties designed to alter the default behavior of the adapter during inbound communication. For more information about any of the Advanced properties for event polling, event delivery, event persistence, archiving, or setting search criteria, see “Activation specification properties” on page 195.

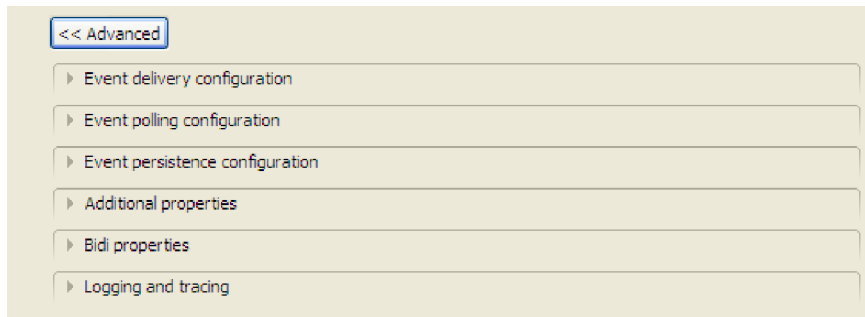


Figure 53. Advanced properties

- **Event delivery configuration**
 - a. In the **Type of delivery** field, select the delivery method. The methods are described in “Delivery type (DeliveryType)” on page 199.
 - b. If you want to ensure that events are delivered only once and to only one export, select the **Ensure assured-once event delivery** check box. This option might reduce performance but does not result in duplicate or missing event delivery. For more information, see “Ensure once-only event delivery (AssuredOnceDelivery)” on page 200.
 - c. In the **Retry limit for failed events** field, specify the number of times to try to deliver an event after a delivery failure. For more information, see “Retry limit for failed events (FailedEventRetryLimit)” on page 201.
- **Event polling configuration**
 - In the **Interval between polling periods (milliseconds)** field, type the time in milliseconds, that the adapter waits between polling periods. For more information about the property, see “Interval between polling periods (PollPeriod)” on page 202.
 - In the **Maximum events in polling period** field, type the number of events to deliver in each polling period. For more information about the property, see “Maximum events in polling period (PollQuantity)” on page 205.
 - To specify the time interval between attempts to connect to the mail server if a connection fails, set **Time between retries in case of system connection failure (in milliseconds)** to a value in milliseconds. For more information, see “Time between retries in case of system connection failure (RetryInterval)” on page 208.
 - To specify the number of connection exceptions during the inbound operation, set **Maximum number of retries in case of system connection failure** to a value greater than or equal to 0. For more information, see “Maximum number of retries in case of system connection failure (RetryLimit)” on page 205.
 - If you want the adapter to stop if polling errors occur, select the **Stop the adapter when an error is encountered while polling** check box. If you do not select this option, the adapter logs an exception but continues to run. For more information, see “Stop the adapter when an error is encountered while polling (StopPollingOnError)” on page 208.
 - Select the **Retry EIS connection on startup** check box, if you want the adapter to try a failed connection when starting. For more information, see “Retry EIS connection on startup (RetryConnectionOnStartup)” on page 207.

- Select the calendar based scheduling option to create calendar based polling for inbound activities. You can schedule your business activities, when you create a new calendar in IBM Integration Designer. The option of working with the calendar based scheduling feature is only possible with IBM Integration Designer as the tooling environment. The following figure helps you to schedule a calendar polling option.

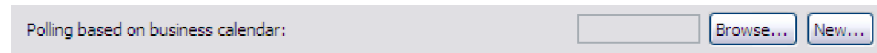


Figure 54. Polling based on business calendar

You can either select a blank calendar or create a new calendar for a module or library.

Note: When you select a blank calendar, you will not be able to set predefined time intervals. You have to define your time intervals. When you create a calendar using a predefined template, you can define time intervals for each template.

- To select an existing calendar for a module or library, click **Browse**. In the Select a Business Calendar window, you can search for existing calendar files (*.cal) in the IBM Integration Designer workspace.
 - In the **Filter by name** field, type the calendar name or name pattern. The calendars matching the pattern are displayed in the **Matching business calendars** area.
 - Select a calendar and click **OK** to return to the external service wizard.
- To create a new calendar entry for a module or library, click **New**. The Create a business calendar window is displayed.
 - In the **Module or library** field, click **Browse** to select an existing calendar module or click **New** to create a module for the new calendar.
 - In the **Folder** field, click **Browse** to select an existing folder or create a new folder for the calendar.
 - In the **Name** field, enter a name for the new calendar.
 - To create a non template calendar, click **Finish**. Or
 - To generate the calendar based on a predefined template, click **Next**. In the Use a template window, select the **Create a calendar using one of the templates** check box and click **Finish**.

The new business calendar is created and available in the Business Integration view. Once you complete the wizard, you can view or modify the calendar schedules in the Business Integration view using the Business Calendar Editor. You can modify the intervals and exceptions, or add new entries for these elements. For more details about working with business calendars, see Business calendars.

Note: You must deploy the Business Calendar module to the same IBM Business Process Manager or WebSphere Enterprise Service Bus instance, along with the inbound application. If you do not map these two connections to the same server instance, the inbound application using the business calendar will by default, poll as there is no calendar configured.

- **Event persistence configuration**

- a. Select **Auto create event table** check box if you want the adapter to create the Event Persistence table. For more information, see “Auto create event table property (EP_CreateTable)” on page 198.
 - b. In the **Event recovery table name** field, specify the name of the table that the adapter uses for event persistence. For more information, see “Event recovery table name property (EP_TableName)” on page 201.
 - c. In the **Event recovery data source (JNDI) name** field, specify the JNDI name of the data source that event persistence uses to connect to the JDBC database. For more information, see “Event recovery data source (JNDI) name property (EP_DataSource_JNDIName)” on page 200.
 - d. In the **User name used to connect to event data source** field, specify the user name that the event persistence uses to connect to the database from the data source. For more information, see “User name used to connect to event data source property (EP_UserName)” on page 209.
 - e. In the **Password used to connect to event data source** field, specify the password that the event persistence uses to connect to the database from the data source. For more information, see “Password used to connect to event data source property (EP_Password)” on page 206.
 - f. In the **Database schema name** field, specify the schema name of the database that the event persistence uses. For more information, see “Database schema name (EP_SchemaName)” on page 198.
- **Additional configuration**
 - a. Select the **Enable transport security (SSL)** check box if you want to enable Secure Sockets Layer (SSL). For more information, see “Enable transport security (SecureConnectionProperty)” on page 199.
 - b. Select the **Emit individual business objects from a multipart e-mail** check box, to specify if the adapter creates individual business objects for each part of a multipart email. For more information, see “Emit individual business objects from a multipart email (EmitIndividualBOs)” on page 199.
 - c. In the **Match all search criteria** field, specify the search criteria to filter which events are polled from the mail server. The events that meet the ANDed conditions are polled. For more information, see “Match all search criteria (MatchAllCriteria)” on page 202.
 - d. In the **Match some search criteria** field, specify the search criteria to filter which events are polled from the mail server. The events that meet the ORed conditions are polled. For more information, see “Match some search criteria (MatchSomeCriteria)” on page 203.
 - e. In the **Archive file naming pattern** field, you can specify a comma-delimited pattern of header names which are used to name archived files stored in the archive folder. For more information, see “Archive file naming pattern (ArchiveFile)” on page 197.
 - **Bidi properties**
 - a. Select the **Bidi transformation** check box to specify bidirectional format. For more information about setting the **Bidi properties**, see “Globalization” on page 212.
 - **Logging and tracing**
 - a. If you have multiple instances of the adapter, enter a value in the **Adapter ID** that is unique for this instance. For more information, see “Adapter ID (AdapterID)” on page 187.

- b. You can select the **Disguise user data as 'XXX' in log and trace files** check box to prevent sensitive user data from being written to log and trace files.
6. In **Service properties**, specify how you want the adapter to connect to the mail server by selecting any one of these authentication methods.
 - To use a J2C authentication alias, click **Using an existing JAAS alias (recommended)** and type the name of the alias in the **J2C Authentication data entry** field. You can either specify an existing authentication alias or create one at any time before deploying the module. The name is case-sensitive and includes the node name.
 - To use the security properties from the activation specification, click **Using security properties from the activation specification** enter the following information:
 - In the **User name** field, type the user name for the mail server.
 - In the **Password** field, type the password for the mail server.

Note: The security properties are not encrypted and stored as plain text. If you are using an authentication alias, a user name and password are not necessary. Also, for outbound communication you do not need to enter a user name and password because a mail server uses an anonymous user name and password to send the emails.

 - To administer the user name and password from another mechanism, click **Other**.
7. To use an existing function selector configuration, use the default value (EmailFunctionSelector). To configure a custom function selector, click **Select**. Clicking **Select** allows you to select a pre-configured function selector. You can configure a function selector if you want to implement a custom function selector. This configuration is an advanced concept. By default, the email function selector is used, which does not require any configuration.
8. Optional: Select the **Change logging properties for wizard** check box if you want to define the level of logging for this module.

What to do next

Browse for or create a data binding for the module.

Selecting a data type and operation name

Use the external service wizard to select a data type and name the operation associated with this data type. For inbound communication, the external service wizard gives you the choice of three different data types: generic email, generic email with business graph, and user-defined type. Each data type corresponds to a business object structure.

Before you begin

You must have specified the connection properties for the adapter to connect to the mail server, data bindings, and data handlers before you can specify the operation and data type for the module.

About this task

To select a data type and name the operation associated with it, follow this procedure.

Procedure

1. In the Add, Edit, or Remove Operations window, click **Add**.
2. In the Specify the I/O Properties window, type an **Operation name**.

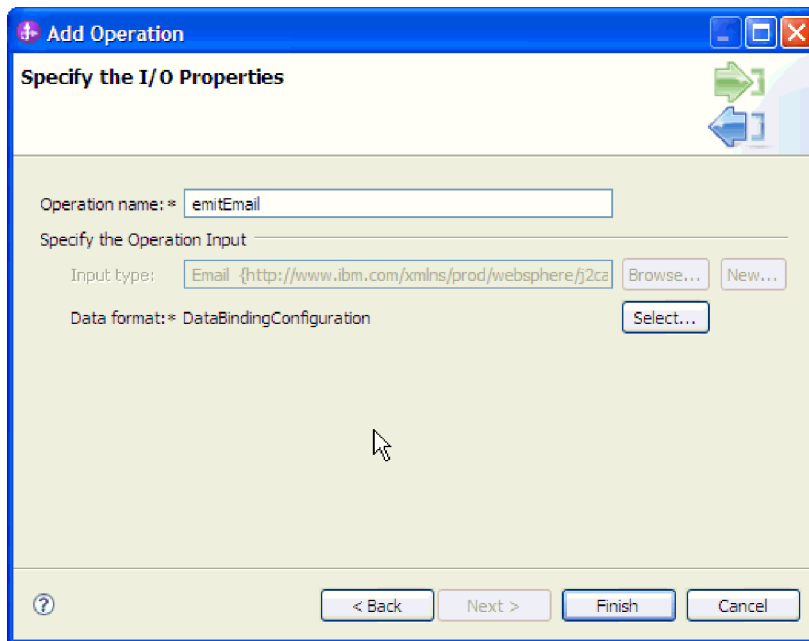


Figure 55. Naming the operation

Type a meaningful name for the operation. If this module is going to be used to convert a simple email business object, name it something like `SendEmail`. Or, if it is going to be used to create a parent email business object with a customer child business object, name it something like `SendCustomerEmail`. For more information about the types of operations the adapter can perform, see "Supported operations" on page 161.

Note: Names cannot contain spaces.

3. The external service wizard defaults to the correct data binding for the data type you selected in the Operation window. If you want to use a different data binding, click **Browse** for a data binding or create a new one using the instructions in the sections "Configuring the data binding" and "Configuring business object properties and data handlers."
4. In the Specify the I/O Properties window, click **Finish**.
5. In the Add, Edit, or Remove Operations window, click **Next**.

Results

A data type is defined for the module and the operation associated with this data type is named.

What to do next

Generate artifacts for the module.

Configuring the data binding

Data bindings read the fields in a business object and fill the corresponding fields in an email. In the external service wizard, you add a data binding to your module and configure it to correspond with your data type. This way, the adapter knows how to populate the fields in an email with information it receives in the business object.

Before you begin

You must have entered service configuration properties for the connection to the mail server.

About this task

To add and configure a data binding for the module, follow this procedure.

Note: You can configure data bindings before running the external service wizard by using IBM Integration Designer. To do this configuration, select **New > Configure Binding Resource** in IBM Integration Designer and complete the data binding windows described in this documentation.

Procedure

1. In the Specify the Security and Configuration Properties window, select a value for the **Data format options** from the list. You can choose to use the data binding configuration for all operations or you can choose to specify a data binding for each operation. If you use the data binding configuration for all operations, then the data binding configured here is used as the default data binding configuration for all the operations. If you choose to specify a data binding for each operation, then you must configure a data binding for each operation. In these steps, the **Use a data format configuration for all operations** option is selected.

Important: If associate your inbound module with a particular user-defined business object type, the steps for defining your data binding in this section dictates which events the adapter processes at run time. At run time, inbound events that are symmetric to the custom data type are processed by the adapter. Those events that are not symmetric to the custom data type are not processed. For these events, the adapter throws an exception and logs an error message.

2. In the **Data format** field, click **Select**.
3. In the Select a Data Format Transformation window, select the **Use existing data format transformation from the list** option to use one of the data bindings included with IBM Integration Designer. Click **Next**. The **Select your custom data format transformation from the workspace** option is available for advanced users who want to use a custom data binding. A custom data binding, once placed in the class path, shows when this option is selected.

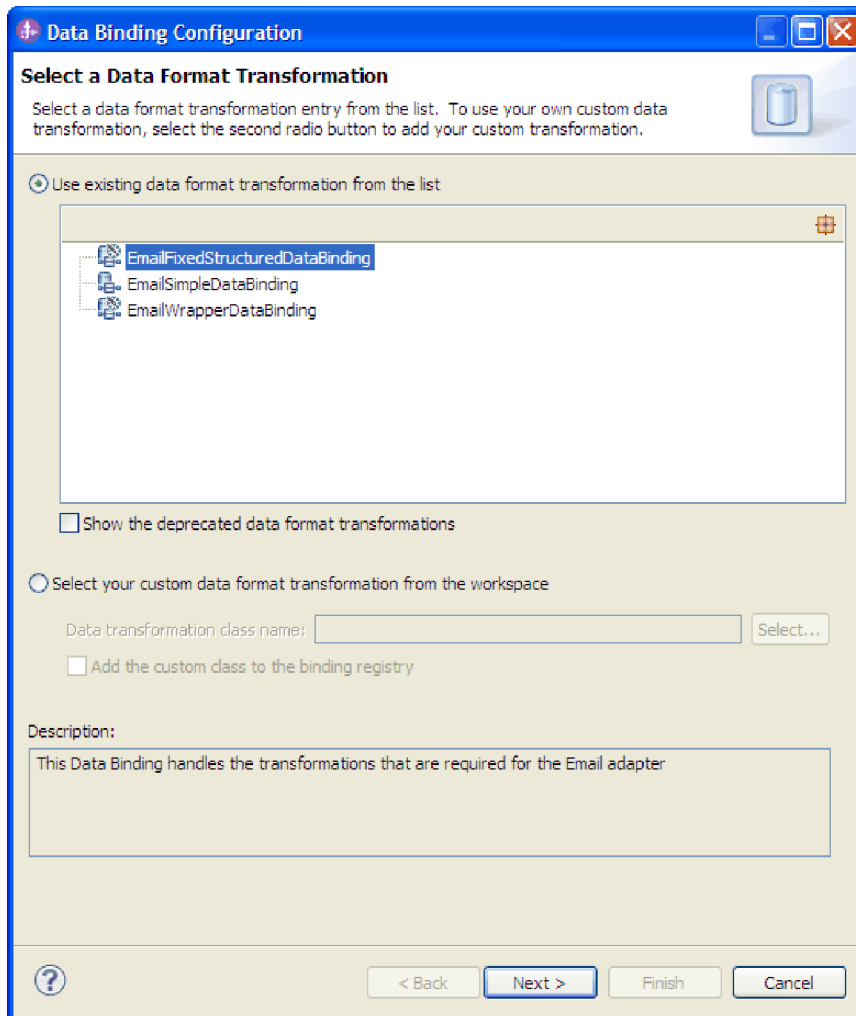


Figure 56. Selecting a data binding

The following data types are matched with the following data bindings.

Table 6. Data types and their data binding equivalents

Data type	Data binding
Generic email	Email Wrapper Data Binding
Generic email with business graph	Email Wrapper Data Binding
User-defined email business object	EmailFixedStructureDataBinding

4. In Specify the Data Transformation Properties window, click **Next**.

Note: This window is used for configuring the data handlers.

5. In Configure a New Data Transformation window, provide the data binding configuration details.
 - a. In the New Data Binding Configuration window, the **Module** defaults to the module name you typed earlier in the wizard. To create a data binding for a different module, select **New** to create a module.

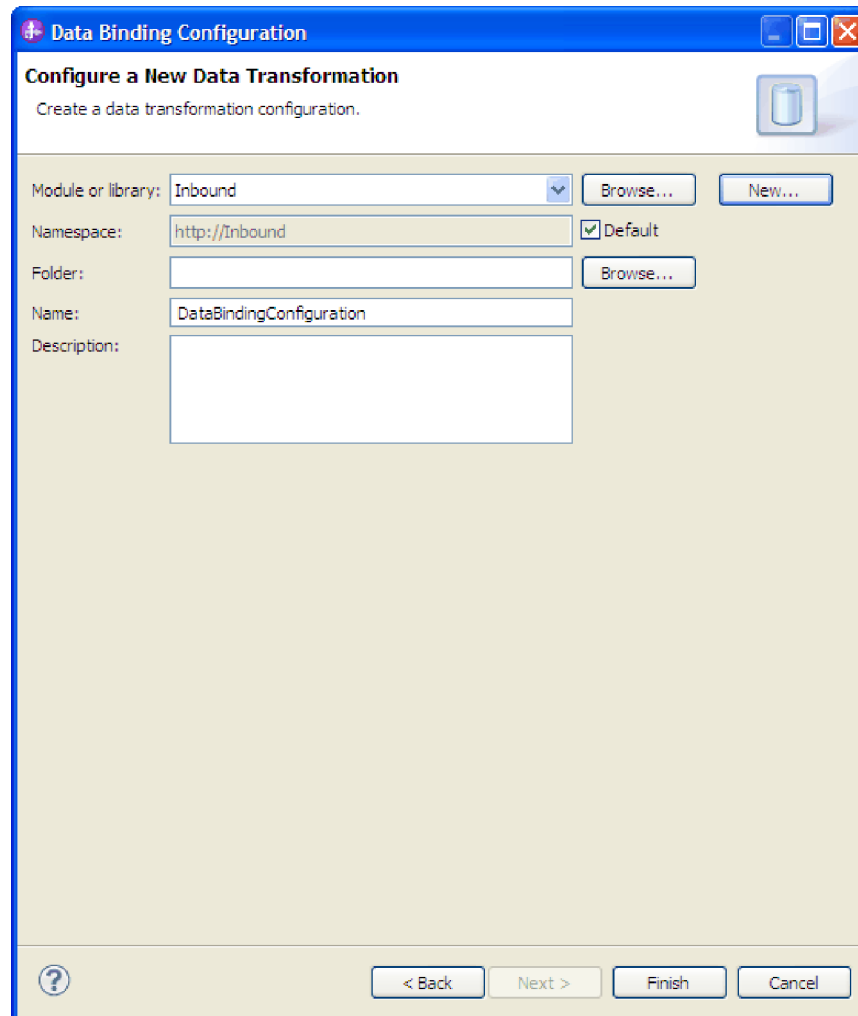


Figure 57. Naming the data binding configuration

- b. If you want to select a new folder for the artifact, click **Browse** and select a new folder location. If you do not browse for a new folder location, the artifacts are created in the root directory for the module.
- c. Type a **Name** for the data binding configuration and click **Finish**.

The data binding class name populates in the Specify the Security and Configuration Properties window.

Results

A data binding is configured for use with the module.

What to do next

Specify data binding properties.

Configuring business object properties and data handlers

When you select a data type that contains business objects, you must specify properties for those business objects. However, this step does not add child business object to the email parent object. Rather, they tell the adapter how to

process particular types of business objects. Data handlers perform the conversions between a business object and a particular MIME format.

Before you begin

You must have created a data binding before specifying business object properties and data handlers for the module. Also, you must have predefined business objects using IBM Integration Designer Business Object Editor. If you stop the wizard here to create business objects, you must start the wizard steps from the beginning.

Note: Data handlers can be configured before running the external service wizard using IBM Integration Designer. To do this configuration, select **New > Configure Binding Resource** in IBM Integration Designer and complete the data handler windows described in this documentation.

About this task

You must define business object properties and data handlers if you have selected the generic email, email with business graph, or user-defined type as the data type. The simple alert email data type does not have properties that need to be configured. To specify business object properties and data handlers, follow this procedure.

Procedure

1. If you chose the email with business object or email with business graph data types, click **Add** to add the business object types to the data binding description in the Add/Edit properties window.

Note: For the user-defined type, the following warning message is displayed if you click **Add** in this window. The **User cannot add new row to the table. Adapter has parsed your Input type and filled the table.** This warning appears because the adapter has determined which business objects the data binding must know about and pre-filled the table. To provide values for the rest of the properties, select individual rows and click **Edit**.

Important: If you are repeating these steps to configure a child data binding for the user-defined data type, note that you cannot select between data handler and data binding when you click **Edit**. The binding type option (to select between data binding and data handler) does not function correctly for the EmailFixedStructuredDataBinding data binding. To configure a child data binding for EmailFixedStructuredDataBinding, click the **Binding type** field and select **DataBinding**.

2. In the Add/Edit properties window, ensure that **DataHandler** is selected in the **Binding type** field.
3. In the **Business object type** field, click **Browse** for existing business objects or **New** to create a business object. Selecting business objects here does not physically add child business objects. Adding business objects at this stage in the wizard tells the adapter that you are going to use certain business object types with your module. It enables the adapter to know what data binding to apply to any child business objects it processes.
 - a. If you selected **Browse** for the **Business object type** field, select a data type from the Data Type Selection window and click **OK**.
 - b. If you selected **New** for the **Business object type** field, complete the following steps.

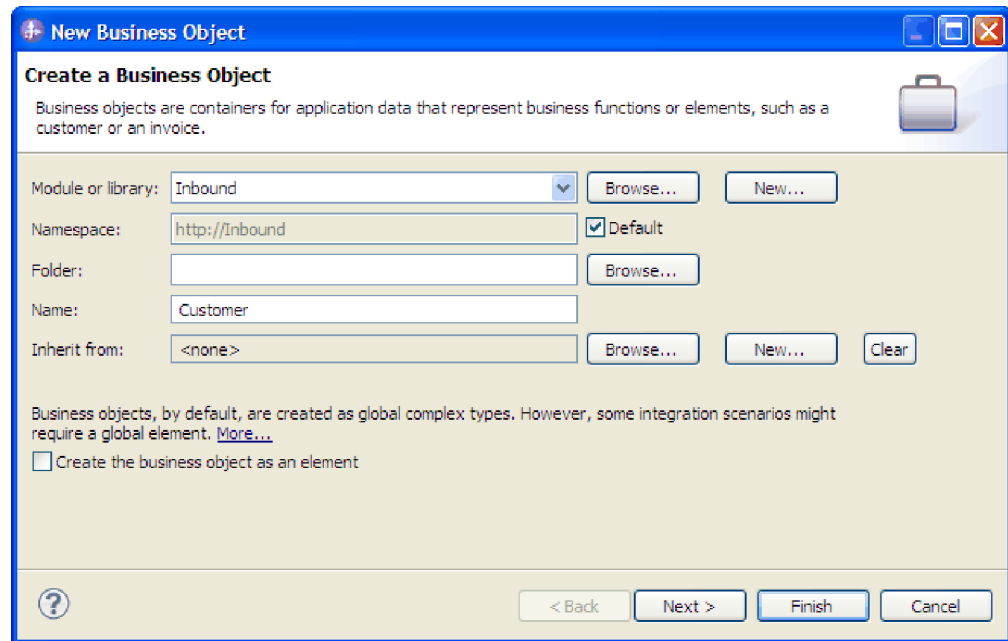


Figure 58. Specifying business object properties for the module

- c. Select the **Module**. If the correct module is not shown, **Browse** for it or click **New** to create a module.
- d. Optional: Type a **Folder** name or **Browse** for the folder on your local drive where business object schema files (XSD files) generated by the external service wizard are stored.
- e. Type a **Name** for the business object.
- f. If you do not want to populate the business object with fields from one or more existing business objects, click **Finish**.
- g. If you want to populate the business object with fields from one or more existing business objects, click **Next**.

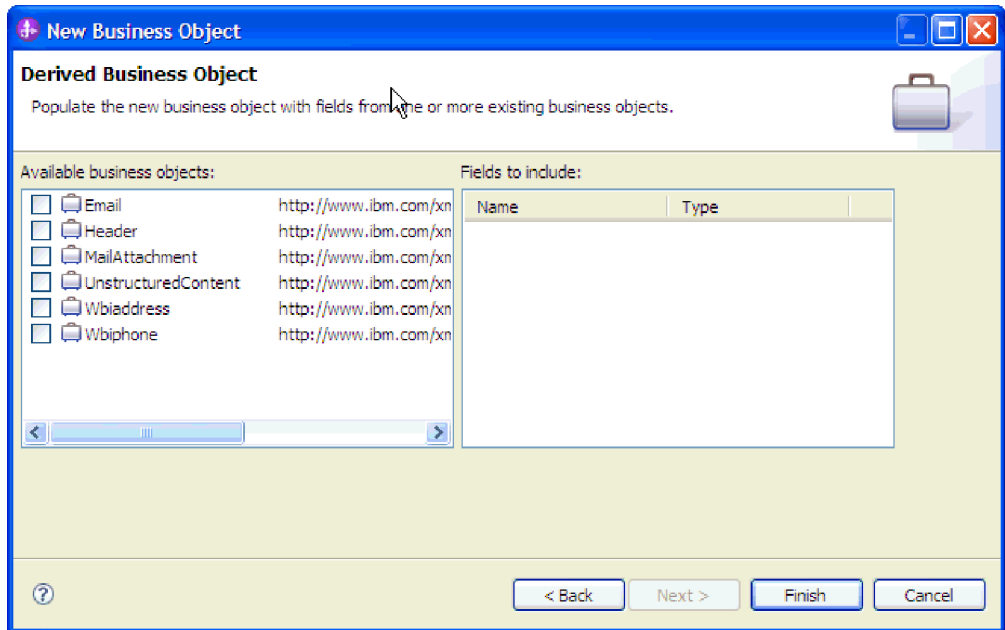


Figure 59. Deriving business object fields from an existing business object

- h. Select the correct business object and click **Finish**. The **Business object type** in the Add/Edit properties window is populated.
4. In the Add/Edit properties window, select a **Mime type** such as **text/xml** for your business object. The mime type corresponds to the data handler that is used by the adapter to perform data transformation from one format to another. This step enables the adapter to decide which format it has to convert the content to when it encounters the business object.

