iWay Software
An Information Builders Company

iWay

iWay Adapter for HL7 for BEA WebLogic User's Guide
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Preface

This documentation describes how to use the iWay Adapter for HL7 for BEA WebLogic. It is intended for developers to enable them to parse, transform, validate, store, and integrate health care information into the existing enterprise and pass information electronically, to partners, in HL7 mandated form.

How This Manual Is Organized

The following table lists the numbers and titles of the chapters and the appendix for this manual with a brief description of the contents of each chapter and appendix.

Chapter/Appendix		Contents
1	Introducing the iWay Adapter for HL7 for BEA WebLogic	Describes the components of the iWay Adapter for HL7 for BEA WebLogic and the process flow for the adapter.
2	Creating XML Schemas or Web Services for the iWay Adapter for HL7 for BEA WebLogic	Describes how to use iWay Application Explorer to create XML schemas and Web services for HL7.
3	Listening for Events in HL7	Describes how to use iWay Application Explorer to configure the adapter to listen for HL7 events.
4	Using Web Services Policy-Based Security	Describes how to configure Web services policy-based security.
5	Management and Monitoring	Describes how you can use managing and monitoring tools provided by iBSE and JCA to gauge the performance of your run-time environment.
6	Customizing HL7 Messages	Describes customizing HL7 messages using the Reference Interface Model (RIM).
A	Using Application Explorer in BEA WebLogic Workshop	Describes how to use iWay Java Swing Application Explorer running in BEA WebLogic Workshop to create XML schemas for HL7.
B	HL7 Document Index	Documents the reference material supplied with the iWay Adapter for HL7.

Documentation Conventions

The following table lists the conventions that apply in this manual and a description of each.

Convention	Description
`THIS TYPEFACE` or `this typeface`	Denotes syntax that you must enter exactly as shown.
`this typeface`	Represents a placeholder (or variable) in syntax for a value that you or the system must supply.
`underscore`	Indicates a default setting.
this typeface	Represents a placeholder (or variable) in a text paragraph, a cross-reference, or an important term.
this typeface	Highlights a file name or command in a text paragraph that must be lowercase.
this typeface	Indicates a button, menu item, or dialog box option you can click or select.
Key + Key	Indicates keys that you must press simultaneously.
`{ }`	Indicates two or three choices; type one of them, not the braces.
|	Separates mutually exclusive choices in syntax. Type one of them, not the symbol.
`...`	Indicates that you can enter a parameter multiple times. Type only the parameter, not the ellipsis points (…).
. . .	Indicates that there are (or could be) intervening or additional commands.

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If you bought the product directly from iWay Software, call Information Builders Customer Support Service (CSS) at (800) 736-6130 or (212) 736-6130. Customer Support Consultants are available Monday through Friday between 8:00 a.m. and 8:00 p.m. EST to address all your iWay Adapter for HL7 for BEA WebLogic questions. Information Builders consultants can also give you general guidance regarding product capabilities and documentation. Please be ready to provide your six-digit site code (*xxxx.xx*) when you call.

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To help our consultants answer your questions effectively when you call, please provide the following information:

- Your six-digit site code number (*xxxx.xx*).
- Your software configuration.

The following table lists the information to provide about your software configuration.

	Version-Build Date	HF/Service Pack	Patches	OS	Java Version
iWay Product					
Third-party Application Server					
EIS (adapter target)					

Note: For the EIS, ensure you record the application or database name and release level, including minor versions, for example, 4.6.1.

- The exact nature of the error or problem, specified as follows:
  - Steps to reproduce the problem.
  - Problem description (be as specific as possible).
  - Error message(s).

- To best define the problem, provide the following:
  - Screen captures of the error
  - Error output files
  - Trace files and log files
  - Log transaction
  - XML schemas and/or document instances
  - Other input documents (for example, transformations)
  - Configuration files (all are applicable):

    .xch files

    config.xml file

    base.xml file

    repository.xml file

    ibserepo.xml file

    .dic files

    .rules files
  - Environment variable settings:

    IWAY55

    IWAY55OEM

    CLASSPATH

    JAVA_HOME

    ACBDIR

    CBDIR (UNIX)
- Has the process, procedure, or query ever worked in its current form? Has it changed recently? If so, how (provide specific details)? How often does the problem occur?
- Can this problem be reproduced? If so, how? Can it be consistently reproduced?
- Have you tried to reproduce your problem in the simplest form possible?
- Do you have a trace file?
- How is the problem affecting your business? Is it halting development or production?
- Do you just have questions about functionality or documentation?

