IBM WebSphere Adapters
Version 7 Release 5 Fix Pack 1 (7.5.0.1)

IBM WebSphere Adapter for Enterprise Content Management
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Contents

Chapter 1. Overview of WebSphere Adapter for Enterprise Content Management

With WebSphere® Adapter for Enterprise Content Management, you can create integrated processes that include the exchange of information with a Content Management Repository, without special coding. The adapter has been built using the open source specification for content repositories called Content Management Interoperability Services (CMIS).

Using the adapter, an application component (the program or piece of code that performs a specific business function) can send requests to a Content Management Repository, for example, to create a new Document or a Folder in a Content Management Repository or update an existing document Content Management Repository in a Content Management Repository software or receive event notifications from the server, for example, to be notified when a new Document or Folder is created, deleted etc. Since the adapter has been built on the Content Management Interoperability Services (CMIS) specification, it creates a standard interface to the data access interface on any Content Management Repository so that the application component does not have to understand the lower-level details such as the implementation of the application or the data structures.

WebSphere Adapter for Enterprise Content Management complies with the Java 2 Platform, Enterprise Edition (J2EE) Connector Architecture (JCA) version 1.5. JCA 1.5 standardizes the way application components, application servers, and enterprise information systems which implement the CMIS specification, interact with each other. WebSphere Adapter for Enterprise Content Management makes it possible for JCA-compliant application servers to connect to and interact with a Content Management Repository. Application components running on the JCA-compliant server can then communicate with the Content Management Repository in a standard way using business objects.

The following example assumes you are setting up an adapter using IBM® Integration Designer and deploying the module that includes the adapter to IBM Business Process Manager or WebSphere Enterprise Service Bus.

In this example, a company uses FileNet® Content Engine version 4.6.0 as the Content Management (CM) tool for most of its business operations. Employee data of the company is stored securely in the Content Engine. The Employee data can be modified, retrieved or created afresh. An application component might be able to use this function as part of an overall business process. For example, information about new hires in the company can be stored in the Content Engine without specific coding. User information can also be updated to reflect promotions.

With the WebSphere Adapter for Enterprise Content Management, you can automatically generate an interface to the data interface of FileNet Content Engine to hide the lower-level details of the function. Depending on how you want to use the adapter, you can embed it with the deployed module, or install the adapter as a stand-alone component, to be used by more than one application. The adapter is deployed to IBM Business Process Manager or WebSphere Enterprise Service Bus. The application component directly interacts with the adapter, and not with FileNet Content Engine.

The adapter module, which you generate with the external service wizard of IBM Integration Designer, uses a standard interface and standard business objects. The adapter takes the standard business object sent by the application component and invokes the appropriate function on the Content Engine. The adapter then returns a standard business object to the application component. The application component does not have to interact directly with the CMIS services; it is the Adapter for Enterprise Content Management that calls the service and returns the results.

To create data for a new employee, the application component will send a standard business object with the information of the new employee to the Adapter for Enterprise Content Management. The application component will receive, in return, the results (success or failure along with the Object Identity, ID) in a standard business object format. The application component is not required to know how the function worked or how the data was structured. The adapter will perform all the interactions with the actual Content Management Repository system.

The WebSphere Adapter for Enterprise Content Management is designed to connect to all Content Management Repositories which implement the CMIS interface. For this release, the adapter will be connecting to FileNet Content Engine.

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-947.ibm.com/support/entry/portal/Overview/Software/WebSphere/WebSphere_Adapters_Family.
- 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 Enterprise Content Management

The adapter supports bidirectional exchange of business data between business applications and Content Management Repository systems, which implement the Content Management Interoperability Services (CMIS) v1.0 specification. The adapter provides outbound and inbound processing under the Java 2 Platform, Enterprise Edition (J2EE) Connector Architecture (JCA) and integrates with Service Component Architecture (SCA) components.

The adapter provides the means for services running on IBM Integration Designer to exchange documents with one or more Content Management Repositories. The services are contained in a module, which consists of both a project in IBM Integration Designer and a unit of deployment to IBM Business Process Manager. The module is packaged and deployed to IBM Business Process Manager as an enterprise archive (EAR) file.

What is a Content Management Repository?

A Content Management Repository is the strategies, methods and tools used to capture, manage, store, preserve, and deliver content and documents related to organizational processes. Content Management Repository tools and strategies allow the management of an organization's unstructured information, wherever that information exists.

The Content Management Repository server metadata

WebSphere Adapter for Enterprise Content Management interacts with a Content Management Repository server using the following metadata constituents:

- A `CMIS service` endpoint identifies a CMIS server.
- A `CMIS service` endpoint may provide access to more than one Content Management Repositories.
- A Content Management Repository can contain `Document Objects` and `Folder Objects`, among other objects.
- A `Document object` represents a stand-alone information asset. `Document objects` are the elementary entities managed by a Content Management Repository.
- A `Folder object` represents a logical container for a collection of file-able objects, which include `folder objects` and `document objects`. `Folder objects` are used to organize file-able objects.
- Every `CMIS object` has an opaque and immutable `Object Identity (ID)`, which is assigned by the repository when the object is created. An ID uniquely identifies an object within a repository regardless of the type of the object.
- Every `CMIS object` has a set of named, but not explicitly ordered, `Properties`.
- The Adapter for Enterprise Content Management is now capable of creating and deleting documents.

Note: FileNet Content Engine caches the metadata to the length of time specified in the CMC_TIME_TO_LIVE property. To increase the frequency of cache updates and to receive the latest information from the FileNet server, specify a lower value for the CMC_TIME_TO_LIVE property by editing the WEB-INF/classes/cmis.properties file. For more information about this property, see Configuring advanced IBM CMIS for FileNet Content Manager properties.

Outbound processing

The WebSphere Adapter for Enterprise Content Management supports outbound request processing. When the adapter receives a request, which is sent in the form of a business object from the module, it processes the request and returns the result as a business object. The adapter provides a standard set of outbound operations.

Outbound processing begins when a module receives a business object from a service, which is called a request. When a request is received, the adapter uses the

information stored in the business object and metadata from the interaction specification properties to perform an operation on the Content Management Repository.

The adapter supports the following outbound operations for Document Types:
- Create
- Delete
- Retrieve
- RetrieveProperties
- Update
- UpdateProperties
- RetrieveAll

The adapter supports the following outbound operations for Folders:
- Create
- Delete
- Retrieve
- Update
- RetrieveAll

The figure below shows how the adapter and module function together as part of an outbound service. A module created for outbound processing receives the request. The adapter determines the operation to be performed based on the information received in the metadata from the interaction specification properties. It then performs the operation on the Content Management Repository.
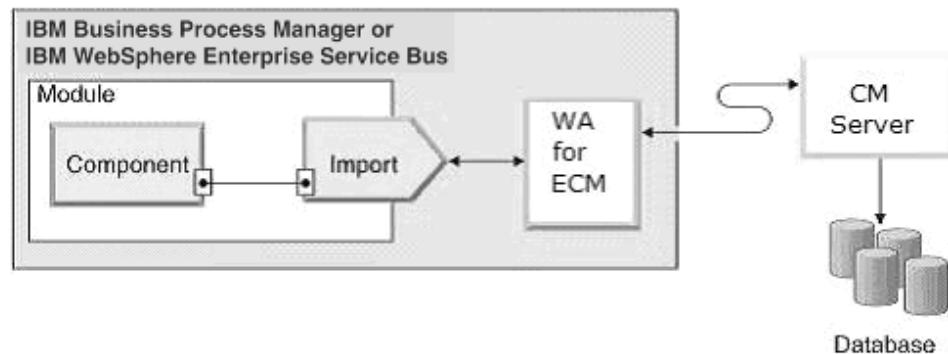
Figure 1. Adapter for Enterprise Content Management as part of an outbound SOA implementation

The adapter connects to the CMIS server with the repository URL, user name and password information. After connecting to the Content Management Repository server, the adapter lists all available **CMIS Repositories**. In each **Repository**, there can be several types of **Document types** and **Folders**. Instances of these Document types and Folders are stored and managed by the Content Management Repository. The adapter lists all Document types and Folders in a Repository and allows the user to select the Document types and Folders as business object types. For each selected business object type, method binding artifacts are generated to support outbound operations.

Outbound operations

Application components use operations to perform actions such as creating instances of Document types or Folders on the Content Management Repository. The adapter provides certain outbound operations. The name of the operation typically indicates the type of action that the adapter takes, such as Create or Delete.

During outbound processing, the calling component (part of SCA application) calls the adapter to connect and work with business data on the Content Management Repository. All interactions between the calling component and the server are request-response type.

Create operation:

The Create operation creates a document or a folder corresponding to the selected Document type or Folders in theContent Management Repository specified content.

Document Types

The adapter receives a request in the form of a business object to a create instance of a Document type in the CMIS Repository. The adapter processes the request and a document with a unique immutable Object Identity (ID) is created in the Content Management Repository. The content of the document is obtained from the attribute values of the requested business object.

An example of a request business object is modelled as below:
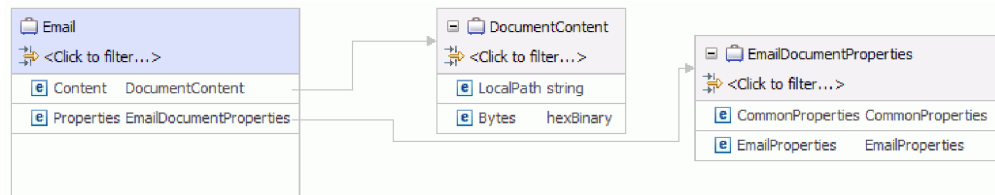
Figure 2. Structure of a request business object

Every Document Type has a set of named, but not explicitly ordered, Properties that are added in a separate business object. The name of this business object would be the Document Type in Camel-case, followed by the word Properties.

The content of the Document is handled in a separate business object titled DocumentContent.

LocalPath and **Bytes** are options for filling up the content that should go into the document. If you want to refer to a file in the local file system from which content is to be taken, provide the absolute file name in the **LocalPath** Business Object field. If you want to provide the content as hexBinary bytes, provide the content in hexBinary form in the **Bytes** Business Object field.

The Bytes field takes precedence over the LocalPath field. Therefore, if you provide values for both the Bytes and the LocalPath fields, the adapter takes the value provided in the Bytes field, and continue the process.

After the document is created, the Properties business object is sent back to the calling component as a response to indicate that the document was created

successfully.
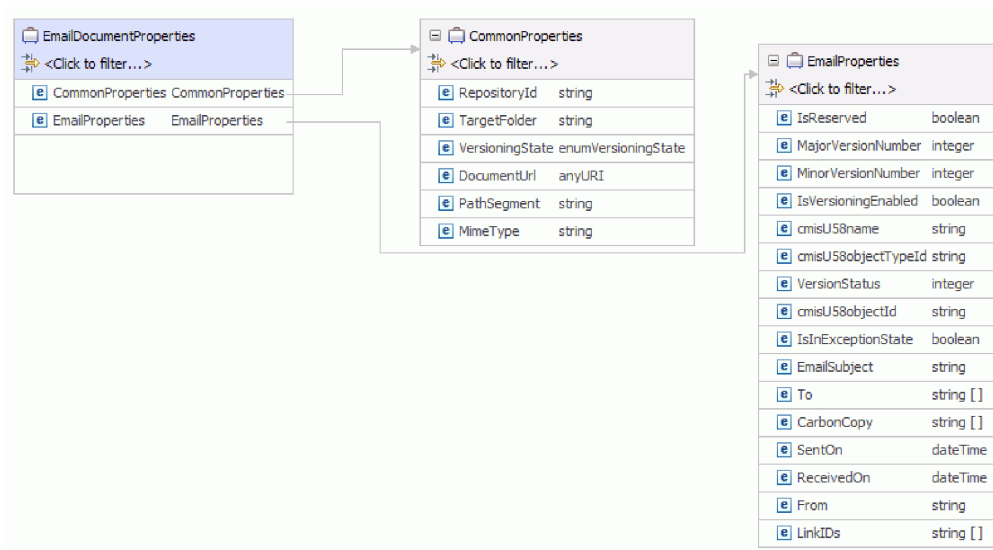
Figure 3. Structure of a response business object

After a successful create operation, the containment name of the document is populated in the `pathSegment` property. To perform other operations using the filename, reference the value of the `pathSegment` property in the `cmisU58name` property.

Folders

The adapter receives a request in the form of a business object to a create an instance of a Folder in the Content Management Repository. The adapter processes the request and a Folder with a unique immutable Object Identity (ID) is created in the Content Management Repository.

To successfully execute a request, either the Path or the Id values in the Parent child business object must be provided in the request business object. This represents the parent folder in which the new folder is created.

An example of a request business object for Folders is modelled as below:

Figure 4. Structure of a request business object for Folders

After the Folder is created, the Properties Business Object is sent back to the calling component as a response to indicate that the Folder was created successfully.

OS1DBFolderProperties	
⇉ <Click to filter...>	
e cmisU58name	string
e cmisU58objectId	string
e cmisU58objectTypeId	string
e cmisU58path	string
e ContainerType	string
e IndexationId	string
e IsHiddenContainer	boolean
e Parent	string
e cmisU58allowedChildObjectTypeIds	string [ ]
e cmisU58baseTypeId	string
e cmisU58changeToken	string
e cmisU58createdBy	string
e cmisU58creationDate	dateTime
e cmisU58lastModificationDate	dateTime
e cmisU58lastModifiedBy	string
e cmisU58parentId	string

Figure 5. Structure of a response business object for Folders

During runtime, if data is not entered for any of the fields, namely,

* RepositoryID, DocumentName, or TargetFolder in the case of Document Types
* Path or the ID values in the Parent child business object in the case of Folders,

a MissingDataException error is returned. This will eventually manifest as a ResourceException which is returned to the calling component.

Retrieve operation:

The Retrieve operation extracts the document content or folder properties based on the request from the SCA component. For Document types, the Retrieve operation

retrieves the content and also the properties from the document. For Folders, the Retrieve operation retrieves the properties of the folder.

Document Types

The adapter receives the request to retrieve a document along with the document location. The TargetFolder and cmisU58name properties must be populated with appropriate values pointing to the document path. Alternately, the cmisU58objectId property in the request can be populated with the Object ID of the document. The adapter processes the request and extracts the content of the document from the Content Management Repository.

Note: When both Object ID and document path are provided as input to the operation, the Object ID takes a precedence over the document path value to perform the operation.

The following figure shows the structure of a request EmailDocumentProperties business object.
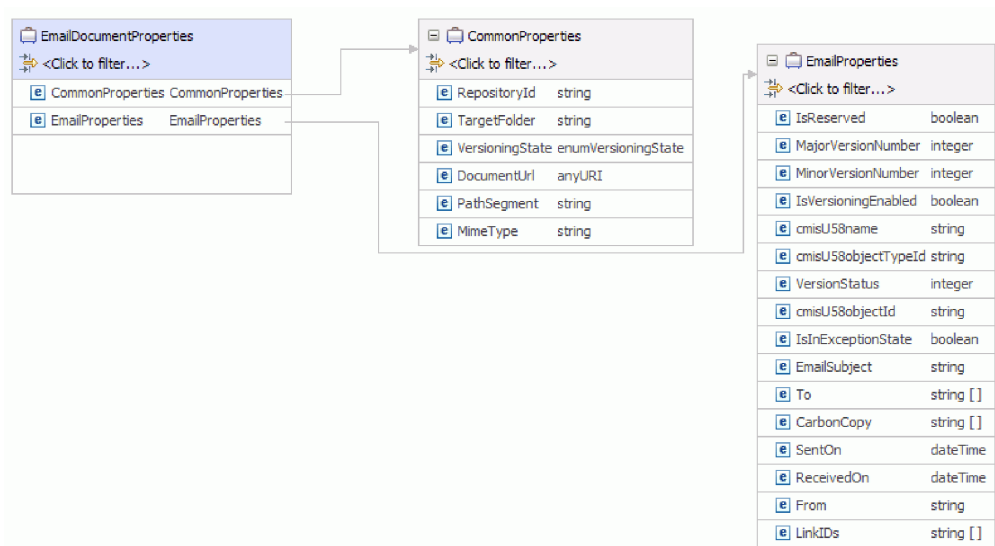
Figure 6. Structure of a request business object

After the content of the document is retrieved in the form of a byte array, it is sent back as the response to the calling component. The response has the top-level business object containing the content of the document and the document properties. The attributes in the business object include information about the retrieved document.
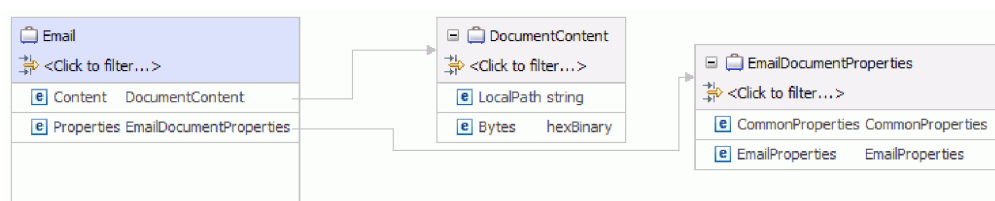
Figure 7. Structure of a response business object

Folders

The adapter receives a request in the form of a business object to retrieve properties of a Folder in the CMIS Repository. The field cmisU58path properties must be populated with appropriate values pointing to the folder.

Note: The path should be the absolute path to the folder starting from the root. Alternately, the cmisU58objectId property in the request can be populated with the Object ID of the folder. The adapter processes the request and extracts the properties of the folder from the Content Management Repository.

An example of a request business object for Folders is modelled as below:
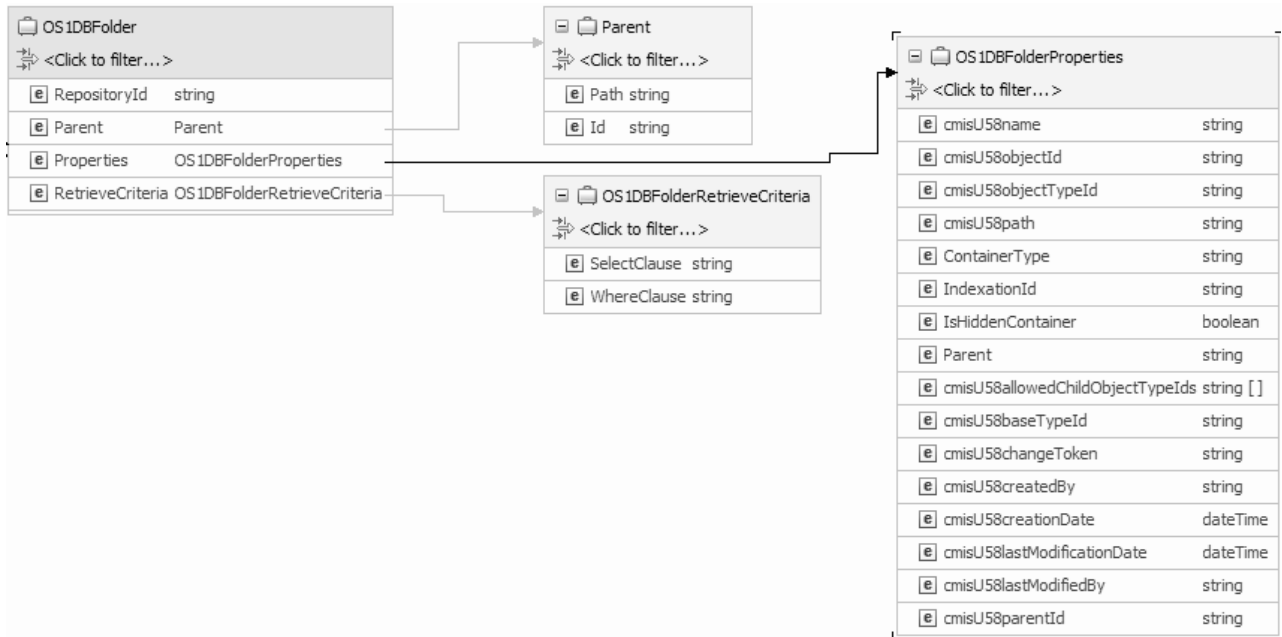
Figure 8. Structure of a request business object for Folders
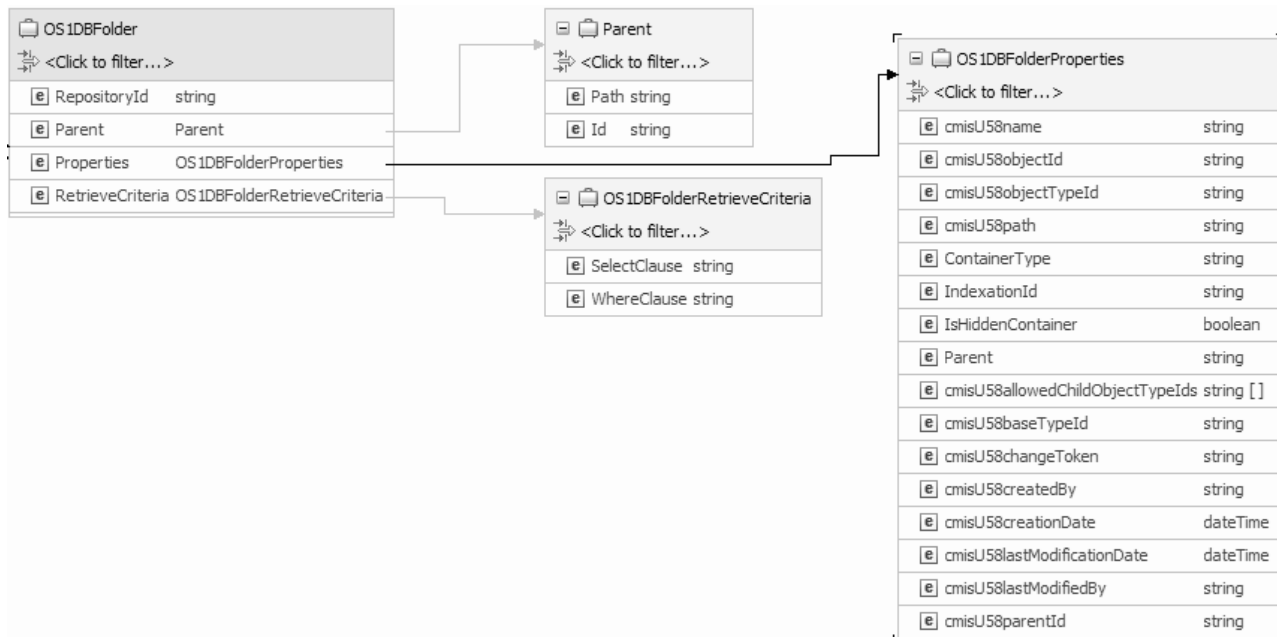
After the Folder is retrieved, the Properties business object is sent back to the calling component as a response.

Figure 9. Structure of a response business object for Folders

OS1DBFolderProperties	
<Click to filter...>	
e cmisU58name	string
e cmisU58objectId	string
e cmisU58objectTypeId	string
e cmisU58path	string
e ContainerType	string
e IndexationId	string
e IsHiddenContainer	boolean
e Parent	string
e cmisU58allowedChildObjectTypeIds	string [ ]
e cmisU58baseTypeId	string
e cmisU58changeToken	string
e cmisU58createdBy	string
e cmisU58creationDate	dateTime
e cmisU58lastModificationDate	dateTime
e cmisU58lastModifiedBy	string
e cmisU58parentId	string

When there is a processing error, the Retrieve operation might return the InvalidRequestFault or the DocumentNotFoundFault fault. For more information about these business faults, refer to Fault business objects .

RetrieveAll operation:

The RetrieveAll operation extracts the properties of all documents along with the Document URLs to the content of the documents or folders which match a search criteria specified in the request from the SCA component.

Document Types

The adapter receives the request to retrieve document which matches a specified search criteria. The search query resembles a standard SQL statement and contains a **Select Clause** and a **Where Clause**. The **From Clause** is a business object level annotation of the RetrieveCriteria Business Object. The SelectClause and WhereClause can be specified in the request business object but the FromClause is fixed.