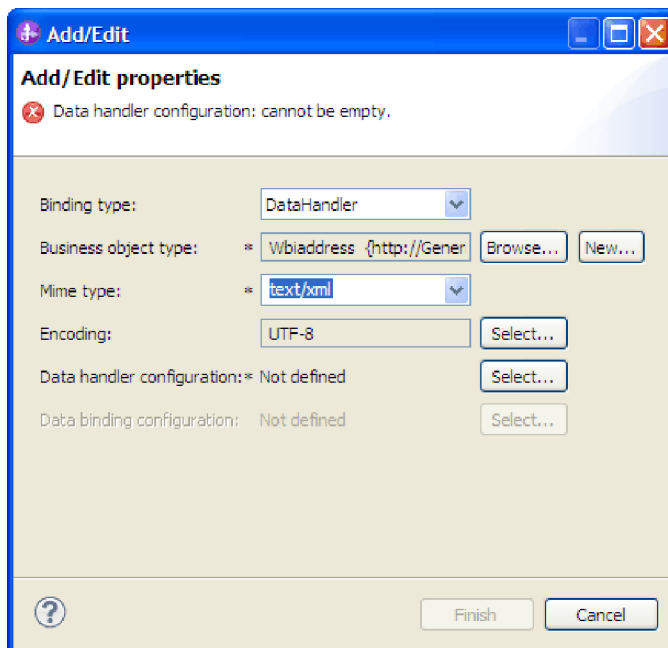


Figure 60. Adding or editing business object data binding properties

5. In the **Encoding** field, click **Select** if you want to choose a different encoding value.
6. In the **Data handler configuration** field, click **Select**. Complete the following steps to create and configure a data handler.
 - a. From the **Use existing data format transformation from the list** option, select the **XML** data handler. Click **Next**.

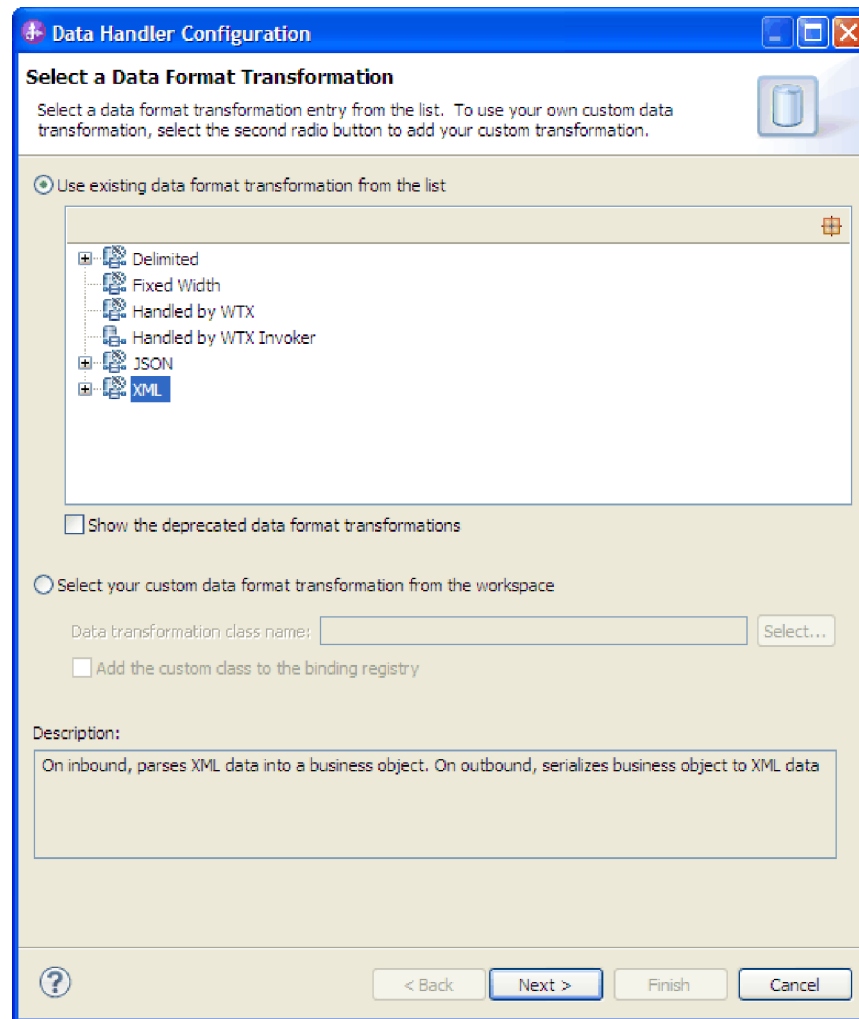


Figure 61. Creating a data handler

- b. In the Specify the Data Transformation Properties window, select an **Encoding** value. Click **Next**.
- c. In the Configure a New Data Transformation window, select the module. If the correct module is not displayed, click **New** to create a new one.
- d. Optional: Type a **Folder** name to specify a folder for the artifacts.
- e. Leave the default data handler **Name** or type a new one.

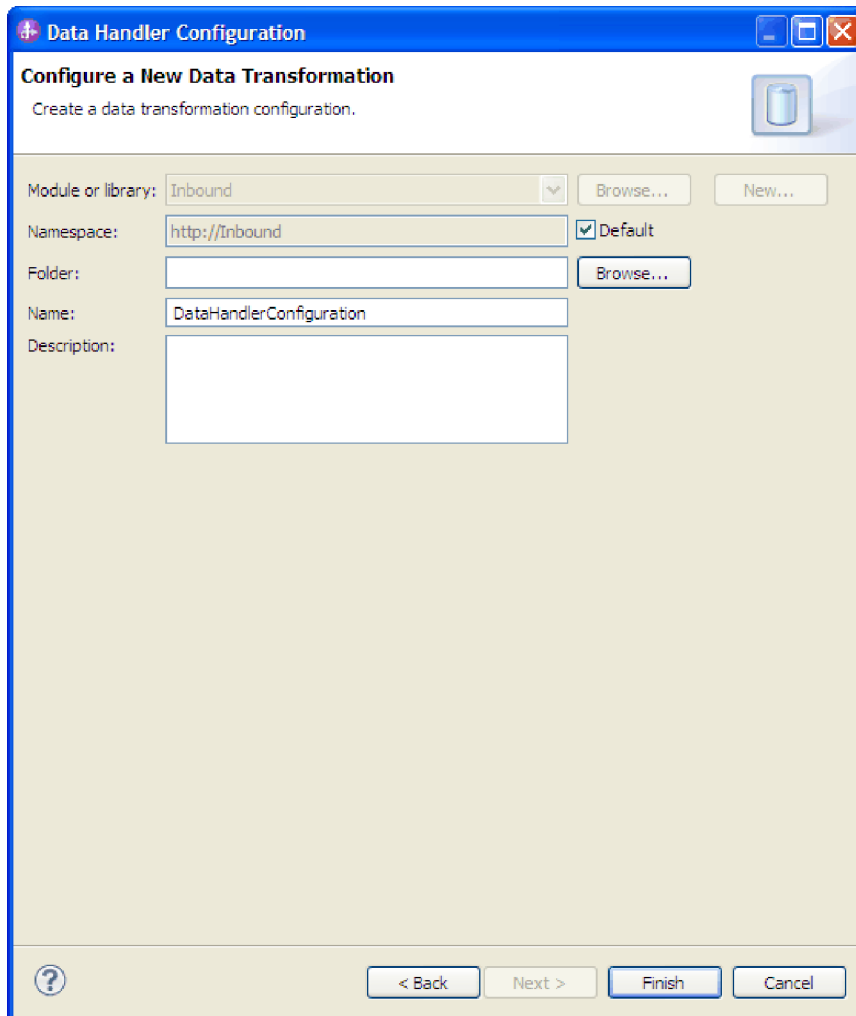


Figure 62. Creating a data handler

- f. Click **Finish**.
7. In the Add/Edit properties window, click **Finish**.

Results

Business object properties and their data handlers are created.

What to do next

Specify interaction specification properties and generate artifacts for the module.

Setting deployment properties and generating the service

The export file is generated when the adapter creates artifacts for the module and contains the operation for the top-level business object.

Before you begin

To generate artifacts for your module you must have already configured data bindings and selected business objects.

About this task

To generate artifacts for your module, follow this procedure.

Procedure

1. In the Specify the Name and Location window, select the **Module**.

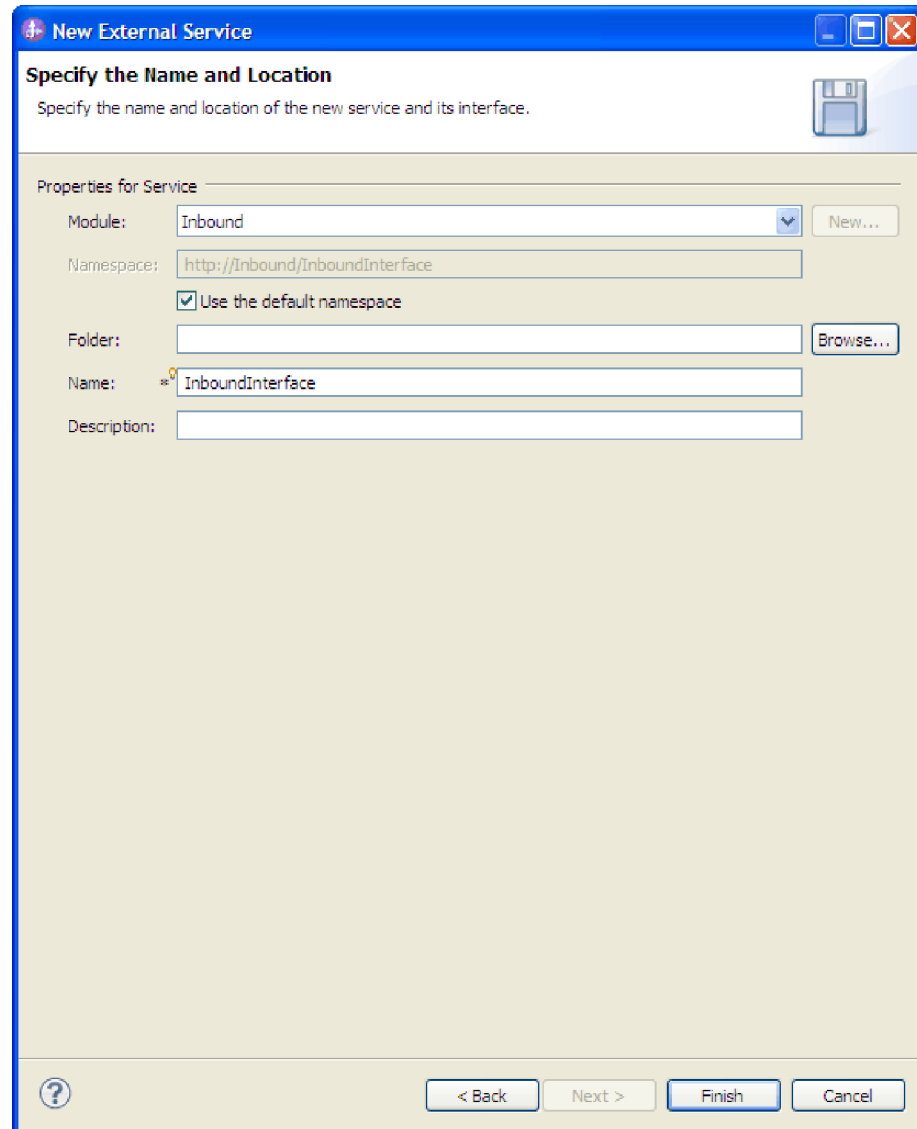


Figure 63. Naming the artifact

2. Optional: Name the **Folder** to store the artifacts.
3. Type a **Name** for the interface. This name displays in the IBM Integration Designer assembly diagram.
4. Optional: Type a **Description**.
5. Click **Finish**. The IBM Integration Designer assembly diagram opens and the interface you created is displayed.

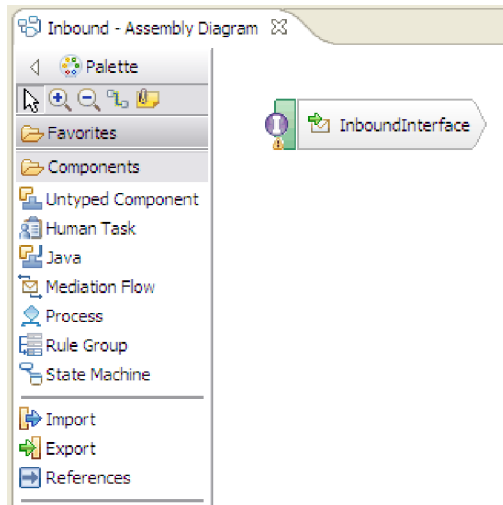


Figure 64. Interface in IBM Integration Designer

The business object you created is also displayed in a different tab.

Results

The IBM Integration Designer generates the artifacts and an export. The inbound artifacts that are created are visible in the IBM Integration Designer Project Explorer under your module.

What to do next

Deploy the module for either testing or production.

Chapter 5. Changing interaction specification properties

To change interaction specification properties for your adapter module after generating the service, use the assembly editor in IBM Integration Designer.

Before you begin

You must have used the external service wizard to generate a service for the adapter.

About this task

You might want to change interaction specification properties after you have generated a service for the adapter. Interaction specification properties, which are optional, are set at the method level, for a specific operation on a specific business object. The values you specify appear as defaults in all parent business objects generated by the external service wizard. You can change these properties before you export the EAR file. You cannot change these properties after you deploy the application.

To change the interaction specification properties, use the following procedure:

Procedure

1. From the Business Integration perspective of IBM Integration Designer, expand the module name.
2. Expand **Assembly Diagram** and double-click the interface.
3. Click the interface in the assembly editor. The module properties are displayed.
4. Click the **Properties** tab. You can also right-click the interface in the assembly diagram and click **Show in Properties**.
5. Under **Binding**, click **Method bindings**. The methods for the interface are displayed, one for each combination of business object and operation.
6. Select the method whose interaction specification property you want to change.
7. Click **Advanced** and change the property in the **Generic** tab. Repeat this step for each method whose interaction specification property you want to change.

Results

The interaction specification properties associated with your adapter module are changed.

What to do next

Deploy the module.

Chapter 6. Deploying the module

Deploy a module to place the files that make up your module and adapter into an operational environment for production or testing. In IBM Integration Designer, the integrated test environment features runtime support for IBM Business Process Manager or WebSphere Enterprise Service Bus, or both, depending on the test environment profiles that you selected during installation.

Deployment environments

There are test and production environments into which you can deploy modules and adapters.

In IBM Integration Designer, you can deploy your modules to one or more servers in the test environment. This is typically the most common practice for running and testing business integration modules. However, you can also export modules for server deployment on IBM Business Process Manager or WebSphere Enterprise Service Bus as EAR files using the Process Administrative Console or command-line tools.

Deploying the module for testing

In IBM Integration Designer, you can deploy a module that includes an embedded adapter to the test environment and work with server tools that enable you to perform such tasks as editing server configurations, starting, and stopping servers and testing the module code for errors. The testing is generally performed on the interface operations of your components, which enables you to determine whether the components are correctly implemented and the references are correctly wired.

Generating and wiring a target component for testing inbound processing

Before deploying to the test environment a module that includes an adapter for inbound processing, you must first generate and wire a target component. This target component serves as the *destination* to which the adapter sends events.

Before you begin

You must have generated an export module, using the external service wizard.

About this task

Generating and wiring a target component for inbound processing is required in a testing environment only. It is not necessary when deploying the adapter in a production environment.

The target component receives events. You *wire* the export to the target component (connecting the two components) using the assembly editor in IBM Integration Designer. The adapter uses the wire to pass event data (from the export to the target component).

Procedure

1. Create the target component.

- a. From the Business Integration perspective of IBM Integration Designer, expand **Assembly Diagram** and double-click the export component. If you did not change the default value, the name of the export component is the name of your adapter + **InboundInterface**.
An interface specifies the operations that can be called and the data that is passed, such as input arguments, returned values, and exceptions. The **InboundInterface** contains the operations required by the adapter to support inbound processing and is created when you run the external service wizard.
- b. Create a new component by expanding **Components**, selecting **Untyped Component**, and dragging the component to the Assembly Diagram.
The cursor changes to the placement icon.
- c. Click the component to have it displayed in the Assembly Diagram.
2. Wire the components.
 - a. Click and drag the export component to the new component.
 - b. Save the assembly diagram. Click **File > Save**.
3. Generate an implementation for the new component.
 - a. Right-click on the new component and select **Generate Implementation > Java**.
 - b. Select **(default package)** and click **OK**. This creates an endpoint for the inbound module.
The Java implementation is displayed in a separate tab.
 - c. **Optional:** Add print statements to print the data object received at the endpoint for each of the endpoint methods.
 - d. Click **File > Save** to save the changes.

What to do next

Continue deploying the module for testing.

Adding the module to the server

In IBM Integration Designer, you can add modules to one or more servers in the test environment.

Before you begin

If the module you are testing uses an adapter to perform inbound processing, generate and wire a *target component* to which the adapter sends the events.

About this task

In order to test your module and its use of the adapter, you need to add the module to the server.

Procedure

1. *Conditional:* If there are no servers in the **Servers** view, add and define a new server by performing the following steps:
 - a. Place your cursor in the **Servers** view, right-click, and select **New > Server**.
 - b. From the Define a New Server window, select the server type.
 - c. Configure servers settings.
 - d. Click **Finish** to publish the server.

2. Add the module to the server.
 - a. Switch to the servers view. In IBM Integration Designer, select **Windows > Show View > Servers**.
 - a. Start the server. In the **Servers** tab in the lower-right pane of the IBM Integration Designer screen, right-click the server, and then select **Start**.
3. When the server status is *Started*, right-click the server, and select **Add and Remove Projects**.
4. In the Add and Remove Projects screen, select your project and click **Add**. The project moves from the **Available projects** list to the **Configured projects** list.
5. Click **Finish**. This deploys the module on the server.

The Console tab in the lower-right pane displays a log while the module is being added to the server.

What to do next

Test the functionality of your module and the adapter.

Testing the module for outbound processing using the test client

Test the assembled module and adapter for outbound processing using the IBM Integration Designer integration test client.

Before you begin

You need to add the module to the server first.

About this task

Testing a module is performed on the interface operations of your components, which enables you to determine whether the components are correctly implemented and the references are correctly wired.

Procedure

1. Select the module you want to test, right-click on it, and select **Test > Test Module**.
2. For information about testing a module using the test client, see the *Testing modules and components* topic in the IBM Integration Designer information center.

What to do next

If you are satisfied with the results of testing your module and adapter, you can deploy the module and adapter to the production environment.

Deploying the module for production

Deploying a module created with the external service wizard to IBM Business Process Manager or WebSphere Enterprise Service Bus in a production environment is a two-step process. First, you export the module in IBM Integration Designer as an enterprise archive (EAR) file. Second, you deploy the EAR file using the IBM Business Process Manager or WebSphere Enterprise Service Bus Process Administrative Console.

Installing the RAR file (for modules using stand-alone adapters only)

If you chose not to embed the adapter with your module, but instead choose to make the adapter available to all deployed applications in the server instance, you need to install the adapter in the form of a RAR file to the application server. A RAR file is a Java archive (JAR) file that is used to package a resource adapter for the Java EE Connector Architecture (JCA).

Before you begin

You must set **Deploy connector project** to **On server for use by multiple adapters** in the Specify the Service Generation and Deployment Properties window of the external service wizard.

About this task

Installing the adapter in the form of a RAR file results in the adapter being available to all Java EE application components running in the server run time.

Procedure

1. If the server is not running, right-click your server in the **Servers** view and select **Start**.
2. When the server status changes to **Started**, right-click the server and select **Administration > Run administrative console**.
3. Log on to the administrative console.
4. Click **Resources > Resource Adapters > Resource adapters**.
5. In the Resource adapters page, click **Install RAR**.

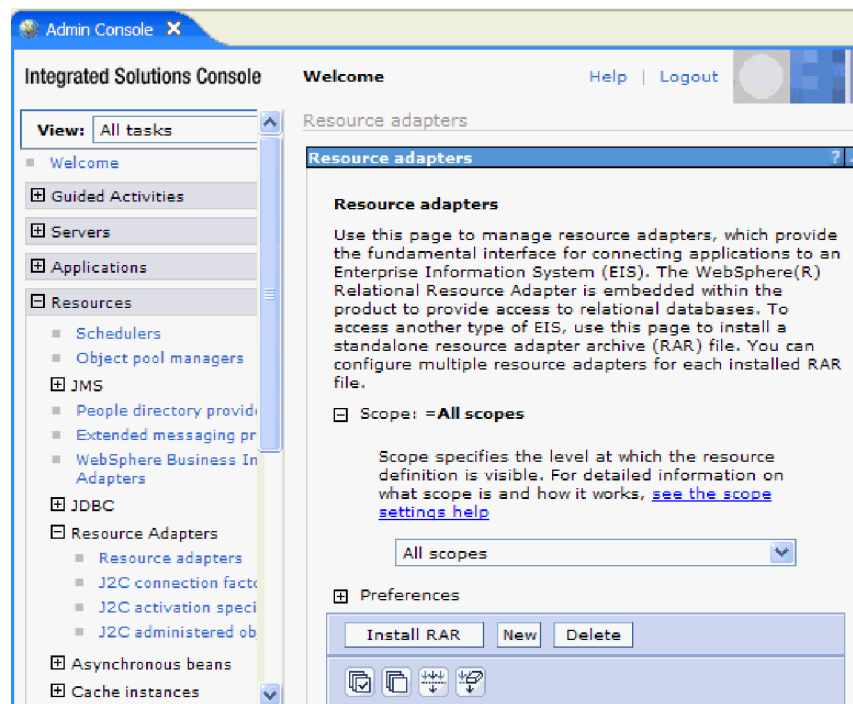


Figure 65. The Install RAR button on the Resource adapters page

6. In the Install RAR file page, click **Browse** and navigate to the RAR file for your adapter.
The RAR files are typically installed in the following path:
IID_installation_directory/ResourceAdapters/adapter_name/adapter.rar
7. Click **Next**.
8. Optional: In the Resource adapters page, change the name of the adapter and add a description.
9. Click **OK**.
10. Click **Save** in the **Messages** box at the top of the page.

What to do next

The next step is to export the module as an EAR file that you can deploy on the server.

Exporting the module as an EAR file

Using IBM Integration Designer, export your module as an EAR file. By creating an EAR file, you capture all of the contents of your module in a format that can be easily deployed to IBM Business Process Manager or WebSphere Enterprise Service Bus.

Before you begin

Before you can export a module as an EAR file, you must have created a module to communicate with your service. The module should be displayed in the IBM Integration Designer Business Integration perspective.

About this task

To export the module as an EAR file, perform the following procedure.

Procedure

1. Right-click the module and select **Export**.
2. In the Select window, expand **Java EE**.
3. Select **EAR file** and click **Next**.
4. Optional: Select the correct EAR application. The EAR application is named after your module, but with “App” added to the end of the name.
5. Browse for the folder on the local file system where the EAR file will be placed.
6. Optional: To export the source files, select the **Export source files** check box. This option is provided in case you want to export the source files in addition to the EAR file. Source files include files associated with Java components, data maps, and so on.
7. Optional: To overwrite an existing file, click **Overwrite existing file**.
8. Click **Finish**.

Results

The contents of the module are exported as an EAR file.

What to do next

Install the module in the Process Administrative Console. This deploys the module to IBM Business Process Manager or WebSphere Enterprise Service Bus.

Installing the EAR file

Installing the EAR file is the last step of the deployment process. When you install the EAR file on the server and run it, the adapter, which is embedded as part of the EAR file, runs as part of the installed application.

Before you begin

You must have exported your module as an EAR file before you can install it on IBM Business Process Manager or WebSphere Enterprise Service Bus.

About this task

To install the EAR file, perform the following procedure. For more information about clustering adapter module applications, see the <http://www.ibm.com/software/webservers/appserv/was/library/>.

Procedure

1. If the server is not running, right-click your server in the **Servers** view and select **Start**.
2. When the server status changes to **Started**, right-click the server and select **Administration > Run administrative console**.
3. Log on to the administrative console.
4. Click **Applications > New Application > New Enterprise Application**.



Figure 66. Preparing for the application installation window

5. Click **Browse** to locate your EAR file and click **Next**. The EAR file name is the name of the module followed by "App."

6. Optional: If you are deploying to a clustered environment, complete the following steps.
 - a. On the **Step 2: Map modules to servers** window, select the module and click **Next**.
 - b. Select the name of the server cluster.
 - c. Click **Apply**.
7. Click **Next**. In the Summary page, verify the settings and click **Finish**.
8. Optional: If you are using an authentication alias, complete the following steps:
 - a. Expand **Security** and select **Business Integration Security**.
 - b. Select the authentication alias that you want to configure. You must have administrator or operator rights to change the authentication alias configurations.
 - c. Optional: If it is not already specified, type the **User name**.
 - d. If it is not already specified, type the **Password**.
 - e. If it is not already specified, type the password again in the **Confirm Password** field.
 - f. Click **OK**.

Results

The project is now deployed and the Enterprise Applications window is displayed.

What to do next

If you want to set or reset any properties or you would like to cluster adapter project applications, make those changes using the Process Administrative Console before configuring troubleshooting tools.

Deploying the module in a clustered environment

In IBM Integration Designer, you can deploy the IBM WebSphere Adapter for Email in a clustered environment.

To deploy the module in a clustered environment, use any of the following approaches.

- **Embedded module:** The adapter is embedded in the application and specific to it. The adapter cannot be shared between multiple applications.
- **Node level module with embedded activation specification:** The adapter is deployed at the node level, with the activation specification created during module creation. The adapter can be shared across multiple applications.
- **Node level module with JNDI activation specification reference:** The adapter is deployed at the node level, and the application provides a JNDI reference to the activation specification. You must create the reference at the cluster scope from the Process Administrative Console, with the same JNDI name. The adapter can be shared across multiple applications.

Deploying module embedded in the application

The adapter is deployed embedded in the application and specific to it. The adapter cannot be shared between multiple applications.

Before you begin

The following steps are a necessary prerequisite to configure and deploy the module.

- IBM Integration Designer version 7.5.0.0 or above.
- A clustered topology deployment environment on the IBM Business Process Manager or WebSphere Enterprise Service Bus available from IBM Integration Designer.
- Create a clustered topology deployment environment, as shown in the following **Gold Topology** configuration figure.

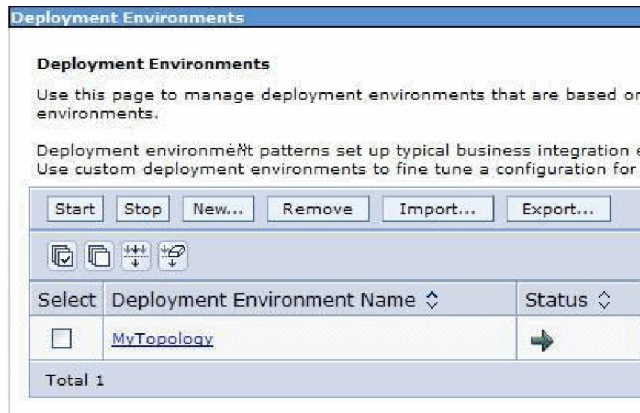


Figure 67. Deployment environment

- Deploy the adapter and the adapter applications (EAR files) in the AppTarget (the target that hosts the SCA container).