User Feedback

In an effort to produce effective documentation, the Documentation Services staff welcomes your opinions regarding this manual. Please use the Reader Comments form at the end of this manual to communicate suggestions for improving this publication or to alert us to corrections. You also can go to our Web site, http://www.iwaysoftware.com and use the Documentation Feedback form.

Thank you, in advance, for your comments.

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Contents

CHAPTER 1

Introducing the iWay Adapter for HL7 for BEA WebLogic

Topics:

- Process Flow for the iWay Adapter for HL7 for BEA WebLogic
- Components of the iWay Adapter for HL7 for BEA WebLogic
- Deployment Information for the iWay Adapter for HL7 for BEA WebLogic

The iWay Adapter for Healthcare Level 7 (HL7) transforms documents into XML format and transforms XML representations of HL7 documents back into HL7 format.

After information has been transformed into XML format, it can be integrated into back or front office systems through iWay application and data adapters that are available from the iWay Adapter Suite of products.

J2EE™ standard interfaces and protocols such as JCA, JDBC™, and JMS are also supported with the iWay Adapter for HL7 for BEA WebLogic. The same adapters can be used to obtain the information required to populate HL7 messages. For example, using the iWay Adapter for RDBMS, data extracted from a backend data source can be mapped to the iWay Adapter for HL7 for BEA WebLogic to produce a valid HL7 document.

Data dictionaries that describe XML format are used to map XML to HL7 format and HL7 format to XML format.

After structural integrity has been verified during the transformation stage, the Validation Engine performs validation, using a set of rules defined in an XML-formatted rules file.

- Where applicable, acknowledgment documents are returned to the sending application, but only if the incoming document is structurally valid. If the content validation fails, the system returns an error code in the acknowledgement document if one is expected.

Process Flow for the iWay Adapter for HL7 for BEA WebLogic

When a document is received by the iWay Adapter for HL7 for BEA WebLogic, it can be processed in a number of ways to aid integration. The iWay Adapter for HL7 for BEA WebLogic supports bi-directional transformation using XML as the intermediate protocol. This adapter is supplied with schemas that describe the HL7 document and can be used to map XML based information to HL7 form.

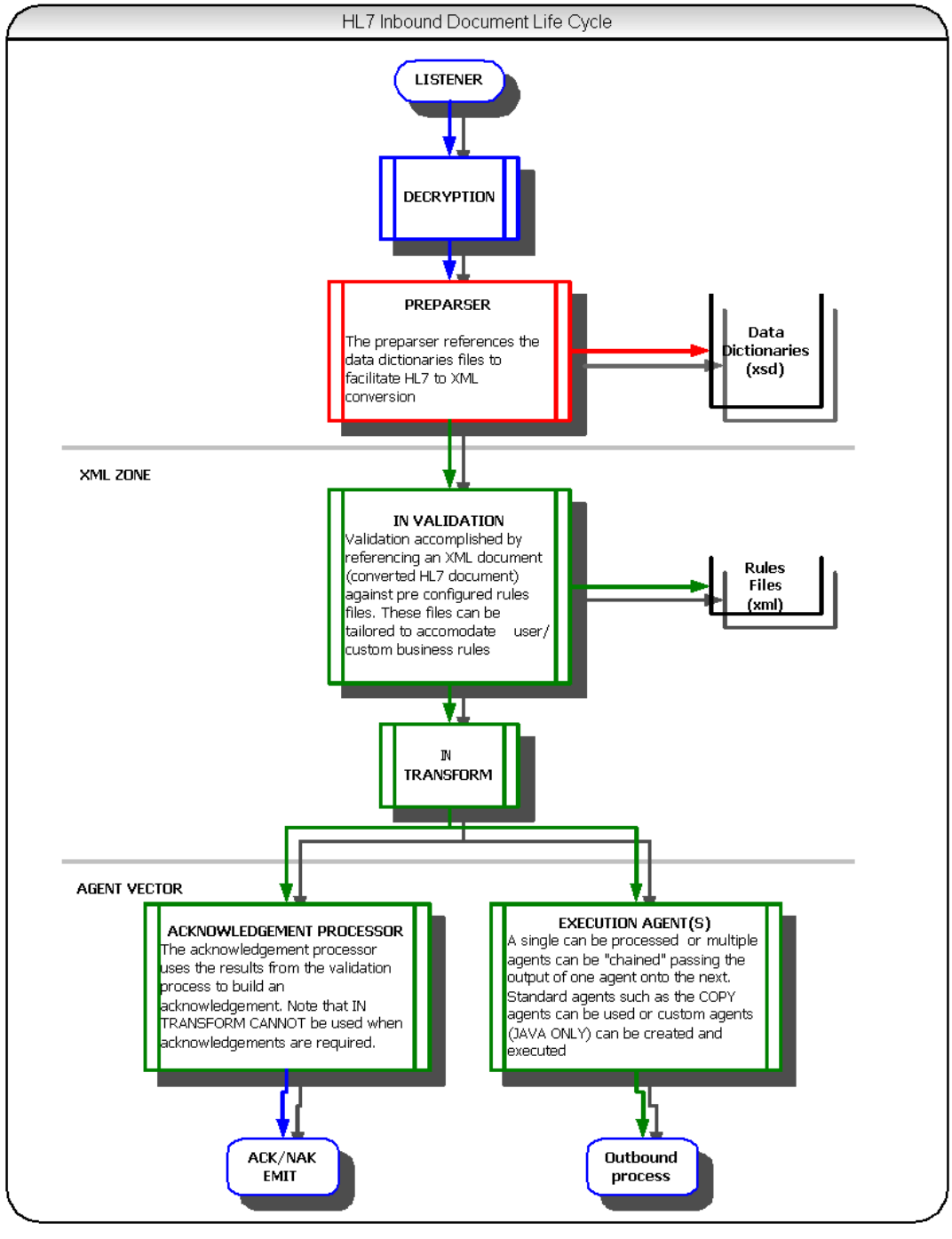
HL7 messages are validated in two ways. Structure is validated through data dictionaries. The dictionaries are used to parse and validate the structure of the message. Content is validated through a rules engine.