For example:

```
SELECT TO, CARBONCOPY FROM EMAIL WHERE USERNAME = 'JOHN' OR FROM = 'JOHNDOE@US.IBM.COM'
       >------(1)--------<       >--(2)-<      >---------------------------(3)-------------------------------<
```

Figure 10. Example

In this example,
- (1) indicates the SelectClause
- (2) indicates the FromClause
- (3) indicates the WhereClause

The adapter processes the request and extracts the properties of all documents along with the Document URL that references the document content matching the search query from the Content Management Repository.

The following figure shows the structure of a request business object for the Email Document Type:
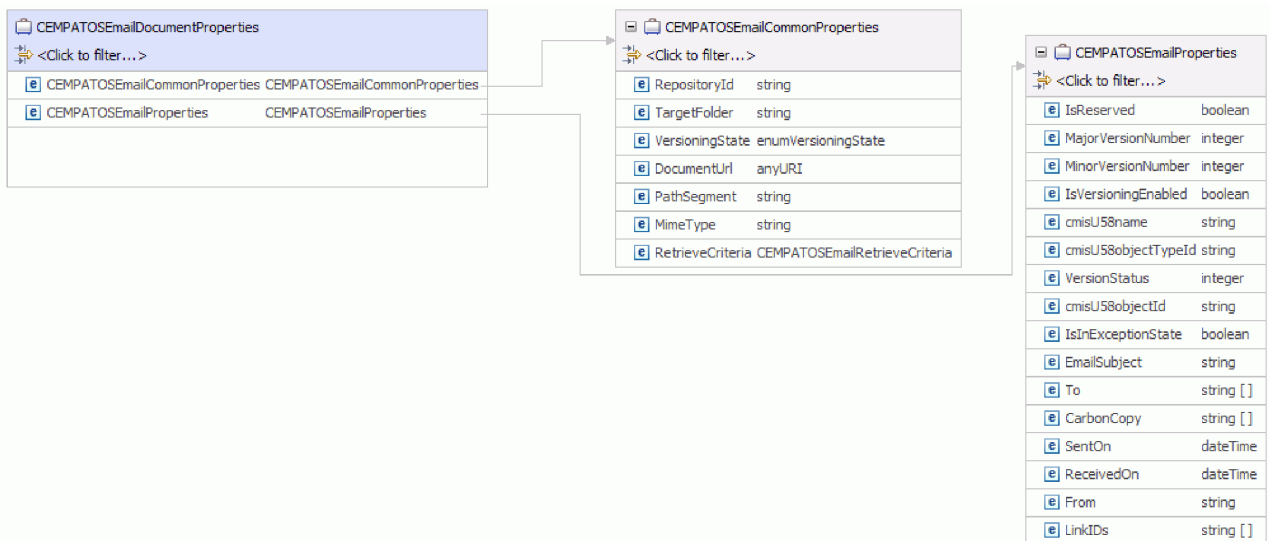
Figure 11. Structure of a request business object

You can specify the SelectClause and WhereClause in the **RetrieveCriteria** child business object inside the **CommonProperties** business object for the Document Type. The default value for SelectClause is * and the default value for the WhereClause is **""**.
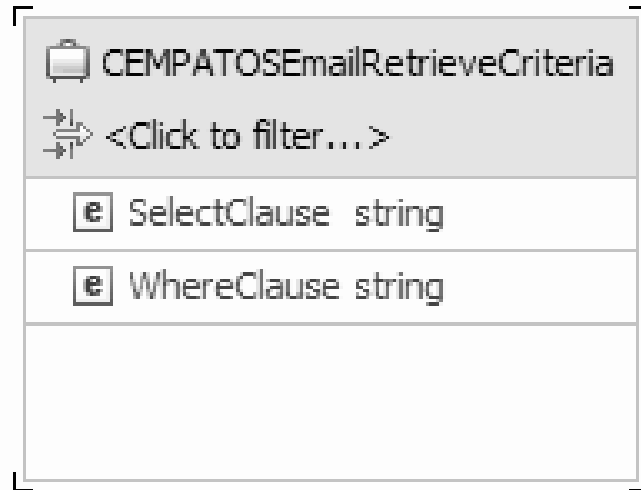
Figure 12. RetrieveCriteria

After the properties and Document URL of the documents are retrieved, it is sent back as the response to the calling component. The response has the top-level business object called Container, which contains the document properties business object. The attributes in the business object include information and the Document URL of the retrieved document.
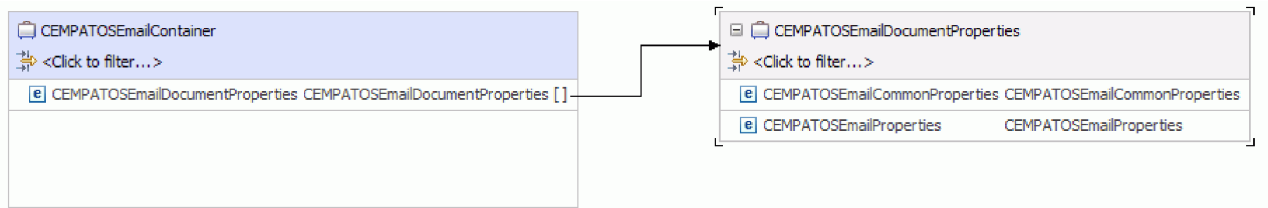
Figure 13. Structure of a response business object

Folders

The adapter receives the request to retrieve folders which matches a specified search criteria. The search query resembles a standard SQL statement and contains a `Select Clause` and a `Where Clause`. The `From Clause` is a business object level annotation of the `RetrieveCriteria` business object. The `SelectClause` and `WhereClause` can be specified in the request business object but the `FromClause` is fixed.

For example:

Figure 14. Example

In this example,
- (1) indicates the SelectClause

- (2) indicates the FromClause
- (3) indicates the WhereClause

The adapter processes the request and extracts the properties of all folders matching the search query from the Content Management Repository.

The following figure shows the structure of a request business object for the folder titled Folder:
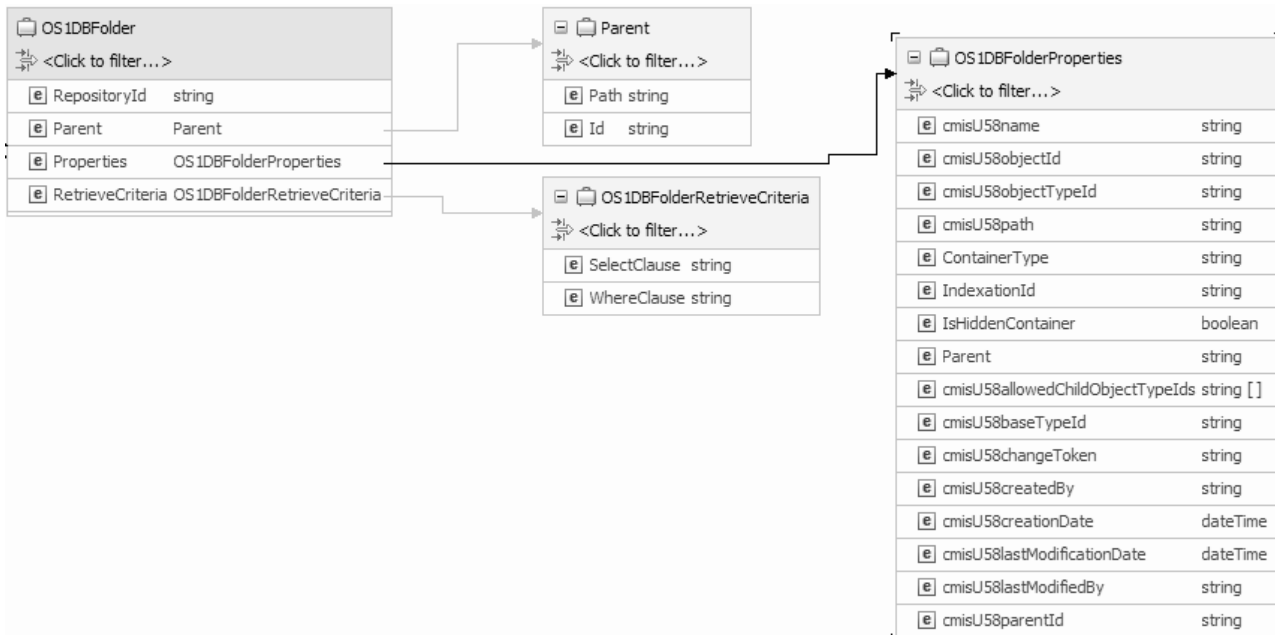
*Figure 15. Example of the structure of request business object*

You can specify the SelectClause and WhereClause in the RetrieveCriteria child business object inside the top-level business object for the Folder. The default value for SelectClause is * and the default value for the WhereClause is "".
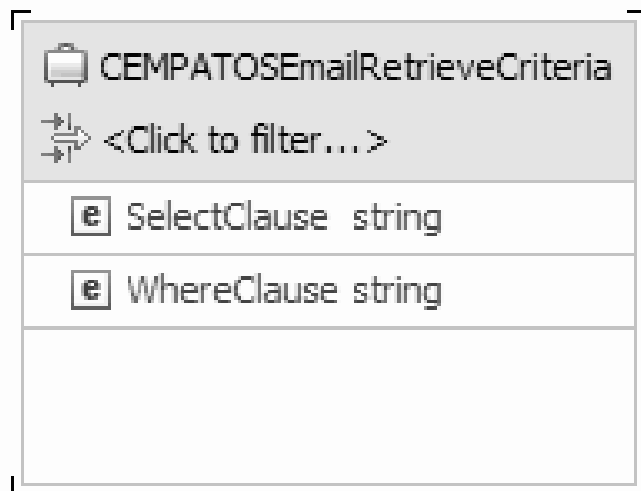
Figure 16. RetrieveCriteria

After the properties of the folders are retrieved, it is sent back as the response to the calling component. The response has the top-level business object called Container, which contains the folder properties business object.

When there is a processing error, the RetrieveAll operation will return the InvalidRequestFault, MissingDataFault or the MatchesExceededLimitFault faults. Refer to Fault business objects for more information on fault business objects.

Update operation:

The Update operation updates a document or folder properties in the CMIS server based on the request from the SCA component.

Document Types

All documents in the CMIS server have a unique `Object ID` and a `Document Path` associated with it. The adapter uses the value set in the unique Object ID to search for the document in the specified Content Management Repository. If the Object ID is not provided in the request business object, the adapter tries to use the value set in the Document Path. The adapter throws an error when both the Object ID and the Document Path are not provided in the request business object.

Note: When both Object ID and document path are provided as input to the operation, the Object ID takes a precedence over the document path value to perform the operation.

After the adapter receives the update request from the SCA application along with the unique Object ID or the Document Path of the document, the adapter processes the request and makes the specified updates to the document.

Every `Document Type` has a set of named, but not explicitly ordered properties, which are added in a separate Business Object. The name of this business object would be the `Document Type` in Camel-case followed by the word `Properties`. The incoming request business object can contain updates for the document itself or one or more of its Properties.

For example, the structure of a request Document type is modelled as the below business object:
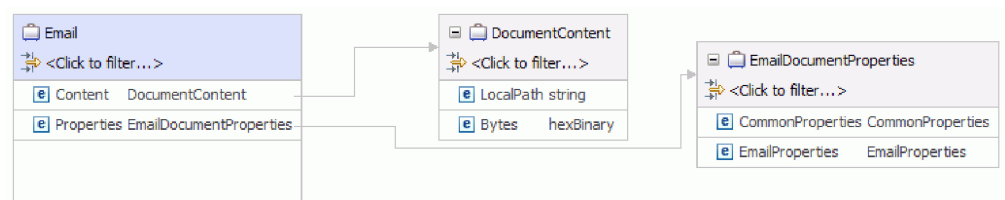
Figure 17. Structure of a request business object

By default, the adapter updates only those items in the document (content and Properties) that have valid data in the corresponding business object fields. During an Update operation, if the value of a Property field on the business object is explicitly set to null, the adapter updates the document by removing the item from the document.

The content of the Document is handled in a separate business object titled DocumentContent.

LocalPath and **Bytes** are options for filling up the content that should go into the document. If you want to refer to a file in the local file system from which content is to be updated, provide the absolute file name in the **LocalPath** Business Object field. If you want to provide the content as hexBinary bytes, provide the content in hexBinary form in the **Bytes** Business Object field.

The Bytes field takes precedence over the LocalPath field. Therefore, if you provide values for both the Bytes and the LocalPath fields, the adapter will take the value provided in the Bytes field and continue the process.

After the document is updated, it is sent back to the calling component to indicate that the document was updated successfully.

The response sent back to the calling component contains just the Properties business object. The response also has attributes that include the Object ID and information about the result of the operation.
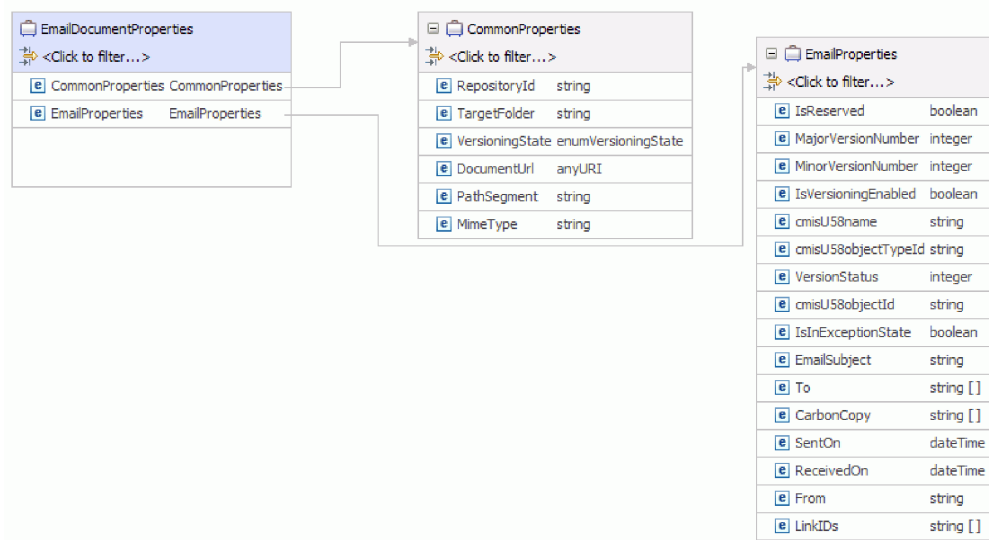
Figure 18. Structure of a response business object

Folders

All folders in the CMIS server have a unique **Object ID** - cmisU58objectId field in the Properties Business Object and a **Path** - cmisU58path field in the Properties business object, associated with it. The adapter uses the value set in the unique Object ID to search for the folder in the specified Content Management Repository. If the Object ID is not provided in the request business object, the adapter tries to use the value set in the Folder Path. The adapter throws an error when both the Object ID and the Folder Path are not provided in the request business object.

Note: When both **Object ID** and **Folder Path** are provided as input to the operation, the **Object ID** takes a precedence over the Folder Path value to perform the operation.

After the adapter receives the update request from the SCA application along with the unique **Object ID** or the **Folder Path** of the folder, the adapter processes the request and makes the specified property updates to the folder.
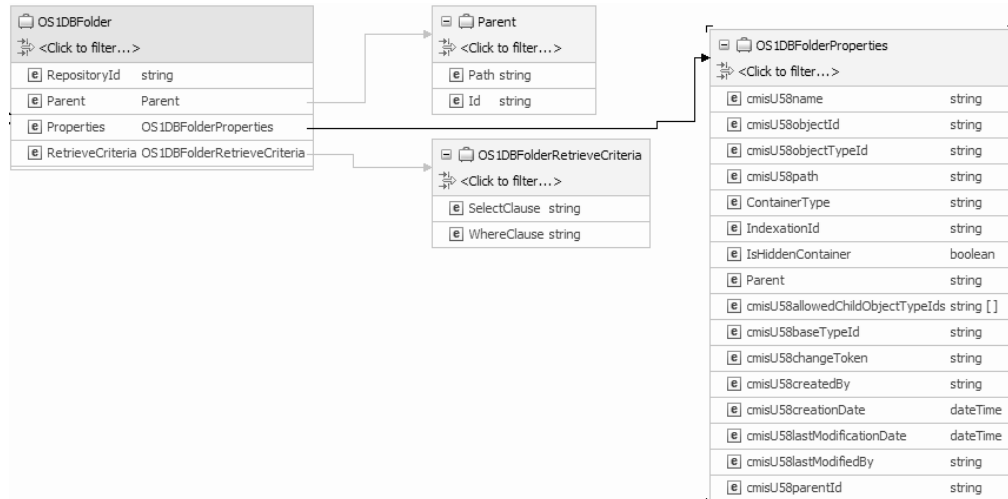
Figure 19. Structure of a request business object for Folders

After the Folder properties are updated, the Properties business object is sent back to the calling component as a response to indicate that the Folder properties were successfully updated.

Figure 20. Structure of a response business object for Folders

OS1DBFolderProperties	
⇄ <Click to filter...>	
🄴 cmisU58name	string
🄴 cmisU58objectId	string
🄴 cmisU58objectTypeId	string
🄴 cmisU58path	string
🄴 ContainerType	string
🄴 IndexationId	string
🄴 IsHiddenContainer	boolean
🄴 Parent	string
🄴 cmisU58allowedChildObjectTypeIds	string [ ]
🄴 cmisU58baseTypeId	string
🄴 cmisU58changeToken	string
🄴 cmisU58createdBy	string
🄴 cmisU58creationDate	dateTime
🄴 cmisU58lastModificationDate	dateTime
🄴 cmisU58lastModifiedBy	string
🄴 cmisU58parentId	string

The Update operation might throw the:

- `MissingDataFault,` the `InvalidRequestFault,` or the `DocumentNonUpdatabilityFault` faults for Document Types
- `MissingDataFault,` or the `InvalidRequestFault` faults for Folders

depending upon the processing error. For more information on business faults refer to Fault business objects .

Delete operation:

The Delete operation deletes a document or folder in the Content Management Repository based on the request from the SCA component.

Document Types

The adapter receives the delete request along with the unique immutable Object Identity (ID) or the unique path to the document on the Content Management Repository. The adapter processes the request and removes the document from the Content Management Repository.

Note:

- Every document in the Content Management Repository has a unique immutable Object Identity (ID). The adapter uses the value set in the ID field or the unique path to the Document on the file on the Content Management Repository, to search for the document.
- When both Object ID and document path are provided as input to the operation, the Object ID takes a precedence over the document path value to perform the operation.

For example, the structure of a request and response Document type is modelled as the below business object.
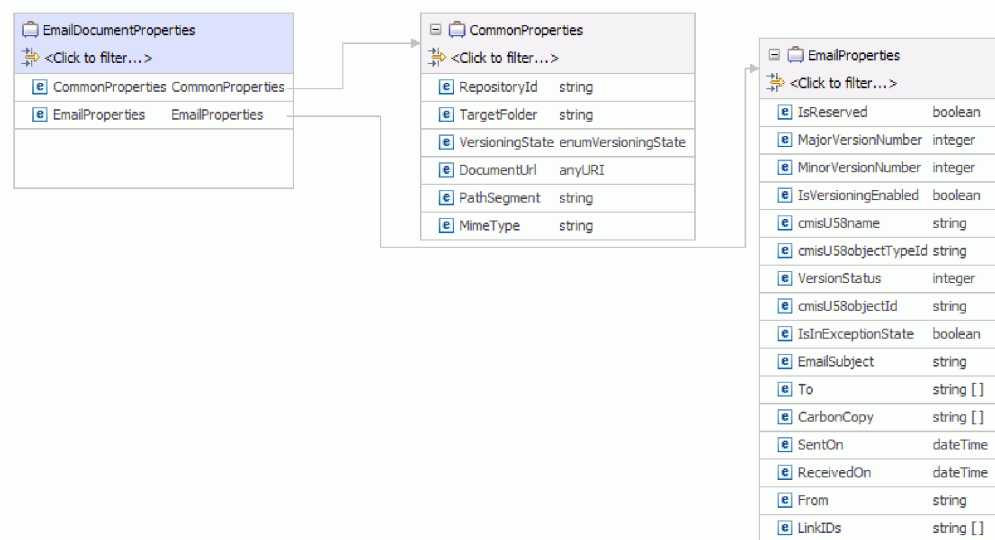
Figure 21. Structure of a delete business object

Every Document Type has a set of named, but not explicitly ordered, Properties that are added as a separate business object. The name of this business object would be the Document Type in Camel-case followed by the word Properties.

After the document is deleted, the top-level business object is sent back to the calling component as a response to indicate that the document was deleted successfully.

Folders

The adapter receives the delete request along with the unique immutable **Object Identity** (ID) - field `cmisU58ObjectId` in the Properties business object, or the **Unique Path** to the folder on the Content Management Repository - field `cmisU58Path` in the Properties business object. The adapter processes the request and removes the folder from the Content Management Repository.

Note:

- Every folder in the Content Management Repository has a unique immutable Object Identity (ID). The adapter uses the value set in the ID field or the unique path to the folder on the file on the Content Management Repository, to search for the folder.
- When both Object ID and Folder Path are provided as input to the operation, the Object ID takes a precedence over the folder path value to perform the operation.

For example, the structure of a request Folder type is modelled as the below business object.
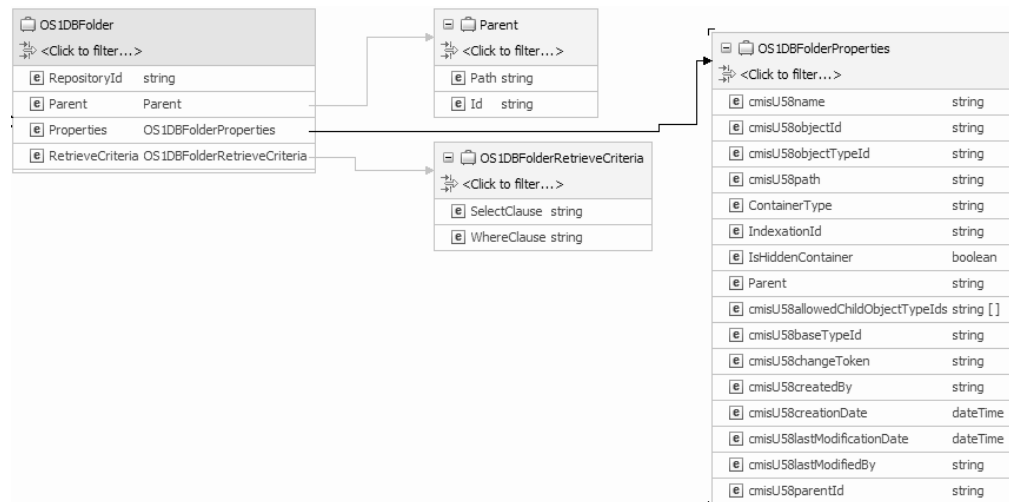
Figure 22. Structure of a request business object for Folders

After the folder is deleted, the top-level business object is sent back to the calling component as a response to indicate that the folder was deleted successfully.

Figure 23. Structure of a response business object for Folders

OS1DBFolderProperties	
<Click to filter...>	
e cmisU58name	string
e cmisU58objectId	string
e cmisU58objectTypeId	string
e cmisU58path	string
e ContainerType	string
e IndexationId	string
e IsHiddenContainer	boolean
e Parent	string
e cmisU58allowedChildObjectTypeIds	string [ ]
e cmisU58baseTypeId	string
e cmisU58changeToken	string
e cmisU58createdBy	string
e cmisU58creationDate	dateTime
e cmisU58lastModificationDate	dateTime
e cmisU58lastModifiedBy	string
e cmisU58parentId	string

The adapter allows you to determine how the fileable objects inside the current folder should be handled for the Delete operation. You can choose to either -

1. Delete all the fileable objects, documents and folders, inside the folder selected for deletion.

2. If all the parent folders for an object are inside the current folder tree, that is, a document has multiple parent folders, then delete the document. Or else, just unfile the document from the current folder tree.