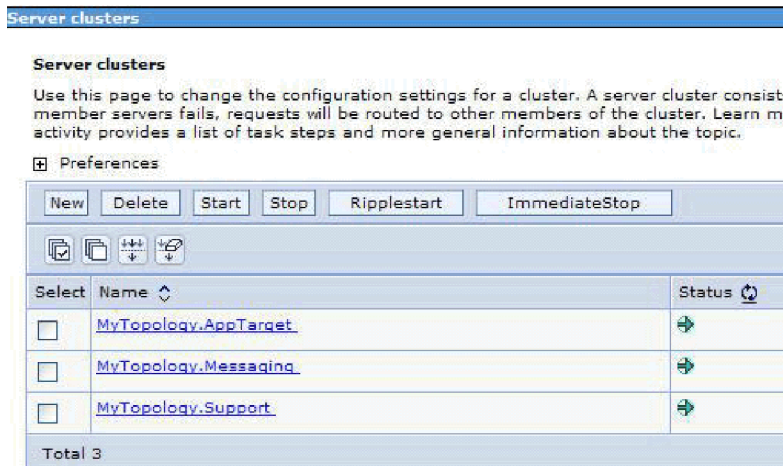


Figure 68. Deployment environment showing server clusters

About this task

To create an application with the embedded adapter, use the external service wizard.

Procedure

1. In the Service Configuration Properties window, from the **Deploy connector project** property list, select **With module for use by single application**.
2. Create the module as described in the Business process management samples for WebSphere Adapters.
3. In the **Dependencies** option for the module, after the module is created, ensure that the **Deploy with module** option is selected for the adapter.
4. If the server is not running, right-click your server in the **Servers** view and select **Start**.
5. When the server status changes to **Started**, right-click the server and select **Administration > Run administrative console**.
6. From the **Deployment Manager Admin Console**, click **Install applications** to deploy the application.
7. On the **Step 2: Map modules to servers** window, select the module and click **Next**. For the embedded adapter option, the adapter is deployed as part of the application.
8. In the Enterprise Applications view, select the new application `<adapter_name>EmbeddedModuleApp`. The new application is displayed after the application is deployed at the deployment manager level.
9. Select the node and click **Installed applications** to view the deployed application on each individual node.

Results

The resource adapter is embedded and deployed as part of the application.

Deploying module at node level with embedded activation specification

The adapter is deployed at the node level, with the activation specification created during module creation. The adapter can be shared across multiple applications.

Before you begin

The following steps are a necessary prerequisite to configure and deploy the module.

- IBM Integration Designer version 7.5.0.0 or above.
- A clustered topology deployment environment on the IBM Business Process Manager or WebSphere Enterprise Service Bus available from IBM Integration Designer.
- Create a clustered topology deployment environment, as shown in the following **Gold Topology** configuration figure.

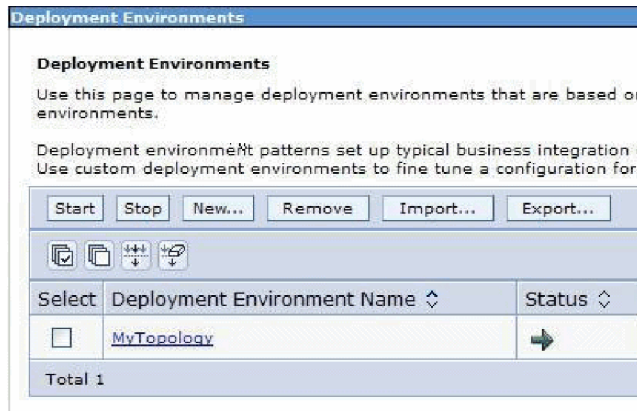


Figure 69. Deployment environment

- Deploy the adapter and the adapter applications (EAR files) in the AppTarget (the target that hosts the SCA container).

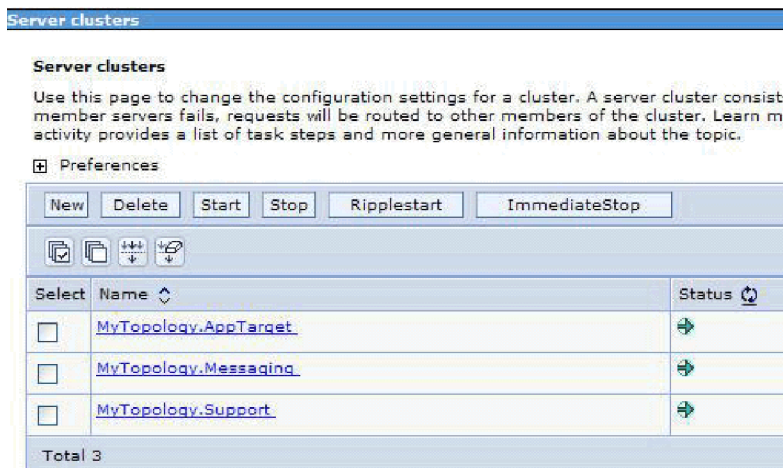


Figure 70. Deployment environment showing server clusters

About this task

To create an application with the node level adapter and activation specification properties specified in the module itself, use the external service wizard.

Procedure

1. In the Service Configuration Properties window, from the **Deploy connector project** property list, select **On server for use by multiple applications**.
2. From the **Connection properties** list, select **Use properties below**.
3. Create the module as described in the Business process management samples for WebSphere Adapters.
4. In the **Dependencies** option for the module, ensure that the **Deploy with module** option is not selected for the adapter. Here, the adapter is not part of the module, therefore you must deploy the adapter before deploying the application.
5. If the server is not running, right-click your server in the **Servers** view and select **Start**.

6. When the server status changes to **Started**, right-click the server and select **Administration > Run administrative console**. Log on to the administrative console.
7. To deploy the adapter at individual nodes, click **Resources > Resource Adapters > Resource adapters**. In the clustered environment, you must install the adapter in each node separately.
8. In the Resource adapters page, click **Install RAR**.
9. In the Install RAR file page, click **Browse** and navigate to the RAR file for your adapter. Deploy the RAR on each node.
The RAR files are typically installed in the following path:
IID_installation_directory/ResourceAdapters/adapter_name/adapter.rar
10. For deployment at node level, do not select any **Scope** because the scope is always **Node**. Click **Next**.
11. Optional: In the Resource adapters page, change the name of the adapter and add a description. Click **OK**.
12. Click **Save** in the **Messages** box at the top of the page.
13. For node level deployment, check if the adapter RAR is deployed at the node level.
14. To deploy the adapter at the cluster level, click **Resources > Resource Adapters > Resource adapters**.
15. In the Resource adapters window, set the **Scope** to **Cluster**, and then click **New**.
16. Select the RAR deployed at the node level.
17. Check if the adapter RAR is now deployed at the cluster level. Deploy the application after the adapter is deployed at the node level on the individual nodes, and then at the cluster level.
18. From the **Deployment Manager Admin Console**, click **Install applications** to deploy the application.
19. On the **Step 2: Map modules to servers** window, select the module and click **Next**. The adapter is not part of the deployed application.
20. In the **Admin Console**, click **Resources > Resource Adapters > IBM WebSphere Adapter for Email > J2C activation specifications** to view the activation specification from the adapter deployed at the cluster level.

Results

The resource adapter is deployed at the node level, with the activation specification.

Deploying module at node level with JNDI activation specification

The adapter is deployed at the node level, and the application provides a JNDI reference to the activation specification. You must create the activation specification with the same JNDI name at the cluster scope from the Process Administrative Console. The adapter can be shared across multiple applications

Before you begin

The following steps are a necessary prerequisite to configure and deploy the module.

- IBM Integration Designer version 7.5.0.0 or above.

- A clustered topology deployment environment on the IBM Business Process Manager or WebSphere Enterprise Service Bus available from IBM Integration Designer.
- Create a clustered topology deployment environment, as shown in the following **Gold Topology** configuration figure.



Figure 71. Deployment environment

- Deploy the adapter and the adapter applications (EAR files) in the AppTarget (the target that hosts the SCA container).

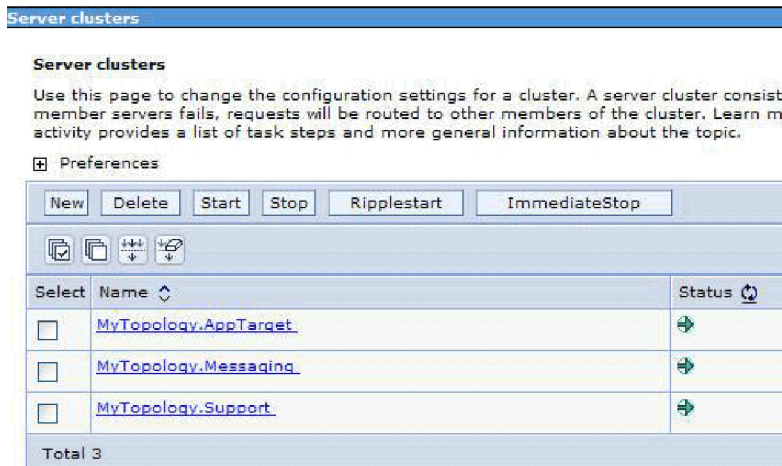


Figure 72. Deployment environment showing server clusters

About this task

To create an application with the node level adapter and activation specification properties specified in the module itself, use the external service wizard.

Procedure

1. In the Service Configuration Properties window, from the **Deploy connector project** property list, select **On server for use by multiple applications**.
2. From the **Connection properties** list, select **Use JNDI lookup name configured on server**.

3. In the **JNDI lookup name** property field, specify the JNDI name. Use this same JNDI name when you create the activation specification from the Admin Console.
4. Create the module as described in the Business process management samples for WebSphere Adapters.
5. In the **Dependencies** option for the module, ensure that the **Deploy with module** option is not selected for the adapter.
6. If the server is not running, right-click your server in the **Servers** view and select **Start**.
7. When the server status changes to **Started**, right-click the server and select **Administration > Run administrative console**. Log on to the administrative console.
8. To install the adapter at the node level, click **Resources > Resource Adapters > Resource adapters**. In the clustered environment, you must install the adapter in each node separately.
9. In the Resource adapters page, click **Install RAR**.
10. In the Install RAR file page, click **Browse** and navigate to the RAR file for your adapter. Deploy the RAR on each node.
The RAR files are typically installed in the following path:
IID_installation_directory/ResourceAdapters/adapter_name/adapter.rar
11. For deployment at node level, do not select any **Scope** because the scope is always **Node**. Click **Next**.
12. Optional: In the Resource adapters page, change the name of the adapter and add a description. Click **OK**.
13. Click **Save** in the **Messages** box at the top of the page.
14. To install the RAR at the cluster level, click **Resources > Resource Adapters > Resource adapters**
15. In the Resource adapters page, set the **Scope** to **Cluster**, and then click **New**.
16. Select the RAR deployed at the node level, and then check if the adapter RAR is now deployed at the cluster level. Deploy the application after the adapter is deployed at the node level on the individual nodes, and then at the cluster level.
17. From the **Deployment Manager Admin Console**, click **Install applications** to deploy the application.
18. In the **Admin Console**, click **Resources > Resource Adapters > IBM WebSphere Adapter for Email > J2C activation specifications > New** to create the activation specification from the adapter deployed at the cluster level.
19. When installing the adapter, in the **Name** field, you must enter the same name as defined in the RAR.
20. In the **JNDI name** field, you must enter the same name as given during the module creation.
21. Click **Resources > Resource Adapters > IBM WebSphere Adapter for Email > J2C activation specifications** to check if the JNDI reference on the adapter is same as the one specified for the module.
22. Click **Resources > Resource Adapters > IBM WebSphere Adapter for Email > J2C activation specifications > Custom properties** to set values for the activation specification in the Admin Console.
23. From the **Deployment Manager Admin console**, click **Install applications** to deploy the application after you deploy the RAR and create the activation specification.

24. On the **Step 2: Map modules to servers** page, select the module and click **Next**. The adapter is not part of the deployed application.

Results

The resource adapter is deployed at the node level, with the JNDI activation specification reference.

Chapter 7. Administering the adapter module

When you are running the adapter in a stand-alone deployment, use the administrative console of the server to start, stop, monitor, and troubleshoot the adapter module. In an application that uses an embedded adapter, the adapter module starts or stops when the application is started or stopped.

Configuring logging and tracing

Configure logging and tracing to suit your requirements. Enable logging for the adapter to control the status of event processing. Change the adapter log and trace file names to separate them from other log and trace files.

Configuring logging properties

Use the Process Administrative Console to enable logging and to set the output properties for a log, including the location, level of detail, and output format of the log.

About this task

Before the adapters can log monitored events, you must specify the service component event points that you want to monitor, what level of detail you require for each event, and format of the output used to publish the events to the logs. Use the administrative console to perform the following tasks:

- Enable or disable a particular event log
- Specify the level of detail in a log
- Specify where log files are stored and how many log files are kept
- Specify the format for log output

If you set the output for log analyzer format, you can open trace output using the Log Analyzer tool, which is an application included with your IBM Process Server. This is useful if you are trying to correlate traces from two different server processes, because it allows you to use the merge capability of the Log Analyzer.

Note: For more information about monitoring on a IBM Process Server, including service components and event points, see http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5m1/topic/com.ibm.wbpm.admin.doc/topics/welcome_wps_mon.html.

You can change the log configuration statically or dynamically. Static configuration takes effect when you start or restart the application server. Dynamic or run time configuration changes apply immediately.

When a log is created, the detail level for that log is set from the configuration data. If no configuration data is available for a particular log name, the level for that log is obtained from the parent of the log. If no configuration data exists for the parent log, the parent of that log is checked, and so on, up the tree, until a log with a non-null level value is found. When you change the level of a log, the change is propagated to the child logs, which recursively propagate the change to their child log, as necessary.

To enable logging and set the output properties for a log, use the following procedure.

Procedure

1. In the navigation pane of the administrative console, select **Servers > WebSphere application servers**.
2. Click the name of the server that you want to work with.
3. Under **Troubleshooting**, click **Logging and tracing**.
4. Click **Change log detail levels**.
5. Specify when you want the change to take effect:
 - For a static change to the configuration, click the **Configuration** tab.
 - For a dynamic change to the configuration, click the **Runtime** tab.
6. Click the names of the packages whose logging level you want to modify. The package names for WebSphere Adapters start with **com.ibm.j2ca.***:
 - For the adapter base component, select **com.ibm.j2ca.base.***.
 - For the adapter base component and all deployed adapters, select **com.ibm.j2ca.***.
 - For the WebSphere Adapter for Email only, select the **com.ibm.j2ca.email.*** package.
7. Select the logging level.

Logging Level	Description
Fatal	The task cannot continue or the component cannot function.
Severe	The task cannot continue, but the component can still function. This logging level also includes conditions that indicate an impending fatal error, that is, situations that strongly suggest that resources are on the verge of being depleted.
Warning	A potential error has occurred or a severe error is impending. This logging level also includes conditions that indicate a progressive failure, for example, the potential leaking of resources.
Audit	A significant event has occurred that affects the server state or resources.
Info	The task is running. This logging level includes general information outlining the overall progress of a task.
Config	The status of a configuration is reported or a configuration change has occurred.
Detail	The subtask is running. This logging level includes general information detailing the progress of a subtask.

8. Click **Apply**.
9. Click **OK**.
10. Optional: To have static configuration changes take effect, stop and then restart the IBM Process Server.

Results

Log entries from this point forward contain the specified level of information for the selected adapter components.

Changing the log and trace file names

To keep the adapter log and trace information separate from other processes, use the administrative console to change the file names. By default, log and trace information for all processes and applications on a IBM Process Server is written to the `SystemOut.log` and `trace.log` files.

Before you begin

You can change the log and trace file names at any time after the adapter module has been deployed to an application server.

About this task

You can change the log and trace file names statically or dynamically. Static changes take effect when you start or restart the application server. Dynamic or run time changes apply immediately.

Log and trace files are in the `install_root/profiles/profile_name/logs/server_name` folder.

To set or change the log and trace file names, use the following procedure.

Procedure

1. In the navigation pane of the administrative console, select **Applications >Application Types>WebSphere enterprise applications**.
2. In the Enterprise Applications list, click the name of the adapter application. This is the name of the EAR file for the adapter, but without the ear file extension. For example, if the EAR file is named `Accounting_OutboundApp.ear`, then click **Accounting_OutboundApp**.
3. In the Configuration tab, select **Modules>Manage Modules**.
4. In the list of modules, click IBM WebSphere Adapter for Email.
5. In the Configuration tab, under Additional Properties, click **Resource Adapter**.
6. In the Configuration tab, under Additional Properties, click **Custom properties**.
7. In the Custom Properties table, change the file names.
 - a. Click either **logFilename** to change the name of the log file or **traceFilename** to change the name of the trace file.
 - b. In the Configuration tab, type the new name in the **Value** field. By default, the log file is called `SystemOut.log` and the trace file is called `trace.log`.
 - c. Click **Apply** or **OK**. Your changes are saved on your local machine.
 - d. To save your changes to the master configuration on the server, use one of the following procedures:
 - **Static change:** Stop and restart the server. This method allows you to make changes, but those changes do not take effect until you stop and start the server.
 - **Dynamic change:** Click the **Save** link in the Messages box above the Custom properties table. Click **Save** again when prompted.

Changing configuration properties for embedded adapters

To change the configuration properties after you deploy the adapter as part of a module, you use the administrative console of the runtime environment. You can update resource adapter properties (used for general adapter operation), managed connection factory properties (used for outbound processing), and activation specification properties (used for inbound processing). For information about configuring logging properties and changing the log and trace file names, see “Configuring logging and tracing” on page 129.

Setting resource adapter properties for embedded adapters

To set resource adapter properties for your adapter after it has been deployed as part of a module, use the administrative console. You select the name of the property you want to configure and then change or set the value.

Before you begin

Your adapter module must be deployed on IBM Business Process Manager or WebSphere Enterprise Service Bus.

About this task

Custom properties are default configuration properties shared by all IBM WebSphere Adapters.

To configure properties using the administrative console, use the following procedure:

Procedure

1. If the server is not running, right-click your server in the **Servers** view and select **Start**.
2. When the server status changes to **Started**, right-click the server and select **Administration > Run administrative console**.
3. Log on to the administrative console.
4. Select **Applications > Application Types > WebSphere enterprise application**.
5. From the Enterprise Applications list, click the name of the adapter module whose properties you want to change. The **Configuration** page is displayed.

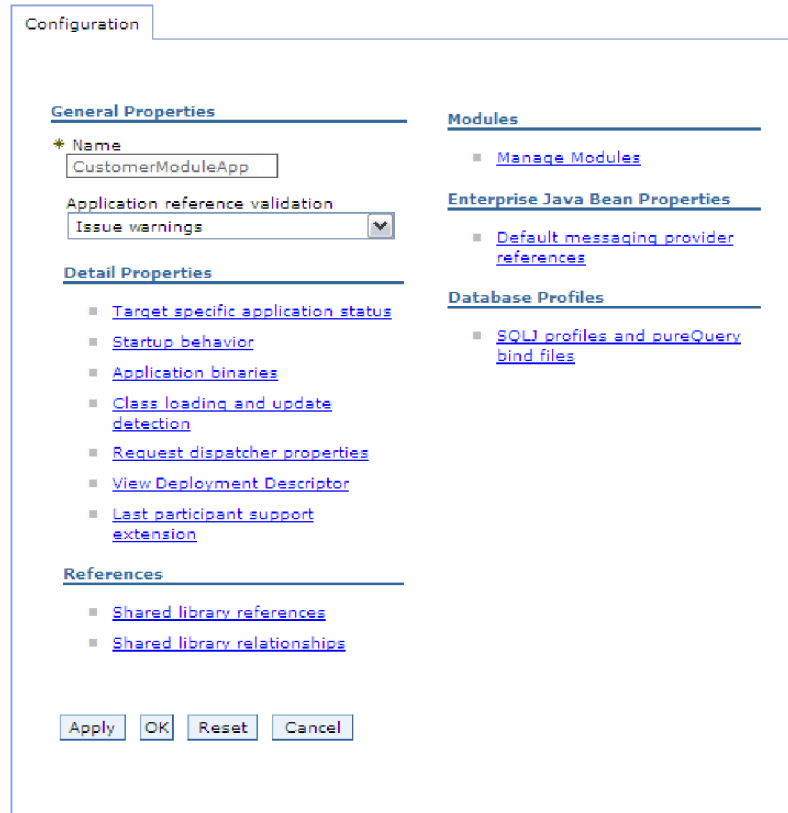


Figure 73. The Manage Modules selection in the Configuration tab

6. Under **Modules**, click **Manage Modules**.
7. Click **IBM WebSphere Adapter for Email**.
8. From the **Additional Properties** list, click **Resource Adapter**.
9. On the next page, from the **Additional Properties** list, click **Custom properties**.
10. For each property you want to change, perform the following steps.

Note: See “Resource adapter properties” on page 186 for more information about these properties.

- a. Click the name of the property. The **Configuration** page for the selected property is displayed.
 - b. Change the contents of the **Value** field or type a value, if the field is empty.
 - c. Click **OK**.
11. In the Messages area, click **Save**.

Results

The resource adapter properties associated with your adapter module are changed.

Setting managed (J2C) connection factory properties for embedded adapters

To set managed connection factory properties for your adapter after it has been deployed as part of a module, use the administrative console. You select the name of the property you want to configure and then change or set the value.

Before you begin

Your adapter module must be deployed on IBM Business Process Manager or WebSphere Enterprise Service Bus.

About this task

You use managed connection factory properties to configure the target mail server instance.

Note: In the administrative console, the properties are referred to as "J2C connection factory properties."

To configure properties using the administrative console, use the following procedure.

Procedure

1. If the server is not running, right-click your server in the **Servers** view and select **Start**.
2. When the server status changes to **Started**, right-click the server and select **Administration > Run administrative console**.
3. Log on to the administrative console.
4. Select **Applications > Application Types > WebSphere enterprise application**.
5. In the Enterprise Applications list, click the name of the adapter module whose properties you want to change.

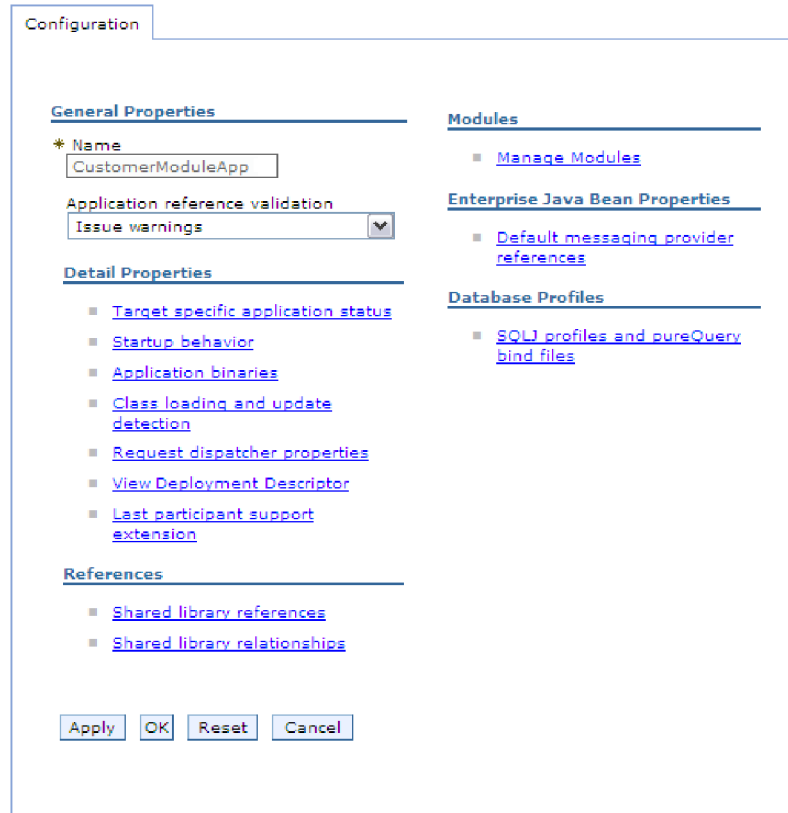


Figure 74. The Manage Modules selection in the Configuration tab

6. Under **Modules**, click **Manage Modules**.
7. Click **IBM WebSphere Adapter for Email**.
8. In the **Additional Properties** list, click **Resource Adapter**.
9. On the next page, from the **Additional Properties** list, click **J2C connection factories**.
10. Click the name of the connection factory associated with your adapter module.
11. In the **Additional Properties** list, click **Custom properties**.
Custom properties are those J2C connection factory properties that are unique to IBM WebSphere Adapter for Email. Connection pool and advanced connection factory properties are properties you configure if you are developing your own adapter.
12. For each property you want to change, perform the following steps.

Note: See “Managed connection factory properties” on page 179 for more information about these properties.

 - a. Click the name of the property.
 - b. Change the contents of the **Value** field or type a value, if the field is empty.
 - c. Click **OK**.
13. In the Messages area, click **Save**.

Results

The managed connection factory properties associated with your adapter module are changed.

Setting activation specification properties for embedded adapters

To set activation specification properties for your adapter after it has been deployed as part of a module, use the administrative console. You select the name of the message endpoint property you want to configure, and then change or set the value.

Before you begin

Your adapter module must be deployed on IBM Business Process Manager or WebSphere Enterprise Service Bus.

About this task

You use activation specification properties to configure the endpoint for inbound processing.

To configure properties using the administrative console, use the following procedure.

Procedure

1. If the server is not running, right-click your server in the **Servers** view and select **Start**.
2. When the server status changes to **Started**, right-click the server and select **Administration > Run administrative console**.
3. Log on to the administrative console.
4. Select **Applications > Application Types > WebSphere enterprise application**.
5. From the Enterprise Applications list, click the name of the adapter module whose properties you want to change.