An HL7 document is validated by the use of a rule file. This file is an XML document that applies pre-built rules to elements in the HL7 message. You can customize the pre-built rules or write your own rules to apply additional business logic. Depending on the direction (for example, to or from HL7 format), the content validation occurs before or after structural validation. The following section describes how the transformation and validation works in inbound (receiving a HL7 message) and outbound (creating a HL7 message) scenarios.

Inbound Processing

TheiWay Adapter for HL7 for BEA WebLogic can "listen" for messages through configurable listeners. The first step in the process is decryption. This is followed by the pre-parse stage where documents are parsed and converted to XML format using data dictionaries to describe the document. These data dictionaries are in XML format and can be modified to tailor messages to the requirements of an installation (for example, Z segments).

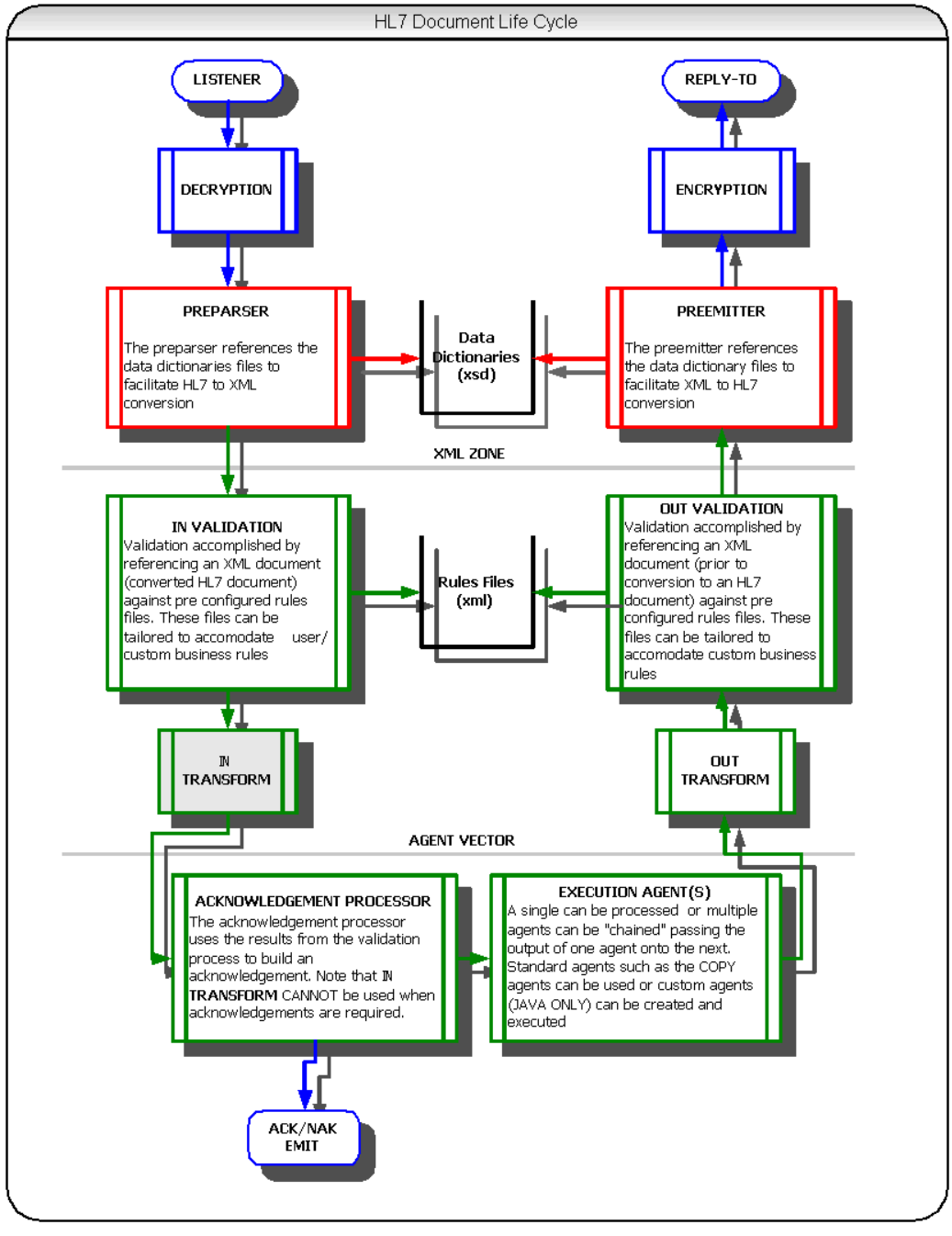
The following diagram describes the flow.



Outbound Processing

Outbound processing mirrors (in reverse) the inbound process. A document can be received in XML format and have business logic applied. The document then can be validated by the rules engine and transformed into a HL7 document at the pre-emit stage in the process.

Inbound and outbound processes also can be run in one pass as illustrated in the following diagram:


HL7 Document Life Cycle
LISTENER
DECRYPTION
PREPARSER
The preparser references the data dictionaries files to facilitate HL7 to XML conversion
Data Dictionaries (xsd)
REPLY-TO
ENCRYPTION
PREEMITTER
The preemitter references the data dictionary files to facilitate XML to HL7 conversion