3. Unfile all the fileable objects, that is, remove all the reference from the fileable object to the parent folder.

The adapter also allows you to configure whether the adapter must continue the delete operation, if the delete operation on any of the folder/documents fail. By default, this is false.

During runtime, if data is not entered for either
- The `RepositoryID` field in the case of Document Types, or
- The unique immutable `Object Identity (ID)` - field `cmisU58ObjectId` in the Properties business object, or the `Unique Path` to the folder on the Content Management Repository - field `cmisU58Path` in the Properties business object in the case of Folders,

a `MissingDataException` will be returned. All other cases of exception during runtime, such as a wrong Document Name or ID, will cause a `ResourceException` error to be returned to the calling component.

RetrieveProperties operation:

The RetrieveProperties operation extracts the properties of a document content based on the request from an SCA component.

The adapter receives the retrieve request along with either the
- Object ID of the document, or
- Target folder and Document Name.

The adapter then processes the request and extracts the Properties of the document from the Content Management Repository.

Note: When both Object ID and document path are provided as input to the operation, the Object ID takes a precedence over the document path value to perform the operation.
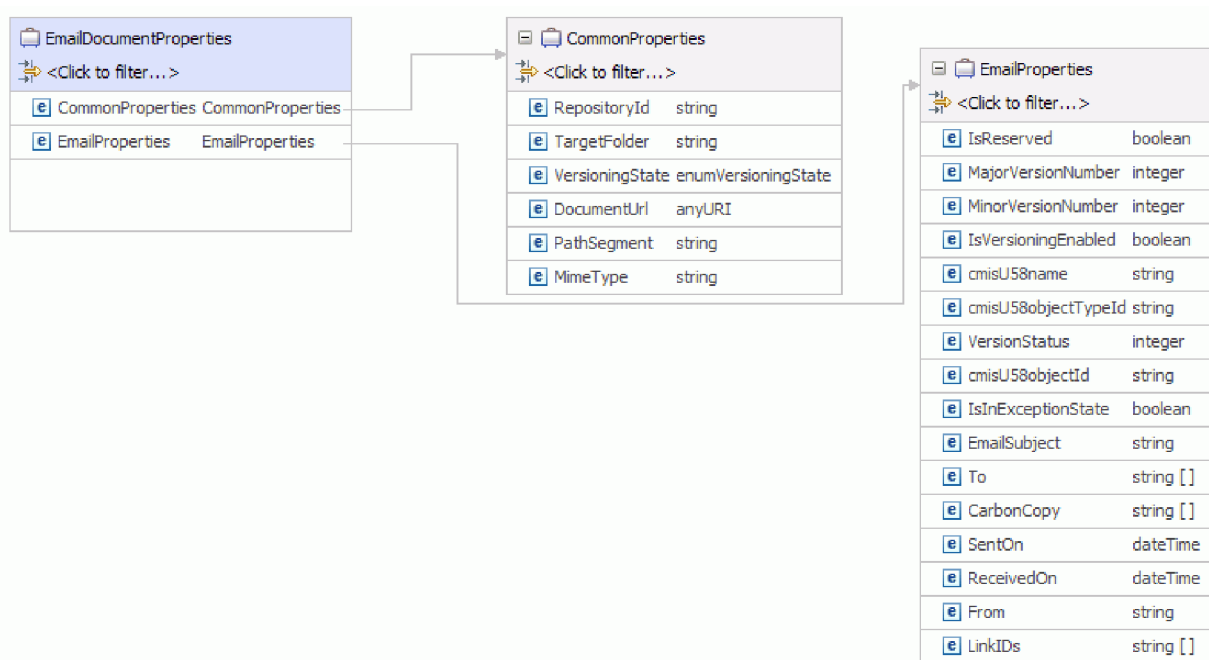
Figure 24. Structure of request and response business object

Along with the Properties of the document, the adapter also returns a link to the **ContentStream** of the Document as a URL and populates it in the **DocumentURL** field of the return business object.

The ContentStream of the document, which provides access to the content in the Document object, can be accessed by the end-point using this URL.

Document URLs are of the following format:

http://cmis.dnsdojo.com:8080/p8cmis/resources/DaphneA/ContentStream/idd_8DB4E573-4B60-46A8-8D92-C109628D9307

The calling application uses the Rest based DocumentURL to fetch the contents of the document. The corresponding fields of the input business objects are populated and sent back as the response to the calling component.

When there is a processing error, the RetrieveProperties operation will return the InvalidRequestFault or the MissingDataFault faults.

UpdateProperties operation:

The UpdateProperties operation updates the properties in a document in the CMIS server based on the request from the SCA component.

Any Document in the CMIS server has a unique **Object ID** and a **Document Path** associated with it. The adapter uses the value set in the unique Object ID to search for the document in the specified Content Management Repository. If the Object ID is not provided in the request business object, the adapter tries to use the value set in the Document Path. The adapter throws an error when both the Object ID and the Document Path are not provided in the request business object.

Note: When both Object ID and document path are provided as input to the operation, the Object ID takes a precedence over the document path value to perform the operation.

After the adapter receives the update request from the SCA application along with the unique Object ID or the Document Path of the document, the adapter processes the request and makes the specified updates to the document properties.

Every **Document Type** has a set of named, but not explicitly ordered properties which are added in a separate Business Object. The name of this business object would be the **Document Type** in Camel-case followed by the word **Properties**. The incoming request business object can contain updates for the document itself or one or more of its Properties.

For example, the structure of a request and response Document type is modelled as the below business object:
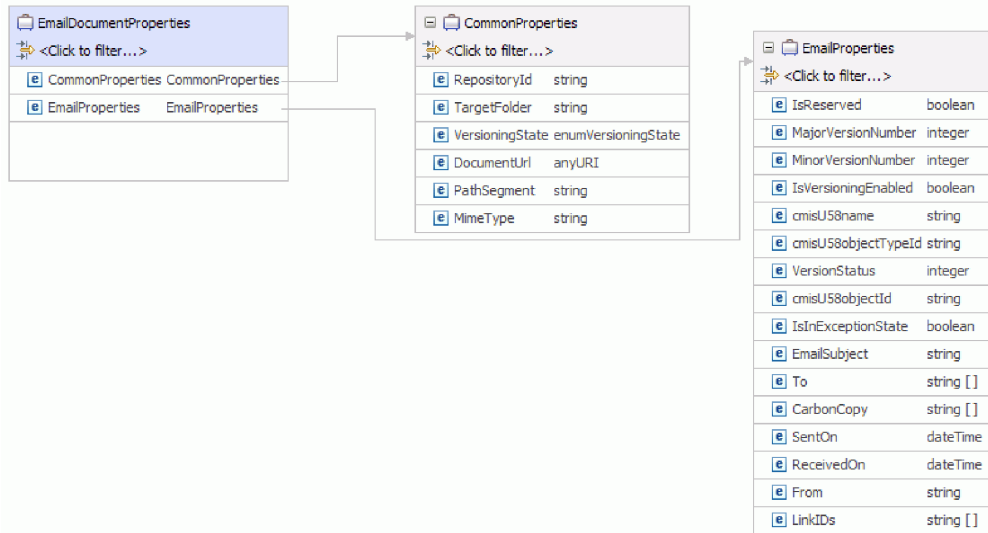
Figure 25. Structure of a request or response business object

By default, the adapter updates only those items in the document (content and Properties) that have valid data in the corresponding business object fields. During an Update operation, if the value of a Property field on the business object is explicitly set to null, the adapter updates the document properties by setting the same null value.

After the document property is updated, it is sent back to the calling component to indicate that the property was updated successfully.

The response sent back to the calling component contains just the Properties business object. The response also has attributes that include the Object ID and information about the result of the operation.

The Update operation might throw the MissingDataFault, the InvalidRequestFault, or the DocumentNonUpdatabilityFault fault depending upon the processing error. For more information on business faults, refer to Fault business objects .

Inbound processing

Adapter for Enterprise Content Management supports inbound processing of events. The adapter polls the event database in the CMIS server for events at specified intervals. Each time a subscription is created or updated, the adapter tracks the process as an event. When the adapter detects an event, it requests a copy of the subscription, converts the data into a business object, and sends it to the consuming service.

To set up the Adapter for Enterprise Content Management for Inbound processing, use the Content Engine Subscription Wizard to create subscriptions on an Enterprise Content Manager system, such as the IBM FileNet Content Manager, for the object class you select. A subscription defines a request to execute an event action. For example, you can create a subscription that notifies you by Email when documents of a specified object class are created and saved in the object store.

You can create a subscription from an object class, an instance in the object class, or a version of the object class. If you create a subscription for an object class, the subscription automatically applies to all new objects to which you assign the class.

An object can be a class definition, single instance, or a version. A class definition refers to a subscription associated with all instances of a given class. A single instance refers to a subscription associated with a specific version of an object. A version refers to a subscription associated with all versions of a versionable object, where each version is a separate instance.

When you assign subscriptions to classes, you can manage a set of common objects more efficiently. You can also limit the number of subscriptions to run at the same time, and ensure optimum system performance.

The following illustration shows the inbound processing flow for Adapter for Enterprise Content Management. The adapter polls the CMIS server for incoming events, converts them into business objects, and then the adapter sends them to a consuming service.
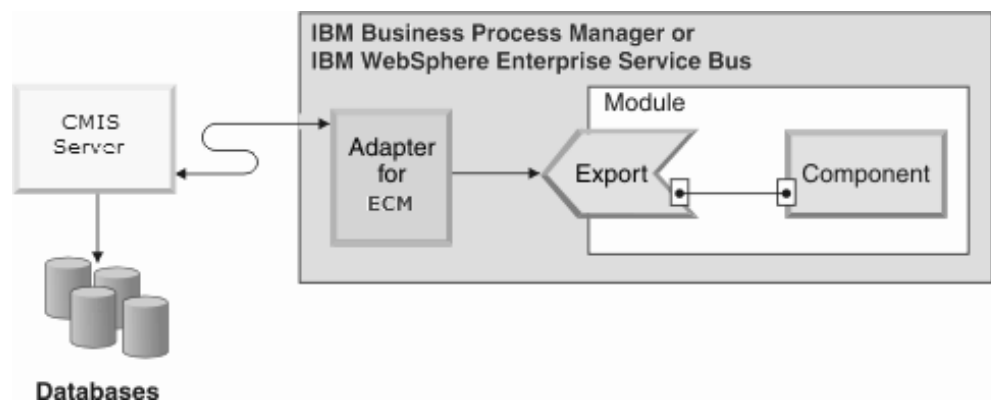
Figure 26. Inbound processing

When you create, update, or delete a document or a folder, the adapter inserts an event record into the event table to record that event. When the adapter is polling events, it reads the information from this event record and retrieves the relative document. The adapter then returns the document or folder as a business object. For an event type of either create or update, the adapter returns the document as a business object on the adapter workstation. For a delete event, the returned business object contains only the Object ID of the deleted document or folder.

The adapter then forwards the business object to the endpoint, which is an exposed interface from an SCA module that offers a business service to the outside world. Business objects contain the information that the adapter obtains from a document as a form.

Use the following steps to process the inbound events:
1. Create a subscription on the Filenet Content Engine.
2. Poll events from the event table.
3. Retrieve the relative business object based on the event type. For a delete event type, only the Object ID of the form is retrieved.
4. Deliver the business object to the endpoint.

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 adapter's messages and trace information in the log viewer.

The adapter's component ID for filtering and highlighting is a string composed of the characters ECMRA plus the value of the adapter ID property. For example, if the adapter ID property is set to 001, the component ID is ECMRA001.

If you run multiple instances of the same adapter, ensure that the first 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 Enterprise Content Management to 001 and 002. The component IDs for those instances, ECMRA001 and ECMRA002, 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 ECMRAInstance.

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.

For more information, see the "Adapter ID" on page 118 property.

Chapter 2. Planning for adapter implementation

Before using WebSphere Adapter for Enterprise Content Management, make sure you understand the experience you need and the server environment in which it runs. Learn the considerations for deploying the adapter in your server environment, and find out how to improve the performance and availability of the adapter by using a clustered server environment.

Before you begin

Before you begin to set up and use the adapter, you should possess a thorough understanding of business integration concepts, the capabilities and requirements of the integration development tools and runtime environment you will use, and the CMIS server environment where you will build and use the solution.

To configure and use WebSphere Adapter for Enterprise Content Management, you should understand and have experience with the following concepts, tools, and tasks:

- The business requirements of the solution you are building.
- Business integration concepts and models, including the Service Component Architecture (SCA) programming model.
- The capabilities provided by the integration development tools you will use to build the solution. You should know how to use these tools to create modules, test components, and complete other integration tasks.
- The capabilities and requirements of the runtime environment you will use for the integration solution. You should know how to configure and administer the host server and how to use the administrative console to set and modify property definitions, configure connections, and manage events.
- The CMIS server environment in which you are working. This includes a detailed understanding of the CMIS GUI.

Known Limitations
- To process messages which contain over 50 megabytes of binary data, set the Java system property `com.ibm.xml.xlxp2.api.util.encoding.DataSourceFactory.bufferLength` in the administrative console, to a value smaller than 64K.

Security

The adapter uses the J2C authentication data entry, or the authentication alias feature of Java 2 security to provide secure user name and password authentication. For more information about security features, see the documentation for IBM Business Process Manager or WebSphere Enterprise Service Bus.

To manage security on FileNet Content Engine, for example, setting up a right ACL (Access Control List) and so on, refer to the official FileNet Content Engine documentation at http://publib.boulder.ibm.com/infocenter/p8docs/v4r5m1/index.jsp.

To understand how the Content Management Interoperability Services exposes security to the end users, refer to the CMIS specification at http://docs.oasis-open.org/cmis/CMIS/v1.0/os/cmis-spec-v1.0.html.

Note: This version of Adapter for Enterprise Content Management supports only the UserID / Password credentials based security mechanism.

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 CMIS 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 (J2C) connection factory properties" on page 120 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 and password
- The URL used to connect to the CMIS 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

Support for secured HTTP communication with CMIS server

IBM WebSphere Adapter for Enterprise Content Management supports secured HTTP communication with CMIS server.

To enable secured HTTP communication, perform the following tasks:
1. Enable the enterprise metadata discovery with secured HTTP communication configuration. For more information, refer to "Configuration for enterprise metadata discovery with secured HTTP communication" on page 29.
2. Enable IBM Process Server with secured HTTP communication. For more information, refer to "Enabling secured HTTP communication on IBM Process Server" on page 29.

Configuration for enterprise metadata discovery with secured HTTP communication

Use IBM Integration Designer to configure the enterprise metadata discovery with secured HTTP communication.

To configure enterprise metadata discovery for HTTPS communication, perform these tasks:

1. Extract the certificate used by the CMIS server for communicating with external clients.
2. Import the extracted certificate to IBM Integration Designer trust store.
   a. Open `ikeyman <intall_root>/java/jre/bin`.
   b. Select **Key Database File > Open**.
   c. Select `PKCS12` as the **Key database type**.
   d. Click **Browse**, to navigate to `<install_root>/runtimes/bi_v7_stub/etc/trust.p12` file.
   e. Click **OK**, to open the trust store.
   f. Enter the password as `WebAS`.
   g. Select **Signer Certificates** under **Key database content**.
   h. Click **Add**.
   i. Click **Browse**, to select and add the extracted certificate.
   j. Click **OK**.
   k. Enter a label for the certificate in the Enter a Label window.
   l. Click **OK**. Now the certificate has been added.
   m. Close `ikeyman`.
3. If the certificate uses hostname, make an entry with the host name and IP address in the `C:\Windows\system32\drivers\etc\hosts` file.
4. When creating a **New External Service**, in the Specify the Discovery Properties window, for the **Connection properties**, select the Connection as **https**, specify the hostname and the secure port number (for IBM WebSphere Application Server, the default port is 9443).

Enabling secured HTTP communication on IBM Process Server

You can import the secured HTTP CMIS communication certificates into IBM Process Server by using one of these two options:

Option 1: Using ikeyman
1. Open `ikeyman <profile_root>/jdk/jre/bin`.
2. Select **Key Database File > Open**.
3. Select `PKCS12` as the **Key database type**.
4. Click **Browse**, to navigate to `<profile_root>/profiles/profilename/config/cells/cellname/nodes/nodename/trust.p12` file.
5. Click **OK**, to open the trust store.
6. Enter the password as `WebAS`.
7. Select **Signer Certificates** under **Key database content**.
8. Click **Add**.
9. Click **Browse**, to select and add the extracted certificate.
10. Click **OK**.

11. Enter a label for the certificate in the Enter a Label window.
12. Click **OK**. Now the certificate has been added.
13. Close `ikeyman` and restart IBM Process Server.

Option 2: Using Administrative Console
1. Start IBM Process Server.
2. Open the **Administrative Console**.
3. Select **Security > SSL certificate and key management**.
4. Select **SSL configurations**.
5. Select the **NodeDefaultSSLSettings** option.
6. Select **SSL keystores**.
7. Choose **NodeDefaultTrustStore**.
8. Select the **Signer certifications** option.
9. Click **Retrieve from port**, and enter the server details from where the certificate needs to be downloaded.
10. Click **Retrieve signer information**. This displays the certificate details.
11. Click **Apply**.
12. Click **Save**, to confirm the changes.
13. Restart the IBM Process Server with the new trust certificate.

User authentication

The adapter supports several methods for supplying the user name and password that are needed to connect to the CMIS 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.

At run time, the adapter needs to provide the user name and password to connect to the CMIS 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
- 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 CMIS server. This includes the adapters embedded in application EAR files as well as adapters that are separately installed on the server.

Using a J2C authentication data entry, or authentication alias, created with the Java Authentication and Authorization Service (JAAS) feature of Java 2 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.
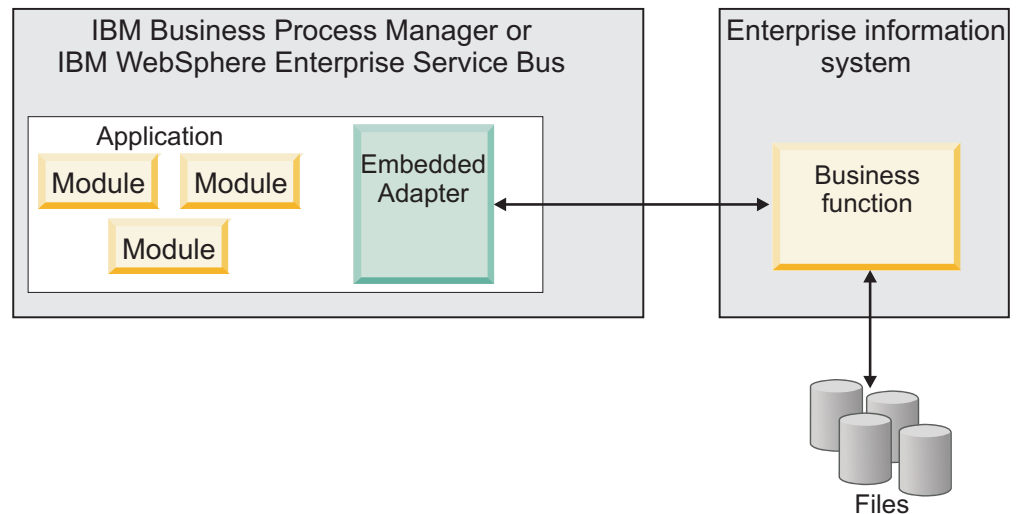
A stand-alone adapter is represented by a stand-alone resource adapter archive (RAR) file, and when deployed, it is available to all deployed applications in the server instance.
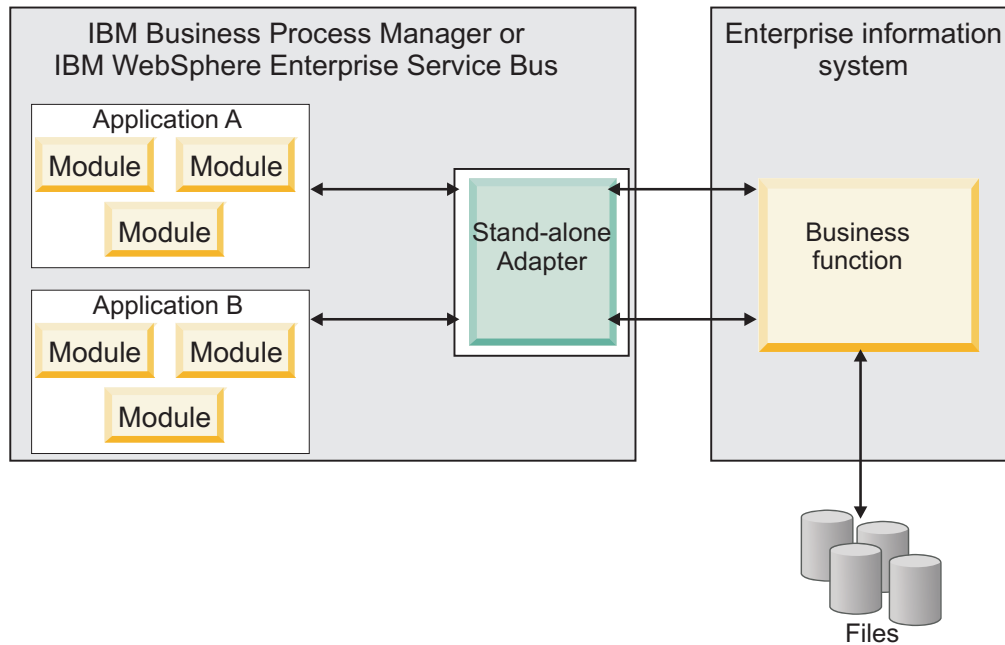
While creating the project for your application using IBM Integration Designer, you can choose how to package the adapter [either bundled with the (EAR) file or as a stand-alone (RAR) file]. Your choice affects how the adapter is used in the run time environment, as well as how the properties for the 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 given 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 given adapter share the same 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.

Note:

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 runtime, the adapter will return 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 Enterprise Content Management version 7.5, the following error message is displayed: IBM WebSphere Adapter for Enterprise Content Management has loaded 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. When you install multiple adapters with different CWYBS_AdapterFoundation.jar versions, the adapter returns the ResourceAdapterInternalException message, due to a version conflict. To overcome this conflict, you must migrate all adapters to the same version level. For further assistance, contact WebSphere Adapters Support for help.

Considerations while deploying WebSphere Adapter 7.5 with another version

There are occasions when you have to work with embedded adapters that do not need a client-server communication, standalone 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.

Deploying a standalone 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 passthrough inbound operation.
4. Create an application in IBM Integration Designer for a standalone ALE passthrough inbound operation.
5. Install and start the application through the administrative console.
6. Verify the error.

Note: An error message will be 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 will fail. At step 6, you will 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, you may need to generate the artifacts into different folders.

Deploying a combination of standalone 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 standalone 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 standalone and embedded deployments. With this approach, the migration process will handle different CWYBS_AdapterFoundation.jar files and will 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-947.ibm.com/support/entry/portal/ Overview/Software/WebSphere/WebSphere_Adapters_Family.

Migrating to version 7.5 of WebSphere Adapter for Enterprise Content Management

Migration considerations

WebSphere Adapter for Enterprise Content Management version 7.5 may have some features and updates that might affect your existing adapter applications. Before migrating applications that use WebSphere Adapter for Enterprise Content Management, you must consider some factors that might affect your existing applications.

Compatibility with earlier versions

WebSphere Adapter for Enterprise Content Management version 7.5 is fully compatible with the custom business objects (XSD files) and data bindings that are created using the adapter Version 7.0.2 and enables the existing business objects and data bindings to work well in the latest version of the adapter.

The version 7.5 of WebSphere Adapter for Enterprise Content Management is fully compatible with Version 7.0.2, and therefore the applications that used the Version 7.0.2 runs unchanged when you upgrade to version 7.5. However, if you want your applications to use features and functionality present in version 7.5 of the adapter, run the migration wizard.