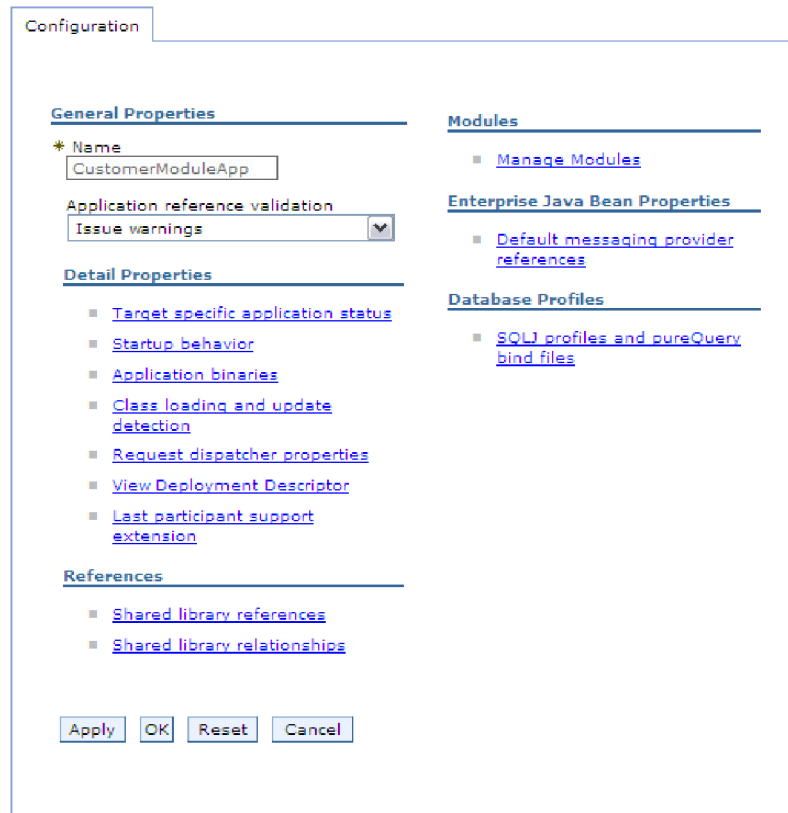


Figure 75. The Manage Modules selection in the Configuration tab

6. Under **Modules**, click **Manage Modules**.
7. Click **IBM WebSphere Adapter for Email**.
8. From the **Additional Properties** list, click **Resource Adapter**.
9. On the next page, from the **Additional Properties** list, click **J2C activation specifications**.
10. Click the name of the activation specification associated with the adapter module.
11. From the **Additional Properties** list, click **J2C activation specification custom properties**.
12. For each property you want to change, perform the following steps.

Note: See “Activation specification properties” on page 195 for more information about these properties.

- a. Click the name of the property.
 - b. Change the contents of the **Value** field or type a value, if the field is empty.
 - c. Click **OK**.
13. In the Messages area, click **Save**.

Results

The activation specification properties associated with your adapter module are changed.

Changing configuration properties for stand-alone adapters

To set configuration properties after you install a stand-alone adapter, use the administrative console of the runtime environment. Provide the general information about the adapter and then set the resource adapter properties (which are used for general adapter operation). If the adapter is used for outbound operations, create a connection factory and then set the properties for it. If the adapter is used for inbound operations, create an activation specification and then set the properties for it. For information about configuring logging properties and changing the log and trace file names, see “Configuring logging and tracing” on page 129.

Setting resource adapter properties for stand-alone adapters

To set resource adapter properties for your stand-alone adapter after it has been installed on IBM Business Process Manager or WebSphere Enterprise Service Bus, use the administrative console. You select the name of the property you want to configure and then change or set the value.

Before you begin

Your adapter must be installed on IBM Business Process Manager or WebSphere Enterprise Service Bus.

About this task

Custom properties are default configuration properties shared by all IBM WebSphere Adapters.

To configure properties using the administrative console, use the following procedure:

Procedure

1. If the server is not running, right-click your server in the **Servers** view and select **Start**.
2. When the server status changes to **Started**, right-click the server and select **Administration > Run administrative console**.
3. Log on to the administrative console.
4. Click **Resources > Resource Adapters > Resource adapters**.
5. In the Resource adapters page, click **IBM WebSphere Adapter for Email**.
6. In the **Additional Properties** list, click **Custom properties**.
7. For each property you want to change, perform the following steps.

Note: See “Resource adapter properties” on page 186 for more information about these properties.

- a. Click the name of the property.
 - b. Change the contents of the **Value** field or type a value, if the field is empty.
 - c. Click **OK**.
8. In the Messages area, click **Save**.

Results

The resource adapter properties associated with your adapter are changed.

Setting managed (J2C) connection factory properties for stand-alone adapters

To set managed connection factory properties for your stand-alone adapter after it has been installed on IBM Business Process Manager or WebSphere Enterprise Service Bus, use the administrative console. You select the name of the property you want to configure and then change or set the value.

Before you begin

Your adapter must be installed on IBM Business Process Manager or WebSphere Enterprise Service Bus.

About this task

You use managed connection factory properties to configure the target mail server instance.

Note: In the administrative console, the properties are referred to as "J2C connection factory properties."

To configure properties using the administrative console, use the following procedure:

Procedure

1. If the server is not running, right-click your server in the **Servers** view and select **Start**.
2. When the server status changes to **Started**, right-click the server and select **Administration > Run administrative console**.
3. Log on to the administrative console.
4. Click **Resources > Resource Adapters > Resource adapters**.
5. In the Resource adapters page, click **IBM WebSphere Adapter for Email**.
6. In the **Additional Properties** list, click **J2C connection factories**.
7. If you are going to use an existing connection factory, skip ahead to select from the list of existing connection factories.

Note: If you have selected **Specify connection properties** when you use the external service wizard to configure the adapter module, you do not need to create a connection factory.

If you are creating a connection factory, perform the following steps:

- a. Click **New**.
- b. In the **General Properties** section of the **Configuration** tab, type a name for the connection factory. For example, you can type AdapterCF.
- c. Type a value for **JNDI name**. For example, you can type com/eis/AdapterCF.
- d. Optional: Select an authentication alias from the **Component-managed authentication alias** list.
- e. Click **OK**.
- f. In the Messages area, click **Save**.

The newly created connection factory is displayed.

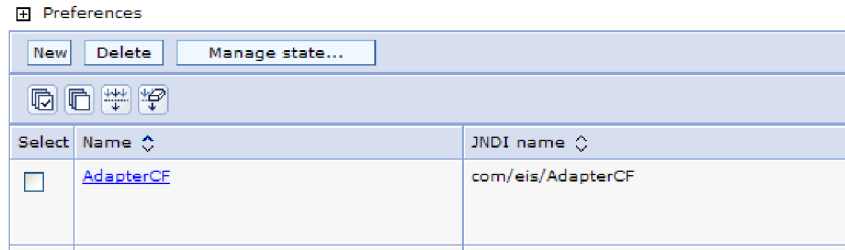


Figure 76. User-defined connection factories for use with the resource adapter

8. In the list of connection factories, click the one you want to use.
9. In the **Additional Properties** list, click **Custom properties**.
Custom properties are those J2C connection factory properties that are unique to WebSphere Adapter for Email. Connection pool and advanced connection factory properties are properties you configure if you are developing your own adapter.
10. For each property you want to change, perform the following steps.
 - Note:** See “Managed connection factory properties” on page 179 for more information about these properties.
 - a. Click the name of the property.
 - b. Change the contents of the **Value** field or type a value, if the field is empty.
 - c. Click **OK**.
11. After you have finished setting properties, click **Apply**.
12. In the Messages area, click **Save**.

Results

The managed connection factory properties associated with your adapter are set.

Setting activation specification properties for stand-alone adapters

To set activation specification properties for your stand-alone adapter after it has been installed on IBM Business Process Manager or WebSphere Enterprise Service Bus, use the administrative console. You select the name of the message endpoint property you want to configure, and then change or set the value.

Before you begin

Your adapter must be installed on IBM Business Process Manager or WebSphere Enterprise Service Bus.

About this task

You use activation specification properties to configure the endpoint for inbound processing.

To configure properties using the administrative console, use the following procedure.

Procedure

1. If the server is not running, right-click your server in the **Servers** view and select **Start**.
2. When the server status changes to **Started**, right-click the server and select **Administration > Run administrative console**.
3. Log on to the administrative console.
4. Click **Resources > Resource Adapters > Resource adapters**.
5. In the Resource adapters page, click **IBM WebSphere Adapter for Email**.
6. In the **Additional Properties** list, click **J2C activation specifications**.
7. If you are going to use an existing activation specification, skip ahead to select from an existing list of activation specifications.

Note: If you have selected **Use predefined connection properties** when you use the external service wizard to configure the adapter module, you must create an activation specification.

If you are creating an activation specification, perform the following steps:

- a. Click **New**.
 - b. In the **General Properties** section of the **Configuration** tab, type a name for the activation specification. For example, you can type AdapterAS.
 - c. Type a value for **JNDI name**. For example, you can type com/eis/AdapterAS.
 - d. Optional: Select an authentication alias from the **Authentication alias** list.
 - e. Select a message listener type.
 - f. Click **OK**.
 - g. Click **Save** in the **Messages** box at the top of the page.
The newly created activation specification is displayed.
8. In the list of activation specifications, click the one you want to use.
 9. In the Additional Properties list, click **J2C activation specification custom properties**.
 10. For each property you want to set, perform the following steps.

Note: See “Activation specification properties” on page 195 for more information about these properties.

- a. Click the name of the property.
 - b. Change the contents of the **Value** field or type a value, if the field is empty.
 - c. Click **OK**.
11. After you have finished setting properties, click **Apply**.
 12. In the Messages area, click **Save**.

Results

The activation specification properties associated with your adapter are set.

Starting the application that uses the adapter

Use the administrative console of the server to start an application that uses the adapter. By default, the application starts automatically when the server starts.

About this task

Use this procedure to start the application, whether it is using an embedded or a stand-alone adapter. For an application that uses an embedded adapter, the adapter starts when the application starts. For an application that uses a stand-alone adapter, the adapter starts when the application server starts.

Procedure

1. If the server is not running, right-click your server in the **Servers** view and select **Start**.
2. When the server status changes to **Started**, right-click the server and select **Administration > Run administrative console**.
3. Log on to the administrative console.
4. Click **Applications > Application Types > WebSphere enterprise applications**.

Note: The administrative console is labeled "Integrated Solutions Console".

5. Select the application that you want to start. The application name is the name of the EAR file you installed, without the .EAR file extension.
6. Click **Start**.

Results

The status of the application changes to Started, and a message stating that the application has started displays at the top of the administrative console.

Stopping the application that uses the adapter

Use the administrative console of the server to stop an application that uses the adapter. By default, the application stops automatically when the server stops.

About this task

Use this procedure to stop the application, whether it is using an embedded or a stand-alone adapter. For an application with an embedded adapter, the adapter stops when the application stops. For an application that uses a stand-alone adapter, the adapter stops when the application server stops.

Procedure

1. If the server is not running, right-click your server in the **Servers** view and select **Start**.
2. When the server status changes to **Started**, right-click the server and select **Administration > Run administrative console**.
3. Log on to the administrative console.
4. Click **Applications > Application Types > WebSphere enterprise applications**.

Note: The administrative console is labeled "Integrated Solutions Console".

5. Select the application that you want to stop. The application name is the name of the EAR file you installed, without the .EAR file extension.
6. Click **Stop**.

Results

The status of the application changes to Stopped, and a message stating that the application has stopped is displayed at the top of the administrative console.

Monitoring performance using Performance Monitoring Infrastructure

Performance Monitoring Infrastructure (PMI) is a feature of the administrative console that allows you to dynamically monitor the performance of components in the production environment, including IBM WebSphere Adapter for Email. PMI collects adapter performance data, such as average response time and total number of requests, from various components in the server and organizes the data into a tree structure. You can view the data through the Tivoli® Performance Viewer, a graphical monitoring tool that is integrated with the Process Administrative Console in IBM Business Process Manager or WebSphere Enterprise Service Bus.

About this task

You can monitor the performance of your adapter by having PMI collect data at the following points:

- At outbound processing to monitor outbound requests.
- At inbound event retrieval to monitor the retrieval of an event from the event table.
- At inbound event delivery to monitor the delivery of an event to the endpoint or endpoints.

Before you enable and configure PMI for your adapter, you must first set the level of tracing detail and run some events from which to gather performance data.

To learn more about how PMI can help you monitor and improve the overall performance of your adapter environment, search for PMI on the IBM Business Process Manager or WebSphere Enterprise Service Bus website:

<http://www.ibm.com/software/webservers/appserv/was/library/>.

Configuring Performance Monitoring Infrastructure

You can configure Performance Monitoring Infrastructure (PMI) to gather adapter performance data, such as average response time and total number of requests. After you configure PMI for your adapter, you can monitor the adapter performance using Tivoli Performance viewer.

Before you begin

Before you can configure PMI for your adapter, you must first set the level of tracing detail and run some events to gather the performance data.

1. To enable tracing and to receive event data, the trace level must be set to either fine, finer, finest, or all. After `*=info`, add a colon and a string, for example:
`*=info: WBILocationMonitor.CEI.ResourceAdapter.`
`*=finest: WBILocationMonitor.LOG.ResourceAdapter.*=finest:`

For instructions on setting the trace level, see “Enabling tracing with the Common Event Infrastructure” on page 146.

2. Generate at least one outbound request or inbound event to produce performance data that you can configure.

Procedure

1. Enable PMI for your adapter.
 - a. In the administrative console, expand **Monitoring and Tuning**, and then select **Performance Monitoring Infrastructure (PMI)**.
 - b. From the list of servers, click the name of your server.
 - c. Select the Configuration tab, and then select the **Enable Performance Monitoring (PMI)** check box.
 - d. Select **Custom** to selectively enable or disable statistics.

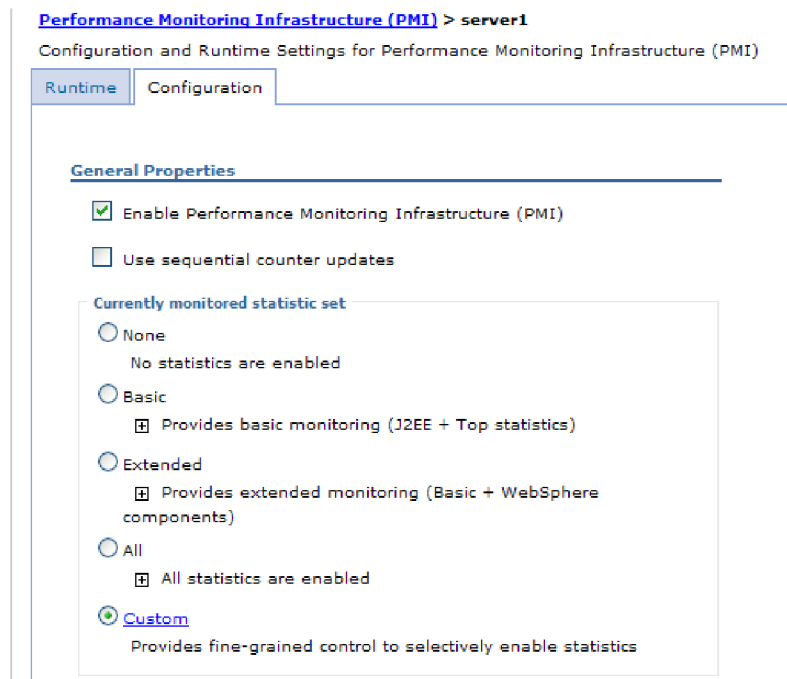


Figure 77. Enabling Performance Monitoring Infrastructure

- e. Click **Apply** or **OK**.
 - f. Click **Save**. PMI is now enabled.
 2. Configure PMI for your adapter.
 - a. In the administrative console, expand **Monitoring and Tuning**, and then select **Performance Monitoring Infrastructure (PMI)**.
 - b. From the list of servers, click the name of your server.
 - c. Select **Custom**.
 - d. Select the **Runtime** tab. The following figure shows the Runtime tab.

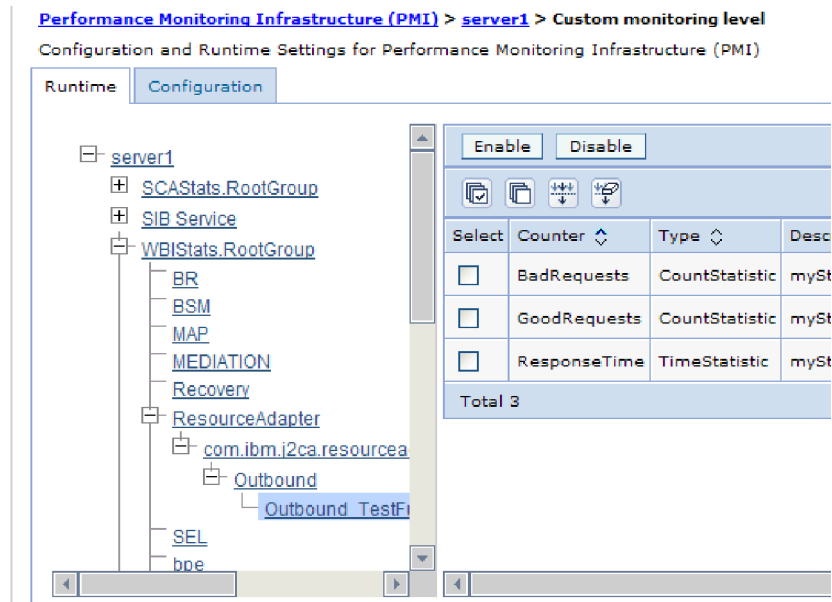


Figure 78. Runtime tab used for configuring PMI

- e. Click **WBISStats.RootGroup**. This is a PMI sub module for data collected in the root group. This example uses the name WBISStats for the root group.
- f. Click **ResourceAdapter**. This is a sub module for the data collected for the JCA adapters.
- g. Click the name of your adapter, and select the processes you want to monitor.
- h. In the right pane, select the check boxes for the statistics you want to gather, and then click **Enable**.

Results

PMI is configured for your adapter.

What to do next

Now you can view the performance statistics for your adapter.

Viewing performance statistics

You can view adapter performance data through the graphical monitoring tool, Tivoli Performance Viewer. Tivoli Performance Viewer is integrated with the Process Administrative Console in IBM Business Process Manager or WebSphere Enterprise Service Bus.

Before you begin

Configure Performance Monitoring Infrastructure for your adapter.

Procedure

1. In the administrative console, expand **Monitoring and Tuning**, expand **Performance Viewer**, then select **Current Activity**.
2. In the list of servers, click the name of your server.
3. Under your server name, expand **Performance Modules**.

4. Click **WBIStatsRootGroup**.
5. Click **ResourceAdapter** and the name of your adapter module.
6. If there is more than one process, select the check boxes for the processes whose statistics you want to view.

Results

The statistics are displayed in the right panel. You can click **View Graph** to view a graph of the data, or **View Table** to see the statistics in a table format.

The following figure shows adapter performance statistics.

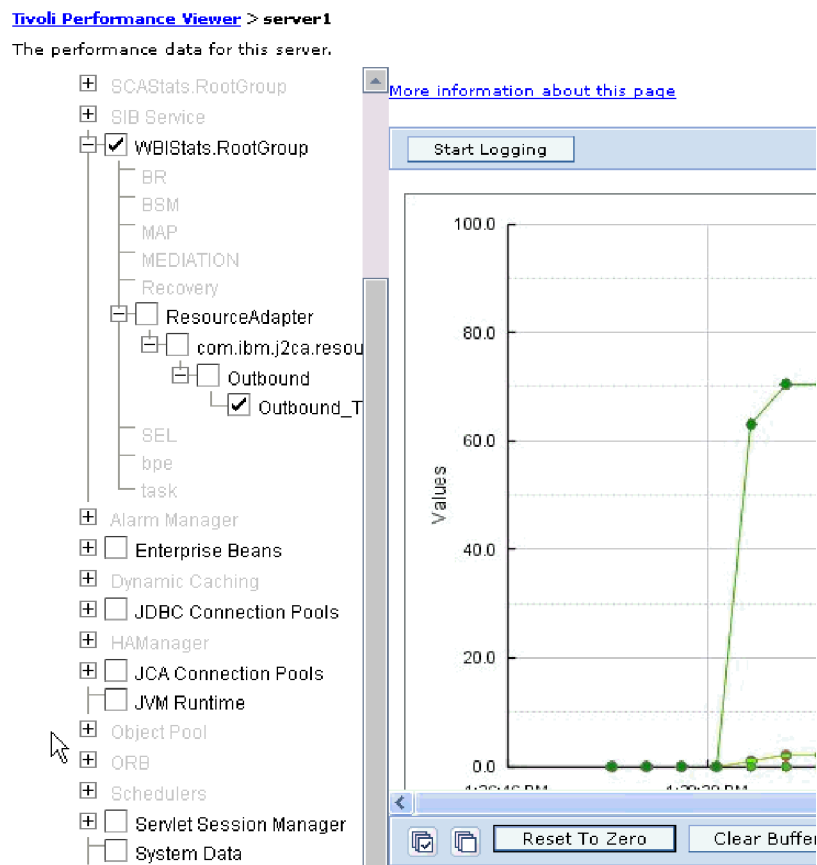


Figure 79. Adapter performance statistics, using graph view

Enabling tracing with the Common Event Infrastructure

The adapter can use the Common Event Infrastructure (CEI), a component embedded in the server, to report data about critical business events such as the starting or stopping of a poll cycle. Event data can be written to a database or a trace log file depending on configuration settings.

About this task

Use this procedure to report CEI entries in the trace log file by using the Common Base Event Browser within the administrative console.

Procedure

1. In the administrative console, click **Troubleshooting**.
 2. Click **Logs and Trace**.
 3. From the list of servers, click the name of your server.
 4. In the **Change Log Detail Levels** box, click the name of the CEI database (for example, `WBIEventMonitor.CEI.ResourceAdapter.*`) or the trace log file (for example, `WBIEventMonitor.LOG.ResourceAdapter.*`) to which you want the adapter to write event data.
 5. Select the level of detail about business events that you want the adapter to write to the database or trace log file, and (optionally) adjust the granularity of detail associated with messages and traces.
 - **No Logging**. Turns off event logging.
 - **Messages Only**. The adapter reports an event.
 - **All Messages and Traces**. The adapter reports details about an event.
 - **Message and Trace Levels**. Settings for controlling the degree of detail the adapter reports about the business object payload associated with an event. If you want to adjust the detail level, select one of the following options:
 - Fine**. The adapter reports the event but none of the business object payload.
 - Finer**. The adapter reports the event and the business object payload description.
 - Finest**. The adapter reports the event and the entire business object payload.
- Note:** The WebSphere Adapter for Email also provides the following logging information.
- Logs all the SMTP, POP, and IMAP commands issued to the mail server and their responses in the trace log file.
 - Logs the adapter foundation class (AFC) version, Java Mail API version, and third-party version artifacts in the trace file.
6. Click **OK**.

Results

Event logging is enabled. You can view CEI entries in the trace log file or by using the Common Base Event Browser within the administrative console.

Chapter 8. Troubleshooting and support

Common troubleshooting techniques and self-help information help you identify and solve problems quickly. For information about configuring logging properties and changing the log and trace file names, see “Configuring logging and tracing” on page 129.

Techniques for troubleshooting problems

Troubleshooting is a systematic approach to solving a problem. The goal is to determine why something does not work as expected and how to resolve the problem. Certain common techniques can help with the task of troubleshooting.

The first step in the troubleshooting process is to describe the problem completely. Without a problem description, neither you or IBM® can know where to start to find the cause of the problem. This step includes asking yourself basic questions, such as:

- What are the symptoms of the problem?
- Where does the problem occur?
- When does the problem occur?
- Under which conditions does the problem occur?
- Can the problem be reproduced?

The answers to these questions typically lead to a good description of the problem, and that is the best way to start down the path of problem resolution.

What are the symptoms of the problem?

When starting to describe a problem, the most obvious question is "What is the problem?" Which might seem like a straightforward question; however, you can break it down into several more-focused questions that create a more descriptive picture of the problem. These questions can include:

- Who, or what, is reporting the problem?
- What are the error codes and messages?
- How does the system fail? For example, is it a loop, hang, lock up, performance degradation, or incorrect result?
- What is the business impact of the problem?

Where does the problem occur?

Determining where the problem originates is not always simple, but it is one of the most important steps in resolving a problem. Many layers of technology can exist between the reporting and failing components. Networks, disks, and drivers are only a few components to be considered when you are investigating problems.

The following questions can help you to focus on where the problem occurs in order to isolate the problem layer.

- Is the problem specific to one platform or operating system, or is it common for multiple platforms or operating systems?
- Is the current environment and configuration supported?

Remember that if one layer reports the problem, the problem does not necessarily originate in that layer. Part of identifying where a problem originates is

understanding the environment in which it exists. Take some time to completely describe the problem environment, including the operating system and version, all corresponding software and versions, and hardware information. Confirm that you are running within an environment that is a supported configuration; many problems can be traced back to incompatible levels of software that are not intended to run together or have not been fully tested together.

When does the problem occur?

Develop a detailed timeline of events leading up to a failure, especially for those cases that are one-time occurrences. You can most simply do this by working backward: Start at the time an error was reported (as precisely as possible, even down to the millisecond), and work backward through the available logs and information. Typically, you need to look only as far as the first suspicious event that you find in a diagnostic log; however, this is not always simple to do and takes practice. Knowing when to stop looking is especially difficult when multiple layers of technology are involved, and when each has its own diagnostic information.

To develop a detailed timeline of events, answer the following questions:

- Does the problem happen only at a certain time of day or night?
- How often does the problem happen?
- What sequence of events leads up to the time that the problem is reported?
- Does the problem happen after an environment change, such as upgrading or installing software or hardware?

Responding to these types of questions can provide you with a frame of reference in which to investigate the problem.

Under which conditions does the problem occur?

Knowing what other systems and applications are running at the time that a problem occurs is an important part of troubleshooting. These and other questions about your environment can help you to identify the root cause of the problem:

- Does the problem always occur when the same task is being performed?
- Does a certain sequence of events need to occur for the problem to surface?
- Do any other applications fail at the same time?

Answering these types of questions can help you explain the environment in which the problem occurs and correlate any dependencies. Remember that just because multiple problems might have occurred around the same time, the problems are not necessarily related.

Can the problem be reproduced?

From a troubleshooting standpoint, the "ideal" problem is one that can be reproduced. Typically with problems that can be reproduced, you have a larger set of tools or procedures at your disposal to help you investigate. Consequently, problems that you can reproduce are often simpler to debug and solve. However, problems that you can reproduce can have a disadvantage: If the problem is of significant business impact, you do not want it to recur! If possible, re-create the problem in a test or development environment, which typically offers you more flexibility and control during your investigation.

Tip: Simplify the scenario to isolate the problem to a suspected component.

The following questions can help you with reproducing the problem:

- Can the problem be re-created on a test machine?
- Are multiple users or applications encountering the same type of problem?
- Can the problem be re-created by running a single command, a set of commands, a particular application, or a stand-alone application?

Adapter returns version conflict exception message

Adapter returns version conflict exception message

Problem

When you install multiple adapters with different versions of CWYBS_AdapterFoundation.jar, and if a lower version of the CWYBS_AdapterFoundation.jar is loaded during run time, the adapter returns the ResourceAdapterInternalException error message, due to a version conflict. For example, when you install Oracle E-Business Suite adapter version 7.0.0.3 and WebSphere Adapter for Email version 7.5.0.3, the following error message is displayed "The version of CWYBS_AdapterFoundation.jar is not compatible with IBM WebSphere Adapter for Email" as IBM WebSphere Adapter for Email loads file:/C:/IBM/WebSphere/ProcServer7/profiles/ProcSrv01/installedConnectors/CWYOE_OracleEBS.rar/CWYBS_AdapterFoundation.jar with version 7.0.0.3. However, the base level of this jar required is version 7.5.0.3. To overcome this conflict, you must migrate all adapters to the same version level.