XML ZONE
IN VALIDATION
Validation accomplished by referencing an XML document (converted HL7 document) against pre configured rules files. These files can be tailored to accomodate user/ custom business rules
Rules Files (xml)
OUT VALIDATION
Validation accomplished by referencing an XML document (prior to conversion to an HL7 document) against pre configured rules files. These files can be tailored to accomodate custom business rules
IN TRANSFORM
OUT TRANSFORM
AGENT VECTOR
ACKNOWLEDGEMENT PROCESSOR
The acknowledgement processor uses the results from the validation process to build an acknowledgement. Note that IN TRANSFORM CANNOT be used when acknowledgements are required.
EXECUTION AGENT(S)
A single can be processed or multiple agents can be "chained" passing the output of one agent onto the next. Standard agents such as the COPY agents can be used or custom agents (JAVA ONLY) can be created and executed
ACK/NAK EMIT

Components of the iWay Adapter for HL7 for BEA WebLogic

The following components are supplied with theiWay Adapter for HL7 for BEA WebLogic:

- Data dictionaries
- XML schemas
- Sample messages (in HL7 and XML form)
- Rules files and code set (lookup) files

Data Dictionaries

The structure of the HL7 documents is described in a set of schema documents represented in XML format. The four schema files are:

- messages_v*nn*.xsd
- segments_v*nn*.xsd
- fields_v*nn*.xsd
- datatypes_v*nn*.xsd

v*nn* represents the version number of the messages: v23, v231, or v24.

Each dictionary describes which members of the next lower level are expected to be present when constructing a valid member of the current level. For example, an A01 message is defined as a specific type of ADT message, where only certain segments are valid.