The migration wizard replaces (upgrades) Version 7.0.2 of the adapter with version 7.5 and enables version 7.5 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 of the adapters. If any of your applications embed an adapter that is Version 7.0.2 and you are upgrading to version 7.5, and you want your applications to take advantage of the features and functions in version 7.5, you might need to change to 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 Integration Designer version 7.5 only supports the migration of adapters from Version 7.0.2 to version 7.5.

Deciding whether to upgrade or to upgrade and migrate

If you decide that you want to upgrade the adapter from Version 7.0.2 to version 7.5, but you do not want to migrate the adapter artifacts, you can do so by deselecting 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 of the adapter.

Migrating multiple adapters referred within a project

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 first

Because adapter migration might require you to change those applications that use version 7.5 of WebSphere Adapter for Enterprise Content Management, 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.

Performing the migration

You can migrate a project or EAR file to version 7.5 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.

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/v7r5mx/topic/com.ibm.wbpm.wid.imuc.doc/topics/tmigsrcart.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 36.

    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 38.

    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**.

    g. Enter values for the **URI** to FileNet Content Engine and the **JAAS stanza** to be used for user authentication and click **Next**.

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.

   Note: The new `ECMEventHandler.jar` is automatically deployed on FileNet Content Engine when the migrated adapter artifacts are deployed on IBM Business Process Manager or WebSphere Enterprise Service Bus.

Results

The project or EAR file is migrated to version 7.5. 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 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 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/ v7r5mx/topic/com.ibm.wbpm.wid.imuc.doc/topics/tmigsrcart.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**.

   Note: The `ECMEventHandler.jar` deployed with your previous application will still be used. No changes are required in the subscription IDs which have already been set up.

Results

The project can now be used with WebSphere Adapter for Enterprise Content Management, version 7.5.

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://publib.boulder.ibm.com/bpcsamp/index.html.

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.

Creating an authentication alias

An authentication alias is a feature that encrypts the password used by the adapter to access the Content Management Repository. The adapter can use it to connect to the Content Management Repository instead of using a user ID and password stored in an adapter property.

Before you begin

To create an authentication alias, you must have access to the administrative console of IBM Business Process Manager or WebSphere Enterprise Service Bus. You must also know the user name and password to use to connect to the Content Management Repository.

The following procedure describes how to access administrative console through IBM Integration Designer. If you are using the administrative console directly (without going through IBM Integration Designer), log in to the administrative console and skip to step 2.

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 administrative console:

   To start the administrative console through IBM Integration Designer, perform the following steps:

   a. In the Business Integration perspective of 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, **IBM Business Process Manager or WebSphere Enterprise Service Bus**) and click **Start**. Wait until the status of the server is Started.

   c. Right-click the name of the server and click **Run administrative console**.

   d. Log on to the administrative console by clicking **Log in**. If your administrative console requires a user ID and password, type the ID and password first and click **Log in**.

2. In the 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. From 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 CMIS server.

d. Optional: 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 have created an authentication alias, which you specify when you configure the adapter properties later in the wizard.

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 7.5**.

   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 inside of the Business Integration section of the IBM Integration Designer window and then select **New > Module**.
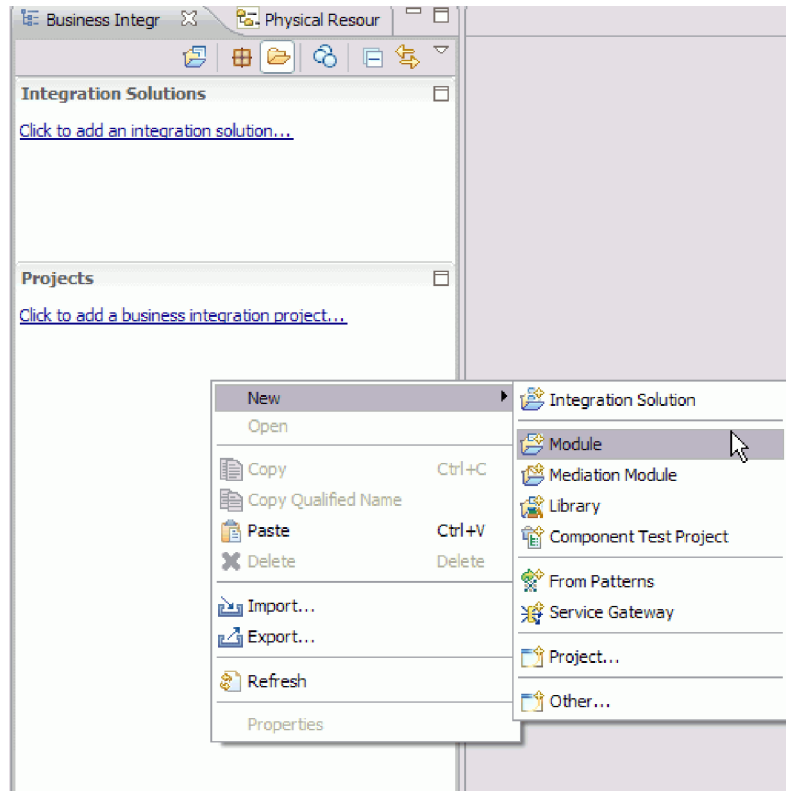
Figure 27. Business Integration section of the window

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.

Creating the project

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

Before you begin

Ensure that you have gathered the information you need to establish a connection to the CMIS server. For example, you need the name or IP address of the CMIS server and the user ID and password to access it.

About this task

If you have an existing project, you can use it instead of creating a new one. Select it before you start the wizard.

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**. Click **Next**.

2. In the New External Service window, expand the **Adapters** folder, select **Enterprise Content Management**, and then click **Next**.

3. In the Select an Adapter window, select **IBM WebSphere Adapter for Enterprise Content Management (IBM :** *version***)**, where *version* is the version of the adapter you want to use, and then click **Next**.

4. In the Import a RAR File window, accept the default project name in the **Connector project** field or type a different name.

5. In the **Target runtime** field, select the type of server where you want to deploy the module. The wizard creates the artifacts that are appropriate to that server.

6. Click **Next**. The Locate the Required Files and Libraries window is displayed.

Results

A new connector project is created, which contains the adapter RAR file. The project is listed in the Business Integration perspective .

What to do next

Continue working in the external service wizard. The next step is to add database-specific files to the project.

Selecting the processing direction

The adapter processing direction can be configured at run time environment. You can either configure your adapter for inbound processing or outbound processing.

Before you begin

Ensure that you are running the external service wizard in IBM Integration Designer to perform this task.

About this task

When you configure your adapter for inbound processing you are processing the request or response interaction from the adapter to your service export. When you configure your adapter for outbound processing you are processing the response from your service import to the adapter.

In the Select the Processing Direction window, select **Outbound** or **Inbound**, and then click **Next** to advance to the Connection properties window.

Results

You have defined the type of process you need for your adapter.

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 find and select business objects and services from the CMIS server, and to generate the business object definitions and related artifacts.

Setting connection properties for the external service wizard

For the external service wizard to be able to discover business objects on the CMIS server, you must specify the connection properties.

About this task

The external service wizard requires these properties to connect to the CMIS server to discover and to create the service description.

Procedure

1. Start the external service wizard and enter the appropriate information in the Select the Processing Direction window, as explained in the "Selecting the processing direction" on page 46 topic.
2. In the Specify the Discovery Properties window, specify the connection properties for the wizard to connect to the CMIS server. The connection information from this window is used by the adapter to connect to the CMIS server and discover business objects. In this same wizard at a later time, you can also change the connection information or an authentication alias to be used at run time.

Figure 28. Specifying the connection properties

    a. In the **Connection** field, select the connection protocol from the following options: **http** or **https**. For more information about enabling the secured HTTP communication, refer to "Support for secured HTTP communication with CMIS server" on page 28

    b. In the **Server** field, specify the server name or IP address of the CMIS end point.

    c. In the **Port number** field, select the appropriate port number or enter the port number.

    d. In the **Path** field, specify the context root.

    e. In the **User name** field, enter the user name used to connect to the server.

    f. In the **Password** field, enter the password used to connect to the server.

    g. The adapter automatically populates the **Repository Service Endpoint** field with the Endpoint Address of CMIS server followed by `/RepositoryService`. For discovering information about the repository, including information about the object-types defined for the repository, the adapter requires a Repository Service Endpoint URL as per the CMIS specification. If you configured your Repository Service endpoint with a different format, you can edit the default setting.

3. Optional: To enable bidirectional support for the adapter at run time:

    a. Click **Advanced**.

    b. In the **Bidi properties** area, select **Bidi transformation**.

> c. Set the ordering schema, text direction, symmetric swapping, character shaping, and numeric shaping properties to control how bidirectional transformation is performed.

4. Optional: To specify the logging level, click **Change the logging properties for the wizard**, and then provide the following information:
   - In **Log file output location**, specify the location of the log file for the wizard.
   - In **Logging level**, specify the severity of errors that you want logged.

   This log information is for the wizard only; at run time, the adapter writes messages and trace information into the standard log and trace files for the server.

5. Click **Next**.

Results

The external service wizard connects to the database and displays the Find Objects in the Enterprise System window.

What to do next

Continue working in the wizard. Locate the objects on the CMIS server for which you want the wizard to create business objects.

Discovering and selecting objects

After connecting to the CMIS server, you can browse through the list of Content Management Repositories at that service endpoint tree of discovered objects to understand the structure of Document Types in the Content Management Repository.

Before you begin

You must have successfully connected to the CMIS server. You must have a clear understanding of the data requirement of the program that needs to access the Content Management Repository.

About this task

This task starts in the Find Objects in the Enterprise System window of the external service wizard.

Procedure

1. In the **Discovered objects** list, click **+** (the plus sign) next to the required Repository node, to see the Document types and Folders discovered by the wizard.
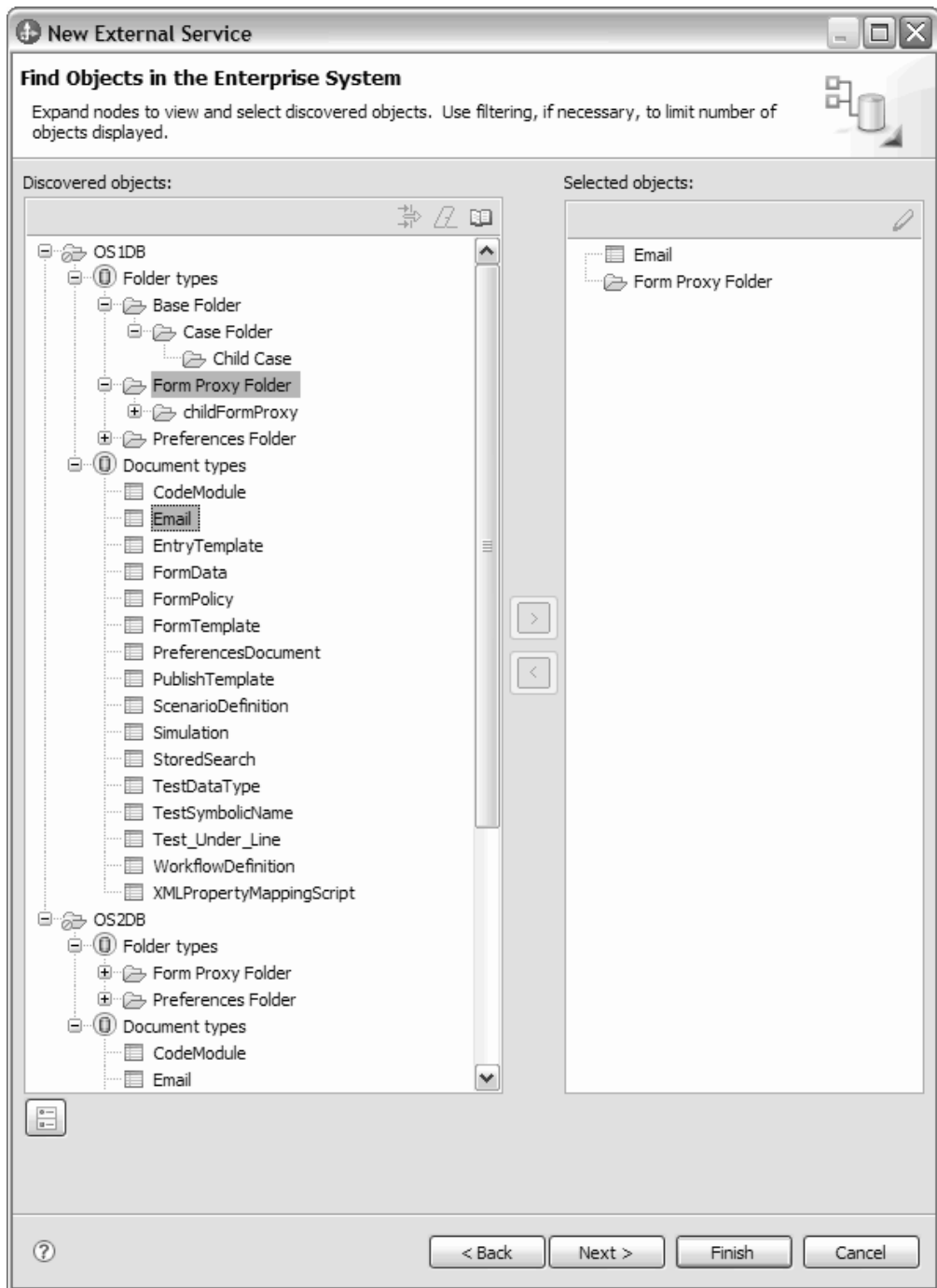
Figure 29. Finding objects in the Enterprise System

2. Select the required objects from the **Discovered objects** listing and use the
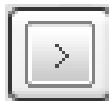
 (Add) button to add them to the **Selected objects** listing.

3. The Specify the Configuration Properties for 'object' window is displayed.

Results

The wizard displays the document and folder objects you have selected to be used by the adapter.

What to do next

Continue working in the external service wizard. The next step is to specify the configuration properties for the selected objects you want to use in your module, configure each business object, and create hierarchies of business objects.

Selecting and configuring business objects

Using the list of Content Management Repositories discovered by the external service wizard, select the Document and Folder types that you need to access in your module, then provide configuration information for your new business objects.

About this task

From the Find Objects in the Enterprise System window, you can select and configure objects in any order. You can add objects individually, or all of these objects at one time. You can mix objects from the various nodes of the **Discovered objects** list.

The high-level flow of selecting and configuring business objects is as follows:

1. Select one or more Document types and Folders in the **Discovered objects** list of the Find Objects in the Enterprise System window.
2. Click the > (Add) button.
3. The wizard opens the Specify the Configuration Properties for 'object' window.
   - If you select a single object, a single Specify the Configuration Properties for 'object' window is displayed.
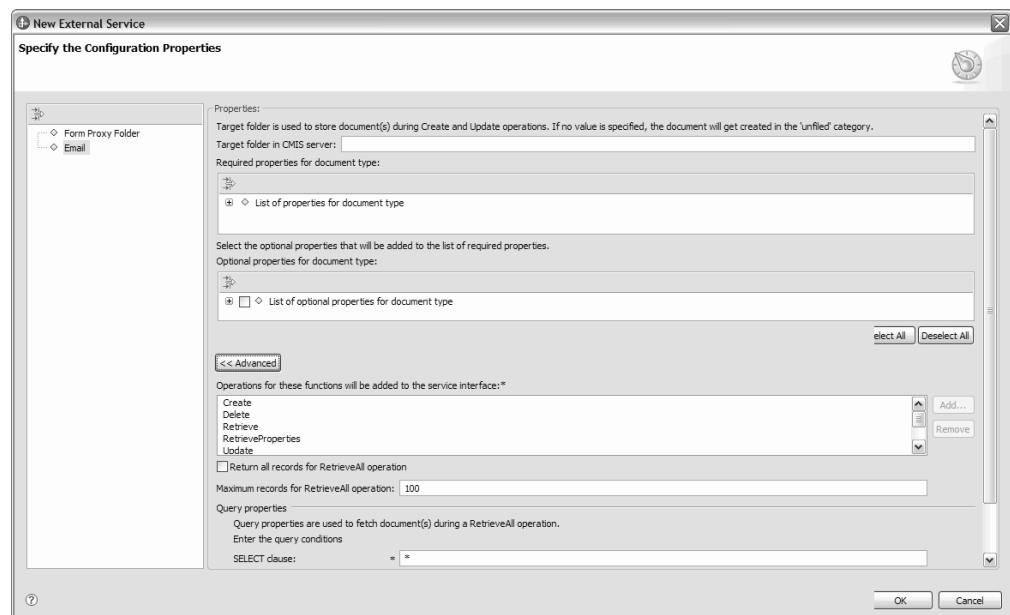
Figure 30. Specifying the configuration properties for a Document Type (Email)

- For Document types, in the Target folder in the CMIS server field, enter the folder name.

  Note: For more information about the DocumentUrl property, refer to the "RetrieveProperties operation" on page 22

- Select the optional properties that you want to see in your final business object from the list of **Custom Properties** and **Inherited Properties**. These properties are ones that the wizard cannot discover by examining the database and are applicable to both Document and Folder types.

- If you select multiple objects, the Specify the Configuration Properties for 'object' window displays with one page for each object selected.

  Click the name of each object in turn. The window displays the same information if you select this object individually.

  Important: Do not click **OK** until you complete the configuration pages for all the objects. The wizard does not close the notebook until you provide all the required fields, but you can close the window before providing optional fields. If you do not configure the optional fields in the wizard, you must use the business object editor to configure them after exiting the wizard.

4. The wizard adds the configured object to the **Selected objects** list.

5. Click **Advanced**. Expand the advanced sections to review and specify the following options:

   a. Choose the operations that needs to be added to the service interface for this object type (document or folder). To configure an operation, you can use either the Add or the Remove option. If you remove any of these operations, the removed operation is made available in the Add Value window for you to add. Use the Add option again to open the Add Value window and select the operations you want to add.

   b. Specify how you want to retrieve the records:
      - If you want the RetrieveAll operation to return all records matching the query, select the **Return all records for RetrieveAll operation** check box.
      - If you want to specify how many records the RetrieveAll operation must return, enter a value in the **Maximum records for RetrieveAll operation** field or enter -1 in the appropriate field. field. The default value is 100.

        Note: The Maximum records for RetrieveAll operation property applies only if you are using the RetrieveAll operation. This property field is disabled (unavailable for use) if you remove the RetrieveAll operation in Step 3 or if you select the **Return all records for RetrieveAll operation** check box.

   c. Enter the query conditions after expanding the **Query Properties** tab.
      - In the **SELECT clause** field, enter the Select clause from Email, for example, **To**
      - In the **WHERE clause** field, enter the Where clause from Email, for example, **sender = 'johndoe@us.ibm.com'**

6. For the Delete operation, you can configure how the Delete operation needs to be extended to the subfolders and documents in the parent folder selected for deletion. For this configuration, you need to select the **Enable delete options for fileable objects in the current folder tree** check box. By default, this property is unchecked.
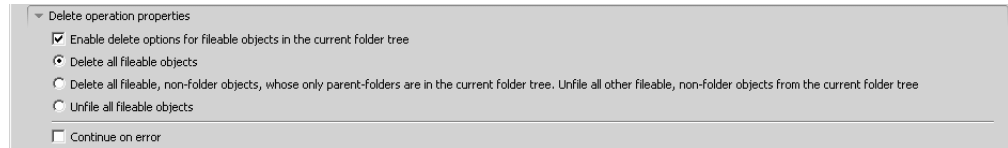
Figure 31. Specifying the configuration properties for a Folder

When the **Enable delete operations for fileable objects in the current folder tree** check box is selected, three radio buttons are enabled:

a. **Delete all fileable objects** - Delete all the fileable objects, documents and folders inside the folder selected for deletion.

b. **Delete all fileable non-folder objects whose only parent-folders are in the current folder tree. Unfile all other fileable non-folder objects from the current folder tree** - If all the parent folders for an object are inside the current folder tree, that is, a document has multiple parent folders, then delete the document. Else, just unfile the document from the current folder tree.

c. **Unfile all fileable objects** - Unfile all the fileable objects, that is, remove all the reference from the fileable object to the parent folder.

You can also configure if the adapter should continue the delete operation, if the delete operation on any of the folder/document fails using the **Continue on error** check box. By default, this is false.

7. The wizard adds the configured object to the Selected objects list.

Note: The target document or folder and its properties should define the appropriate query Name to use the RetrieveAll feature. Refer to the CMIS specification for more details on how to construct a valid query.

As long as you do not exit from the wizard, you can work iteratively to select and configure the business objects you need in your module. However, before you start the wizard to add objects to an existing module, understand the requirements of the program that uses the business objects carefully. The wizard overwrites the existing business objects in the same path.

Related information

⤷ http://docs.oasis-open.org/cmis/CMIS/v1.0/os/cmis-spec-v1.0.html

Configuring the selected objects

After you have selected metadata objects in the external service wizard, you must specify properties that apply to these objects.

Procedure

1. When the **Selected objects** list in the Find Objects in the Enterprise System window contains all the business objects you want to use in your application, click **Next**.

2. In the **Namespace** field, either accept the default namespace or type the full name of another namespace.

   The namespace is prefixed to the business object name to keep the business object schemas logically separated.
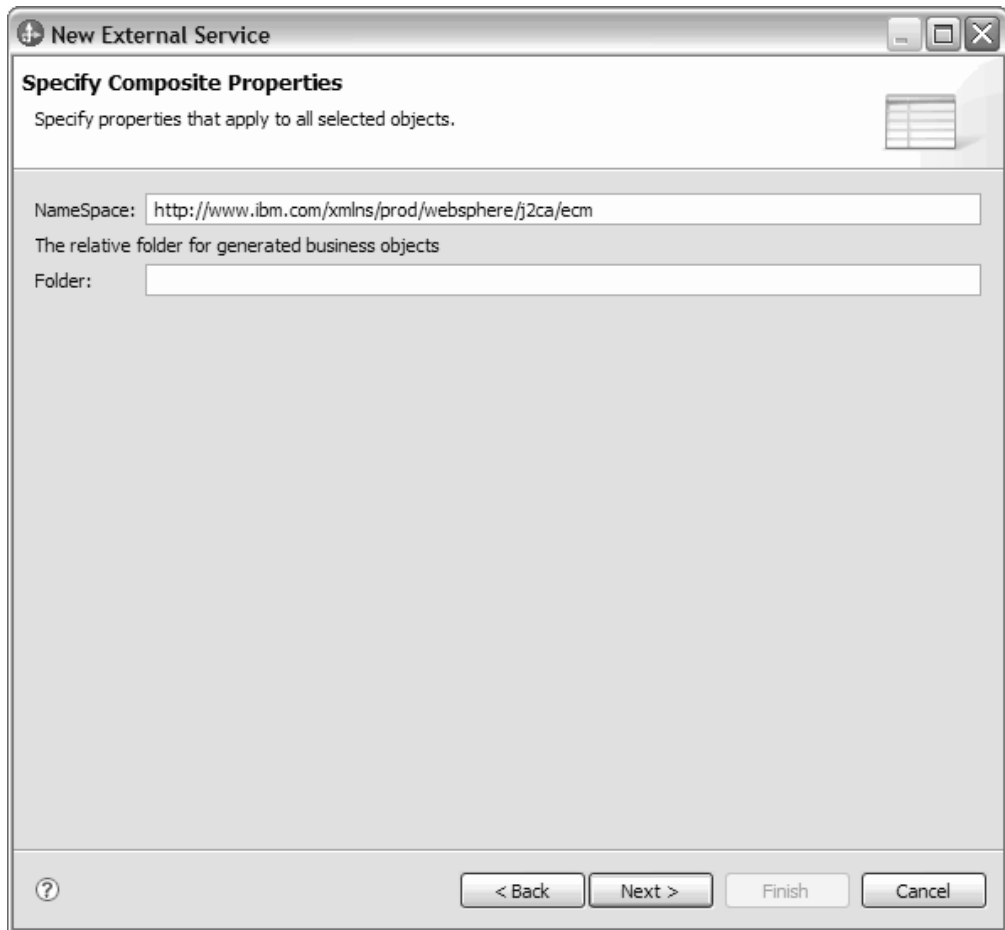
Figure 32. Specify Composite Properties

3. Optional: In the **Folder** field, type the relative path to the folder where the generated business objects are to be stored. Click **Next**.