Solution

Migrate all adapters to the same version level.

For further assistance, visit <http://www.ibm.com/support/docview.wss?uid=swg27006249>.

Log and Trace Analyzer

The adapter creates log and trace files that can be viewed with the Log and Trace Analyzer.

The Log and Trace Analyzer can filter log and trace files to isolate the messages and trace information for the adapter. It can also highlight the messages of an adapter and trace information in the log viewer.

The adapter's component ID for filtering and highlighting is a string composed of the characters EMARA plus the value of the adapter ID property. For example, if the adapter ID property is set to 001, the component ID is EMARA001.

If you run multiple instances of the same adapter, ensure that the first eight characters of the adapter ID property are unique for each instance so that you can correlate the log and trace information to a particular adapter instance. By making the first seven characters of an adapter ID property unique, the component ID for multiple instances of that adapter is also unique, allowing you to correlate the log and trace information to a particular instance of an adapter. For example, when you set the adapter ID property of two instances of WebSphere Adapter for Email to 001 and 002. The component IDs for those instances, EMARA001 and EMARA002, are short enough to remain unique, enabling you to distinguish them as separate adapter instances. However, instances with longer adapter ID properties cannot be distinguished from each other. If you set the adapter ID properties of two instances

to Instance01 and Instance02, you will not be able to examine the log and trace information for each adapter instance because the component ID for both instances is truncated to EMARAIstanc.

For outbound processing, the adapter ID property is located in both the resource adapter and managed connection factory property groups. If you update the adapter ID property after using the external service wizard to configure the adapter for outbound processing, be sure to set the resource adapter and managed connection factory properties consistently. It prevents inconsistent marking of the log and trace entries. For inbound processing, the adapter ID property is located only in the resource adapter properties, so this consideration does not apply.

The data binding component, which converts between business objects and the native data formats in email text and attachments, does not use the adapter component ID when generating log and trace messages. Instead, it uses a string that indicates which data binding generated the message. Table 7 lists the component ID used by each adapter-specific data binding for WebSphere Adapter for Email. For custom data bindings, the data binding must set the component ID.

Table 7. Component IDs for adapter-specific data bindings

Data binding	Component ID
EmailSimpleDataBinding	EMARASEDB
EmailWrapperDataBinding	EMARAEWDB
EmailFixedStructureDataBinding	EMARAFSDB

For more information, see the “Adapter ID (AdapterID)” on page 187 property.

First-failure data capture (FFDC) support

The adapter supports first-failure data capture (FFDC), which provides persistent records of failures and significant software incidents that occur during run time in IBM Business Process Manager or WebSphere Enterprise Service Bus.

The FFDC feature runs in the background and collects events and errors that occur at run time. The feature provides a means for associating failures to one another, allowing software to link the effects of a failure to their causes, and facilitate the quick location of the root cause of a failure. The data that is captured can be used to identify exception processing that occurred during the adapter run time.

When a problem occurs, the adapter writes exception messages and context data to a log file, which is in the *install_root/profiles/profile/logs/ffdc* directory.

For more information about first-failure data capture (FFDC), see the IBM Business Process Manager or WebSphere Enterprise Service Bus documentation.

Disabling end point applications of the passive adapter

Problem

In the active-passive configuration mode of the adapters, the endpoint application of the passive adapter instance also listens to the events or messages even if the `enableHASupport` property is set to `True`.

Cause

By default, in WebSphere Application Server, the `alwaysactivateAllMDBs` property in the JMS activation specification is set to `True`. This enables the endpoint application of all the adapter (active or passive) instances to listen to the events.

Solution

To stop the endpoint application of the passive adapter instance from listening to the events, you must set the `alwaysactivateAllMDBs` property value to `False`. The JMS activation specification is associated with one or more MDBs and provides the necessary configuration to receive events. If the `alwaysActivateAllMDBs` property is set to `False`, then the endpoint application of only the active adapter instance receives the events.

Perform the following procedure, to set the `alwaysActivateAllMDBs` property to `False`.

1. Log on to the Process Administrative Console.
2. Go to **Resources > JMS > Activation specifications**.
3. Click the activation specification corresponding to the application from the list.
4. Click **Custom properties** under **Additional properties**.
5. Click `alwaysActivateAllMDBs`.
6. Change the value to `False`.
7. Click **Apply** and **OK**.

Result

The endpoint application of only the active adapter instance listens to the events.

Solutions to common problems

Some of the problems you might encounter while running WebSphere Adapter for Email with your database are described along with solutions and workaround. These problems and solutions are in addition to those documented as technotes on the software support website.

For a complete list of technotes about WebSphere Adapters, see <http://www.ibm.com/support/search.wss?tc=SSMKUK&rs=695&rank=8&dc=DB520+D800+D900+DA900+DA800+DB560&dtm>.

Adapter returns version conflict exception message

Problem

When you install multiple adapters with different versions of `CWYBS_AdapterFoundation.jar`, and if a lower version of the `CWYBS_AdapterFoundation.jar` is loaded during run time, the adapter returns the `ResourceAdapterInternalException` error message, due to a version conflict. For example, when you install Oracle E-Business Suite adapter version 7.0.0.3 and WebSphere Adapter for Email version 7.5.0.3, the following error message is displayed "The version of `CWYBS_AdapterFoundation.jar` is not compatible with IBM WebSphere Adapter for Email" as IBM WebSphere Adapter for Email loads file: `/C:/IBM/WebSphere/ProcServer7/profiles/ProcSrv01/installedConnectors/CWYOE_OracleEBS.rar/CWYBS_AdapterFoundation.jar` with version 7.0.0.3.

However, the base level of this jar required is version 7.5.0.3. To overcome this conflict, you must migrate all adapters to the same version level.

Solution

Migrate all adapters to the same version level.

For further assistance, visit <http://www.ibm.com/support/docview.wss?uid=swg27006249>.

Unable to start adapter through webservices

Problem

After configuring the adapter, you might note that:

1. the webservices client based on the WSDL is not getting generated properly in IBM Integration Designer.
2. you may not be able to invoke the WSDL using certain webservices client, such as RESTUI firefox plugin and soapUI tool.

Solution

Perform the following steps to enable the adapter module to load the ASI file.

1. Create a library project.
2. Change to the Enterprise Explorer view in IBM Integration Designer.
3. Locate the ASI file of the adapter in **connector project -> connectorModule**.
4. Copy the ASI file of the adapter and paste it in the library project.
5. Add the library project to the list of dependencies for the adapter module.
6. Clean project.

Support

This section provides information about how to troubleshoot a problem with your IBM® software, including instructions for searching knowledge bases, downloading fixes, and obtaining support.

Searching knowledge bases (Web search)

You can often find solutions to problems by searching IBM knowledge bases. You can optimize your results by using available resources, support tools, and search methods.

About this task

You can find useful information by searching the information center for Product X. However, sometimes you need to look beyond the information center to answer your questions or resolve problems.

To search knowledge bases for information that you need, use one or more of the following approaches:

- Search for content by using the IBM® Support Assistant (ISA).
ISA is a no-charge software serviceability workbench that helps you answer questions and resolve problems with IBM software products. You can find instructions for downloading and installing ISA on the ISA website.

- Find the content that you need by using the IBM Support Portal.
The IBM Support Portal is a unified, centralized view of all technical support tools and information for all IBM systems, software, and services. The IBM Support Portal lets you access the IBM electronic support portfolio from one place. You can tailor the pages to focus on the information and resources that you need for problem prevention and faster problem resolution. Familiarize yourself with the IBM Support Portal by viewing the demo videos (https://www.ibm.com/blogs/SPNA/entry/the_ibm_support_portal_videos) about this tool. These videos introduce you to the IBM Support Portal, explore troubleshooting and other resources, and demonstrate how you can tailor the page by moving, adding, and deleting portlets.
- Search for content by using the IBM masthead search. You can use the IBM masthead search by typing your search string into the Search field at the top of any ibm.com® page.
- Search for content by using any external search engine, such as Google, Yahoo, or Bing. If you use an external search engine, your results are more likely to include information that is outside the ibm.com domain. However, sometimes you can find useful problem-solving information about IBM products in newsgroups, forums, and blogs that are not on ibm.com.

Tip: Include "IBM" and the name of the product in your search if you are looking for information about an IBM product.

Getting Fixes

A product fix might be available to resolve your problem.

About this task

To get product fixes, perform the following steps.

Procedure

1. Determine which fix you need. Check the list of IBM WebSphere Adapter for Email recommended fixes to confirm that your software is at the latest maintenance level. Check the list of problems fixed in the IBM WebSphere Adapter for Email fix readme documentation that is available for each listed fix pack to see if IBM has already published an individual fix to resolve your problem. To determine what fixes are available using IBM Support Assistant, run a query on fix from the search page.

Individual fixes are published as often as necessary to resolve defects in IBM Business Process Manager or WebSphere Enterprise Service Bus IBM WebSphere Adapter for Email. In addition, two kinds of cumulative collections of fixes, called fix packs and refresh packs, are published periodically for IBM WebSphere Adapter for Email, in order to bring users up to the latest maintenance level. You should install these update packages as early as possible in order to prevent problems.

Note: A list of recommended, generally available (GA) fixes for the WebSphere Java™ Connector Architecture (JCA) and WebSphere Business Integration adapters are available here. If a Fix Pack is not available for an adapter, it implies that the GA version is the recommended version and details about that version of the adapter can be found in the Release notes.

2. Download the fix. Open the download document and follow the link in the Download package section. When downloading the file, ensure the name of the

maintenance file is not changed. This includes both intentional changes and inadvertent changes caused by certain web browsers or download utilities.

3. Apply the fix. Follow the instructions in the Installation Instructions section of the download document.
4. Optional: To receive weekly notification of fixes and updates, subscribe to My Support e-mail updates.

Self-help resources

Use the resources of IBM software support to get the most current support information, obtain technical documentation, download support tools and fixes, and avoid problems with WebSphere Adapters. The self-help resources also help you diagnose problems with the adapter and provide information about how to contact IBM software support.

Support website

The WebSphere Adapters software support website at <http://www.ibm.com/support/docview.wss?uid=swg27006249> provides links to many resources to help you learn about, use, and troubleshoot WebSphere Adapters, including:

- Flashes (alerts about the product)
- Technical information including the product information center, manuals, IBM Redbooks®, and whitepapers
- Educational offerings
- Technotes

Recommended fixes

A list of recommended fixes you must apply is available at the following location: <http://www.ibm.com/support/docview.wss?fdoc=aimadp&rs=695&uid=swg27010397>.

Technotes

Technotes provide the most current documentation about WebSphere Adapter for Email, including the following topics:

- Problems and their currently available solutions
- Answers to frequently asked questions
- How to information about installing, configuring, using, and troubleshooting the adapter
- *IBM Software Support Handbook*

For a list of technotes for WebSphere Adapter for Email, see <http://www-01.ibm.com/support/docview.wss?uid=swg27024034>.

For a list of technotes for all adapters, see <http://www.ibm.com/support/search.wss?tc=SSMKUK&rs=695&rank=8&dc=DB520+D800+D900+DA900+DA800+DB560&dtm>.

Chapter 9. Reference information

To support you in your tasks, reference information includes details about business objects that are generated by the external service wizard and information about adapter properties, including those that support bidirectional transformation. It also includes pointers to adapter messages and related product information.

Business object information

A business object is a structure that contains specific information about an email being processed by an inbound or outbound module. Business objects contain information about how the adapter processes the email content and attachments, and also how the business objects are associated with an operation (such as Create). Business object names are generated by the external service wizard and are named according to their contents.

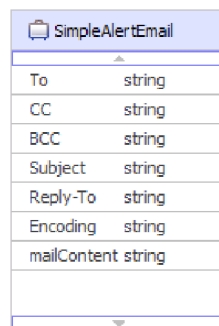
Business object structures

The adapter supports three different types of business object structures: simple alert email, email business object, and a user-defined type business object. The simple alert email structure sends text-only messages without attachments, the email business object sends and receives all types of messages both for transformed and non-transformed types, and the user-defined type sends and receives your own fixed structure transformed type messages only.

All the business object structures include standard headers such as To and From in the wrapper business object. For more information about the headers supported by the adapter, see “Header business object properties” on page 164.

Simple alert email business object structure

The simple alert email business object structure (SimpleAlertEmail) sends a single string email message to the mail server. This structure is supported only during the outbound communication. With the SimpleAlertEmail structure, the email message does not undergo any formatting or transformation. The intended recipient is a human and the body mime type is text/plain. As shown in the following illustration, it is composed of a single business object.



SimpleAlertEmail	
To	string
CC	string
BCC	string
Subject	string
Reply-To	string
Encoding	string
mailContent	string

Figure 80. SimpleAlertEmail business object structure

With this business object structure, the only required values are the From and To fields. For more information about the values of the SimpleAlertEmail business object structure, see the section on the SimpleAlertEmail business object structure in the reference section of this documentation.

Email business object structure

The email business object structure is used both during inbound and outbound communication. The adapter always creates an email business object for its specific use. The email business object is a parent business object consisting of attributes that directly relate to the fields in an email message. If you choose, it can also contain child business objects for email mailContent business object and attachments. The following illustration shows the email business object with two child business objects: header and mailAttachments.

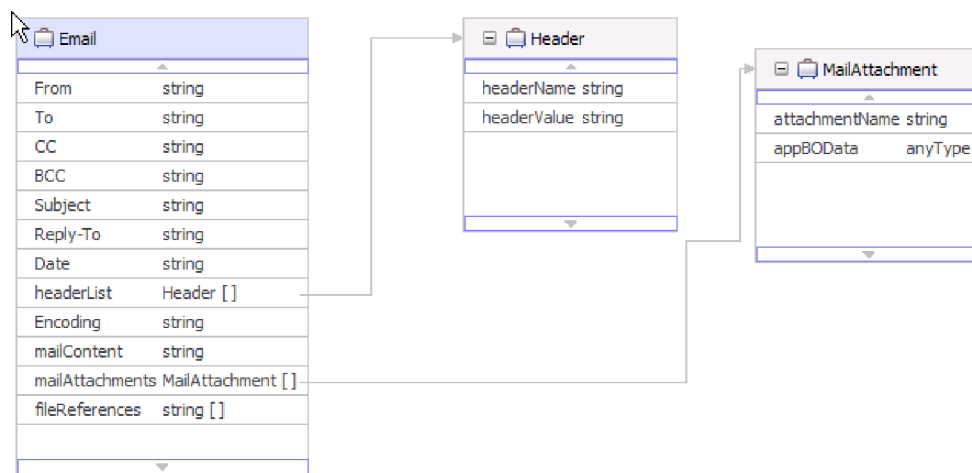


Figure 81. Email business object with mail attachment and header child objects

The header child business object shown in Figure 81 stores header information for an email. The headerList attribute in the email wrapper object is an array of header business objects. The headerList attribute might contain all the headers for an email, each represented by a header business object. However, the standard headers present in the email wrapper business object takes precedence over the headers in the headerList attribute.

Note: Bcc and Resent-bcc headers, cannot be retrieved from an inbound email, but they can be set for outbound emails.

For each attachment on an inbound email, the adapter creates a separate mail attachment business object. For every mail attachment business object the adapter receives during outbound communications, the adapter creates a separate email attachment. As noted in the illustration, the mail attachment business object consists of an attachment name and the data in the attachment.

The data in an attachment can be of any type. Business objects such as Customer or PurchaseOrder, which is defined in the business object editor before being processed by the external service wizard and have a specific structure outlined by you, are called structured content business objects. Similarly, you can specify a structured business object for the mailContent attribute of the email wrapper business object.

Structured content business objects are decomposed by the data binding and their content is recorded into individual logical fields within the business object structure. Unstructured content business objects are provided by the adapter and allow a user to send string (AsText) or bytes (AsBinary) through the adapter. Unstructured content business objects are used for pass-through processing during outbound communication.

Note: Because the adapter is expected to decompose each business object added to the module, you must define a data binding mime type and a data handler during the data binding configuration portion of the external service wizard. The adapter does not automatically associate a data binding mime type and data handler type with your business object because it has no way of knowing what type of conversion is necessary for the import objects.

The following illustration shows a mail attachment business object with a customer child object.

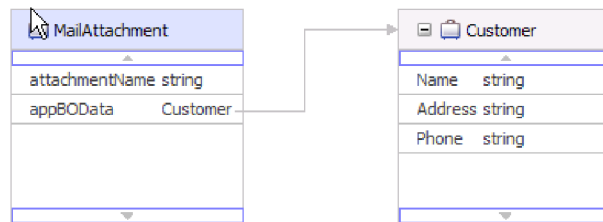


Figure 82. Mail attachment business object with structured content child object

Unstructured content business objects are used to store unstructured data, such as rich text, PDF, or images (as binary content). They are not decomposed by the data binding because their content is not placed into specific fields in the business object. Instead, unstructured content is supplied as a single string or binary field in the business object structure. The following illustration shows a mail attachment business object with an unstructured content child object.

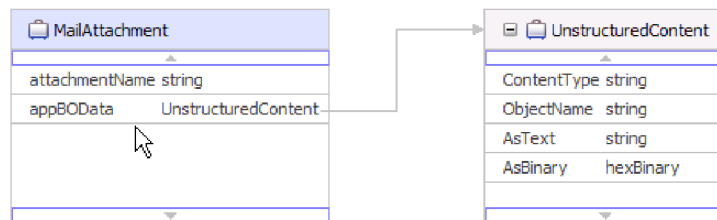


Figure 83. Mail attachment business object with unstructured content

Unstructured business objects have the following attributes:

Table 8. Unstructured business object attributes

Attribute name	Value
Content type	Type of content sent. For example, text/xml, application/binary, or image/jpeg.
AsText	Value to be sent as email text
AsBinary	Value to be sent as binary data

User-defined business object structure

Like the email business object structure, the user-defined business object structure consists of attributes that directly relate to the fields in an email message and child business objects for email attachments and headers. While the email business object structure can contain child objects of any type, the user-defined business object structure requires that you know the structure of all emails being sent or received by the adapter in advance. For example, if all incoming and outgoing emails contain mail content of customer type, attachment1 of account type, and attachment2 of account type, as shown in User-defined business object structure with child objects.

By selecting the user-defined data type in the external service wizard, you can define your own fixed structure wrapper business object. This configuration enables you to use ordinary mapping tools to consume and work with your business objects without having to determine the business object type at run time.

The following illustration shows an example of a user-defined business object with Order, Customer, and Account child business objects.

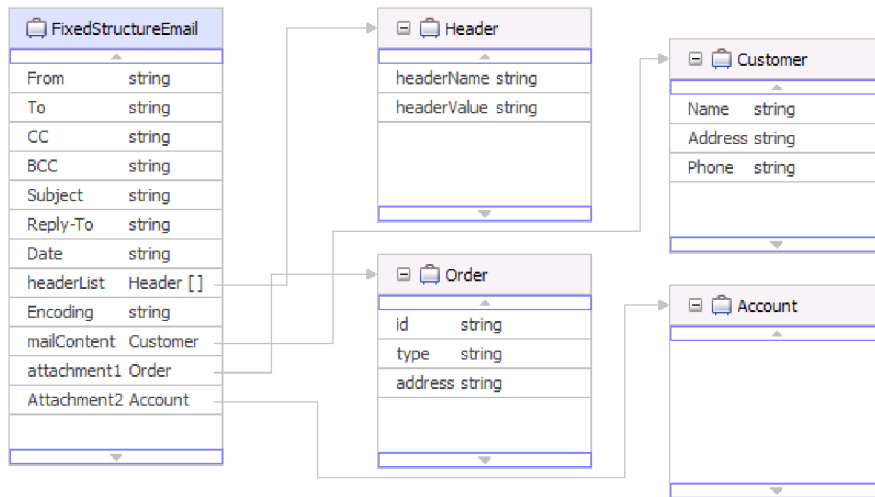


Figure 84. User-defined business object structure with child objects

If you select user-defined email business object in the external service wizard when creating your inbound module, the adapter only processes events symmetric to the user-defined email business object you define in the `EmailFixedStructureDataBinding` data binding. If the adapter receives an event that is not symmetric to the specified custom data type, it does not process the event. Instead, the adapter throws an exception with the appropriate error message.

The adapter logs an error if an event:

- Contains a different type of mail or attachment content than the type defined in the `EmailFixedStructureDataBinding`.
- Contains a different number of attachments than defined in the `EmailFixedStructureDataBinding`.
- Is missing mail content or attachments.

Supported operations

Each business object is associated with an operation, such as create. Operations might be stored in a business graph, which is like an enhanced business object, if you choose to use business graphs. Each operation tells the adapter what to do with the business object. For outbound communication, there are three different create operations used to create an email from the contents of a business object. For inbound communication, only the emit email operation is supported.

Create email

In the external service wizard, you specify a name for the operation. This name can be anything meaningful to you, such as SendEmail or SendEmailwithBO. The operations listed here represent the three examples of types of outbound create options that the adapter can start. The emit operation is always used for inbound communication, as it is the only supported inbound operation.

The create email operation is used with the email business object. When started, the create email operation creates an email message from the attributes in the email business object.

Create address

The create address operation is used when the adapter creates an email from a fixed structure business object that includes an address business object.

Create customer

The create customer operation is used when the adapter creates an email from a fixed structure business object that includes a customer business object.

Emit email

For inbound communication, emit email is the only supported operation. When started, this operation instructs the adapter to take information from an email and convert it to representative business objects.

Naming conventions

When the external service wizard generates a business object, it provides a name for the business object based on the business object schema file (XSD file) name.

When the external service wizard provides the business object name, it converts the name of the object to mixed case, which means that it removes any separators, such as spaces or underscores, and then capitalizes the first letter of each word. For example, if the external service wizard uses a mail server object called CUSTOMER_ADDRESS to generate a business object, it generates a business object called CustomerAddress.

The generated business object name can indicate the structure of the business object. Names are derived during the metadata import process and are the same as the name given by the user to the pre-generated XSD files. Business objects names have no semantic value to the adapter. It means that if you change the business object name, the behavior of the business object remains the same.

Important: If you choose to rename a business object, use the refactoring functionality in IBM Integration Designer to ensure that you update all the

business object dependencies. For instructions on using refactoring to rename business objects, refer to the following link: <http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5m1/topic/com.ibm.wbpm.wid.bpel.doc/selector/topics/trefacts.html>.

Business graphs take the name of the business object followed by "BG". For example, a business graph for a customer business object would be called CustomerBG.

Note: Business graph generation is optional.

Email business object properties

During external service discovery, the adapter generates the email business object. This parent business object includes all the header, encoding, and mail content details that the adapter needs to process both inbound and outbound requests.

The following table lists the attributes of the email business object. For the simple alert email business object structure, a number of header fields (such as To and From) are part of the email wrapper business object. These header fields are not part of the email wrapper business object with other business object structures (such as the generic email data type). For this reason, all the header values available in the simple alert email wrapper business object are not listed in this topic. For a list and description for each of the properties available in the simple alert email version of the wrapper business object, see "Header business object properties" on page 164.

Each property available with all versions of the email business object is described completely in the sections that follow the table.

Note: In business object attributes, the use of the [] symbol denotes an array of values.

Table 9. Email business object attributes

Business object attribute name	Description
Encoding	Contains outbound data encoding information when you do not use data transformation.
File references	Contains the list of files that must be attached to an outbound email.
Header list	Contains header details for all the headers listed in an inbound email request.
Mail attachments	Stores the content for the attachments of an email.
Mail content	Stores the content for the body of an email. This attribute does not include email attachments.

Encoding

This attribute is set during outbound communications to indicate the type of character encoding the adapter will use.

Table 10. Encoding details

Required	No
Default	No default value

Table 10. Encoding details (continued)

Attribute type	String
Usage	Encoding is used for headers, mail content, and attachment business objects.
Example	The following are the examples of the encoding attribute: <ul style="list-style-type: none"> • ASCII for character encoding based on the English alphabet • Big5 for character encoding based on traditional Chinese characters • GB18030 for globalized characters in a business graph
Globalized	No
Bidi supported	No

File references

This attribute contains a list of files that must be attached to an outbound email. This attribute is not used during inbound processing.

Table 11. File references details

Required	No
Default	No default value
Attribute type	String []
Usage	During outbound communication, the run time specifies absolute paths for the referenced files listed in this field. The adapter reads these files, which are on the local system with the adapter, and includes them as attachments to the outbound email.
Globalized	Yes
Bidi supported	No

Header List

This attribute is populated with the header details for all the headers listed in a polled email request.

Table 12. Header list details

Required	No
Default	No default value
Attribute type	Header[]
Usage	Headers are the fields in an email, such as To, From, Cc, Bcc, and Subject.
Globalized	Yes
Bidi supported	Yes

Mail attachments

This attribute stores the content details for an attachment in an inbound email request.

Table 13. Mail attachments details

Required	No
Default	No default value
Attribute type	MailAttachment[]

Table 13. Mail attachments details (continued)

Usage	Stores the content details for an attachment in an inbound email request.
Globalized	Yes
Bidi supported	No

Mail content

During inbound communication, this attribute stores any content found in the body of the email request. During outbound communication, this attribute contains the data that becomes the body of the email being sent to the mail server. This attribute does not include email attachments.

Table 14. Mail content details

Required	Yes
Default	No default value
Attribute type	anyType
Usage	Contains body content of an email.
Globalized	Yes
Bidi supported	No

Header business object properties

Header business object properties are used to store standard (RFC822) email headers and headers customized by you. They are populated dynamically by the adapter and comprise a name and value pair. Customized headers and their related information are tracked by the adapter with the help of the headerList entries in the email business object.

The adapter picks up the header name from the HeaderList property in the email business object. Each header can have multiple values, but Bcc and Resent-bcc headers cannot be retrieved from an email. However, they can be sent on an email.

All headers are encoded by the adapter in the specified character set. Because To and From header values are required, the adapter ends the outbound Create operation, if the encoding of either of those header values fails. The JavaMail API does not provide enough information to decipher the character set and encoding information for the header content; hence header content might not be globalized

The following table provides example header business object name and value pairs.

Table 15. Examples of header business object name and value pairs

Name	Value
HeaderName = to	HeaderValue = abc@xyz.com
HeaderName = cc	HeaderValue = def@xyz.com
HeaderName = mimetype	HeaderValue = text/plain

The following table lists the Standard email Headers supported by the adapter. A more detailed description of each property is provided in the sections that follow

the table. For more information about how to read the property detail tables in the sections that follow, see Guide to information about properties.

Table 16. Standard email Headers supported by the adapter

Property name	Description
Bcc	The blind carbon copy addresses for the email
Cc	The email addresses for secondary recipients of the email
Comments	Specifies whether text comments can be added to the message body
Date	The date the email was created
Encrypted	Specifies whether the body of a message was encrypted by the sender
From	The address that the email was sent from
In reply to	Subject line of previous correspondence that the email message is responding to
Keywords	Keywords or phrases contained in the email separated by commas
Message identifier	The unique identifier (local-part address unit) referring to the particular version of a particular message
References	Other pieces of email correspondence referenced by this email
Reply to	Addresses to which the responses to the email is sent
Resent - bcc	Blind carbon copy addresses for the email
Resent - cc	Email addresses for secondary or informational recipients of the email
Resent - date	The date the email was forwarded
Resent - from	The address that the email was resent from
Resent - message identifier	The unique identifier (local-part address unit) that refers explicitly to a particular version of a particular message
Resent - reply to	Addresses to which the responses to the email is sent
Resent - sender	Authenticated identity of the agent (person, system, or process) sending the email message
Resent - to	Addresses of the primary recipients of the email
Sender	Authenticated identity of the agent (person, system, or process) sending the email message
Subject	Summary of what the email is about
To	Addresses of the primary recipients of the email

Blind carbon copy (Bcc)

This property specifies blind carbon copy addresses for the email. The addresses listed in this field are not included in copies of the message sent to the primary and secondary recipients.