However, not all valid segments are required, and some may be repeated. A detailed example of the content of these files, the document ORU/R01, is included in Appendix B, *HL7 Document Index*.

The data dictionaries are accessed during the pre-parser and pre-emitter phases, during which time the document transformation occurs.

Messages

For an HL7 message to be converted from HL7 format to XML format, a representation of that message must exist in the data dictionary. The following example describes an acknowledgement message (ACK). The message contains three segments, MSH, MSA, and ERR, but only the first two are mandatory. The third is optional.

None of these segments may be repeated in the message. If a field can be repeated, then the attribute, maxOccurs, will be non-zero; if the number of repetitions is unlimited, the attribute will be set to "unbounded."

```
<!-- MESSAGE ACK -->
<!-- .. message definition ACK -->
<element name="ACK">
         <complexType>
            <sequence>
               <element minOccurs="1" maxOccurs="1" ref="MSH" />
               <element minOccurs="1" maxOccurs="1" ref="MSA" />
               <element minOccurs="0" maxOccurs="1" ref="ERR" />
                </sequence>
         </complexType>
</element>
```

The iWay Adapter for HL7 for BEA WebLogic supplies a Rules Engine that uses rules files to validate messages.

Segments

The segment sequence described in the previous section shows which segments make up a valid message. Each segment is further divided into fields that in turn are divided into components and sub-components.

The following example shows the fields that for the segment Accident Segment (ACC).

```
<!-- SEGMENT ACC -->
<element name="ACC">
  <complexType>
    <sequence>
      <element minOccurs="0" maxOccurs="1" ref="ACC_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="ACC_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="ACC_LOCATION" />
      <element minOccurs="0" maxOccurs="1" ref="ACC_AUTO_STATE" />
           <element minOccurs="0" maxOccurs="1" ref="ACC_JOB_IND" />
      <element minOccurs="0" maxOccurs="1" ref="ACC_DEATH_IND" />
    </sequence>
  </complexType>
</element>
```

The same convention is used to identify the fields that are required and those that can be repeated.

Fields

The fields referred to in the previous segments are described in the fields section of the Data Dictionary. The *ref* attribute of the element tag contains a matching value to the reference in the segment document.

Additional attributes indicate whether the data in the field is derived from a lookup table. For example, *lookupTab="50"* indicates that lookup table 50 holds all of the valid codes for this field.

The *type* attribute is a reference to the data types section of the Data Dictionary and enables further qualification of the field.

```
<!-- FIELD ACC_DATETIME -->
<element    ref="ACC_DATETIME"
            lookupTab="0"
            longName="Accident Date/Time"
            type="TS" />

<!-- FIELD ACC_CODE -->
<element    ref="ACC_CODE"
            lookupTab="50"
            longName="Accident Code"
            type="CE_0050" />
```

Data Types

The primitive data types, as the name suggests, are the lowest level of data type. Complex data types are made up of numerous primitive data types.

The following example includes the primitive data types referenced in the field data dictionary example: Time stamp (TS, Identifier (ID)), String (ST), and Lookup From User-Defined Tables (IS). The complex data type CE_0050 is described in terms of its primitive data types.

```
<!-- PRIMITIVE DATATYPE TS -->
<simpleType name="TS">
  <restriction base="string" />
</simpleType>
<!-- PRIMITIVE DATATYPE ID -->
<simpleType name="ID">
  <restriction base="string" />
</simpleType>
<!-- PRIMITIVE DATATYPE ST -->
<simpleType name="ST">
  <restriction base="string" />
</simpleType>
<!-- PRIMITIVE DATATYPE IS -->
<simpleType name="IS">
  <restriction base="string" />
</simpleType>
```

```
<!-- COMPOSITE DATATYPE CE_0050 -->
<complexType name="CE_0050">
  <sequence>
   <element minOccurs="0" maxOccurs="1" ref="CE_0050_ID"
     longName="identifier" lookupTab="50" type="ID" />
   <element minOccurs="0" maxOccurs="1" ref="CE_0050_TXT"
     longName="text" lookupTab="0" type="ST" />
   <element minOccurs="0" maxOccurs="1" ref="CE_0050_CODE_SYS"
     longName="name of coding system" lookupTab="396" type="IS" />
   <element minOccurs="0" maxOccurs="1" ref="CE_0050_ALT_ID"
     longName="alternate identifier" lookupTab="0" type="ST" />
   <element minOccurs="0" maxOccurs="1" ref="CE_0050_ALT_TXT"
     longName="alternate text" lookupTab="0" type="ST" />
   <element minOccurs="0" maxOccurs="1" ref="CE_0050_ALT_CODE_SYS"
     longName="name of alternate coding sys" lookupTab="396" type="IS" />
  </sequence>
</complexType>
```