   Note: If you are creating multiple adapter artifacts within a module, ensure that you specify different business object folders for each adapter within the module. For example, if you are creating artifacts for Oracle, JDBC, SAP, and JDE within a module, you need to create different relative folders for each of these adapters. If you do not specify different relative folders, the existing artifacts are overwritten when you generate new artifacts.

   Note: If you are creating inbound and outbound artifacts within a module, ensure that you specify different business object folders each for inbound and outbound business objects. If you do not specify different relative folders, the existing artifacts are overwritten when you generate new artifacts, resulting in runtime failure.

Results

You have provided information that applies to all business objects in the module.

What to do next

Continue working in the wizard. The next step is to specify deployment information to use at run time and information for saving the service as a module.

Setting deployment properties and generating the service

After you select and configure business objects for your module, use the external service wizard to configure properties that the adapter uses to connect to a CMIS server system. The wizard creates a new business integration module where all the artifacts and property values are saved. This task is performed using the Specify the Service Generation and Deployment Properties and Specify the Location Properties windows of the external service wizard.

Results

The module is created in the project and artifacts are generated.

Setting deployment properties for a runtime environment

The connection properties are initialized to the values that the wizard used to connect to the database. From this screen, you can modify the user information for the module.

Before you begin

Ensure that you have configured the business object.

About this task

To generate artifacts for your module, use the following procedure:

Procedure

1. In the Specify the Service Generation and Deployment Properties window, click **Edit Operations** to review the names of or add a description for the operations for the business objects that you are creating.

2. In **Deployment Properties**, specify how you want the adapter to connect to the CMIS 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 properties, click **Using security properties from the managed connection factory** and enter the following information:

        – In the **User name** field, type the user name to connect to the CMIS server.

        – In the **Password** field, type the password to connect to the CMIS server.

        Note: The security properties are not encrypted and stored as plain text.

    * To use any other method of authenticating to the CMIS server, click **Other**.

3. 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.

4. If you selected **On server for use by multiple adapters** in the previous step, specify how you want to set the **Connection Properties** at runtime.

   - If you manually created and configured a managed connection factory or activation specification on the server or if you have already deployed an application that connects to the same CMIS server using the same managed connection factory or activation specification properties, you can reuse the managed connection factory or activation specification by specifying the name of its Java Naming and Directory Interface (JNDI) data source:

     a. From the **Connection settings** list, select **Use predefined connection properties**.

     b. In the **JNDI Lookup Name** field, type the name of the JNDI data source for an existing managed connection factory or activation specification.

     c. Click **Next**.

   - If this application is the first one that connects to the database with a specific user name and password, or if you want to administer the user name and password separately from other applications, select **Specify connection**

properties.

Figure 33. Specify the service generation and deployment properties window

5. In **Connection Properties**, review and if necessary, change the values of the required connection properties. The fields are initialized with the connection information you specified when you started the wizard.

   a. In the **Connection** field, select the connection protocol from the following options: **http** or **https**.

   b. In the **Server** field, specify the server name or IP address of the CMIS end point.

   c. In the **Port number** field, select the appropriate port number or enter the port number.

   d. In the **Path** field, specify the context root.

6. Specify advanced properties by clicking **Advanced**. Expand each of the advanced sections to review the properties.

   • **Additional Properties**

Figure 34. Additional properties for specifying endpoint URLs

   a. In the **Object discovery endpoint URL** field, you can execute the query made during RetrieveAll operation. The default content in this field is the CMIS server URL followed by `/DiscoveryService`.

       For example, http://hostname:portnumber/contextroot/DiscoveryService

   b. In the **Object service endpoint URL** field, you can update the URL for performing ID-based CRUD (Create, Retrieve, Update, Delete) operations on Objects in a Content Management Repository. The default content in this field is the CMIS server URL followed by `/ObjectService`.

       For example, http://hostname:portnumber/contextroot/ObjectService

   c. In the **Navigation service endpoint URL** field, you can update the URL used to traverse the folder hierarchy in a Content Management Repository, and to locate Documents that are checked out. The default content in this field is the CMIS server URL followed by `/NavigationService`.

       For example, http://hostname:portnumber/contextroot/NavigationService

   d. In the **Versioning service endpoint URL** field, you can update the URL used to navigate or update a Document Version Series. The default value in this field is the CMIS server URL followed by `/VersioningService`.

       For example, http://hostname:portnumber/contextroot/VersioningService

   e. In the **Locale** field, type the preferred language. For example, English (en_US).

- **Logging and Tracing**

Figure 35. Logging and Tracing property

   a. If you have multiple instances of the adapter, set Adapter ID to a value that is unique for this instance.

   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.

- **Processing methods for illegal XML characters**
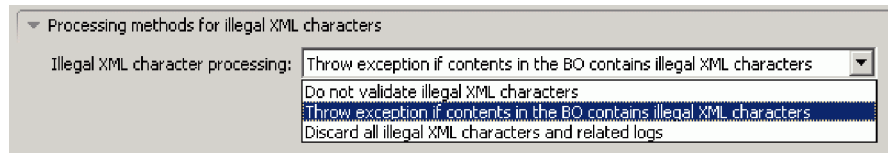
Figure 36. Processing methods for illegal XML characters property

   a. From the **Illegal XML character processing** drop-down list, select one of the options that correspond to your requirement:
      – **Do not validate illegal XML characters**, if you want to work with the default adapter behavior.

         Note: If you select the **Do not validate illegal XML characters** option, the adapter displays an exception as the Enterprise Content Management server does not support illegal characters.
      – **Throw exception if contents in the BO contains illegal XML characters**, if you want to proceed after you get an exception message, and log the illegal XML characters in the trace file, at runtime.
      – **Discard all illegal XML characters and related logs**, if you want the adapter to discard the illegal XML characters, and log the characters in the trace file, at runtime.
7. Click **Next**.

Results

The Specify the Location Properties window is displayed.

Setting location properties for artifacts
After you select and configure deployment properties, use the external service wizard to configure location properties that the adapter uses to generate the service.

Before you begin

Ensure that you have configured the business object.

About this task

To configure location properties for your module follow this procedure:

Procedure
1. In the Specify the Location Properties window, select an existing module or create a new one.
   * To use an existing module, select its name from the **Module** list.

      Important: If the module contains an interface or business object with the same name as that you are now configuring, the original interface or business object in the module is replaced by the new version.
   * To create a new module:
   a. Click **New**.
   b. In the Select a Business Integration Project Type window, select **Module** and click **Next**.

c. In the Create a Module window, type a name for the module in the **Module name** field.

d. To retain the service description files (the `.import` and the `.wsdl` files) to be located in the default folder in the module, leave the **Use default location** check box selected. To specify a different folder in the module, clear the **Use default location** check box, and then click **Browse** to specify a different folder in the **Location** field.

e. To automatically open the module in the assembly diagram in Integration Designer when the wizard closes, select the **Open the module assembly diagram** check box.

f. Click **Finish** to create the module.

2. Specify the namespace you want to use for your outbound interface.

   - Select **Use the default namespace** check box to retain the outbound interface to use the default derived namespace. By default, this check box is selected.

   - To specify a different namespace, clear **Use the default namespace** check box and type a different value in the **Namespace** field.

3. Specify the folder in the new module where the service description is to be saved. In the **Folder** field, type the folder name or browse to an existing folder. If you do not specify a folder name, the artifacts (the import, XSD, and WSDL files) are stored in the root folder of the module (the folder with the module name).

4. In the **Name** field, accept the default import name or type a different name.

5. If you want to save business objects in a library where they can be used by other modules, select **Save business objects to a library** check box and specify the location of the library in the **Library** field.

6. In the **Description** field, type a descriptive comment about the module.

7. Click **Finish** to complete the setting of location properties.

   Note: If the Model Changed window is displayed, click **Yes**.

Results

The artifacts are generated.

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 find and select business objects and services from the CMIS server, choose subscription events, and to generate business object definitions and related artifacts.

Configuring the external service wizard for inbound processing

To configure a module to use the adapter for inbound processing, use the external service wizard in IBM Integration Designer to find and select business objects and services from the CMIS server, and to generate business object definitions and related artifacts.

System setup for inbound processing
The following steps are a necessary prerequisite to the inbound process.

Before you begin

Log in to the administrative console of the installed IBM Business Process Manager or WebSphere Enterprise Service Bus to perform the required system setup

Procedure
1. Copy the `jaas.conf.WSI` file from your FileNet Content Engine installation `<ContentEngine Home>\config\samples\` and paste it in your local machine.
2. Browse to **Application servers** -> `<your Server name>` -> **Java and Process Management -> Process definition** -> **Java Virtual Machine**.
3. Add the following statement in **Generic JVM arguments**:
   `-Djava.security.auth.login.config=<path to the `*`jaas.conf.WSI`*` in the local machine>`.

Results

You have defined the prerequisite for the FileNet Content Engine installation API that is required in the adapter for JAAZ Authentication.

What to do next

For more information, refer to the FileNet Content Engine installation documentation.

Related information

⇨ http://publib.boulder.ibm.com/infocenter/p8docs/v4r5m1/index.jsp?topic=/ com.ibm.p8.doc/developer_help/content_engine_api/guide/ gs_concepts_setup_thin_client_cews_transport.htm

Setting connection properties for the external service wizard
For the external service wizard to be able to discover business objects on the CMIS server, you must specify the connection properties.

About this task

The external service wizard requires these properties to connect to the CMIS server for discovery of stored Document Types and for creating the service description.

Procedure
1. Start the external service wizard and enter the appropriate information in the Select the Processing Direction window, as explained in the "Selecting the processing direction" on page 46 topic.
2. In the Specify the Discovery Properties window, specify the connection properties for the wizard to connect to the CMIS server. The connection information from this window is used by the adapter to connect to the CMIS server and discover business objects. In this same wizard at a later time, you can also change the connection information or an authentication alias to be used at run time.
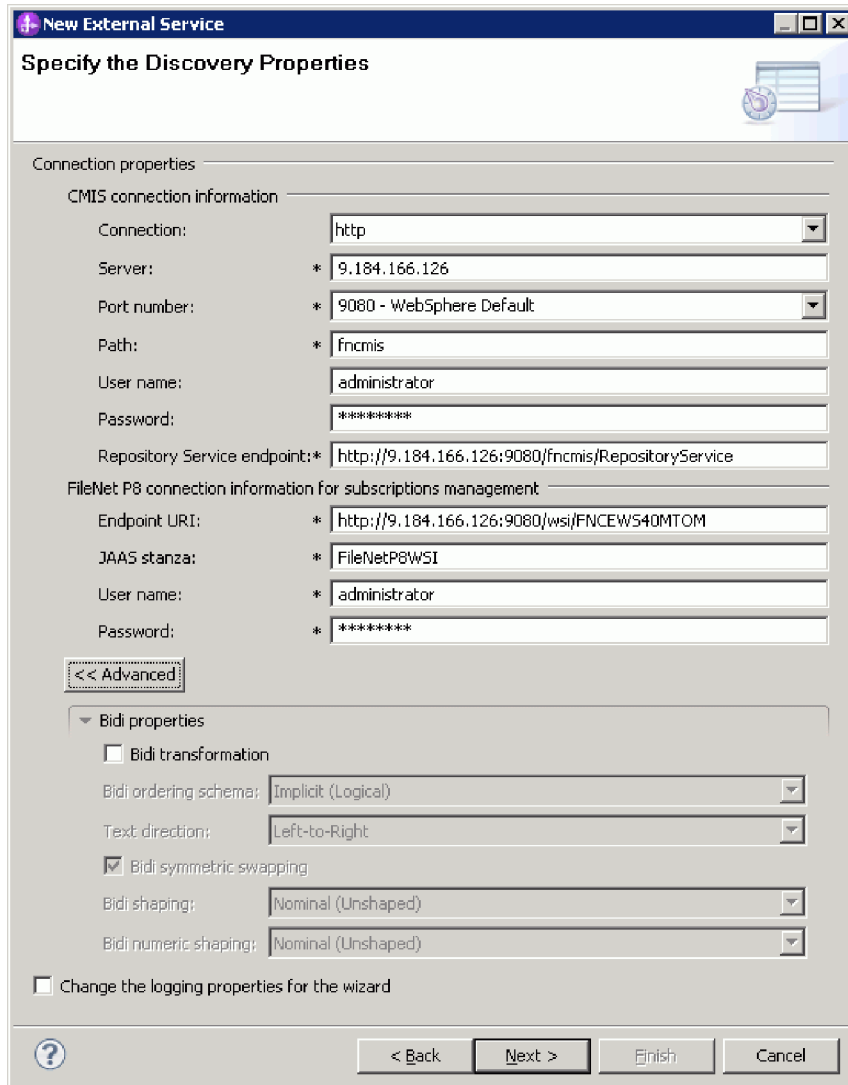
Figure 37. Specifying the connection properties

CMIS connection information

a. In the **Connection** field, select the connection protocol from the following options: **http** or **https**. For more information about enabling the secured HTTP communication, refer to "Support for secured HTTP communication with CMIS server" on page 28.

b. In the **Server** field, specify the server name or IP address of the CMIS end point.

c. In the **Port number** field, select the appropriate port number or enter the port number.

d. In the **Path** field, specify the context root.

e. In the **User name** field, enter the user name used to connect to the server.

f. In the **Password** field, enter the password used to connect to the server.

g. The adapter automatically populates the **Repository Service Endpoint** field with the Endpoint Address of CMIS server followed by **/RepositoryService**. For discovering information about the repository, including information about the object-types defined for the repository, the adapter requires a Repository Service Endpoint URL as per the CMIS

specification. If you configured your Repository Service endpoint with a different format, you can edit the default setting.

FileNet connection information for subscriptions management

a. In the **Endpoint URI** field, enter the URI address of the endpoint CMIS server.

b. In the **JAAS stanza** field enter the JAAS stanza details. Example: FileNetP8WSI.

c. In the **User name** field, enter your Administrator (user name) information. You must have Administrator privileges to create and update subscriptions.

d. In the **Password** field, enter the password for your FileNet connection.

3. Optional: To enable bidirectional support for the adapter at run time:

a. Click **Advanced**.

b. In the **Bidi properties** area, select **Bidi transformation**.

c. Set the ordering schema, text direction, symmetric swapping, character shaping, and numeric shaping properties to control how bidirectional transformation is performed.

4. Optional: To specify the logging level, click **Change the logging properties for the wizard**, and then provide the following information:

   • In **Log file output location**, specify the location of the log file for the wizard.

   • In **Logging level**, specify the severity of errors that you want logged.

   This log information is for the wizard only; at run time, the adapter writes messages and trace information into the standard log and trace files for the server.

5. Click **Next**.

Results

The external service wizard connects to the Content Management Repository and displays the Find Objects in the Enterprise System window.

What to do next

Continue working in the wizard. Locate the objects on the CMIS server for which you want the wizard to create business objects.

Discovering and selecting objects

After connecting to the CMIS server, you can browse the tree of discovered objects to select a Folder and select an object, such as Workflow Definition, CodeModule, Email, and so on. You can use the filtering mechanism to limit the number of objects to be displayed.

Before you begin

You must have successfully connected to the CMIS server. You must have a clear understanding of the object for which you want to specify the configuration properties.

About this task

This task starts in the Find Objects in the Enterprise System window of the external service wizard.

Procedure

1. Select the required objects, Folder and Document Types, from the **Discovered objects** listing and click the (Add) [>] button to add that item to the **Selected objects** listing.
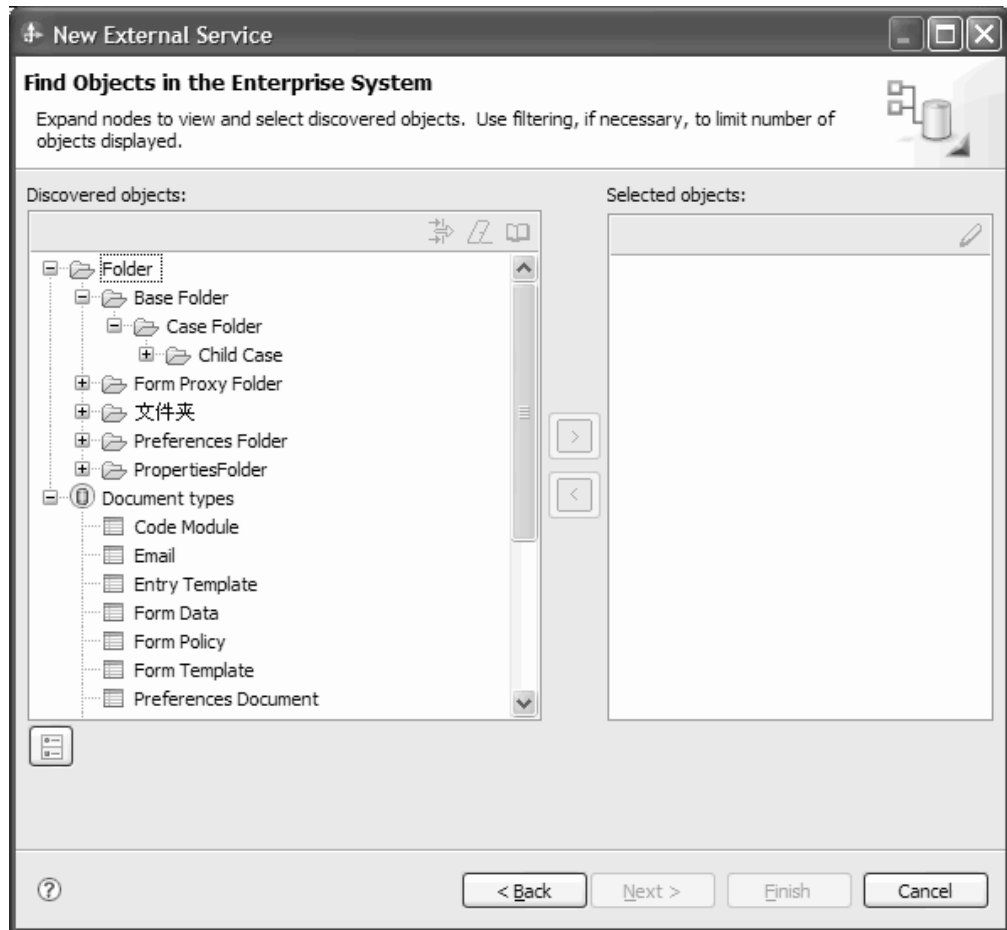
Figure 38. Finding objects in the enterprise system

2. In the Metadata Configuration screen for the chosen native object, you need to specify a unique value for the Subscription Name field.
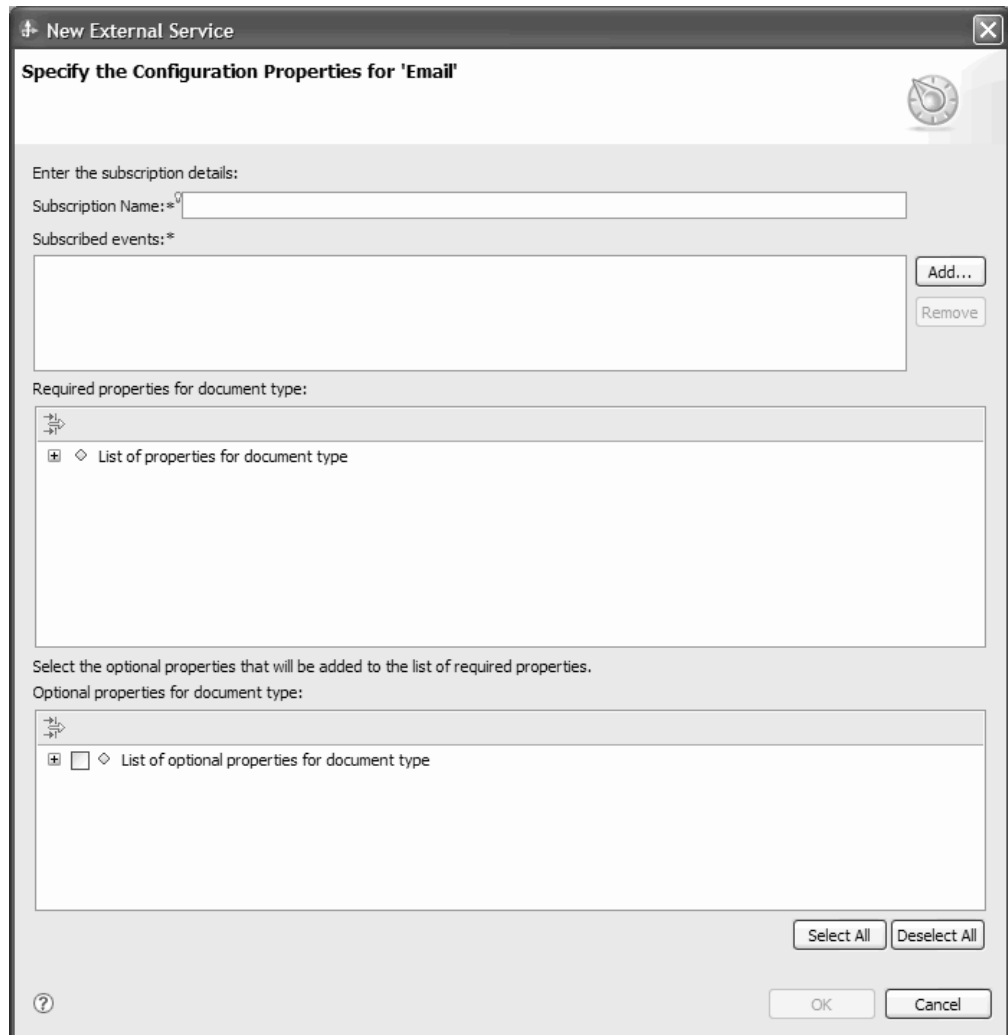
Figure 39. Selecting subscriptions and properties

> **Note:** The subscription name must be unique across all the applications that are configured for a repository.