Table 17. Blind carbon copy details

Required	No
Default	No default value
Property type	String
Usage	This header is only supported for outbound communication. Some systems choose to include the text of the Bcc field only in the copy of the author, while some systems include these addresses to all those recipients listed in the Bcc field.
Globalized	Yes
Bidi supported	Yes

Carbon copy (Cc)

This property specifies the email addresses of secondary recipients of the email.

Table 18. Carbon copy details

Required	No
Default	No default value
Property type	String
Usage	Specifies email addresses of secondary recipients of the email. All recipients listed in this field are visible to anyone receiving the email.
Globalized	Yes
Bidi supported	Yes

Comments

This property allows the addition of text comments to the message body without disturbing the message body content.

Table 19. Comments details

Required	No
Default	No default value
Property type	String
Usage	Allows the addition of text comments to the message body without disturbing the message body content.
Bidi supported	No

Date

The date set by the mail server of the sender during inbound processing. The date the email is created during outbound processing.

Table 20. Date details

Required	No
Default	No default value
Property type	String
Usage	The date set by the mail server of the sender during inbound processing. The date the email is created during outbound processing.
Globalized	Yes
Bidi supported	Yes

Encrypted

This property indicates whether the body of a message was encrypted by the sender. If set to True, the message was encrypted.

Table 21. Encrypted details

Required	No
Default	No default value

Table 21. Encrypted details (continued)

Property type	String
Usage	Setting the encrypted header value to True does not enable encryption. This property only notes whether the message has been encrypted for informational purposes.
Bidi supported	No

From

This property specifies the address that the email was sent from.

Table 22. From details

Required	Yes
Default	No default value
Property type	String
Usage	Specifies the address that the email was sent from.
Globalized	Yes
Bidi supported	Yes

In reply to

The contents of this field identify which piece of previous correspondence is being answered with a new email message.

Table 23. In reply to details

Required	No
Default	No default value
Property type	String
Usage	Identifies which piece of previous correspondence is being answered with a new email message.
Bidi supported	No

Keywords

This property specifies keywords or phrases contained in the email, which are separated by commas.

Table 24. Keywords details

Required	No
Default	No default value
Property type	String
Usage	Keywords specified using this field are used during selective polling.
Bidi supported	No

Message Identifier (Message ID)

This property specifies the unique identifier (local-part address unit) that refers explicitly to a particular version of a particular message.

Table 25. Message ID details

Required	No
Default	No default value
Property type	String
Usage	Each revision of an email message is assigned a new message ID. The uniqueness of the message ID is guaranteed by the host system that generates it. It is machine readable and does not include any meaningful syntax for users.
Bidi supported	No

References

The contents of this field identify other pieces of email correspondence referenced by the email.

Table 26. References details

Required	No
Default	No default value
Property type	String
Usage	Identifies other pieces of email correspondence referenced by the email.
Bidi supported	No

Reply to

This property specifies the addresses where responses to the email are to be sent.

Table 27. Reply to details

Required	No
Default	No default value
Property type	String
Usage	Specifies the addresses to which the response emails are to be sent.
Bidi supported	No

Resent - blind carbon copy (Resent-bcc)

This property specifies the blind carbon copy addresses for the email.

Table 28. Resent-blind carbon copy details

Required	No
Default	No default value
Property type	String
Usage	This value is only supported during outbound communication. The addresses listed in this field are not included in copies of the message sent to the primary and secondary recipients. Some systems choose to include the text of the Bcc field only in the copy of the author, while some systems include these addresses to all those recipients listed in the Bcc field.
Bidi supported	No

Resent - carbon copy (Resent-cc)

This property specifies the email addresses for secondary recipients of the email.

Table 29. Resent-carbon copy details

Required	No
Default	No default value
Property type	String
Usage	Specifies the email addresses for secondary recipients of the email.
Bidi supported	No

Resent - date

This property specifies the date that the email was forwarded.

Table 30. Resent - date details

Required	No
Default	No default value
Property type	String
Usage	Specifies the date that the email was forwarded.
Bidi supported	No

Resent - from

This property specifies the address that the email was resent from.

Table 31. Resent - from details

Required	No
Default	No default value
Property type	String
Usage	Specifies the address that the email was resent from.
Bidi supported	No

Resent message identifier (Resent-message-ID)

This property specifies the unique identifier (local-part address unit) that refers explicitly to a particular version of a particular message.

Table 32. Resent-message-ID details

Required	No
Default	No default value
Property type	String
Usage	Each revised email message is assigned a new message ID. The uniqueness of the message ID is guaranteed by the host system that generates it. It is machine readable and does not include any meaningful syntax for users.
Bidi supported	No

Resent - reply to

This property specifies the addresses where responses to the email are to be sent.

Table 33. Resent reply to details

Required	No
Default	No default value
Property type	String
Usage	Specifies the addresses where responses to the email are to be sent.
Bidi supported	No

Resent - sender

This property specifies the authenticated identity of the agent (person, system, or process) that is sending the email message.

Table 34. Resent sender details

Required	No
Default	No default value
Property type	String
Usage	Specifies the authenticated identity of the agent (person, system, or process) that is sending the email message.
Bidi supported	No

Resent - to

This field contains the addresses for the primary recipients of the email.

Table 35. Resent - to details

Required	No
Default	No default value
Property type	String
Usage	Contains the addresses for the primary recipients of the email.
Bidi supported	No

Sender

This property specifies the authenticated identity of the agent the (person, system, or process) that is sending the email message.

Table 36. Sender details

Required	No
Default	No default value
Property type	String
Usage	Specifies the authenticated identity of the agent the (person, system, or process) that is sending the email message.
Bidi supported	No

Subject

This property contains a summary of what the email is about.

Table 37. Subject details

Required	No
Default	No default value
Property type	String
Usage	Contains a summary of what the email is about.
Globalized	Yes
Bidi supported	Yes

To

This field contains the addresses for the primary recipients of the email.

Table 38. To details

Required	No
Default	No default value
Property type	String
Usage	Contains the addresses for the primary recipients of the email.
Globalized	Yes
Bidi supported	Yes

Mail attachment business object properties

Each email attachment is stored in its own Mail Attachment object. Mail Attachment business objects consist of an attachment name and data worth of one email attachment.

During inbound processing, the attachments are parsed and the contents sent out as business objects. By default, each attachment is parsed into one MailAttachment business object. However, you can select to emit the entire email as a single email business object by setting the activation specification property **Emit individual business objects from a multipart email** to false in the external service wizard.

During outbound processing, IBM Business Process Manager or WebSphere Enterprise Service Bus sets the data within the MailAttachment business object. The data in this business object then becomes an email attachment when the email message is created by the adapter.

Note: MailAttachment objects can store email attachments of any user-defined type (such as Customer or PurchaseOrder).

The following table describes the attribute values for the mail attachment business object. A more detailed description of each property is provided in the sections that follow the table. For more information about how to read the property detail tables in the sections that follow, see Guide to information about properties.

Table 39. MailAttachment business object attribute values

Attribute name	Purpose
"Attachment name"	The name of the email attachment
"Application business object data (AppBOData)"	Data contained in the email attachment.

Attachment name

This attribute value specifies the name of the file attached to the email.

Table 40. Attachment name attribute characteristics

Required	Yes
Default	No default value
Attribute type	String
Usage	The fully qualified path of the email attachment
Globalized	Yes
Bidi supported	No

Application business object data (AppBOData)

This attribute comprises the data in the file attached to the email.

Table 41. Application business object data attribute characteristics

Required	Yes
Default	No default value
Attribute type	anyType
Usage	The anyType attribute type can hold hexBinary content or a child business-object. For hexBinary type, the data binding deciphers the data and converts it to an unstructured content business object.
Globalized	Yes
Bidi supported	No

Email outbound response business object properties

To support business faults, the WebSphere Adapter for Email must be configured to receive the outbound responses from the mail server. The response from the mail server contains recipient IDs to which the email is successfully delivered, the recipient IDs to which the email is not delivered, the delivery status, and the message ID of the email. The adapter then builds a response business object from the response received from the mail server.

Note: You can configure the time period for which the adapter waits to receive a response from the mail server by setting the "Response set timeout (ResponseSetTimeout)" on page 185 property.

The following table describes the attribute values for the email outbound response business object. A more detailed description of each property is provided in the sections that follow the table. For more information about how to read the property detail tables in the sections that follow, see Guide to information about properties.

Note: In the business object attributes description, the use of the [] symbol denotes an array of values.

Table 42. Email outbound response business object attributes

Business object attribute name	Description
DeliveredTo	Contains the recipient addresses to which the email is delivered
UndeliveredTo	Contains the recipient addresses to which the email is not delivered
“Status” on page 174	Contains information about the delivery status of the email
“MessageID” on page 174	Contains the message ID of the email

DeliveredTo

This attribute contains information about delivered recipient addresses.

Table 43. Delivered email attribute details

Required	No
Default	No default value
Attribute type	String []
Usage	This attribute contains the list of all the email addresses to which the email is successfully delivered.
Globalized	Yes
Bidi supported	Yes

UndeliveredTo

This attribute contains information about undelivered recipient addresses.

Table 44. Undelivered email attribute details

Required	No
Default	Null
Attribute type	String []
Usage	This attribute contains list of all the email addresses to which the email is not delivered and displays null if the email is delivered to all addresses.
Globalized	Yes
Bidi supported	Yes

Status

This attribute stores the delivery status of the email.

Table 45. Status attribute details

Required	No
Default	No default value
Possible Values	MESSAGE DELIVERED SUCCESSFULLY MESSAGE NOT DELIVERED
Attribute type	String
Usage	This attribute shows the delivery status of the email. The adapter shows the status as either message delivered successfully or message not delivered.
Globalized	Yes
Bidi supported	No

MessageID

This attribute stores the message ID of the email.

Table 46. MessageID attribute details

Required	No
Default	No default value
Attribute type	String
Usage	During outbound operation, this attribute stores the message ID of email. The adapter then returns the message ID in the response business object.
Globalized	Yes
Bidi supported	No

Business faults

The adapter supports business faults, which are exceptions that are anticipated and declared in the outbound service description, or import. Business faults occur at predictable points in a business process, and are caused by a business rule violation or a constraint violation.

Although IBM Business Process Manager and WebSphere Enterprise Service Bus support other types of faults, the adapter generates only business faults, which are called *faults* in this documentation. Not all exceptions become faults. Faults are generated for errors that are actionable, that is, errors that can have a recovery action the ones that does not require the termination of the application. For example, the adapter generates a fault when it receives a business object for outbound processing that does not contain the required data or when the adapter encounters certain errors during outbound processing.

Fault business objects

The external service wizard creates a business object for each fault that the adapter can generate. In addition, the wizard creates a `WBIFault` superset business object, which has information common to all faults, such as the message, `errorCode`, and `primaryKeySet` attributes as shown in Figure 85 on page 175.

WBIFault	
message	string
errorCode	string
primaryKeySet	PrimaryKeyPairType []

Figure 85. The structure of the WBIFault business object

WebSphere Adapter for Email enables faults for you. Manual configuration of faults is not required. The adapter provides the following fault business objects that the wizard creates:

- **EmailSendFault**
When processing any create operation, the adapter generates this fault when sending an email if an exception occurs that is not related to connection to the mail server.
- **MissingDataFault**
If the business object that is passed to the outbound operation does not have all the required attributes, the adapter returns this fault. This fault can occur for the Create, Delete, Update, Retrieve, ApplyChanges and Exists operations.

Event store structure

Each time an email is read by the adapter during inbound communication, the adapter updates the status of the event in an event store. The status of each event is continually updated by the adapter for recovery purposes until the events are delivered to a configured export on the run time.

When event persistence is optionally configured, the adapter implements the event store in an Email-specific relational table called EmailEventTable. This table is tied to event recovery operations. When event persistence is not configured, the adapter determines which events need to be recovered based on the emails present in the staging directory. The event recovery feature is activated when the adapter terminates abruptly. Upon termination, events that are still being processed, or processed but not completely posted to the service, still require completion. The adapter reads the event store to determine which events still need to be processed and then facilitates their completion. The event persistence framework takes care of delivering the event only once to the target service.

Each inbound module has a unique connection and is associated with one event store. Multiple modules pointing to the same event store is not supported

The following table illustrates the structure of the WebSphere Adapter for Email event store.

Table 47. Event table structure

Column name	Property type	Description
EVNTID	Varchar (255)	The event ID associated with the polled inbound event. The ID is taken from the message ID of the polled email.

Table 47. Event table structure (continued)

Column name	Property type	Description
EVNTSTAT	Integer	<p>The status of the event as it moves through the system. Valid values are NEW(0), FETCHED(3), PROCESSED(1) and FAILED(-1).</p> <p>An event is logged in the event store as NEW(0), when the adapter discovers a new email on the mail server that meets the specified search criteria noted in the activation specification properties.</p> <p>When the adapter starts fetching an event from the mail server to the local system in RFC822 format, it is logged in the event table as FETCHED(3) with the value Null XID. For an event, FETCHED(3) with some XID value (not NULL), the XID is created with transaction in progress and ready to be delivered (in this situation, event can be recovered).</p> <p>Event status values:</p> <ul style="list-style-type: none"> • NEW(0): The event is ready to be processed. • FETCHED(3): The event is picked up for processing. • PROCESSED(1): The event is processed and delivered successfully. • FAILED(-1): The event is not processed due to one or more problems.
XID	Varchar (255)	It is used by the adapter for assured event delivery and recovery.
BQTOTAL	Integer	Not used by the adapter.
BQPROC	Integer	Not used by the adapter.
EVNTDATA	Varchar (255)	Stores the name of the folder on the mail server where the email event was polled.

Outbound configuration properties

IBM WebSphere Adapter for Email has several categories of outbound connection configuration properties, which you set with the external service wizard while generating or creating objects and services. You can change the resource adapter and managed connection factory properties after you deploy the module to IBM Business Process Manager or WebSphere Enterprise Service Bus using IBM Integration Designer or the Process Administrative Console, but connection properties for the external service wizard cannot be changed after deployment.

Guide to information about properties

The properties used to configure WebSphere Adapter for Email are described in detail in tables included in each of the configuration properties topics, such as

Resource adapter properties, Managed connection factory properties, and so on. To help you use these tables, information about each row you might see is explained here.

The following table explains the meaning of each row that might be displayed in the table for a configuration property.

Row	Explanation
Required	<p>A required field (property) must have a value in order for the adapter to work. Sometimes the external service wizard provides a default value for required properties.</p> <p>Removing a default value from a required field on the external service wizard <i>will not change that default value</i>. When a required field contains no value at all, the external service wizard processes the field using its assigned default value, and that default value is displayed on the Process Administrative Console.</p> <p>Possible values are Yes and No.</p> <p>Sometimes a property is required only when another property has a specific value. When this is the case, the table notes this dependency. For example,</p> <ul style="list-style-type: none"> • Yes, when the EventQueryType property is set to Dynamic • Yes, for Oracle databases
Possible values	Lists and describes the possible values that you can select for the property.
Default	<p>The predefined value that is set by the external service wizard. When the property is required, you must either accept the default value or specify one yourself. If a property has no default value, the table states No default value.</p> <p>The word None is an acceptable default value, and does not mean that there is no default value.</p>
Unit of measure	Specifies how the property is measured, for example in kilobytes or seconds.
Property type	<p>Describes the property type. Valid property types include:</p> <ul style="list-style-type: none"> • Boolean • String • Integer
Usage	<p>Describes usage conditions or restrictions that might apply to the property. For instance, here is how a restriction would be documented:</p> <p>For Rational® Application Developer for WebSphere Software version 6.40 or earlier, the password:</p> <ul style="list-style-type: none"> • Must be uppercase • Must be 8 characters in length <p>For versions of Rational Application Developer for WebSphere Software later than 6.40, the password:</p> <ul style="list-style-type: none"> • Is not case-sensitive • Can be up to 40 characters in length. <p>This section lists other properties that affect this property or the properties that are affected by this property and describes the nature of the conditional relationship.</p>
Example	<p>Provides sample property values, for example:</p> <p>"If Language is set to JA (Japanese), code page number is set to 8000".</p>

Row	Explanation
Globalized	If a property is globalized, it has national language support, meaning that you can set the value in your national language. Valid values are Yes and No .
Bidi supported	Indicates whether the property is supported in bidirectional (bidi) processing. Bidirectional processing refers to the task of processing data that contains both right-to-left (Hebrew or Arabic, for example) and left-to-right (a URL or file path, for example) semantic content within the same file. Valid values are Yes and No .

Connection properties for the external service wizard

Enterprise service discovery selection properties are used to build a service description and to save the built-in artifacts. These properties are configured in the external service wizard.

The following table lists the connection properties for the external service wizard. These properties can only be configured using the external service wizard and cannot be changed after deployment. A more detailed description of each property is provided in the sections that follow the table. For information about how to read the property details tables in the following sections, see *Guide to information about properties*

Table 48. Connection properties for the external service wizard

In the wizard	Description
Adapter style	Service type associated with the module.
Business object type location	Absolute path for the folder on the local drive where business objects generated by the external service wizard are stored.
Function selector	The name of the function selector configuration during inbound communication.
Operation name	Operation defined in the external service wizard.

Adapter style

This property specifies the service type associated with the module.

Table 49. Service type details

Required	Yes
Default	Outbound
Property type	List of values
Possible values	Outbound Inbound
Usage	Specifies the service type associated with the adapter module
Globalized	No
Bidi supported	No

Business object type location

This property specifies the absolute path of the folder on the local drive where business objects generated by the external service wizard are stored.

Table 50. Business object type location details

Required	No
Default	No default value
Property type	String
Usage	Specifies the absolute path of the folder on the local drive where business objects generated by the external service wizard are stored
Globalized	No
Bidi supported	No

Function selector

This property specifies the name of the function selector implementation when the service type is inbound.

Table 51. Function selector details

Required	When the service type is set to inbound, this property is required. When the service type is set to outbound, this property is not valid.
Default	For inbound processing, the default is EmailFunctionSelector. For outbound processing, this field is not editable and there is no default.
Property type	String
Usage	There is no equivalent property for outbound communication.
Globalized	No
Bidi supported	(Not available)

Operation name

This property specifies the name you give to the operation used with this module.

Table 52. Operation name property details

Required	Yes
Default	No default value
Property type	String
Usage	This value is user-defined and something that is meaningful to you.
Example	SendEmail SendCustomerBO
Globalized	No
Bidi supported	(Not available)

Managed connection factory properties

Managed connection factory properties are used by the adapter at run time to create an outbound connection instance with the mail server.

The following table lists and describes the managed connection factory properties for outbound communication. You set managed connection factory properties using the external service wizard and can change them using the IBM Integration Designer Assembly Editor before deployment. After deployment, you can change these values using the IBM Business Process Manager or WebSphere Enterprise Service Bus Process Administrative Console.

A more detailed description of each property is provided in the sections that follow the table. For information about how to read the property details tables in the sections that follow, see Guide to information about properties.

Note: The external service wizard refers to these properties as managed connection factory properties, and the IBM Business Process Manager or WebSphere Enterprise Service Bus Process Administrative Console refers to them as (J2C) connection factory properties.

Table 53. Managed connection factory properties

In the wizard	In the Process Administrative Console	Description
Adapter ID	AdapterID	Identifies the adapter instance for PMI events and for logging and tracing.
“Alternate email ID in case of delivery failure” on page 183	alternateEmailIdInCaseOfDeliveryFailures	Specifies the alternate email address for receiving bounced mails.
Bidi format string	BIDIContextEIS	The bidi format for string type business data exchanged between the mail server and the adapter.
“Retry interval if connection fails (in milliseconds) entities” on page 182	connectionRetryInterval	Specifies the time interval between the attempts to reconnect to the mail server if the connection fails.
Disguise user data as “XXX” in log and trace files	HideConfidentialTrace	Specifies whether to disguise potentially sensitive information by writing X strings instead of user data in the log and trace files.
Host name	HostName	The IP address of the host where the mail server is running.
“Maximum retries on connection failure (connectionRetryLimit)” on page 183	ConnectionRetryLimit	Specifies the maximum number of times the adapter tries to reestablish an outbound connection to the EIS.
Password	Password	The password for the user name associated with the mail server.
Port	Port	The SMTP port where the mail server is listening.
Protocol	Protocol	The protocol used for outbound communication with the mail server.
Response set timeout	Responsetimeout	Specifies the time period for which the adapter waits to receive a response from the mail server.
Secure connection	enableSSL	Specifies whether secure socket layers are enabled for outbound communication.
Select when antivirus or firewall software is running	closeConnection	Specifies whether the adapter closes the managed connection with the mail server after each request.
User name	UserName	The user name for the mail server used to send outbound emails.

Adapter ID (AdapterID)

This property identifies a specific deployment or instance of the adapter.

Table 54. Adapter ID details

Required	Yes
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Table 54. Adapter ID details (continued)

Default	001
Property type	String
Usage	<p>This property identifies the adapter instance in the log and trace files, and also helps identify the adapter instance while monitoring adapters. The adapter ID is used with an adapter-specific identifier, EMARA, to form the component name used by the Log and Trace Analyzer tool. For example, if the adapter ID property is set to 001, the component ID is EMARA001.</p> <p>If you run multiple instances of the same adapter, ensure that the first eight characters of the adapter ID property are unique for each instance so that you can correlate the log and trace information to a particular adapter instance. By making the first seven characters of an adapter ID property unique, the component ID for multiple instances of that adapter is also unique, allowing you to correlate the log and trace information to a particular instance of an adapter.</p> <p>For example, when you set the adapter ID property of two instances of WebSphere Adapter for Email to 001 and 002. The component IDs for those instances, EMARA001 and EMARA002, are short enough to remain unique, enabling you to distinguish them as separate adapter instances. However, instances with longer adapter ID properties cannot be distinguished from each other. If you set the adapter ID properties of two instances to Instance01 and Instance02, you will not be able to examine the log and trace information for each adapter instance because the component ID for both instances is truncated to EMARAIinstanc.</p> <p>For inbound processing, the value of this property is set at the resource adapter level. For outbound processing, the value can be set both at the resource adapter level and the managed connection factory level. After you use the external service wizard to configure the adapter for outbound processing, you can set the resource adapter and managed connection factory properties independently. If you use the IBM Integration Designer assembly editor or the administrative console to reset these properties, ensure that you set them consistently, to prevent inconsistent marking of the log and trace entries.</p>
Globalized	Yes
Bidi supported	No

Bidi format string (BIDContextEIS)

This property indicates the bidi format for string type business data exchanged between the mail server and the adapter.

Table 55. Bidi format string details

Required	No
Possible values	IBM Business Process Manager and WebSphere Enterprise Service Bus use ILYNN (implicit, left-to-right, on, off, nominal). These five attributes comprise the format used by Windows.
Default	No default value
Property type	String
Usage	<p>A five-character string that identifies the bidirectional format used by the mail server.</p> <p>If the mail server that sends or receives data from the server uses a different format than ILYNN, the adapter converts the format before introducing the data to the server. For the conversion to occur, you use the external service wizard to set attribute values that represent the bidirectional format used by the mail server. This is done when you configure the module for the first time.</p>
Example	<p>ILYNN VRYNN VLYNN</p>

Table 55. Bidi format string details (continued)

Globalized	No
Bidi supported	No

Retry interval if connection fails (in milliseconds) entities

This property specifies the time interval between attempts to reconnect to the mail server if the connection fails.

Table 56. Retry interval if connection fails (milliseconds) property characteristics

Required	No
Possible values	Integers equal to and greater than 0
Default	60000
Unit of measure	Milliseconds
Property type	Integer
Usage	<p>This property is applicable only if the value of the property "Maximum retries on connection failure" is set to greater than 0.</p> <p>When the adapter encounters an error while establishing a connection to the mail server, this property specifies the time interval the adapter waits between attempts to reestablish a connection.</p>
Globalized	No
Bidi supported	No

Disguise user data as "XXX" in log and trace files (HideConfidentialTrace)

This property specifies whether to replace user data in log and trace files with a string of X's to prevent unauthorized disclosure of potentially sensitive data.

Table 57. Disguise user data as "XXX" in log and trace files details

Required	No
Possible values	True False
Default	False
Property type	Boolean
Usage	<p>If you set this property to True, the adapter replaces user data with a string of X's when writing to log and trace files.</p> <p>For inbound processing, the value of this property is set at the resource adapter level. For outbound processing, the value can be set both at the resource adapter level and the managed connection factory level. After you use the external service wizard to configure the adapter for outbound processing, you can set the resource adapter and managed connection factory properties independently. If you use the IBM Integration Designer assembly editor or the administrative console to reset these properties, ensure that you set them consistently, to prevent inconsistent marking of the log and trace entries.</p>
Globalized	No
Bidi supported	No

Alternate email ID in case of delivery failure

This property is used to specify an alternate email address to send a bounced email notification, in case of delivery failure due to an incorrect To address in an email message.

Table 58. Alternate email ID property details

Required	No
Default	No default value
Property type	String
Usage	When an incorrect To address is specified in the email, a bounced email notification is sent to the alternate email address specified in the managed factory connection properties. This configuration ensures a backup address to receive notifications for mail delivery failures. Note: The alternate email address can be different from the From address.
Globalized	No
Bidi supported	No

Host name (HostName)

This property specifies the IP address of the host where the mail server is running.

Table 59. Host name details

Required	No
Default	localhost
Property type	String
Usage	Specifies the IP address of the host where the mail server is running
Globalized	No
Bidi supported	No

Maximum retries on connection failure (connectionRetryLimit)

This property specifies the number of times the adapter attempts to reestablish a connection to the EIS, when the adapter encounters an error related to the outbound connection.

Table 60. Maximum retries in case of system connection failure details

Required	No
Possible values	Integer equal to and greater than zero
Default	0
Property type	Integer

Table 60. Maximum retries in case of system connection failure details (continued)

Usage	<p>When the adapter encounters an error related to the outbound connection, it attempts to reestablish a physical connection (when physical connection is not established) for the number of times specified for this property with a time delay specified in the property "Retry interval if connection fails (in milliseconds) entities" on page 182.</p> <p>If the value is set to 0, the adapter does not validate the connection to the EIS and it executes the outbound operation. If the EIS connection is invalid, the outbound operation fails. The adapter does not attempt to reconnect to the EIS.</p> <p>If the value is set to greater than 0, then during each request the adapter validates if the connection to the EIS is active.</p> <ul style="list-style-type: none"> • If the connection is valid, the operation is completed. • If connection is invalid, the adapter terminates the current managed connection and a new managed connection is created (new physical connection). If the adapter is successful in reestablishing the connection to the EIS, the outbound operation is completed otherwise the adapter generates the ResourceException after trying to reconnect for the specified number of times.
Globalized	No
Bidi supported	No

Password (Password)

This property specifies the password for the user name associated with the mail server.