Deployment Information for the iWay Adapter for HL7 for BEA WebLogic

The iWay Adapter for HL7 for BEA WebLogic works in conjunction with the following components:

- iWay Application Explorer

with either

- iWay Business Services Engine (iBSE)

or

- iWay Enterprise Connector for J2EE™ Connector Architecture (JCA)

Application Explorer, used to configure connections and create Web services and events, can be configured to work in a Web services environment in conjunction with the iWay Business Services Engine or with the iWay Enterprise Connector for J2EE Connector Architecture (JCA). When working in a JCA environment, the connector uses the Common Client Interface (CCI) to provide fast integration services using iWay Adapters instead of using Web services.

Both iBSE and the iWay connector for JCA are deployed to an application server such as BEA WebLogic Server with iWay Application Explorer and the adapters.

Deployment Roadmap

The following table lists the location of information about deploying the iWay Adapter for HL7 for BEA WebLogic in the three iWay operating environments. A description of each environment follows the table.

Deployment Option	Chapter
iWay Application Explorer	• Chapters 2 and 3 of this guide • i*Way Installation and Configuration for BEA WebLogic* • *iWay Servlet Application Explorer for BEA WebLogicUser's Guide*
iWay Business Services Engine (iBSE)	• *iWay Installation and Configuration for BEA WebLogic*
iWay Enterprise Connector for J2EE Connector Architecture (JCA)	• *iWay Connector for JCA for BEA WebLogic User's Guide* • *iWay Installation and Configuration for BEA WebLogic*

iWay Application Explorer

iWay Application Explorer uses an explorer metaphor to browse the HL7 system for metadata. The explorer enables you to create XML schemas and Web services for the associated object. In addition, you can create ports and channels to listen for events in HL7. External applications that access HL7 through the iWay Adapter for HL7 for BEA WebLogic use either XML schemas or Web services to pass data between the external application and the adapter.

The iWay Business Services Engine (iBSE)

The iWay Business Services Engine (iBSE) exposes—as Web services—enterprise assets that are accessible from adapters regardless of the programming language or the particular operating system. The iBSE simplifies the creation and execution of Web services when running:

- Custom and legacy applications
- Database queries and stored procedures
- Packaged applications
- Terminal emulation and screen-based systems
- Transactional systems

Web services is a distributed programming architecture that promises to solve Enterprise Application Integration (EAI) hurdles that other programming models cannot. It enables programs to communicate with one another using a text-based, but platform and language independent message format called XML (Extensible Markup Language).

Coupled with a platform and language independent messaging protocol called SOAP (Simple Object Access Protocol), XML enables application development and integration by assembling previously built components from multiple Web services. The iBSE includes a preconfigured SOAP listener for incoming SOAP requests.

The iWay Enterprise Connector for J2EE Connector Architecture (JCA)

The iWay Enterprise Connector for J2EE Connector Architecture (JCA) enables developers of JCA-compliant applications to deploy iWay adapters as JCA resources. The connector is supported on J2EE-compliant application servers such as BEA WebLogic Server.

The iWay Connector for JCA is distributed as both a standard Resource Adapter Archive (RAR) for deployment to the application server and as a JAR file for stand-alone applications. Thus, the connector can be employed in systems that are non-compliant, although services such as pooled connections will not be available.

CHAPTER 2

Creating XML Schemas or Web Services for the iWay Adapter for HL7 for BEA WebLogic

Topics:

- Overview
- Starting iWay Servlet Application Explorer
- Establishing a Target for HL7
- Creating a Schema
- Creating a Web Service

This section describes how to use iWay Servlet Application Explorer to create XML schemas or Web services for the iWay Adapter for HL7 for BEA WebLogic.

Overview

External applications that access HL7 through the adapter use either XML schemas or Web services to pass data between the external application and the adapter. You can use iWay Servlet Application Explorer to create the required XML schemas and Web services.

Application Explorer is a Web application running within a servlet container that is accessible through a Web browser. For more information on installing and configuring the iWay Servlet Application Explorer, see the *iWay 5.5 Installation and Configuration for BEA WebLogic* documentation.