3. Click **Add** and select the required Event types to form a subscription.
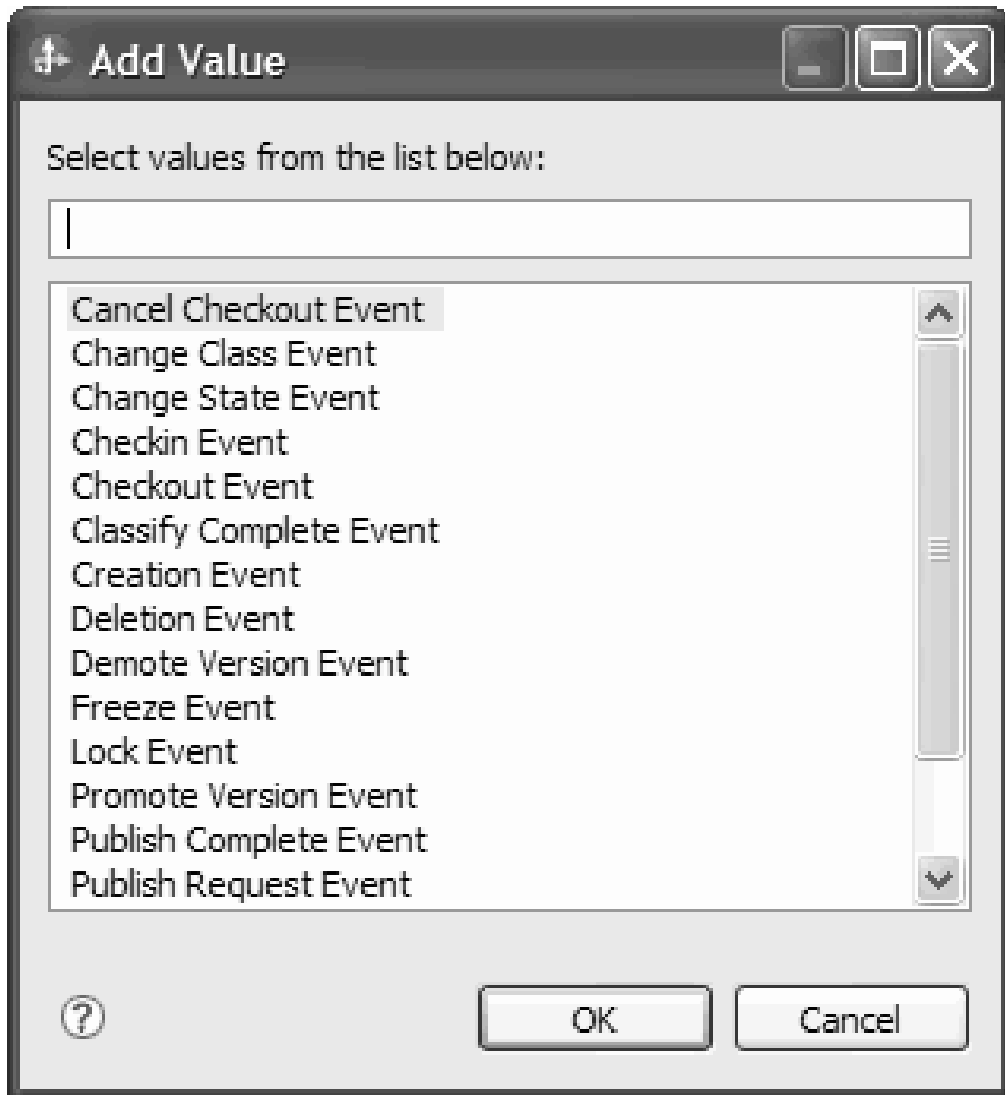
Figure 40. Select event types to Add

> **Note:** Subscriptions are created during run time. If the adapter detects the existence of a subscription with the same name, provided during the Enterprise Metadata Discovery in the target CMIS server, it adds the missing events to that subscription and reuses it.

4. Select the list of properties for the folder or document type. The optional properties will get added along with the required properties.

> **Note:** Required properties cannot be de-selected.

5. Select the properties you want to be a part of the generated business object.
6. Click **Select All** to assign the list of configuration properties.
7. Click **Deselect All** to cancel your choice, and reassign the list of configuration properties.

Results

The wizard displays the selected object that you want to use with the Adapter for Enterprise Content Management.

What to do next

Continue working in the external service wizard. The next step is to select the objects you want to use in your module, configure each business object, and create a hierarchy for that business object.

Configuring the selected objects

After you have selected the discovered object in the external service wizard, you must specify the properties that apply to that object.

Procedure

1. When the **Selected objects** list in the Find Objects in the Enterprise System window contains all the business objects you want to use in your application, click **Next**.

2. In the **NameSpace** field, either accept the default namespace or type the full name of another namespace.

   The namespace is prefixed to the business object name to keep the business object schemas logically separated.
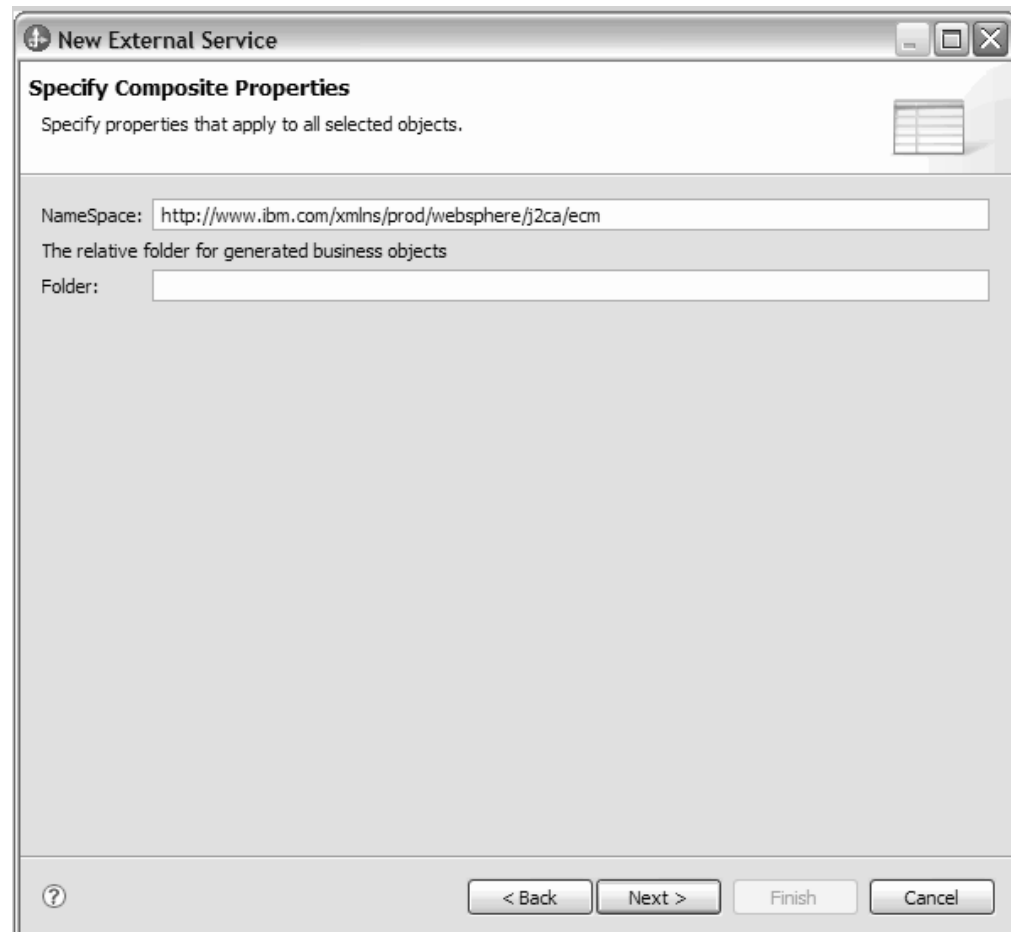
Figure 41. Specifying the composite properties

3. Optional: In the **Relative folder for generated business objects** field, type the relative path to the folder where the generated business objects are to be stored. Click **Next**.

Note: If you are creating multiple adapter artifacts within a module, ensure that you specify different business object folders for each adapter within the module. For example, if you are creating artifacts for Oracle, JDBC, SAP, and JDE within a module, you need to create different relative folders for each of these adapters. If you do not specify different relative folders, the existing artifacts are overwritten when you generate new artifacts.

Results

You have specified composite properties that apply to all the objects you have specified.

What to do next

Continue working in the wizard. The next step is to specify deployment information to use at run time and information for saving the service as a document type.

Setting deployment properties and generating the service

After you select and configure business objects for your module, use the external service wizard to configure properties that the adapter uses to connect to a CMIS server system. The wizard creates a business integration module where all the artifacts and property values are saved. This task is performed using the Specify the Service Generation and Deployment Properties and Specify the Location Properties windows of the external service wizard.

Results

The module is created in the project and artifacts are generated.

Setting deployment properties for a runtime environment:

The connection properties are initialized to the values that the wizard used, to find objects in the enterprise system. From this screen, you can modify the user information for the module.

Before you begin

This task is performed using the Specify the Service Generation and Deployment Properties window of the external service wizard.

About this task

To generate artifacts for your module, follow this procedure:

Procedure
1. In the Specify the Service Generation and Deployment Properties window, click **Edit Operations** to modify the name, or add a description to the operation to be generated.
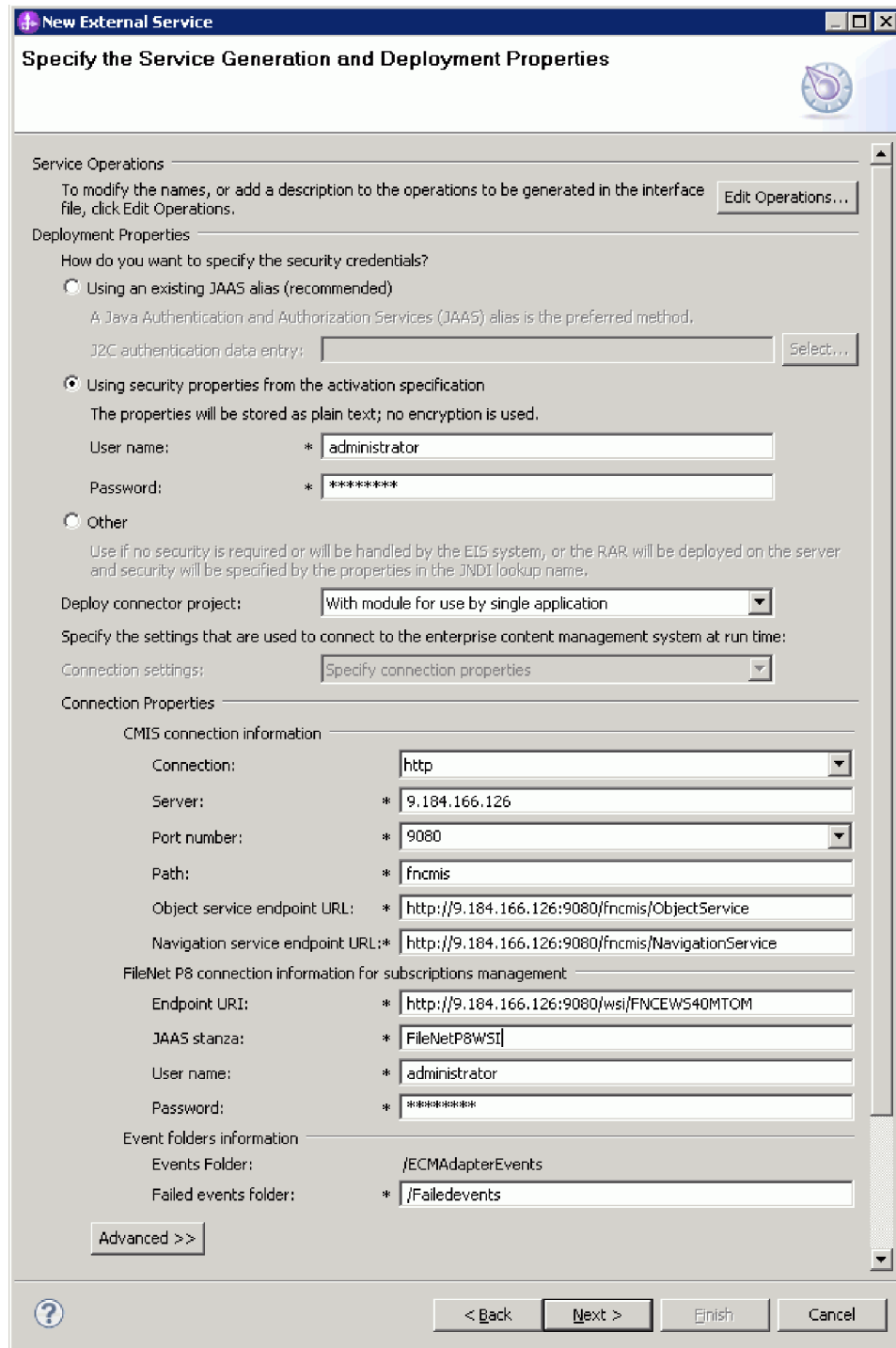
Figure 42. Specifying the service generation and deployment properties window

2. In **Deployment Properties**, specify how you want the adapter to connect to the CMIS 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 properties, click **Using security properties from the managed connection factory** and enter the following information:
  - In the **User name** field, type the user name to connect to the CMIS server.
  - In the **Password** field, type the password to connect to the CMIS server.

    Note: The security properties are not encrypted and stored as plain text.
- To use any other method of authenticating to the CMIS server, click **Other**.
3. 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.
4. If you selected the **On server for use by multiple applications** value in the previous step, specify how you want to set the connection properties at runtime.
   - If you manually created and configured a managed connection factory or activation specification on the server or if you have already deployed an application that connects to the same CMIS server using the same managed connection factory or activation specification properties, you can reuse the managed connection factory or activation specification by specifying the name of its Java Naming and Directory Interface (JNDI) data source:
     a. From the **Connection settings** list, select **Use predefined connection properties**.
     b. In the **JNDI Lookup Name** field, type the name of the JNDI data source for an existing managed connection factory or activation specification.

    c. Click **Next**.

- If this is the first application that connects to the database with a specific user name and password, or if you want to administer the user name and password separately from other applications, select **Specify connection properties**.

5. In **Connection Properties**, review and if necessary, change the values of the required connection properties. The fields are initialized with the connection information you specified when you started the wizard.

- In **CMIS connection information**, change the values of the required connection properties.

  – In the **Connection** field, select the connection protocol from the following options: **http** or **https**.

  – In the **Server** field, specify the server name or IP address of the CMIS end point.

  – In the **Port number** field, select the appropriate port number or enter the port number.

  – In the **Path** field, specify the context root.

  – In the **Object service endpoint URL** field, you can update the URL to perform ID-based CRUD (Create, Retrieve, Update, Delete) operations on Objects in a Content Management Repository. The default content in this field is the CMIS server URL followed by `/ObjectService`.

    For example, `http://filenet-p8:9081/fncmis/ObjectService`

- In the **Navigation service endpoint URL** field, you can update the URL used to traverse the folder hierarchy in a Content Management Repository, and to locate Documents that are checked out. The default content in this field is the CMIS server URL followed by **/NavigationService**

  For example, `http://FileNet-p8:9081/fncmis/NavigationService`

- In **FileNet connection information for subscriptions management**, review and if necessary, change the values of the required connection properties. The fields are initialized with the FileNet connection information you specified when you started the wizard.

  - In the **Endpoint URI** field, you can update the URI of the end point.

    For example, `http://FileNet-p8-CDL:9080/wsi/FNCEWS40MTOM`

  - In the **JAAS Stanza** field, enter the JAAS stanza details.

    For example, `FileNetP8WSI`

  - In the **User name** field, enter your Administrator (user name) information. You must have Administrator privileges to create and update subscriptions.

  - In the **Password** field, enter the password for your FileNet Content Engine connection.

    In **Event folders information**, note that the **Events Folder** field is automatically populated by with the appropriate event.

- In the **Failed event folder** field, enter the folder name designated for failed events, during the FileNet Content Engine configuration. Ensure that this folder exists on the CMIS server instance.

  Example: `/FailedEventFolder`

6. Optional: Specify advanced properties by clicking **Advanced**. Expand each of the advanced sections to review the properties.
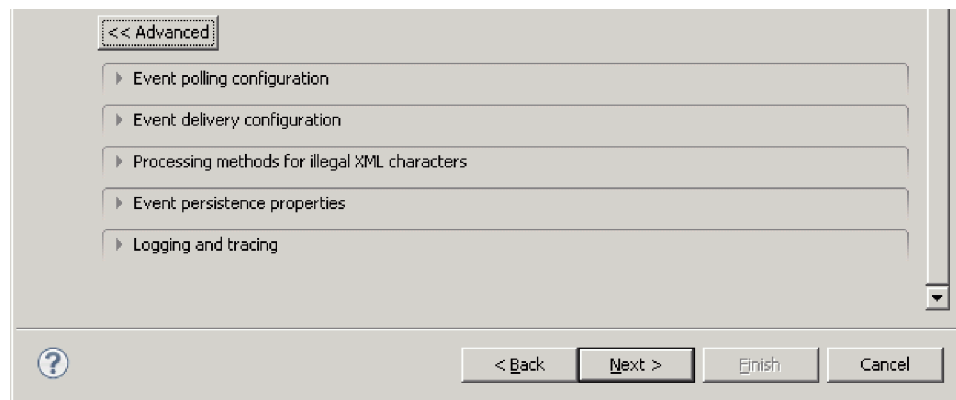
- **Event polling configuration**

Figure 43. Event polling configuration property

– In the **Interval between polling periods** field, type the number of milliseconds that the adapter waits between polling periods.

– In the **Maximum events in polling period** field, type the number of events to deliver in each polling period.

– To specify the time interval between attempts to connect to the CMIS server if a connection fails, set **Time between retries in case of system connection failure (in milliseconds)** to a value in milliseconds.

– 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.

– Select the **Stop the adapter when an error is encountered while polling** option, to stop polling when a polling errors occur. If you do not select this option, the adapter logs an exception and continues to run.

– Optional: Select the **Retry EIS connection on startup** check box if you want the adapter to continue trying to connect to a system to which it could not connect during startup.

– Select the **Polling based on calendar 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. You can either select a blank calendar or create a new calendar for a module or library. 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.

   a. To create a new calendar entry for a module or library, click **New**. The Create a business calendar window is displayed.

      1) 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.

      2) In the **Folder** field, click **Browse** to choose or create a new folder for the calendar.

      3) Enter a name for the new calendar.

      4) Click **Next** if you want to generate the calendar, through a predefined template. Or, click **Finish**, to create a non template calendar.

   b. 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 **Name** field, type the calendar name or click the calendar in the Matching business calendars screen. Click **OK** to open the external service wizard.

- In the **WebSphere Integration workspace**, select the **Calendar** module, and browse **Integration logic->Calendars**, to view or modify the calendar schedules. You can modify the intervals and exceptions, or add new entries for these elements. For more information, refer to the information at http:// publib.boulder.ibm.com/infocenter/dmndhelp/v7r5mx/ index.jsp?topic=/com.ibm.wbpm.wid.bpel.doc/topics/cbuscal.html.

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 delivery configuration**

Figure 44. Event delivery configuration property

a. In the **Type of delivery** field, select the delivery method.

b. If you want to ensure that events are delivered only once and to only one export, select **Ensure assured-once event delivery**. Although this option might reduce performance, it prevents duplicate or missing events.

c. By default, the adapter processes all events that it finds when it polls. If you do not want it to process events that have timestamps later than the current time, select **Do not process events that have a time stamp in the future**.

d. To set the number of attempts to connect to the CMIS server if a connection fails, specify a value in the **Retry limit for failed events** field.

e. To set the number of connections for event delivery during the inbound operation, specify a value greater than or equal to 1 for the **Minimum** and **Maximum** fields. Any value less than 1 is treated as 1 by the adapter.

• **Processing methods for illegal XML characters**

Figure 45. Processing methods for illegal XML characters property

a. From the **Illegal XML character processing** drop-down list, select one of the options that correspond to your requirement:

– **Do not validate illegal XML characters**, if you want to work with the default adapter behavior.

   Note: If you select the **Do not validate illegal XML characters** option, the adapter displays an exception as the Enterprise Content Management server does not support illegal characters.

– **Throw exception if contents in the BO contains illegal XML characters**, if you want to proceed after you get an exception message, and log the illegal XML characters in the trace file, at runtime.

– **Discard all illegal XML characters and related logs**, if you want the adapter to discard the illegal XML characters, and log the characters in the trace file, at runtime.

• **Event persistence properties**

Figure 46. Event persistence properties

To ensure that events are delivered once, and only once, to the export in the case of a failure, set the event persistence fields.

a. Select the **Auto create event table** check box, to create the event persistence table automatically.

b. In the **Event recovery table name** field, enter the name of the table used by the adapter for event persistence processing.

c. In the **Event recovery data source (JNDI) name** field, enter the JNDI name of the data source used by event persistence processing to obtain the JDBC database connection. The data source must be created in IBM Business Process Manager.

d. In the **User name** field, enter your database user name.

e. In the **Password** field, enter your password.

f. In the **Database schema name** field, enter the name of the database used by event persistence processing.

• **Logging and tracing**

Figure 47. Logging and tracking property

a. If you have multiple instances of the adapter, enter a value in the **Adapter ID** that is unique for this instance.

    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.

7. Click **Next**.

Results

The Specify the Location Properties window is displayed.

What to do next

Continue working in the wizard. The next step is to specify the location properties for artifacts.

Setting location properties for artifacts:

After you select and configure deployment properties, use the external service wizard to configure location properties that the adapter uses to generate the service.

Before you begin

Ensure that you have configured the business object.

About this task

To configure location properties for your module follow this procedure:

Procedure

1. In the Specify the Location Properties window, select an existing module or create a new one.
   - To use an existing module, select its name from the **Module** list.

     Important: If the module contains an interface or business object with the same name as that you are now configuring, the original interface or business object in the module is replaced by the new version.
   - To create a new module:
     a. Click **New**.
     b. In the Select a Business Integration Project Type window, select **Module** and click **Next**.
     c. In the Create a Module window, type a name for the module in the **Module name** field.
     d. To retain the service description files (the `.import` and the `.wsdl` files) to be located in the default folder in the module, leave the **Use default location** check box selected. To specify a different folder in the module, clear the **Use default location** check box, and then click **Browse** to specify a different folder in the **Location** field.
     e. To automatically open the module in the assembly diagram in Integration Designer when the wizard closes, select the **Open the module assembly diagram** check box.
     f. Click **Finish** to create the module.

Figure 48. Specifying the location properties

2. Specify the namespace you want to use for your inbound interface.
   - Select **Use the default namespace** check box to retain the inbound interface to use the default derived namespace. By default, this check box is selected.
   - To specify a different namespace, clear **Use the default namespace** check box and type a different value in the **Namespace** field.
3. Specify the folder in the new module where the service description is to be saved. In the **Folder** field, type the folder name or browse to an existing folder. If you do not specify a folder name, the artifacts (the import, XSD, and WSDL files) are stored in the root folder of the module (the folder with the module name).
4. In the **Name** field, accept the default import name or type a different name.
5. If you want to save business objects in a library where they can be used by other modules, select **Save business objects to a library** check box and specify the location of the library in the **Library** field.
6. In the **Description** field, type a descriptive comment about the module.
7. Click **Finish** to complete the setting of location properties.

   Note: If the Model Changed window is displayed, click **Yes**.

Results

The wizard exits. The artifacts are generated.

Chapter 5. Modifying artifacts

Often business requirements mandate changes to the backend enterprise information system (EIS) data structures. These changes call for regeneration and reconfiguration of artifacts (import and export) that were previously generated using the external service wizard.

A few business scenarios where the output from one enterprise service discovery flow can be reused in successive flows, are outlined as follows:

- When you want to add a new object to the object set.
- When you want to modify configurations on selected objects like changes to operations, operation names, and service level settings like security, transactions, and reliability.
- When you want to remove a discovered object from the object set.
- When you want to rediscover existing objects in the service to synchronize the service if the objects in the back-end system have been updated.

To modify existing artifacts, you can invoke the wizard in one of the following ways. The external service wizard is initialized with previously configured settings.

- In the assembly editor, select the component you want to modify, right-click, and select **Edit Binding**.
- In the Business Integration view, select the component you want to modify, right-click, and select **Edit Binding**.
- Select the component in the assembly editor and select the Properties view. In the Binding tab, click the **Edit** link.

Note: The Edit Binding option is available for artifacts generated using IBM Integration Designer 7.0 only. If you are importing a project interchange from an earlier version of IBM Integration Designer, the Edit Binding option is not available. If you have made any manual changes to the configuration, running the wizard again will overwrite these changes.

Modifying service import

Modify an import component by rediscovering and reconfiguring the objects using the Edit Binding option in IBM Integration Designer.

About this task

You can invoke the external service wizard to modify the information of a service import interface. The wizard automatically populates the existing information for the selected import interface. You can modify the objects and services, and then regenerate the import component with the modified data.

Procedure

1. Invoke the external service wizard for the selected service interface import component using one of the following methods.
   - In the assembly editor, select the component you want to modify, right-click and select **Edit Binding**.
   - In the Business Integration view, select the component you want to modify, right-click and select **Edit Binding**.

- Select the interface in the assembly editor and select the Properties view. In the Binding tab, click the **Edit** link.

The Find Objects in the Enterprise System window of the external service wizard is displayed. The external service wizard automatically populates the existing configuration details for the selected import interface.

2. In the Find Objects in the Enterprise System window, make the required changes. For more information about discovering objects, see "Discovering and selecting objects" on page 49.