Table 61. Password details

Required	No
Default	No default value
Property type	String
Usage	Authenticates the outbound SMTP session with the mail server. IBM Business Process Manager or WebSphere Enterprise Service Bus Process Administrative Console does not encrypt the Password property the first time.
Globalized	No
Bidi supported	Yes

Port (Port)

This property specifies the SMTP port where the mail server is listening.

Table 62. Port details

Required	No
Default	25
Property type	Integer
Usage	If the Secure connection (SSL) property is set to True, this property must be updated.
Globalized	No
Bidi supported	No

Protocol (Protocol)

This property specifies the protocol to be used for outbound communication with the mail server.

Table 63. Protocol details

Required	No
Default	SMTP
Property type	String
Usage	SMTP is the only supported value for this property.
Globalized	Yes
Bidi supported	No

Response set timeout (ResponseSetTimeout)

This property specifies the length of time the adapter waits for receiving a response from the mail server.

Table 64. Response set timeout details

Required	No
Possible values	Any positive integer
Default	0
Unit of measure	Milliseconds
Property type	Integer
Usage	You can configure the outbound response time for number of specified milliseconds that the adapter waits for a response from the mail server. After the specified time period, the adapter stops waiting for a response from the mail server. Note: If the value is 0, the adapter continues to wait until it gets a response from the mail server.
Example	A value of 5 specifies that the adapter waits for 5 milliseconds to get a response from the mail server.
Globalized	No
Bidi supported	No

Secure connection (SSL) (enableSSL)

This property specifies whether secure socket layers are enabled for outbound communication.

Table 65. Enable secure socket layers details

Required	No
Default	False
Property type	Boolean
Usage	If set to True, the port property must be set to 465.
Globalized	No
Bidi supported	No

Select when antivirus or firewall software is running (SecureConnection)

Selecting this option closes the managed connection with the mail server after each outbound request. It is used when antivirus or firewall security software is running on the system where the adapter is deployed or the system that hosts the mail server.

Table 66. Select when antivirus or firewall software is running details

Required	No
Default	True
Property type	Boolean
Possible values	True False
Usage	This property is provided because some antivirus programs consider the managed connection between the adapter and the mail server malicious. This results in the mail sent by the adapter to the mail server being blocked by an antivirus program or firewall. If set to True, the adapter closes the managed connection after each outbound request, ensuring that antivirus and firewall software do not block emails from the adapter. If set to False, the adapter does not close the managed connection after each outbound request. This setting might cause antivirus and firewall software to block emails from the adapter.
Globalized	No
Bidi supported	No

User name (UserName)

This property specifies the user name for the mail server to be used with the outbound SMTP session.

Table 67. User name details

Required	No
Default	No default value
Property type	String
Usage	The mail server must be running on the host noted in this property.
Globalized	Yes
Bidi supported	Yes

Resource adapter properties

A resource adapter contains properties such as the adapter ID and logging and tracing options specific to the adapter. You can set the logging and tracing properties using the external service wizard during adapter configuration. You can set or change any of the properties using the Process Administrative Console.

The following table lists and describes the resource adapter properties. A more detailed description of each property is provided in property details tables that follow the table. For information about how to read the property details tables in the sections that follow, see Guide to information about properties.

Table 68. Resource adapter properties

In the wizard	In the Process Administrative Console	Description
Adapter ID	AdapterID	Identifies the adapter instance for PMI events and for logging and tracing.
Disguise user data as "XXX" in log and trace files	HideConfidentialTrace	Specifies whether to disguise potentially sensitive information by writing X strings instead of user data in the log and trace files.
(Not available)	Enable HA support	Do not change this property.

Adapter ID (AdapterID)

This property identifies a specific deployment or instance of the adapter.

Table 69. Adapter ID details

Required	Yes
Default	001
Property type	String
Usage	<p>This property identifies the adapter instance in the log and trace files, and also helps identify the adapter instance while monitoring adapters. The adapter ID is used with an adapter-specific identifier, EMARA, to form the component name used by the Log and Trace Analyzer tool. For example, if the adapter ID property is set to 001, the component ID is EMARA001.</p> <p>If you run multiple instances of the same adapter, ensure that the first eight characters of the adapter ID property are unique for each instance so that you can correlate the log and trace information to a particular adapter instance. By making the first seven characters of an adapter ID property unique, the component ID for multiple instances of that adapter is also unique, allowing you to correlate the log and trace information to a particular instance of an adapter.</p> <p>For example, when you set the adapter ID property of two instances of WebSphere Adapter for Email to 001 and 002. The component IDs for those instances, EMARA001 and EMARA002, are short enough to remain unique, enabling you to distinguish them as separate adapter instances. However, instances with longer adapter ID properties cannot be distinguished from each other. If you set the adapter ID properties of two instances to Instance01 and Instance02, you will not be able to examine the log and trace information for each adapter instance because the component ID for both instances is truncated to EMARAIinstanc.</p> <p>For inbound processing, the value of this property is set at the resource adapter level. For outbound processing, the value can be set both at the resource adapter level and the managed connection factory level. After you use the external service wizard to configure the adapter for outbound processing, you can set the resource adapter and managed connection factory properties independently. If you use the IBM Integration Designer assembly editor or the administrative console to reset these properties, ensure that you set them consistently, to prevent inconsistent marking of the log and trace entries.</p>
Globalized	Yes
Bidi supported	No

Disguise user data as "XXX" in log and trace files (HideConfidentialTrace)

This property specifies whether to replace user data in log and trace files with a string of X's to prevent unauthorized disclosure of potentially sensitive data.

Table 70. Disguise user data as "XXX" in log and trace files details

Required	No
Possible values	True False
Default	False
Property type	Boolean
Usage	If you set this property to True, the adapter replaces user data with a string of X's when writing to log and trace files. For inbound processing, the value of this property is set at the resource adapter level. For outbound processing, the value can be set both at the resource adapter level and the managed connection factory level. After you use the external service wizard to configure the adapter for outbound processing, you can set the resource adapter and managed connection factory properties independently. If you use the IBM Integration Designer assembly editor or the administrative console to reset these properties, ensure that you set them consistently, to prevent inconsistent marking of the log and trace entries.
Globalized	No
Bidi supported	No

Enable high availability support (enableHASupport)

Do not change this property. It must be set to true.

Interaction specification properties

Interaction specification properties specify business object details for a given data type selected in the external service wizard. When interaction specification values such as To or From addresses are set in the wizard, these values are automatically populated in the business objects created in association with the module.

The following table lists the Interaction specification properties. A complete description of each property is provided in the sections that follow the table.

Table 71. Interaction specification properties

In the wizard	Description
Blind carbon copy	Specifies blind carbon copy addresses for the email.
Carbon copy	Specifies email addresses of secondary recipients of the email.
Date	The date set by the mail server of the sender during inbound processing. The date the email is created during outbound processing.
Encoding	The type of character encoding to use
From	Specifies the address that the email was sent from.
Password	Specifies the password for the user name associated with the mail server.
Reply to	Specifies the addresses to which the response emails are to be sent.
Subject	Contains a summary of what the email is about.
To	Contains the addresses for the primary recipients of the email.
User name	Specifies the user name for the mail server to be used for the outbound SMTP session.

Blind carbon copy (Bcc)

This property specifies blind carbon copy addresses for the email. The addresses listed in this field are not included in copies of the message sent to the primary and secondary recipients.

Table 72. Blind carbon copy details

Required	No
Default	No default value
Property type	String
Usage	This header is only supported for outbound communication. Some systems choose to include the text of the Bcc field only in the copy of the author, while some systems include these addresses to all those recipients listed in the Bcc field.
Globalized	Yes
Bidi supported	Yes

Carbon copy (Cc)

This property specifies the email addresses of secondary recipients of the email.

Table 73. Carbon copy details

Required	No
Default	No default value
Property type	String
Usage	Specifies email addresses of secondary recipients of the email. All recipients listed in this field are visible to anyone receiving the email.
Globalized	Yes
Bidi supported	Yes

Date

The date set by the mail server of the sender during inbound processing. The date the email is created during outbound processing.

Table 74. Date details

Required	No
Default	No default value
Property type	String
Usage	The date set by the mail server of the sender during inbound processing. The date the email is created during outbound processing.
Globalized	Yes
Bidi supported	Yes

Encoding

This attribute is set during outbound communications to indicate the type of character encoding the adapter will use.

Table 75. Encoding details

Required	No
Default	No default value
Attribute type	String
Usage	Encoding is used for headers, mail content, and attachment business objects.
Example	The following are the examples of the encoding attribute: <ul style="list-style-type: none"> • ASCII for character encoding based on the English alphabet • Big5 for character encoding based on traditional Chinese characters • GB18030 for globalized characters in a business graph
Globalized	No
Bidi supported	No

From

This property specifies the address that the email was sent from.

Table 76. From details

Required	Yes
Default	No default value
Property type	String
Usage	Specifies the address that the email was sent from.
Globalized	Yes
Bidi supported	Yes

Password (Password)

This property specifies the password for the user name associated with the mail server.

Table 77. Password details

Required	Yes
Default	No default value
Property type	String
Usage	Authenticates the inbound POP3 or IMAP session with the mail server.
Globalized	Yes
Bidi supported	Yes

Reply to

This property specifies the addresses where responses to the email are to be sent.

Table 78. Reply to details

Required	No
Default	No default value
Property type	String
Usage	Specifies the addresses to which the response emails are to be sent.

Table 78. Reply to details (continued)

Bidi supported	No
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Subject

This property contains a summary of what the email is about.

Table 79. Subject details

Required	No
Default	No default value
Property type	String
Usage	Contains a summary of what the email is about.
Globalized	Yes
Bidi supported	Yes

To

This field contains the addresses for the primary recipients of the email.

Table 80. To details

Required	No
Default	No default value
Property type	String
Usage	Contains the addresses for the primary recipients of the email.
Globalized	Yes
Bidi supported	Yes

User name (UserName)

This property specifies the user name for the mail server to be used for the outbound SMTP session.

Table 81. User name details

Required	Yes
Default	No default value
Property type	String
Usage	This property specifies the user name for the mail server to be used for the outbound SMTP session.
Globalized	Yes
Bidi supported	Yes

Inbound configuration properties

WebSphere Adapter for Email has several categories of inbound connection configuration properties, which you set with the external service wizard while generating or creating objects and services. You can change the resource adapter and activation specification properties after you deploy the module using IBM

Integration Designer or the Process Administrative Console, but connection properties for the external service wizard cannot be changed after deployment.

Guide to information about properties

The properties used to configure WebSphere Adapter for Email are described in detail in tables included in each of the configuration properties topics, such as Resource adapter properties, Managed connection factory properties, and so on. To help you use these tables, information about each row you might see is explained here.

The following table explains the meaning of each row that might be displayed in the table for a configuration property.

Row	Explanation
Required	<p>A required field (property) must have a value in order for the adapter to work. Sometimes the external service wizard provides a default value for required properties.</p> <p>Removing a default value from a required field on the external service wizard <i>will not change that default value</i>. When a required field contains no value at all, the external service wizard processes the field using its assigned default value, and that default value is displayed on the Process Administrative Console.</p> <p>Possible values are Yes and No.</p> <p>Sometimes a property is required only when another property has a specific value. When this is the case, the table notes this dependency. For example,</p> <ul style="list-style-type: none"> • Yes, when the EventQueryType property is set to Dynamic • Yes, for Oracle databases
Possible values	Lists and describes the possible values that you can select for the property.
Default	<p>The predefined value that is set by the external service wizard. When the property is required, you must either accept the default value or specify one yourself. If a property has no default value, the table states No default value.</p> <p>The word None is an acceptable default value, and does not mean that there is no default value.</p>
Unit of measure	Specifies how the property is measured, for example in kilobytes or seconds.
Property type	<p>Describes the property type. Valid property types include:</p> <ul style="list-style-type: none"> • Boolean • String • Integer

Row	Explanation
Usage	<p>Describes usage conditions or restrictions that might apply to the property. For instance, here is how a restriction would be documented:</p> <p>For Rational Application Developer for WebSphere Software version 6.40 or earlier, the password:</p> <ul style="list-style-type: none"> • Must be uppercase • Must be 8 characters in length <p>For versions of Rational Application Developer for WebSphere Software later than 6.40, the password:</p> <ul style="list-style-type: none"> • Is not case-sensitive • Can be up to 40 characters in length. <p>This section lists other properties that affect this property or the properties that are affected by this property and describes the nature of the conditional relationship.</p>
Example	<p>Provides sample property values, for example:</p> <p>"If Language is set to JA (Japanese), code page number is set to 8000".</p>
Globalized	<p>If a property is globalized, it has national language support, meaning that you can set the value in your national language.</p> <p>Valid values are Yes and No.</p>
Bidi supported	<p>Indicates whether the property is supported in bidirectional (bidi) processing. Bidirectional processing refers to the task of processing data that contains both right-to-left (Hebrew or Arabic, for example) and left-to-right (a URL or file path, for example) semantic content within the same file.</p> <p>Valid values are Yes and No.</p>

Connection properties for the external service wizard

Enterprise service discovery selection properties are used to build a service description and to save the built-in artifacts. These properties are configured in the external service wizard.

The following table lists the connection properties for the external service wizard. These properties can only be configured using the external service wizard and cannot be changed after deployment. A more detailed description of each property is provided in the sections that follow the table. For information about how to read the property details tables in the following sections, see Guide to information about properties

Table 82. Connection properties for the external service wizard

In the wizard	Description
Adapter style	Service type associated with the module.
Business object type location	Absolute path for the folder on the local drive where business objects generated by the external service wizard are stored.
Function selector	The name of the function selector configuration during inbound communication.
Operation name	Operation defined in the external service wizard.

Adapter style

This property specifies the service type associated with the module.

Table 83. Service type details

Required	Yes
Default	Outbound
Property type	List of values
Possible values	Outbound Inbound
Usage	Specifies the service type associated with the adapter module
Globalized	No
Bidi supported	No

Business object type location

This property specifies the absolute path of the folder on the local drive where business objects generated by the external service wizard are stored.

Table 84. Business object type location details

Required	No
Default	No default value
Property type	String
Usage	Specifies the absolute path of the folder on the local drive where business objects generated by the external service wizard are stored
Globalized	No
Bidi supported	No

Function selector

This property specifies the name of the function selector implementation when the service type is inbound.

Table 85. Function selector details

Required	When the service type is set to inbound, this property is required. When the service type is set to outbound, this property is not valid.
Default	For inbound processing, the default is EmailFunctionSelector. For outbound processing, this field is not editable and there is no default.
Property type	String
Usage	There is no equivalent property for outbound communication.
Globalized	No
Bidi supported	(Not available)

Operation name

This property specifies the name you give to the operation used with this module.

Table 86. Operation name property details

Required	Yes
Default	No default value
Property type	String
Usage	This value is user-defined and something that is meaningful to you.
Example	SendEmail SendCustomerBO
Globalized	No
Bidi supported	(Not available)

Activation specification properties

Activation specification properties are properties that hold the inbound event processing configuration information for an export.

The following table lists the activation specification properties for inbound communication. You set the activation specification properties using the external service wizard and can change them before deployment using the IBM Integration Designer Assembly Editor. After deployment, you can change these values using the IBM Business Process Manager or WebSphere Enterprise Service Bus Process Administrative Console.

A more detailed description of each property is provided in the sections that follow the table. For information about how to read the property detail tables in the sections that follow, see Guide to information about properties.

Table 87. Activation specification properties

In the wizard	In the Process Administrative Console	Description
Archive file naming pattern	ArchiveFileNamingPattern	A comma delimited pattern of header names used to name archived files being stored in the archive folder.
Archive folder	ArchiveFolder	The file folder on the local system where successfully processed emails are archived as files.
Auto create event table	EP_CreateTable	Specifies whether the adapter should create a database table for the event store if one does not exist
Bidi format string	BIDIContextEIS	Indicates the bidi format for string type business data exchanged between the mail server and the adapter
Database schema name	EP_SchemaName	The schema name for the database used by the adapter's event persistence feature
Delivery type	DeliveryType	Determines the order in which events are delivered by the adapter to the export.
Emit individual business objects from a multipart email	EmitIndividualBOs	Specifies whether the adapter creates individual business objects for each part of a multipart email.
Enable transport security (SSL)	enableSSL	Specifies whether a Secure Sockets Layer (SSL) connection is enabled.

Table 87. Activation specification properties (continued)

In the wizard	In the Process Administrative Console	Description
Ensure once-only event delivery	AssuredOnceDelivery	Specifies whether the adapter provides assured once delivery of events.
Event recovery data source (JNDI) name	EP_DataSource_JNDIName	The JNDI name of the data source used by the event persistence class to acquire the JDBC database connection
Event recovery table name	EP_TableName	The name of the event store used by the adapter
Retry limit for failed events	FailedEventRetryLimit	The number of times the adapter attempts to redeliver an event before marking the event as failed.
Failed events folder	FailedEventsFolder	The absolute path to the file folder on the local system where unsuccessfully processed email events are archived in file format.
Host name	HostName	The IP address of the host where the mail server is running.
Interval between polling periods	PollPeriod	The length of time that the adapter waits between polling periods.
Match all search criteria	MatchAllSearchCriteria	The search criteria to filter which events are polled from the mail server.
Match some search criteria	MatchSomeSearchCriteria	The search criteria to filter which events are polled from the mail server.
Maximum events in polling period	PollQuantity	The number of events the adapter delivers to the export during each poll period.
Maximum connections	MaximumConnections	The maximum number of connections that the adapter can use for inbound event delivery.
Minimum connections	MinimumConnections	The minimum number of connections that the adapter can use for inbound event delivery.
Maximum number of retries in case of system connection failure	RetryLimit	The number of times the adapter tries to reestablish an inbound connection after an error.
Password	Password	The password associated with the mail server user name.
Password used to connect to event data source	EP_Password	The password used by the adapter's event persistence feature. It is used to acquire the JDBC database connection from the data source configured in the server.
Poll folder	Poll folder	The name of the mail folder or mail folders the adapter polls for inbound requests (emails).
Port	Port	The POP3 or IMAP port where the mail server is listening.
Protocol	Protocol	The protocol adapter uses for inbound communication with the mail server.
Retry EIS connection on startup	RetryConnectionOnStartup	Controls whether the adapter retries the connection to the mail server if it cannot connect at startup.
Time between retries in case of system connection failure (milliseconds)	RetryInterval	The length of time that the adapter waits between attempts to reestablish connection after an error during inbound operations.
Staging directory	InProgressFolder	The folder on the file system where the emails polled from the mail server are first written in file format.

Table 87. Activation specification properties (continued)

In the wizard	In the Process Administrative Console	Description
Stop polling on error	StopPollingOnError	Specifies whether the adapter stops polling for events when it encounters an error during polling.
(Not available)	“UseFiveLevelBO” on page 209	Specifies whether business graphs and wrappers are generated for child business objects of the email parent business object.
User name	UserName	The user name for the mail server.
User name used to connect to event data source	EP_UserName	The user name used by the adapter's assured-once delivery feature.

Archive file naming pattern (ArchiveFile)

This property is used to specify a comma delimited pattern of header names used to name archived files being stored in the archive folder.

Table 88. Archive file naming pattern details

Required	No
Default	The message-ID of the email event. This information is retrieved from the email header.
Property type	String
Usage	This property is to be used with the “Archive folder (ArchiveFolder)” property.
Example	If the header values From, Date are specified, the adapter picks the From address and Date from the email headers and combines them with the message ID to form the file name (From name + Date + Message ID).
Globalized	Yes
Bidi supported	No

Archive folder (ArchiveFolder)

This property specifies the file folder on the local system where successfully processed emails are archived in RFC822 file format.

Table 89. Archive folder details

Required	No
Default	No default value
Property type	String
Usage	<p>This folder must be manually created on the same system as the adapter before the adapter is run. If no archive folder is specified, the adapter does not successfully archive the emails. They are deleted from the In progress folder.</p> <p>You can use a WebSphere Application Server environment variable to represent the archive folder. Specify the name of the environment variable in braces, preceded by a \$ symbol. For example: \${ARCHIVE_FOLDER}. See the topic on creating an environment variable in this documentation.</p>
Globalized	Yes
Bidi supported	Yes

Auto create event table property (EP_CreateTable)

This property specifies whether the adapter should create an event store if it detects one does not exist.

Table 90. Automatically create event table details

Required	No
Possible values	True False
Default	True
Property type	Boolean
Usage	If set to True, the adapter creates an event store if it detects that one does not exist. If set to False, the adapter does not create an event store even if one does not exist. Make sure that an event store exists if you want to ensure the delivery of events.
Globalized	No
Bidi supported	No

Bidi format string (BIDIContextEIS)

This property indicates the bidi format for string type business data exchanged between the mail server and the adapter.

Table 91. Bidi format string details

Required	No
Possible values	IBM Business Process Manager and WebSphere Enterprise Service Bus use ILYNN (implicit, left-to-right, on, off, nominal). These five attributes comprise the format used by Windows.
Default	No default value
Property type	String
Usage	A five-character string that identifies the bidirectional format used by the mail server. If the mail server that sends or receives data from the server uses a different format than ILYNN, the adapter converts the format before introducing the data to the server. For the conversion to occur, you use the external service wizard to set attribute values that represent the bidirectional format used by the mail server. This is done when you configure the module for the first time.
Example	ILYNN VRYNN VLYNN
Globalized	No
Bidi supported	No

Database schema name (EP_SchemaName)

This property specifies the schema name for the database used by the adapter's assured-once delivery feature.

Table 92. Database schema name details

Required	No
Default	No default value

Table 92. Database schema name details (continued)

Property type	String
Usage	Specifies the schema name for the database used by the adapter's assured-once delivery feature. This value is not case-sensitive.
Globalized	Yes
Bidi supported	Yes

Delivery type (DeliveryType)

This property specifies the order in which events are delivered by the adapter to the export.

Table 93. Delivery type details

Required	No
Possible values	ORDERED UNORDERED
Default	ORDERED
Property type	String
Usage	The following values are supported: <ul style="list-style-type: none"> • ORDERED: The adapter delivers events to the export one at a time. • UNORDERED: The adapter delivers all events to the export at once.
Globalized	No
Bidi supported	No

Emit individual business objects from a multipart email (EmitIndividualBOs)

This property specifies whether the adapter creates individual business objects for each part of a multipart email.

Table 94. Emit individual business objects from a multipart email details

Required	No
Default	False
Property type	Boolean
Usage	The split for individual business object is completed by the adapter and each of the business objects is emitted as generic email (emitEmail). Each part of a multipart email is considered an individual business object and emitted using the email wrapper object, where content of each part is set in the mail content attribute.
Globalized	(Not available)
Bidi supported	No

Enable transport security (SecureConnectionProperty)

This property specifies if the Secure Sockets Layer (SSL) connection is enabled for the POP3 or IMAP protocol chosen in the **Protocol** property.

Table 95. Enable transport security details

Required	No
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Table 95. Enable transport security details (continued)

Default	False
Property type	Boolean
Usage	If set to True, the port value needs to be set to one of the following values: For the POP3 protocol, 995 For the IMAP protocol, 993
Globalized	No
Bidi supported	No

Ensure once-only event delivery (AssuredOnceDelivery)

This property specifies whether to provide ensure once-only event delivery for inbound events.

Table 96. Ensure once-only event delivery details

Required	Yes
Possible values	True False
Default	True
Property type	Boolean
Usage	When this property is set to True, the adapter provides assured once event delivery. This means that each event is delivered once and only once. A value of False does not provide assured once event delivery, but provides better performance. When this property is set to True, the adapter attempts to store transaction (XID) information in the event store. If it is set to False, the adapter does not attempt to store the information. This property is used only if the export component is transactional. If it is not, no transaction can be used, regardless of the value of this property.
Globalized	No
Bidi supported	No

Event recovery data source (JNDI) name property (EP_DataSource_JNDIName)

This property specifies the JNDI name of the data source that will be used by the event persistence class to acquire the JDBC database connection.

Table 97. Event recovery data source (JNDI) name details

Required	Yes, if the AssuredOnceDelivery property is set to True
Default	No default value
Property type	String
Usage	This value is case-sensitive. The external service wizard does not create the data source on IBM Business Process Manager or WebSphere Enterprise Service Bus. Make sure that the data source is defined on the server before deploying the adapter.
Globalized	Yes

Table 97. Event recovery data source (JNDI) name details (continued)

Bidi supported	Yes
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Event recovery table name property (EP_TableName)

This property specifies the name of the event store that will be used by the adapter for event persistence.

Table 98. Event recovery table name details

Required	Yes, if the AssuredOnceDelivery property is set to True
Default	EmailEventTable
Property type	String
Usage	The value specified for this property must be unique for each adapter instance and cannot be used by another instance. This value is not case-sensitive.
Globalized	Yes
Bidi supported	Yes

Retry limit for failed events (FailedEventRetryLimit)

This property specifies the number of times that the adapter attempts to redeliver an event before marking the event as failed.

Table 99. Retry limit for failed events details

Required	No
Possible values	Integers
Default	5
Property type	Integer
Usage	<p>Use this property to control how many times the adapter tries to send an event before marking it as failed. It accepts the following values:</p> <p>Default If this property is not set, the adapter tries five additional times before marking the event as failed.</p> <p>0 The adapter tries to deliver the event an infinite number of times. When the property is set to 0, the event remains in the event store and the event is never marked as failed.</p> <p>> 0 For integers greater than zero, the adapter retries the specified number of times before marking the event as failed.</p> <p>< 0 For negative integers, the adapter does not retry failed events.</p>
Globalized	No
Bidi supported	No

Failed events folder (FailedEventsFolder)

This property specifies the file folder on the local system where unsuccessfully processed email events are archived in file format.

Table 100. Failed events folder details

Required	No
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Table 100. Failed events folder details (continued)

Default	No default value
Property type	String
Usage	This folder must be manually created on the same system as the adapter before the adapter is run. If you do not specify a failed events folder, the adapter does not archive any unsuccessful email event. You can use a WebSphere Application Server environment variable to represent the failed events folder. Specify the name of the environment variable in braces, preceded by a \$ symbol. For example: <code>\${FAILEDEVENTS_FOLDER}</code> . See the topic on creating an environment variable in this documentation.
Globalized	Yes
Bidi supported	No

Host name (HostName)

This property specifies the IP address of the host where the mail server is running.

Table 101. Host name details

Required	No
Default	localhost
Property type	String
Usage	Specifies the IP address of the host where the mail server is running
Globalized	No
Bidi supported	Yes

Interval between polling periods (PollPeriod)

This property specifies the length of time that the adapter waits between polling periods.

Table 102. Interval between polling periods details

Required	Yes
Possible values	Integers greater than or equal to 0.
Default	2000
Unit of measure	Milliseconds
Property type	Integer
Usage	The poll period is established at a fixed rate, which means that if running the poll cycle is delayed for any reason (for example, if a prior poll cycle takes longer than expected to complete) the next poll cycle occurs immediately to make up for the lost time caused by the delay.
Globalized	No
Bidi supported	No

Match all search criteria (MatchAllCriteria)

This property specifies search criteria that the adapter uses to filter which events are polled from designated poll folders on the mail server. Events that meet the ANDed conditions are polled.