   Note: To change the connection properties for the external service wizard, click **Back** and change the properties in the Specify the Discovery Properties window. For more information see, "Setting connection properties for the external service wizard" on page 47.

   a. To modify the configuration of an object from the **Selected objects** list, select the object name and then click the ✎ (Edit) icon.

   b. To remove an object from the **Selected objects** list, select the object name, and then click the [<] (Remove) button.

3. Click **Next**. If you click **Cancel**, the changes you made in the previous step does not take effect.

4. In the Specify Composite Properties window, you can modify the existing operations or add more operations to the selected object. For more information about the configuration procedure, refer to "Configuring the selected objects" on page 53.

5. Click **Next**.

6. In the Service Generation window, modify the service operations if required.

7. Click **Finish**. The artifacts are regenerated.

8. Complete any other required manual configuration.

Results

The artifacts are updated.

What to do next

You can test and deploy your module.

Modifying service export

Modify an export component by rediscovering and reconfiguring the objects using the Edit Binding option in IBM Integration Designer.

About this task

You can invoke the external service wizard to modify the information of a service export interface. The wizard automatically populates the existing information for the selected export interface. You can modify the objects and services, and then regenerate the export component with the modified data.

Procedure

1. Invoke the external service wizard for the selected service interface export component using one of the following methods.

- In the assembly editor, select the component you want to modify, right-click and select **Edit Binding**.
- In the Business Integration view, select the component you want to modify, right-click and select **Edit Binding**.
- Select the interface in the assembly editor and select the Properties view. In the Binding tab, click the **Edit** link.

The Find Objects in the Enterprise System window of the external service wizard is displayed. The external service wizard automatically populates the existing configuration details for the selected export interface.

2. In the Find Objects in the Enterprise System window, make the required changes. For more information about discovering objects, see "Discovering and selecting objects" on page 63.

   Note: To change the connection properties for the external service wizard, click **Back** and change the properties in the Specify the Discovery Properties window. For more information see, "Setting connection properties for the external service wizard" on page 47.

   a. To modify the configuration of an object from the **Selected objects** list, select the object name and then click the ⬦ (Edit) icon.

   b. To remove an object from the **Selected objects** list, select the object name,

      and then click the ⬦ (Remove) button.

3. Click **Next**. If you click **Cancel**, the changes you made in the previous step does not take effect.

4. In the Specify Composite Properties window, you can modify the existing operations or add more operations to the selected object. For more information about the configuration procedure, refer to "Configuring the selected objects" on page 67.

5. Click **Next**.

6. In the Service Generation window, modify the service operations if required.

7. Click **Finish**. The artifacts are regenerated.

8. Complete any other required manual configuration.

Results

The artifacts are updated.

What to do next

You can test and deploy your module.

Chapter 6. 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.

Results

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

What to do next

Deploy the module.

Chapter 7. 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 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 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 2 Connector (J2C) architecture.

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 J2EE 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**.
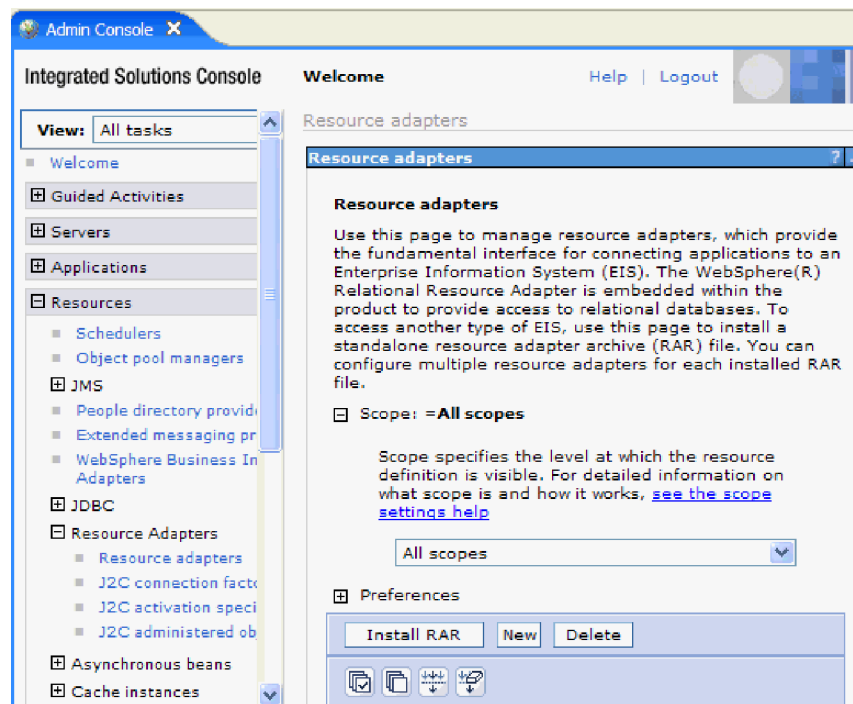
Figure 49. The Install RAR button on the Resource adapters page

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. 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. 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 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 50. 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 administrative console before configuring troubleshooting tools.

Chapter 8. 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.

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.

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 51. The Manage Modules selection in the Configuration tab

6. Under **Modules**, click **Manage Modules**.
7. Click **IBM WebSphere Adapter for Enterprise Content Management**.
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 118 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 CMIS 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.
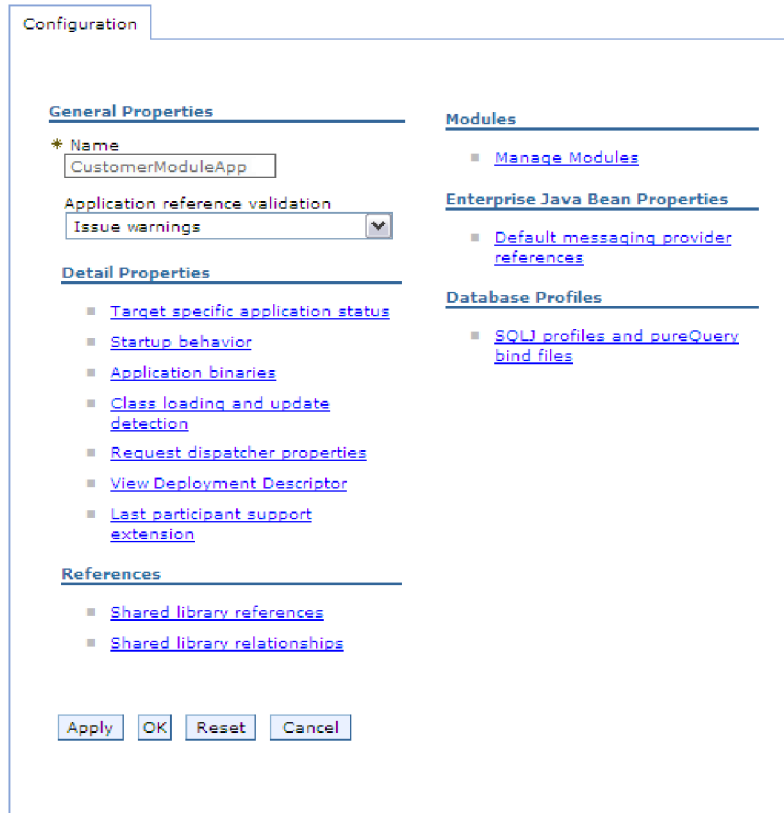
Figure 52. The Manage Modules selection in the Configuration tab

6. Under **Modules**, click **Manage Modules**.
7. Click **IBM WebSphere Adapter for Enterprise Content Management**.
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 Enterprise Content Management. 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 (J2C) connection factory properties" on page 120 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.
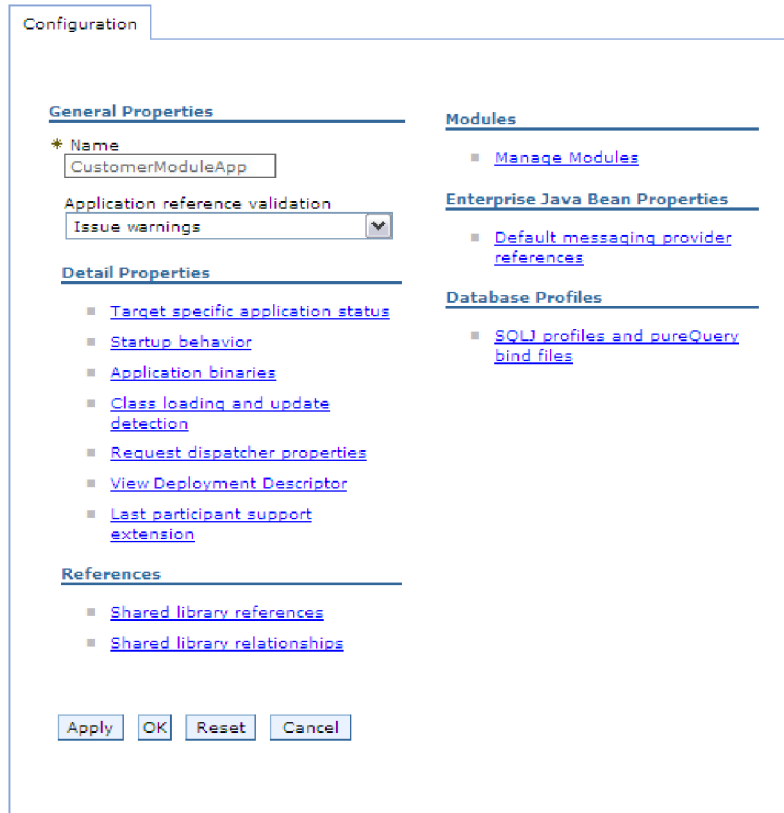
Figure 53. The Manage Modules selection in the Configuration tab

6. Under **Modules**, click **Manage Modules**.
7. Click **IBM WebSphere Adapter for Enterprise Content Management**.
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.
    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.

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 Enterprise Content Management**.
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 118 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 CMIS 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 Enterprise Content Management**.
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.
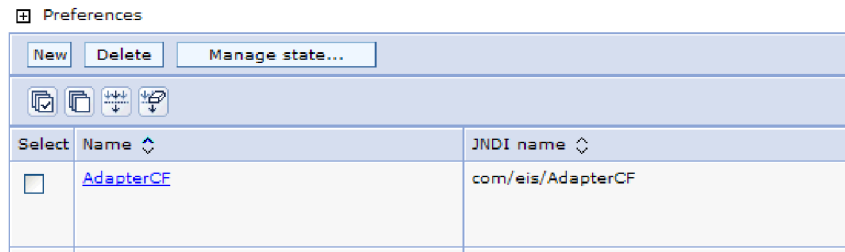
Figure 54. User-defined connection factories for use with the resource adapter

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 Enterprise Content Management. 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 (J2C) connection factory properties" on page 120 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 Enterprise Content Management**.
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. Select a message listener type.

   e. Click **OK**.

   f. 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.

    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 Enterprise Content Management. 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 administrative console in IBM Business Process Manager or WebSphere Enterprise Service Bus.

About this task

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 107.
2. Generate at least one outbound request 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.
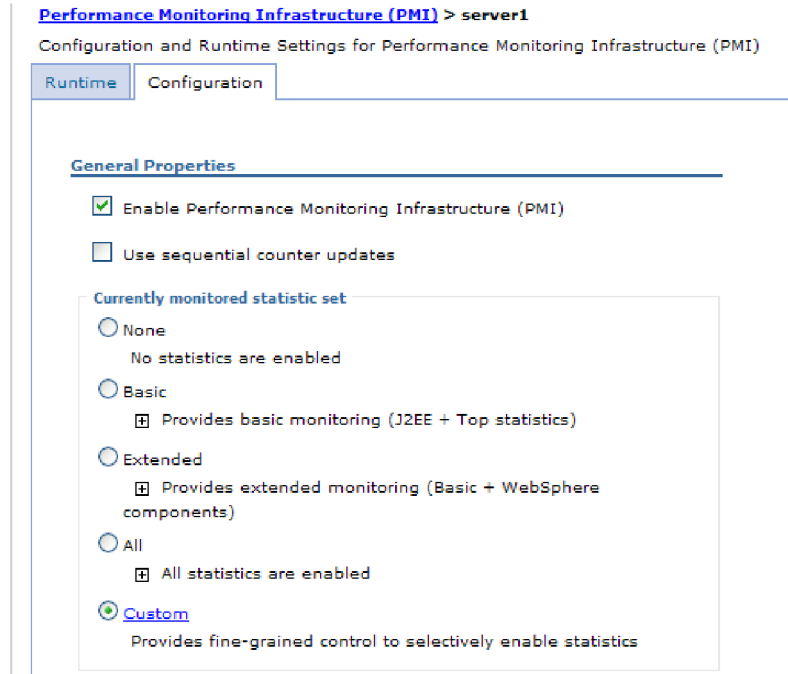
Figure 55. Enabling Performance Monitoring Infrastructure

     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.
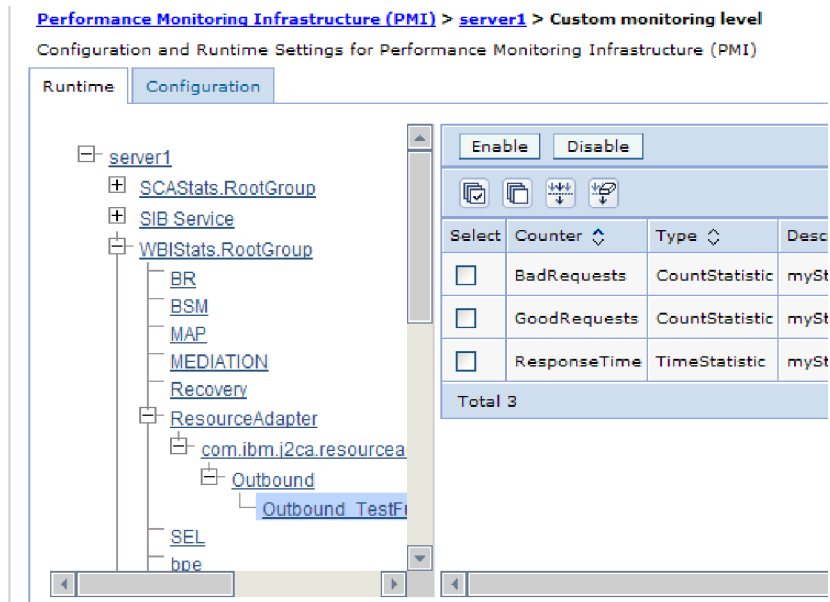
Figure 56. Runtime tab used for configuring PMI

 e. Click **WBIStats.RootGroup**. This is a PMI sub module for data collected in the root group. This example uses the name WBIStats 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 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.
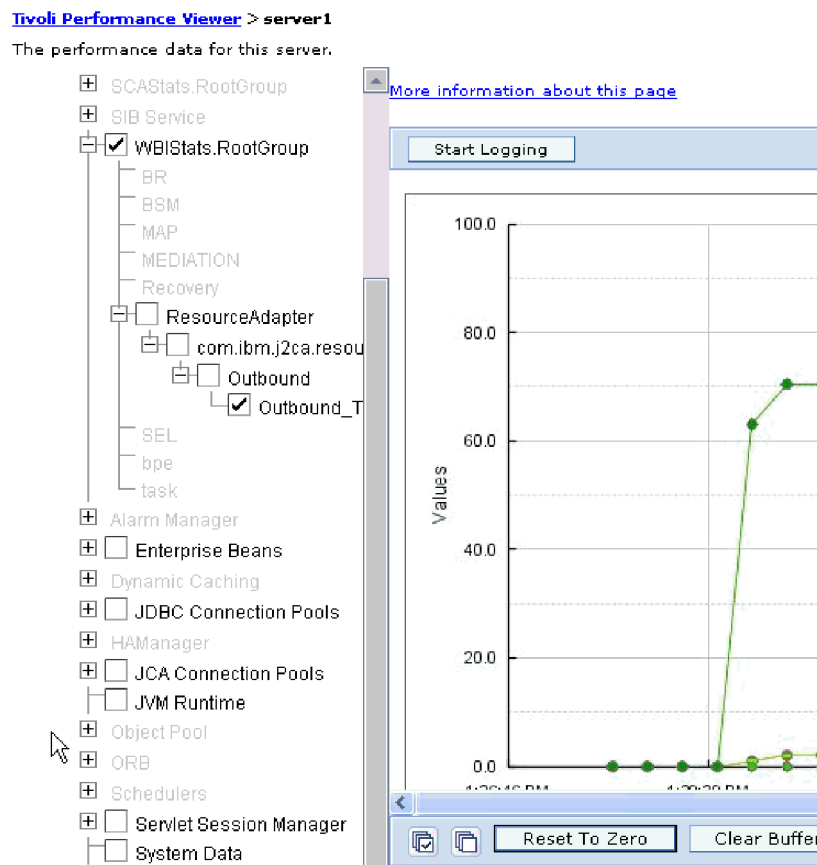
Figure 57. Adapter performance statistics, using graph view

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.
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 9. Troubleshooting and support

Common troubleshooting techniques and self-help information help you identify and solve problems quickly.

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 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/v7r5mx/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** > **Application Servers**.
2. Click the name of the server that you want to work with.
3. Under **Troubleshooting**, click **Logs and trace**.
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 Enterprise Content Management only, select the **com.ibm.j2ca.ecm.*** 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. 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 > 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, in the Modules list, click **Manage Modules**.
4. In the list of modules, click IBM WebSphere Adapter for Enterprise Content Management.
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.

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 thereby 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 located 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.

Solutions to common problems

Some of the problems you might encounter while running WebSphere Adapter for Enterprise Content Management 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.

Resolving file processing error

Problem

If there are documents in the Event Subscription folder when the adapter begins to look for events, these documents will be skipped and will not be processed. Due to the presence of these documents, the number of events processed by the Adapter in each poll cycle will be less than the value in the PollQuantity property.

If the number of documents created by user exceeds the value of the PollQuantity property, the Adapter will not pick up any files.

Workaround:

This issue can be resolved in the following manner
- by increasing the value of the PollQuantity property to a larger value
- by moving the documents created by the user, from the subscription folder.

Note: It is advisable not to create any user documents in Event Subscription folder in the CMIS server.

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 runtime, the adapter will return 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 Enterprise Content Management version 7.5, the following error message is displayed: IBM WebSphere Adapter for Enterprise Content Management has loaded 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. When you install multiple adapters with different CWYBS_AdapterFoundation.jar versions, the adapter returns the ResourceAdapterInternalException message, due to a version conflict. To overcome this conflict, you must migrate all adapters to the same version level. For further assistance, contact WebSphere Adapters Support for help.

Solution

Migrate all adapters to the same version level.

For further assistance, visit http://www-947.ibm.com/support/entry/portal/ Overview/Software/WebSphere/WebSphere_Adapters_Family.

'No LoginModules configured for FileNetP8WSI' exception

During inbound processing, if you get the exception **No LoginModules configured for FileNetP8WSI**, you have to add arguments in the Java Virtual Machine.

Refer to "System setup for inbound processing" on page 60 for information on adding arguments.

Connection unavailable after Resource Adapter project is closed and reopened

The Adapter for Enterprise Content Management cannot inspect the CMIS server if you close and reopen the adapter module during an EMD run. To resolve this problem, restart your IBM® Integration Designer instance.

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-947.ibm.com/ support/entry/portal/Overview/Software/WebSphere/ WebSphere_Adapters_Family 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 Enterprise Content Management, 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 Adapters, visit this address:

http://www.ibm.com/support/search.wss?tc=SSMKUK&rs=695&rank=8 &dc=DB520+D800+D900+DA900+DA800+DB560&dtm.

Plug-in for IBM Support Assistant

WebSphere Adapter for Enterprise Content Management provides a plug-in for IBM Support Assistant, which is a free, local software serviceability workbench. The plug-in supports the dynamic trace feature. For information about installing or using IBM Support Assistant, visit this address:

http://www.ibm.com/software/support/isa/.

Chapter 10. Reference

Detailed information about business objects, adapter properties (enterprise service discovery properties, resource adapter properties, managed (J2C) connection factory properties, activation specification properties, and interaction specification properties), messages, and related product information is provided for your reference.

Configuration properties

IBM WebSphere Adapter for Enterprise Content Management has several categories of configuration properties, which you set with the external service wizard while generating or creating objects and services. You can change the resource adapter, managed connection factory, and activation specification properties after you deploy the application to IBM Business Process Manager or WebSphere Enterprise Service Bus.

Guide to information about properties

The properties used to configure WebSphere Adapter for Enterprise Content Management 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	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. Removing a default value from a required field on the external service wizard *will not change that default value*. 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 administrative console. Possible values are **Yes** and **No**. Sometimes a property is required only when another property has a specific value. When this is the case, the table will note this dependency. For example, • 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	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 will state No default value. The word None is an acceptable default value, and does not mean that there is no default value.
Unit of measure	Specifies how the property is measured, for example in kilobytes or seconds.

Row	Explanation
Property type	Describes the property type. Valid property types include: • Boolean • String • Integer
Usage	Describes usage conditions or restrictions that might apply to the property. For instance, here is how a restriction would be documented: For Rational® Application Developer for WebSphere Software version 6.40 or earlier, the password: • Must be uppercase • Must be 8 characters in length For versions of Rational Application Developer for WebSphere Software later than 6.40, the password: • Is not case sensitive • Can be up to 40 characters in length. 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.
Example	Provides sample property values, for example: "If Language is set to JA (Japanese), code page number is set to 8000".
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**.

Outbound configuration properties

IBM WebSphere Adapter for Enterprise Content Management 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 administrative console, but connection properties for the external service wizard cannot be changed after deployment.

Connection properties for the wizard

External service connection properties are used to establish a connection between the external service wizard, a tool that is used to create business objects, and the CMIS server. These properties specify such things as connection configuration, bidirectional transformation properties, and logging options for the wizard. After a connection is established, the wizard can discover in the CMIS server the metadata it needs to create business objects.

The following table lists and describes the connection properties. These properties can only be configured using the wizard and cannot be changed after deployment. A complete 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" on page 115.

Table 1. Connection properties for the external service wizard

Property name in the wizard	Description
"Endpoint address of the CMIS server"	The URL pointing to the CMIS server end-point.
"User name (UserName)"	The CMIS server user name.
"Password (Password)"	The password for the corresponding user name.
"Repository Service URL of the CMIS Server" on page 118	The URL pointing to the CMIS server Repository Service.

Endpoint address of the CMIS server

This property specifies the URL of the CMIS server end-point.

Table 2. Endpoint address of the CMIS server

Required	Yes
Default	No default value
Property type	String
Usage	Must be a valid URL
Example	http://cmisserver.com/p8apis
Globalized	No
Bidi supported	No

User name (UserName)

This property specifies the user name to connect to the CMIS server.

Table 3. user name to connect to the CMIS server

Required	Yes
Default	No default value
Property type	String
Usage	The user name to connect to the CMIS server. Typing an incorrect user name prevents the adapter from accessing the CMIS server.
Globalized	No
Bidi supported	Yes

Password (Password)

This property specifies the password for the CMIS server user name.

Table 4. Password details

Required	Yes
Default	No default value
Property type	String

Table 4. Password details (continued)

Usage	The password for the CMIS server user name. Typing an incorrect password prevents the adapter from accessing the CMIS server.
Globalized	No
Bidi supported	Yes

Repository Service URL of the CMIS Server

This property specifies the URL of the Repository Service of the CMIS server.

Table 5. URL of the Repository Service of the CMIS server

Required	Yes
Default	Endpoint Address of the CMIS Server + **/RepositoryService**
Property type	String
Usage	Must be a valid URL
Example	http://cmisserver.com/p8apis/RepositoryService
Globalized	No
Bidi supported	No

Resource adapter properties

The resource adapter properties control the general operation of the adapter, such as specifying the namespace for business objects. You set the resource adapter properties using the external service wizard when you configure the adapter. After deploying the adapter, use the administrative console to change these properties.

The following table lists the resource adapter properties and their purpose. A complete description of each property is provided in the sections that follow the table.

Table 6. Resource adapter properties for the Adapter for Enterprise Content Management

Name		
In the wizard	**In the 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" on page 119	hideConfidentialTrace	Specifies whether to disguise potentially sensitive information by writing X strings instead of user data in the log and trace files.

Adapter ID

This property identifies a specific deployment, or instance, of the adapter.

Table 7. Adapter ID details

Required	Yes
Default	001
Property type	String

Table 7. Adapter ID details (continued)

Usage	This property identifies the adapter instance in log and trace files, and also helps identify the adapter instance while monitoring adapters. The adapter ID is used with an adapter-specific identifier, ECMRA, 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 ECMRA001. If you run multiple instances of the same adapter, ensure that the first 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 Enterprise Content Management to 001 and 002. The component IDs for those instances, ECMRA001 and ECMRA002, 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 cannot examine the log and trace information for each adapter instance because the component ID for both instances is truncated. 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	Yes
Bidi supported	No

Disguise user data as "XXX" in log and trace files

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 8. 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.

Table 8. Disguise user data as "XXX" in log and trace files details (continued)

Globalized	No
Bidi supported	No

Managed (J2C) connection factory properties

Managed connection factory properties are used by the adapter at run time to create an outbound connection instance with the CMIS server.

You set the managed connection factory properties using the external service wizard and can change them using the IBM Integration Designer Assembly Editor, or after deployment through the IBM Business Process Manager administrative console.

The following table lists the managed connection factory properties. A complete 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 understanding property details.

Note: The external service wizard refers to these properties as managed connection factory properties and the IBM Business Process Manager administrative console refers to them as (J2C) connection factory properties.

Table 9. Managed connection factory properties

Property name		Description
In the wizard	**In the administrative console**	
"Adapter ID" on page 121	adapterID	Identifies the adapter instance for PMI events and for logging and tracing.
"Disguise user data as "XXX" in log and trace files" on page 121	hideConfidentialTrace	Specifies whether to disguise potentially sensitive information by writing X strings instead of user data in the log and trace files.
"Maximum Number of retries in case of system connection failure" on page 122	connectionRetryLimit	The adapter will try connecting to the Enterprise Information System (EIS) for a specified number of tries. Select only if you want to reduce the number of connection exceptions in the outbound operation. If selected, adapter will validate the connection for each outbound request.
"Time between retries in case of system connection failure (milliseconds)" on page 122	connectionRetryInterval	Specifies the time interval between attempts to restart the event listeners.
"Endpoint Address of the CMIS server" on page 123	contextRootEndpointAddress	Specifies the name or address of the server that hosts the CMIS server.
"Navigation Service URL of the CMIS server" on page 123	navigationServiceEndpoint	Specifies the URL to locate the Navigation Service of the CMIS server.
"Object Service URL of the CMIS server" on page 123	objectServiceEndpoint	Specifies the URL to locate the Object Service of the CMIS server.
"Password" on page 124	password	Specifies the password of the user account of the adapter in the CMIS server.
"User name " on page 124	userName	Specifies the name of the user account of the adapter in the CMIS server.

Table 9. Managed connection factory properties (continued)

Property name		Description
In the wizard	**In the administrative console**	
"Versioning Service URL of the CMIS server" on page 124	versioningServiceEndpoint	Specifies the URL to locate the Versioning Service of the CMIS server.

Adapter ID

This property identifies a specific deployment or instance of the adapter.

Table 10. Adapter ID details

Required	Yes
Default	001
Property type	String
Usage	This property identifies the adapter instance in log and trace files, and also helps identify the adapter instance while monitoring the adapters. The adapter ID is used with an adapter-specific identifier, ECMRA, 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 ECMRA001. If you run multiple instances of the same adapter, ensure that the first 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 Enterprise Content Management to 001 and 002. The component IDs for those instances, ECMRA001 and ECMRA002, 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 cannot examine the log and trace information for each adapter instance because the component ID for both instances is truncated. 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	Yes
Bidi supported	No

Disguise user data as "XXX" in log and trace files

This property specifies whether to replace user data in the log and the trace files with a string of X's to prevent unauthorized disclosure of potentially sensitive data.

Table 11. 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

Maximum Number of retries in case of system connection failure

This property specifies the number of times the adapter attempts to create a connection to the Enterprise Information System (EIS). The adapter will try connecting to the EIS for the specified number of times. Select only if you want to reduce the number of connection exceptions in the outbound operation. If you select this option, the adapter will validate the connection for each outbound request.

Table 12. Reset Client details

Required	No
Possible values	Integers
Default	0
Property type	Integer
Usage	Only positive values are valid.
	When the adapter encounters an error related to the outbound connection, it retries to establish 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 "Time between retries in case of system connection failure (milliseconds)."
	If the value is 0, the adapter does not perform any EIS connection validation and executes the outbound operation.
	if the value is > 0, then during each request the adapter validates if the EIS connection is active. • If the connection is valid the operation is completed. • if connection is invalid, the adapter invalidates the current managed connection and a new managed connection is created (new physical connection)
Globalized	No
Bidi supported	No

Time between retries in case of system connection failure (milliseconds)

This property specifies the time interval between attempts to connect to the Enterprise Information System (EIS).

Table 13. Time between retries in case of system connection failure details

Required	No
Possible Values	Positive Integers
Default	`60000`
Unit of measure	Milliseconds
Property type	Integer
Usage	When the adapter encounters an error related to the outbound connection, this property specifies the time interval that the adapter waits in between attempts to reestablish an outbound connection. It is disabled by default and is only enabled when the value of "Maximum Number of retries in case of system connection failure" on page 122 is greater than 0.
Globalized	No
Bidi supported	No

Endpoint Address of the CMIS server

This property specifies the URL of the CMIS server end-point.

Table 14. Endpoint address details

Required	Yes
Default	No default value
Property type	String
Usage	Must be a valid URL
Example	`http://cmisserver.com/p8apis`
Globalized	No
Bidi supported	No

Navigation Service URL of the CMIS server

This property specifies the URL of the Navigation Service of the CMIS server.

Table 15. URL of the Repository Service of the CMIS server

Required	Yes
Default	Endpoint Address of the CMIS Server + **`/NavigationService`**
Property type	String
Usage	Must be a valid URL
Example	http://cmisserver.com/p8apis/NavigationService
Globalized	No
Bidi supported	No

Object Service URL of the CMIS server

This property specifies the URL of the Object Service of the CMIS server.

Table 16. URL of the Repository Service of the CMIS server

Required	Yes

Table 16. URL of the Repository Service of the CMIS server (continued)

Default	Endpoint Address of the CMIS Server + **/ObjectService**
Property type	String
Usage	Must be a valid URL
Example	http://cmisserver.com/p8apis/ObjectService
Globalized	No
Bidi supported	No

Password

This property specifies the password of the user account of the adapter on the CMIS server.

Table 17. Password details

Required	Yes
Default	No default value
Property type	String
Usage	The password for the CMIS server user name. Typing an incorrect password prevents the adapter from accessing the CMIS server.
Globalized	No
Bidi supported	No

User name

This property specifies the user name to connect to the CMIS server.

Table 18. User name details

Required	Yes
Default	No default value
Property type	String
Usage	The user name for connecting to the CMIS server. Typing an incorrect user name prevents the adapter from accessing the CMIS server.
Globalized	No
Bidi supported	No

Versioning Service URL of the CMIS server

This property specifies the URL of the Versioning Service of the CMIS server.

Table 19. URL of the Repository Service of the CMIS server

Required	Yes
Default	Endpoint Address of the CMIS Server + **/VersioningService**
Property type	String
Usage	Must be a valid URL
Example	http://cmisserver.com/p8apis/VersioningService
Globalized	No

Table 19. URL of the Repository Service of the CMIS server (continued)

Bidi supported	No

Interaction specification properties

Interaction specification, or InteractionSpec, properties control the interaction for an operation. The external service wizard sets the interaction specification properties when you configure the adapter. Typically, you do not need to change these properties. However, some properties for outbound operations can be changed by the user. For example, you might increase the value of the interaction specification property that specifies the maximum number of records to be returned by a RetrieveAll operation, if your RetrieveAll operations do not return complete information. To change these properties after the application is deployed, use the assembly editor in IBM Integration Designer. The properties reside in the method binding of the import.

Table 20 lists and describes the interaction specification property that you set. For information about how to read the property detail tables in the sections that follow, see "Guide to information about properties" on page 115.

Table 20. Interaction specification property for the Adapter for Enterprise Content Management

Property name	Description
"Maximum records for RetrieveAll operation"	Maximum number of result sets to return during a RetrieveAll operation

Maximum records for RetrieveAll operation

This property specifies the maximum number of records to return for a RetrieveAll operation.

Table 21. Maximum records for RetrieveAll operation details

Required	Yes
Default	100

Table 21. Maximum records for RetrieveAll operation details (continued)

Usage	Use this property to control the number of records returned by the RetrieveAll operation.
	• If the value -1, the RetrieveAll operation returns all records matching the query. The value for this property is set to -1 internally when you select the **Return all records for RetrieveAll operation** check box.
	• If the value is zero or less than zero except -1, the adapter returns the exception MatchesExceededLimitException.
	• If the value is greater than zero and the number of matches in the database exceeds the value of this property, the adapter returns the exception MatchesExceededLimitException. If the RetrieveAll operation does not return all the records, increase this value. For example, if you set the value to 50 and the table contains 100 records, the adapter returns the exception MatchesExceededLimitException.
	• If the value is greater than zero and the number of matches in the database is lesser than the value of this property, the RetrieveAll operation returns all records. For example, if you set the value to 50 and the table contains 25 records, the RetrieveAll operation returns all the 25 records.
Property type	Integer
Globalized	No
Bidi supported	No

Inbound configuration properties

WebSphere Adapter for Enterprise Content Management 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 administrative console, but connection properties for the external service wizard cannot be changed after deployment.

Connection properties for the wizard

External service connection properties are used to establish a connection between the external service wizard, a tool that is used to create business objects, and the CMIS server. These properties specify such things as connection configuration, bidirectional transformation properties, and logging options for the wizard. Once a connection is established, the wizard can discover in the CMIS server the metadata it needs to create business objects.

The following table lists and describes the connection properties. These properties can only be configured using the wizard and cannot be changed after deployment. A complete 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" on page 115.

Table 22. Connection properties for the external service wizard

Property name in the wizard	Description
"Connection" on page 127	The protocol used for connection
"Server" on page 127	The server name or IP address of the CMIS end point

Table 22. Connection properties for the external service wizard (continued)

Property name in the wizard	Description
"Path"	The context root
"Port Number" on page 128	The port number
"User name (UserName)" on page 128	The CMIS server user name
"Password (Password)" on page 128	The password for the corresponding user name
"JAAS Stanza" on page 129	The JAAS Stanza for a FileNet Content Engine connection
"Repository Service URL of the CMIS Server" on page 129	The URL pointing to the CMIS server Repository Service
"Endpoint URI" on page 129	The URI to connect to FileNet Content Engine

Connection

This property specifies protocol used for connection.

Table 23. Connection

Required	Yes
Default	No default value
Property type	String
Usage	**http** or **https**
Globalized	No
Bidi supported	No

Server

This property specifies the server name or the IP address of the CMIS server end point .

Table 24. Server

Required	Yes
Default	No default value
Property type	String
Usage	Specify the server name or the IP address of the CMIS end point
Globalized	No
Bidi supported	No

Path

This property specifies the context root.

Table 25. Path

Required	Yes
Default	No default value
Property type	String
Usage	Specify the context root

Table 25. Path (continued)

Globalized	No
Bidi supported	No

Port Number

This property specifies the port number.

Table 26. Port number

Required	Yes
Default	9080 - WebSphere default
Property type	String
Usage	Select from the list or key in the port number
Globalized	No
Bidi supported	No

User name (UserName)

This property specifies the user name to connect to the CMIS server.

Table 27. User name to connect to the CMIS server

Required	Yes
Default	No default value
Property type	String
Usage	The user name to connect to the CMIS server. Typing an incorrect user name prevents the adapter from accessing the CMIS server.
Globalized	No
Bidi supported	Yes

Password (Password)

This property specifies the password for the CMIS server user name.

Table 28. Password details

Required	Yes
Default	No default value
Property type	String
Usage	The password for the CMIS server user name. Typing an incorrect password prevents the adapter from accessing the CMIS server.
Globalized	No
Bidi supported	Yes

JAAS Stanza

This property specifies the JAAS Stanza for the FileNet Content Engine connection.

Table 29. JAAS Stanza

Required	Yes
Default	No default value
Property type	String
Usage	Specify the Jaas Stanza for FileNet connection.
Example	`FileNetP8WSI`
Globalized	No
Bidi supported	No

Repository Service URL of the CMIS Server

This property specifies URL of the Repository Service of the CMIS server.

Table 30. URL of the Repository Service of the CMIS server

Required	Yes
Default	Endpoint Address of the CMIS Server + **`/RepositoryService`**
Property type	String
Usage	Must be a valid URL
Example	http://cmisserver.com/p8apis/RepositoryService
Globalized	No
Bidi supported	No

Endpoint URI

The URI to connect to FileNet Content Engine.

Table 31. Endpoint URI

Required	Yes
Default	No default value
Property type	String
Usage	Must be a valid URI
Globalized	No
Bidi supported	No

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 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 32. Activation specification properties

In the wizard	In the administrative console	Description
"Base events folder (baseEventFolder)" on page 131	baseEventFolder	The folder where all the events are stored
"Connection" on page 131	connection	The protocol used for connection
"JAAS Stanza" on page 131	fnJaazStanza	The JAAS stanza for the FileNet Content Engine connection
"Endpoint URI" on page 132	fnUri	The URI to connect to FileNet Content Engine
Navigation Service URL	navigationServiceEndpoint	URL used to traverse the folder hierarchy in the Content Management Repository
"Object Service URL of the CMIS server" on page 132	objectServiceEndpoint	URL to perform ID-based CRUD (Create, Retrieve, Update, Delete) operations on Objects
Failed events folder	FailedEventsFolder	The absolute path to the file folder on the local system where unsuccessfully processed e-mail events are archived in file format.
Host name	HostName	The IP address of the host where the mail server is running.
"Password (Password)" on page 133	Password	The password associated with the CMIS server user name.
"Path" on page 134	path	The context root
"Port Number" on page 134	portNumber	Port number
"Subscription" on page 134	subscriptions	The subscription details that are captured during discovery
"User name " on page 134	userName	The user name for an CMIS server.
"FileNet P8 User Name " on page 135	fnUserName	The FileNet P8 user name to connect to FileNet P8, and set up a subscription.
"FileNet P8 Password" on page 135	fnPassword	The FileNet P8 password to connect to FileNet P8, and set up a subscription.

Bidi format string (BIDIContextEIS)

This property indicates the bidi format for string type business data exchanged between the mail server and the adapter.

Table 33. 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

Table 33. Bidi format string details (continued)

Usage	A five-character string that identifies the bidirectional format used by the CMIS server.
	If the CMIS server that sends or receives data from the server uses a different format than ILYNN, the adapter converts the format prior to 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 CMIS server. This is done when you configure the module for the first time.
Example	ILYNN VRYNN VLYNN
Globalized	No
Bidi supported	No

Base events folder (baseEventFolder)

This property specifies the file folder on the local system where all the events are stored.

Table 34. Base events folder details

Required	No
Default	/ECMAdapterEvents
Property type	String
Usage	This property is populated and is not editable

Connection

This property specifies protocol used for connection

Table 35. Connection

Required	Yes
Default	No default value
Property type	String
Usage	**http** or **https**

JAAS Stanza

This property specifies the JAAS Stanza for the FileNet Content Engine connection.

Table 36. JAAS Stanza

Required	Yes
Default	No default value
Property type	String
Usage	Specify the Jaas Stanza for FileNet connection
Example	FileNetP8WSI

Endpoint URI

The URI to connect to FileNet Content Engine.

Table 37. Endpoint URI

Required	Yes
Default	No default value
Property type	String
Usage	Must be a valid URI

Navigation Service URL of the CMIS server

This property specifies URL of the Navigation Service of the CMIS server.

Table 38. URL of the Repository Service of the CMIS server

Required	Yes
Default	Endpoint Address of the CMIS Server + **/NavigationService**
Property type	String
Usage	Must be a valid URL
Example	http://cmisserver.com/p8apis/NavigationService

Object Service URL of the CMIS server

This property specifies URL of the Object Service of the CMIS server.

Table 39. URL of the Repository Service of the CMIS server

Required	Yes
Default	Endpoint Address of the CMIS Server + **/ObjectService**
Property type	String
Usage	Must be a valid URL
Example	http://cmisserver.com/p8apis/ObjectService

Failed events folder (FailedEventsFolder)

This property specifies the file folder on the local system where unsuccessfully processed e-mail events are archived in file format.

Table 40. Failed events folder details

Required	No
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 e-mail 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: ${FAILEDEVENTS_FOLDER}. See the topic on creating an environment variable in this documentation.

Host name (HostName)

This property specifies the IP address of the host where the mail server is running.

Table 41. Host name details

Required	No
Default	`localhost`
Property type	String
Usage	Specifies the IP address of the host where the mail server is running

Maximum connections (MaximumConnections)

This property specifies the maximum number of connections that the adapter can use for inbound event delivery.

Table 42. 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 43. 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

Password (Password)

This property specifies the password for the CMIS server user name.

Table 44. Password details

Required	Yes
Default	No default value
Property type	String
Usage	The password for the CMIS server user name. Typing an incorrect password prevents the adapter from accessing the CMIS server.

Path

This property specifies the context root

Table 45. Path

Required	Yes
Default	No default value
Property type	String
Usage	Specify the context root

Port Number

This property specifies the Port number

Table 46. Port number

Required	Yes
Default	9080 - WebSphere default
Property type	String
Usage	Select from the list or key in the Port number

Subscription

This property specifies subscription details that are captured during discovery

Table 47. Subscription

Required	Yes
Default	No default value
Property type	String
Usage	Specify the subscription details that are captured during discovery in the following format: `subscriptionName:;ObjectClass:;ObjectType:;Events:;RepoId: subscriptionName:<:yoursub-name>;ObjectClass:<my object class>;ObjectType:<Folder or Document>;Events:<your subscribed events>;RepoId:<Repository ID>`.

User name

This property specifies the user name to connect to the CMIS server.

Table 48. User name details

Required	Yes
Default	No default value
Property type	String
Usage	The user name for connecting to the CMIS server. Typing an incorrect user name prevents the adapter from accessing the CMIS server.

FileNet P8 User Name

This property specifies the user name to connect to the FileNet8 system.

Table 49. FileNet8 User name

Required	Yes
Default	No default value
Property type	String
Usage	The FileNet P8 user name for connecting to the FileNet8 system. Typing an incorrect user name prevents the adapter from accessing the FileNet8 system.
Bidi supported	Yes

FileNet P8 Password

This property specifies the password to connect to the FileNet8 system.

Table 50. FileNet8Password

Required	Yes
Default	No default value
Property type	String
Usage	The FileNet P8 password for connecting to the FileNet 8 system. Typing an incorrect password prevents the adapter from accessing the FileNet8 system.
Bidi supported	Yes

Globalization

WebSphere Adapter for Enterprise Content Management 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.

Support for globalization

The adapter is globalized to support single and multibyte character sets and deliver message text in the specified language.

Introduction

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, and 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 encoding for characters in most known character code sets (both single and multibyte). Therefore, when data is transferred between these integration system components, there is no need for character conversion.

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 globalization for business objects and adapter foundation classes (AFC) related properties.

Globalization support for outbound and inbound properties

The Adapter for Enterprise Content Management supports globalized character for the following outbound and inbound properties.

- All DocumentClass Properties
- All Folder Properties
- Managed Connection Factory Properties
- Activation Specification Properties
- Log files
- Traces

Adapter messages

View the messages issued by WebSphere Adapter for Enterprise Content Management at the following location.

Link to messages: http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5mx/topic/com.ibm.wbpm.ref.doc/topics/welc_ref_msg_wbpm.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 CWYEC are issued by WebSphere Adapter for Enterprise Content Management
- 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 Enterprise Content Management.

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://www14.software.ibm.com/webapp/wsbroker/redirect?version=pix&product=wps-dist&topic=bpmroadmaps.
- 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 7.5, information center, which includes IBM Business Process Manager, IBM WebSphere Enterprise Service Bus, and IBM Integration Designer information: http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r5mx/index.jsp.
- IBM Business Process Manager, version 7.0, information center, which includes IBM Business Process Manager, IBM WebSphere Enterprise Service Bus, and IBM Integration Designer information: http://publib.boulder.ibm.com/infocenter/dmndhelp/v7r0mx/index.jsp.

- WebSphere Adapters, version 6.2.x, information center: http://publib.boulder.ibm.com/infocenter/dmndhelp/v6r2mx/index.jsp.
- IBM WebSphere Adapters, version 7.5 installation on WebSphere Application Server, version 8.0 information: http://www-01.ibm.com/support/docview.wss?rs=695&uid=swg27011040.

developerWorks® resources

- WebSphere Adapter Toolkit
- WebSphere business integration zone

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Index

A

activation specification properties
  list of   129
  setting in administrative console   97, 101
adapter   46, 61
  information resources   136
  messages   136
  package files   109
  performance   104
  project, create   45
  related information   136
  samples and tutorials   136
  support and assistance   136
  technotes   136
adapter application
  starting   102
  stopping   103
Adapter for Enterprise Content Management module
  exporting as EAR file   89
  installing EAR file on server   90
  starting   102
  stopping   103
adapter implementation
  security   27
alias, authentication   43
authentication
  description   30
  in the wizard   30
  runtime environment   30
authentication alias
  J2C   30

B

business object, predefine   44
business objects
  how to view   49
Business objects
  supported operations   5

C

CEI (Common Event Infrastructure)   107
Common Event Infrastructure (CEI)   107
compatibility matrix   2
confidential data, disguising   28
confidential tracing   28
configuration properties
  inbound   126
configuring
  logging properties   109
  Performance Monitoring Infrastructure (PMI)   104
connector project   45
Create operation   5
custom properties
  activation specification   97, 101
  managed connection factory   95, 100

custom properties *(continued)*
  resource adapter   93, 99

D

debugging
  self-help resources   113
Delete operation   19
deployment   90
  production environment   88
  test environment   85
deployment environment   85
deployment options   31
developerWorks   137
disguising confidential data   28

E

EAR file
  exporting   89
  installing on server   90
ECM System setup   61
edit binding
  import component   80
embedded adapter
  activation specification properties, setting   97
  considerations for using   32
  managed connection factory properties, setting   95
  resource adapter properties, setting   93
  usage considerations   31
embedded adapters
  changing configuration properties   93
  setting activation specification properties   97
  setting managed (J2C) connection factory properties   95
  setting resource adapter properties   93
exporting module as EAR file   89
external service connection properties   117, 126
external service wizard
  connection properties   47, 61
  start up   47, 61

F

FFDC (first-failure data capture)   112
files
  SystemOut.log log file   111
  trace.log trace file   111
first-failure data capture (FFDC)   112

H

hardware and software requirements   2
hardware requirements   2
High Availability (HA)
  clustered environments   136

I

IBM Business Process Manager
  information   136
IBM Business Process Manager or WebSphere Enterprise Service Bus
  deploying to   88
IBM Business Process Manager, version 7.0, information   136
IBM i adapter   46
IBM Integration Designer
  information   136
  starting   44
  test environment   85
IBM WebSphere Adapter for Enterprise Content Management
  administering   93
IBM WebSphere Adapter Toolkit   137
  developerWorks resources   136
IBM WebSphere Enterprise Service Bus
  information   136
implementation, Java   86
import component   80
inbound
  configuration properties   126
Inbound event processing   24
inbound processing   46, 61
Inbound processing   24
installing EAR file   90
interaction specification properties
  changing   83
interaction specification property   125
iterative development
  connection-based editing   80
  Edit Binding   80
  import component   80

J

Java 2 security   27, 30
Java implementation   86

L

Log Analyzer   109
log and trace
  configure   109
Log and Trace Analyzer, support for   26
log and trace files   26
log files
  changing file name   111
  disabling   109
  enabling   109

143

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