Table 103. Match all search criteria details

Required	No
Possible values	<p>You can use any of the following header values when specifying search criteria:</p> <ul style="list-style-type: none"> • content= • subject= • to= • cc= • from= • sender= • date=
Default	No default value. It means that you have not selected any filtering options.
Property type	String
Usage	<p>Specify AND conditions by separating them with a comma (.). This limits the event search to only mail events in the poll folder that meet the ANDed specific search criteria.</p> <p>Specify NOT conditions by separating them with an exclamation mark (!). This limits the event search to only mail events in the poll folder that do not include the search options NOTed.</p> <p>If both Match all search criteria and Match some criteria properties are set, the adapter uses the AND operation between the fields. This means that the outputs of the first set of conditions are subjected to the second set of conditions. For example, if sender=xyz@abc.com, to=pqr@abc.com is set for Match all search criteria property and subject=test, from!=lmn@abc.com is set for Match some search criteria property, the adapter searches for events with a sender value of xyz@abc.com and a to value of pqr@abc.com that might also have a subject value of test and which does not have a from value of lmn@abc.com.</p>
Example	<p>sender=xyz@abc.com, to=pqr@abc.com picks up any events with a sender value that matches sender=xyz@abc.com and a to value of to=pqr@abc.com.</p> <p>sender=xyz@abc.com, to!=pqr@abc.com picks up any events with a sender value that matches sender=xyz@abc.com and does not have a to value of pqr@abc.com.</p>
Globalized	No
Bidi supported	No

Match some search criteria (MatchSomeCriteria)

This property specifies the search criteria the adapter uses to filter which events are polled from the designated poll folders on the mail server. Events that meet the ORed conditions are polled.

Table 104. Match some search criteria details

Required	No
Possible values	<p>You can use any of the following header values when specifying search criteria:</p> <ul style="list-style-type: none"> • content= • subject= • to= • cc= • from= • sender= • date=
Default	Default is blank. It means that you have not selected any filtering options.
Property type	String

Table 104. Match some search criteria details (continued)

Usage	<p>Specify OR conditions by separating them with a comma (.). This limits the event search to mail events in the poll folder that meet the ORed search criteria.</p> <p>Specify NOT conditions by separating them with an exclamation mark (!). This limits the event search to only mail events in the poll folder that do not include the search options NOTed.</p> <p>If both Match all search criteria and Match some criteria properties are set, the adapter uses the AND operation between the fields. This means that the outputs of the first set of conditions are subjected to the second set of conditions. For example, if sender=xyz@abc.com, to=pqr@abc.com is set for Match all search criteria property and subject=test, from!=lmn@abc.com is set for Match some search criteria property, the adapter searches for events with a sender value of xyz@abc.com and a to value of pqr@abc.com that might also have a subject value of test and which does not have a from value of lmn@abc.com.</p>
Example	<p>sender=xyz@abc.com, to=pqr@abc.com picks up any events with a sender value that matches sender=xyz@abc.com and a to value of to=pqr@abc.com.</p> <p>sender=xyz@abc.com, to!=pqr@abc.com picks up any events with a sender value that matches sender=xyz@abc.com and does not have a to value of pqr@abc.com.</p>
Globalized	No
Bidi supported	No

Maximum connections (MaximumConnections)

This property specifies the maximum number of connections that the adapter can use for inbound event delivery.

Table 105. Maximum connections details

Required	No
Default	1
Property type	Integer
Usage	Only positive values are valid. Any value less than 1 is treated as 1 by the adapter.
Globalized	No
Bidi supported	No

Minimum connections (MinimumConnections)

This property specifies the minimum number of connections that the adapter can use for inbound event delivery.

Table 106. Minimum connections details

Required	No
Default	1
Property type	Integer
Usage	Only positive values are valid. Any value less than 1 is treated as 1 by the adapter.
Globalized	No
Bidi supported	No

Maximum events in polling period (PollQuantity)

This property specifies the number of events that the adapter delivers to the export during each poll period.

Table 107. Maximum events in polling period details

Required	Yes
Default	10
Property type	Integer
Usage	The value must be greater than 0. If this value is increased, more events are processed per polling period and the adapter may perform less efficiently. If this value is decreased, fewer events are processed per polling period and the adapter's performance might improve slightly.
Globalized	No
Bidi supported	No

Maximum number of retries in case of system connection failure (RetryLimit)

This property specifies the number of times the adapter tries to reestablish an inbound connection.

Table 108. Maximum number of retries in case of system connection failure

Required	No
Possible values	0 and positive integers
Default	0
Property type	Integer
Usage	This property controls how many times the adapter retries the connection if the adapter cannot connect to the mail server to perform inbound processing. A value of 0 indicates an infinite number of retries. To control whether the adapter retries if it cannot connect to the mail server when it is first started, use the RetryConnectionOnStartup property.
Globalized	No
Bidi supported	No

Password (Password)

This property specifies the password for the user name associated with the mail server.

Table 109. Password details

Required	Yes
Default	No default value
Property type	String
Usage	Authenticates the inbound POP3 or IMAP session with the mail server. IBM Business Process Manager or WebSphere Enterprise Service Bus Process Administrative Console does not encrypt the Password property the first time.
Globalized	Yes
Bidi supported	Yes

Password used to connect to event data source property (EP_Password)

This property specifies the password used by the adapter's assured-once delivery feature.

Table 110. Password used to connect to event data source details

Required	Yes, if the AssuredOnceDelivery property is set to True
Default	No default value
Property type	String
Usage	Specify the password that the adapter uses to connect to the event store. This value is case-sensitive.
Globalized	Yes
Bidi supported	Yes

Poll folder (PollFolder)

This property specifies the name of the mail folder or mail folders the adapter polls for inbound requests (emails).

Table 111. Poll folder details

Required	No for POP3 protocol Yes for IMAP protocol
Default	For the POP3 protocol, the default is Inbox For the IMAP protocol, there is no default value.
Property type	String
Usage	For the POP3 protocol, the adapter cannot poll multiple mail server folders. It automatically defaults to Inbox because Inbox is the only supported value with POP3. If the Protocol property is set to POP3, this property defaults to Inbox. No other value for POP3 is supported. If the Protocol property is set to IMAP, you can define one or more mail folder names. To poll multiple mail server folders, folder names are delimited with commas.
Globalized	Yes
Bidi supported	No

Port (Port)

This property specifies the POP3 or IMAP port where the mail server is listening.

Table 112. Port details

Required	No
Default	110 when the protocol is set to POP3 143 when the protocol is set to IMAP
Property type	Integer

Table 112. Port details (continued)

Usage	If the Secure connection (SSL) property is set to True, this property must be updated. For the POP3 protocol, it must be set to 995. For the IMAP protocol, it must be set to 993.
Globalized	No
Bidi supported	No

Protocol (Protocol)

The property specifies the protocol used for inbound communication with the mail server.

Table 113. Protocol details

Required	No
Possible values	IMAP POP3
Default	POP3
Property type	String
Usage	If set to IMAP, the adapter uses the IMAP email protocol for inbound communication. If set to POP3, the adapter uses the POP3 email protocol for inbound communication.
Globalized	No
Bidi supported	No

Retry EIS connection on startup (RetryConnectionOnStartup)

This property controls whether the adapter attempts to connect again to the mail server if it cannot connect at startup.

Table 114. Retry EIS connection on startup details

Required	No
Possible values	True False
Default	False
Property type	Boolean
Usage	This property indicates whether the adapter should retry the connection to the mail server if the connection cannot be made when the adapter is started: <ul style="list-style-type: none"> Set the property to False when you want immediate feedback about whether the adapter can establish a connection to the mail server, for example, when you are building and testing the application that receives events from the adapter. If the adapter cannot connect, the adapter writes log and trace information and stops. The administrative console shows the application status as Stopped. After you resolve the connection problem, start the adapter manually. Set the property to True if you do not need immediate feedback about the connection. If the adapter cannot connect during startup, it writes log and trace information, and then attempts to reconnect, using the RetryInterval property to determine how frequently to retry and the value of the RetryLimit property to retry multiple times until that value is reached. The administrative console shows the application status as Started.

Table 114. Retry EIS connection on startup details (continued)

Globalized	No
Bidi supported	No

Time between retries in case of system connection failure (RetryInterval)

When the adapter encounters an error related to the inbound connection, this property specifies the length of time the adapter waits before trying to reestablish a connection.

Table 115. Retry interval details

Required	Yes
Default	2000
Unit of measure	Milliseconds
Property type	Integer
Usage	Only positive values are valid. When the adapter encounters an error related to the inbound connection, this property specifies the length of time the adapter waits before trying to establish a new connection.
Globalized	No
Bidi supported	No

Staging directory (InProgressFolder)

This property specifies the folder on the file system where the emails polled from the mail server are first written in file format.

Table 116. Staging directory details

Required	Yes
Default	No default value
Property type	String
Usage	<p>This folder must be created on the same system where the adapter is running before the adapter is started. After being written to the file system in file format, each file is named based on the Message-ID of its corresponding email event. These details are retrieved from the email header value.</p> <p>You can use a WebSphere Application Server environment variable to represent the In progress folder. Specify the name of the environment variable in braces, preceded by a \$ symbol. For example: \${INPROGRESS_FOLDER}. See the topic on creating an environment variable in this documentation.</p>
Globalized	Yes
Bidi supported	Yes

Stop the adapter when an error is encountered while polling (StopPollingOnError)

This property specifies whether the adapter will stop polling for events when it encounters an error during polling.

Table 117. Stop the adapter when an error is encountered while polling details

Required	No
Possible values	True False
Default	False
Property type	Boolean
Usage	If this property is set to True, the adapter stops polling when it encounters an error. If this property is set to False, the adapter logs an exception when it encounters an error during polling and continues polling.
Globalized	No
Bidi supported	No

UseFiveLevelBO

This property specifies whether business graphs and wrappers are generated for child business objects of the email parent business object.

Table 118. Use five level business object details

Required	No
Default	True
Property type	Boolean
Usage	This property is for compatibility with earlier versions with version 6.0.2 business objects and does not appear in the external service wizard. In version 6.0.2, the default for this property was True.
Globalized	(Not available)
Bidi supported	No

User name (UserName)

This property specifies the user name for the mail server to be used for the inbound POP3 or IMAP session.

Table 119. User name details

Required	Yes
Default	No default value
Property type	String
Usage	The mail server must be running on the host specified in the host property.
Globalized	Yes
Bidi supported	Yes

User name used to connect to event data source property (EP_UserName)

This property specifies the user name used by the adapter's event assured-once delivery feature.

Table 120. User name used to connect to event data source details

Required	Yes, if you want assured-once delivery
Default	No default value
Property type	String
Usage	Specify the user name that the adapter uses to connect to the event store.
Globalized	Yes
Bidi supported	Yes

Resource adapter properties

A resource adapter contains properties such as the adapter ID and logging and tracing options specific to the adapter. You can set the logging and tracing properties using the external service wizard during adapter configuration. You can set or change any of the properties using the Process Administrative Console.

The following table lists and describes the resource adapter properties. A more detailed description of each property is provided in property details tables that follow the table. For information about how to read the property details tables in the sections that follow, see Guide to information about properties.

Table 121. Resource adapter properties

In the wizard	In the Process Administrative Console	Description
Adapter ID	AdapterID	Identifies the adapter instance for PMI events and for logging and tracing.
Disguise user data as "XXX" in log and trace files	HideConfidentialTrace	Specifies whether to disguise potentially sensitive information by writing X strings instead of user data in the log and trace files.
(Not available)	Enable HA support	Do not change this property.

Adapter ID (AdapterID)

This property identifies a specific deployment or instance of the adapter.

Table 122. Adapter ID details

Required	Yes
Default	001
Property type	String

Table 122. Adapter ID details (continued)

Usage	<p>This property identifies the adapter instance in the log and trace files, and also helps identify the adapter instance while monitoring adapters. The adapter ID is used with an adapter-specific identifier, EMARA, to form the component name used by the Log and Trace Analyzer tool. For example, if the adapter ID property is set to 001, the component ID is EMARA001.</p> <p>If you run multiple instances of the same adapter, ensure that the first eight characters of the adapter ID property are unique for each instance so that you can correlate the log and trace information to a particular adapter instance. By making the first seven characters of an adapter ID property unique, the component ID for multiple instances of that adapter is also unique, allowing you to correlate the log and trace information to a particular instance of an adapter.</p> <p>For example, when you set the adapter ID property of two instances of WebSphere Adapter for Email to 001 and 002. The component IDs for those instances, EMARA001 and EMARA002, are short enough to remain unique, enabling you to distinguish them as separate adapter instances. However, instances with longer adapter ID properties cannot be distinguished from each other. If you set the adapter ID properties of two instances to Instance01 and Instance02, you will not be able to examine the log and trace information for each adapter instance because the component ID for both instances is truncated to EMARAIstanc.</p> <p>For inbound processing, the value of this property is set at the resource adapter level. For outbound processing, the value can be set both at the resource adapter level and the managed connection factory level. After you use the external service wizard to configure the adapter for outbound processing, you can set the resource adapter and managed connection factory properties independently. If you use the IBM Integration Designer assembly editor or the administrative console to reset these properties, ensure that you set them consistently, to prevent inconsistent marking of the log and trace entries.</p>
Globalized	Yes
Bidi supported	No

Disguise user data as "XXX" in log and trace files (HideConfidentialTrace)

This property specifies whether to replace user data in log and trace files with a string of X's to prevent unauthorized disclosure of potentially sensitive data.

Table 123. Disguise user data as "XXX" in log and trace files details

Required	No
Possible values	True False
Default	False
Property type	Boolean
Usage	<p>If you set this property to True, the adapter replaces user data with a string of X's when writing to log and trace files.</p> <p>For inbound processing, the value of this property is set at the resource adapter level. For outbound processing, the value can be set both at the resource adapter level and the managed connection factory level. After you use the external service wizard to configure the adapter for outbound processing, you can set the resource adapter and managed connection factory properties independently. If you use the IBM Integration Designer assembly editor or the administrative console to reset these properties, ensure that you set them consistently, to prevent inconsistent marking of the log and trace entries.</p>
Globalized	No

Table 123. Disguise user data as "XXX" in log and trace files details (continued)

Bidi supported	No
----------------	----

Enable high availability support (enableHASupport)

Do not change this property. It must be set to true.

Globalization

WebSphere Adapter for Email is a globalized application that can be used in multiple linguistic and cultural environments. Based on character set support and the locale of the host server, the adapter delivers message text in the appropriate language. The adapter supports bidirectional script data transformation between integration components.

Globalization and bidirectional data transformation

The adapter is globalized to support single- and multi-byte character sets and deliver message text in the specified language. The adapter also performs bidirectional script data transformation, which refers to the task of processing data that contains both right-to-left (Hebrew or Arabic, for example) and left-to-right (a URL or file path, for example) semantic content within the same file.

Globalization

Globalized software applications are designed and developed for use within multiple linguistic and cultural environments rather than a single environment. WebSphere Adapters, IBM Integration Designer, IBM Business Process Manager or WebSphere Enterprise Service Bus are written in Java. The Java runtime environment within the Java virtual machine (JVM) represents data in the Unicode character code set. Unicode contains encodings for characters in most known character code sets (both single- and multi-byte). Therefore, when data is transferred between these integration system components, there is no need for character conversion.

WebSphere Adapter for Email converts data in mail content and attachments to a byte stream, which can in turn be converted to a string. During this process, the encoding is maintained by using Unicode encoding. For example,

- XML documents are used for integration and maintain their encoding within the document. The XML DataHandler is globalized so the data remains intact.
- The adapter converts a stream of data to bytes, which in turn is converted to a string. During this process, the encoding is maintained by using UTF-8 encoding.

To log error and informational messages in the appropriate language and for the appropriate country or region, the adapter uses the locale of the system on which it is running. The adapter supports all the group 1 languages and Thai.

Bidirectional script data transformation

Languages such as Arabic and Hebrew are written from right to left, yet they contain embedded segments of text that are written left to right, resulting in bidirectional script. When software applications handle bidirectional script data, standards are used to display and process it. Bidirectional script data transformation applies only to string type data. IBM Business Process Manager or

WebSphere Enterprise Service Bus use the Windows standard format, but applications or file systems that exchange data with the server might use a different format. The adapter transforms bidirectional script data passed between the two systems so that it is accurately processed and displayed on both sides of a transaction. It transforms the script data by using a set of properties that defines the format of script data, as well as properties that identify content or metadata to which transformation applies.

Note: Popular wrapper business object header values such as from, to, Cc, Bcc, reply-to, subject, and date are bidi-enabled. The name portions of email addresses are also bidi-enabled.

Bidirectional script data formats

IBM Business Process Manager or WebSphere Enterprise Service Bus use the bidirectional format of ILYNN (implicit, left-to-right, on, off, nominal). These five attributes comprise the format used by Windows. If an application or file system that sends or receives data from the server uses a different format, the adapter converts the format before introducing the data to the server. For the conversion to occur, you use the external service wizard to set attribute values that represent the bidirectional format used by the sending application or file system. This configuration setting is done when you deploy the module for the first time.

The bidirectional format consists of five attributes. When you set bidirectional properties, you assign values for each of these attributes. The attributes and settings are listed in the following table.

Table 124. Bidirectional format attributes

Letter position	Purpose	Values	Description	Default setting
1	Order schema	I	Implicit (Logical)	I
		V	Visual	
2	Direction	L	Left-to-Right	L
		R	Right-to-Left	
		C	Contextual Left-to-Right	
		D	Contextual Right-to-Left	
3	Symmetric Swapping	Y	Symmetric swapping is on	Y
		N	Symmetric swapping is off	
4	Text Shaping	S	Text is shaped	N
		N	Text is not shaped (Nominal)	
		I	Initial shaping	
		M	Middle shaping	
		F	Final shaping	
		B	Isolated shaping	
5	Numeric Shaping	H	National (Hindi)	N
		C	Contextual shaping	
		N	Numbers are not shaped (Nominal)	

Bidirectional properties that identify data for transformation

To identify business data that is subject to transformation, set the bidi format string property. Do this configuration by specifying values for each of the five bidirectional format attributes (listed in the preceding table) for the property.

To identify event persistence data subject to transformation, set the BiDiFormatEP property. Do this configuration by specifying values for each of the five bidirectional format attributes (listed in the preceding table) for the property. The BiDiFormatEP property can be set for the activation specification.

To identify application-specific data for transformation, annotate the BiDiContext property within a business object. Do this configuration by using the business object editor within IBM Integration Designer to add the properties as application-specific elements of the business object.

Bidirectional transformation in business objects

For outbound processing, you can modify the business objects to enable the bidirectional transformation of the headers in the WebSphere Adapter for Email business object and the data in content-specific business objects.

You must add an annotation to the complex type of the business object to specify the bidirectional formatting attributes in the following files:

- For the generic business object, change the email.xsd file.
- For the user-defined business object, change the custom wrapper (for example, the CustomWrapper.xsd file).
- For the SimpleAlertEmail business object, change the SimpleAlertEmail.xsd file.
- For all the custom data type business objects such as the WbiAddress.xsd file, use WbiPhone.xsd.

The following sections include annotations that can serve as examples.

Bidirectional formatting attributes of the business object

The following annotation, which contains the bidirectional context information, applies to all the headers in the email business objects. The EmailWrapperDataBinding uses the bidirectional information in the element BiDiContext to transform the header values.

```
<complexType name="Email">
  <annotation>
    <appinfo
      source="http://www.ibm.com/xmlns/prod/websphere/j2ca/
datatransformation/databindingmapping">
      <dtm:DataBindingMapping
        xsi:type="dtm:DataBindingMapping"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xmlns:dtm="http://www.ibm.com/xmlns/prod/websphere/j2ca/
datatransformation/databindingmapping">
        <BiDiContext>
          <orientation>rtl</orientation>
          <textShape>nominal</textShape>
          <orderingScheme>visual</orderingScheme>
          <symmetricSwapping>true</symmetricSwapping>
          <numeralShapes>nominal</numeralShapes>
        </BiDiContext>
      </dtm:DataBindingMapping>
    </appinfo>
  </annotation>
```

Bidirectional formatting attributes of the wrapper

You can add an annotation to the wrapper business object that is the user-defined type. The annotation in the wrapper business objects such as the generic (email) and the user-defined type (CustomerWrapper) is used to do bidirectional transformation of wrapper attributes (header values). The content-specific business objects that are used inside the wrapper business objects are not transformed using annotation in the wrapper business objects. To transform content-specific business objects, you must edit the respective business object definition to add the annotation shown in the previous example for bidirectional formatting attributes of the business object.

The following annotation is an example for the wrapper:

```
<complexType name="Customer">
<annotation>
  <appinfo
    source="http://www.ibm.com/xmlns/prod/websphere/j2ca/
datatransformation/databindingmapping">
    <dtm:DataBindingMapping
      xsi:type="dtm:DataBindingMapping"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xmlns:dtm="http://www.ibm.com/xmlns/prod/websphere/j2ca/
datatransformation/databindingmapping">
        <BiDiContext>
          <orientation>rtl</orientation>
          <textShape>nominal</textShape>
          <orderingScheme>visual</orderingScheme>
          <symmetricSwapping>true</symmetricSwapping>
          <numeralShapes>nominal</numeralShapes>
        </BiDiContext>
      </dtm:DataBindingMapping>
    </appinfo>
  /annotation>
```

Properties enabled for bidirectional data transformation

Bidirectional (bidi) data transformation properties control the format of bidirectional script data exchanged between an application or file system and integration tools and runtime environments. After these properties are set, bidirectional script data is correctly processed and displayed in IBM Integration Designer and IBM Business Process Manager or WebSphere Enterprise Service Bus.

At design time all properties enabled for bidirectional transformation can be configured using the external service wizard and all business object bidi properties can be configured using the Business Object Editor tool in the IBM Integration Designer. At deployment time, all managed connection factory and activation specification bidi properties can be configured using the IBM Business Process Manager or WebSphere Enterprise Service Bus Process Administrative Console.

Bidirectional properties are divided into three types:

- EIS bidirectional format - Specifies the bidirectional format for string type business data exchanged between the mail server and the adapter.
- Metadata bidirectional format - Specifies the bidirectional format for metadata and configuration data of string type used by the adapter to establish and maintain communication with the mail server. This format includes both configuration properties such as User name and application-specific information stored in business object definitions (XSD files) and business object attributes.
- Event persistence bidirectional format - Specifies the bidirectional format for event persistence properties.

The following table shows property types characterized by bidi format.

Table 125. Bidi formats

Level of property definition	Bidirectional enabled property name	Property name as it appears in the wizard	Property name as it appears in the Process Administrative Console
Managed connection factory (MCF) properties	MCF-related properties	BiDi format string	BiDiContextEIS
Activation specification (AS) properties	AS-related properties	EIS BiDi Format	BiDiContextEIS
Activation specification properties	All event persistence properties	Event Persistence BiDi Format	BiDiFormatEP
Business object (BO)	BO-related properties	EIS BiDi Format	BiDiContextEIS
Business object	BO-related properties	Metadata BiDi Format	BiDiContextMetadata

All the bidi supported configuration properties for both inbound and outbound communication are shown in the following tables.

Note: Only properties of string type are enabled for bidirectional transformation. Integer properties, such as port and host, the host name property, and Boolean type properties cannot be enabled for bidirectional transformation.

Managed connection factory properties

The following managed connection properties control the bidirectional transformation during outbound communications.

- User name
- Password

Note: The Protocol managed connection factory property is not enabled for bidirectional transformation because it maintains a constant value for the SMTP protocol.

Activation specification properties

The following activation specification properties control the bidirectional transformation during inbound communications.

- Archive file naming pattern
- Archive folder
- Database
- Database schema name
- User name used to connect to event data source
- Event recovery data source (JNDI) name
- Event recovery table name
- Failed events folder
- Password
- Poll folder
- Staging directory
- User name

Note: Substring searches for globalized characters are not supported by the Java Mail API, so `MatchAllCriteria` and `MatchSomeCriteria` properties are not enabled for bidirectional transformation.

Adapter messages

View the messages issued by WebSphere Adapter for Email at the following location.

Link to messages: http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5m1/topic/com.ibm.wbpm.ref.doc/adapt_messages.html

The displayed Web page shows a list of message prefixes. Click a message prefix to see all the messages with that prefix:

- Messages with the prefix CWYEM are issued by WebSphere Adapter for Email
- Messages with the prefix CWYBS are issued by the adapter foundation classes, which are used by all the adapters

Related information

The following information centers, IBM Redbooks, and web pages contain related information for WebSphere Adapter for Email.

Information resources

- The WebSphere Business Process Management information resources web page includes links to articles, Redbooks, documentation, and educational offerings to help you learn about WebSphere Adapters: <http://www-01.ibm.com/software/integration/integration-designer/>.
- The WebSphere Adapters library page includes links to all versions of the documentation: <http://www.ibm.com/software/integration/wbiadapters/library/infocenter/>.

Information about related products

- IBM Business Process Manager, Version 8.0.1, information center, which includes IBM Business Process Manager, and IBM Integration Designer information: <http://pic.dhe.ibm.com/infocenter/dmndhelp/v8r0m1/index.jsp>.
- IBM Business Process Manager, Version 8.0, information center, which includes IBM Business Process Manager, and IBM Integration Designer information: <http://pic.dhe.ibm.com/infocenter/dmndhelp/v8r0mx/index.jsp>.

developerWorks® resources

- WebSphere Adapter Toolkit
- WebSphere business integration zone

Video samples

To help you use WebSphere Adapters, sample videos are available to detail some of the scenarios.

You can find several WebSphere Adapters video demonstrations at this FTP location <ftp://ftp.software.ibm.com/software/websphere/integration/wsa/library/videos/>.

To view these video samples:

1. Download the zip file of the required sample from the FTP location.
2. Extract the downloaded zip file to your system.
3. From the extracted folder, double-click the HTML file.
4. The video sample opens in your default Web browser.

Note: Some of the video samples has a built-in audio narration. If you do not want to listen to the audio, you can lower its tab to the minimum, and slide the tab to an audio level, whenever you want the audio back.

The following sample videos for IBM Integration Designer are currently available at this location: <ftp://ftp.software.ibm.com/software/websphere/integration/wsa/library/videos/IID>

- Applying Adapter fix for IBM Integration Designer toolkit
- Applying Adapter fix for IBM Process Server at embedded level
- Applying Adapter fix for IBM Process Server at node level
- Checking version in IBM Integration Designer toolkit
- Checking version in IBM Process Server after enabling traces

The following sample videos for WebSphere Adapters version 7.5.0 are currently available at this location: <ftp://ftp.software.ibm.com/software/websphere/integration/wsa/library/videos/750>

- AFC: Scheduling Calendar based polling
- AFC: Overcoming an AFC version conflict situation

The sample videos for WebSphere Adapters Version 7.0 are currently available at this location: <ftp://ftp.software.ibm.com/software/websphere/integration/wsa/library/videos/700>

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