Starting iWay Servlet Application Explorer

Before you can use iWay Servlet Application Explorer, you must start BEA WebLogic Server. Then, you can open Application Explorer.

Procedure How to Start BEA WebLogic Server on Windows or on UNIX

1. To start the BEA WebLogic Server on Windows:
   a. Click the *Windows Start menu*.
   b. Select *Programs*, *BEA WebLogic Platform 8.1*, *User Projects, your domain for iWay,* and then, click *Start Server.*
2. To start BEA WebLogic Server on UNIX or from a command line, type the following at the prompt:

   ```
   BEA_HOME\user_projects\domains\DOMAIN_NAME\startWebLogic.cmd
   ```

   where:

   BEA_HOME
   Is the directory where BEA WebLogic is installed.

   DOMAIN_NAME
   Is the domain you are using for iWay.

Procedure How to Open iWay Servlet Application Explorer

To open Application Explorer:

1. Enter the following URL in your browser window:

   ```
   http://hostname:port/iwae/index.html
   ```

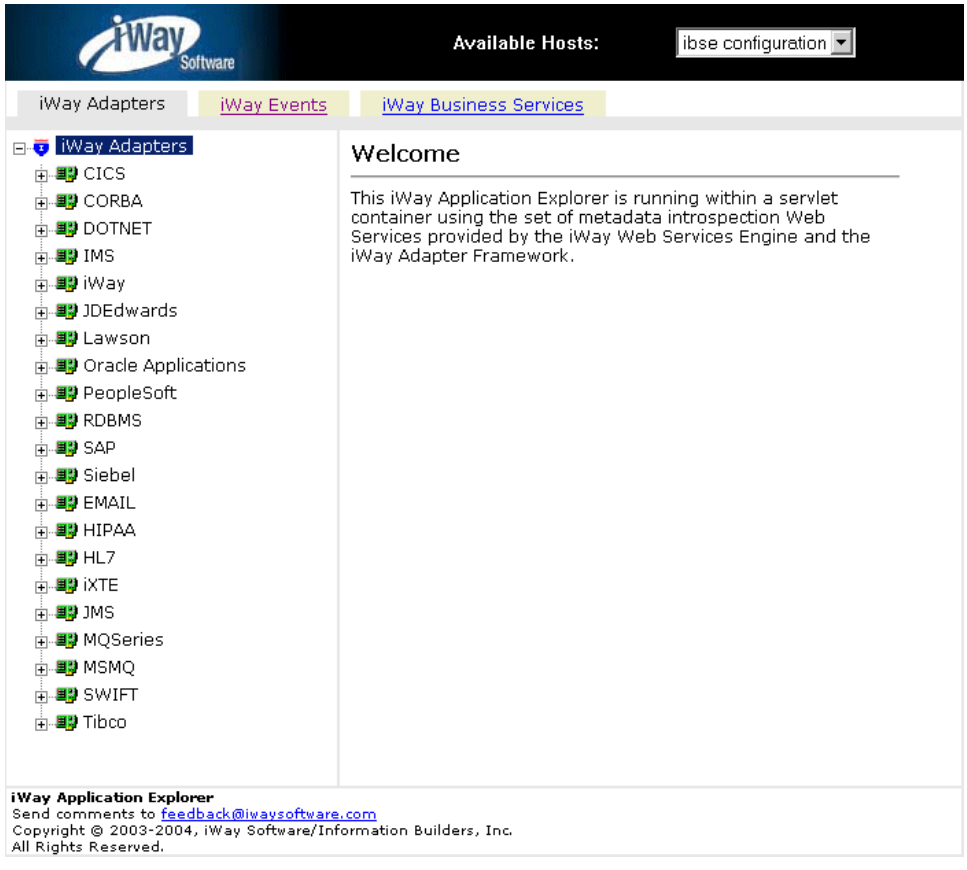
   where:

   hostname
   Is the name of the machine where your application server is running.

port

Is the port where the application server is listening.

After you start Application Explorer, the following Welcome window opens, showing the iWay Adapters, iWay Events, and iWay Business Services tabs. The iWay Adapters node is highlighted in the left pane.



The Available Hosts drop-down menu in the upper right lists the iWay Connector for JCA or Servlet iBSE instance you can access.

For more information on adding instances, see the *iWay 5.5 Installation and Configuration for BEA WebLogic* documentation.

You are now ready to create new targets for HL7.

Establishing a Target for HL7

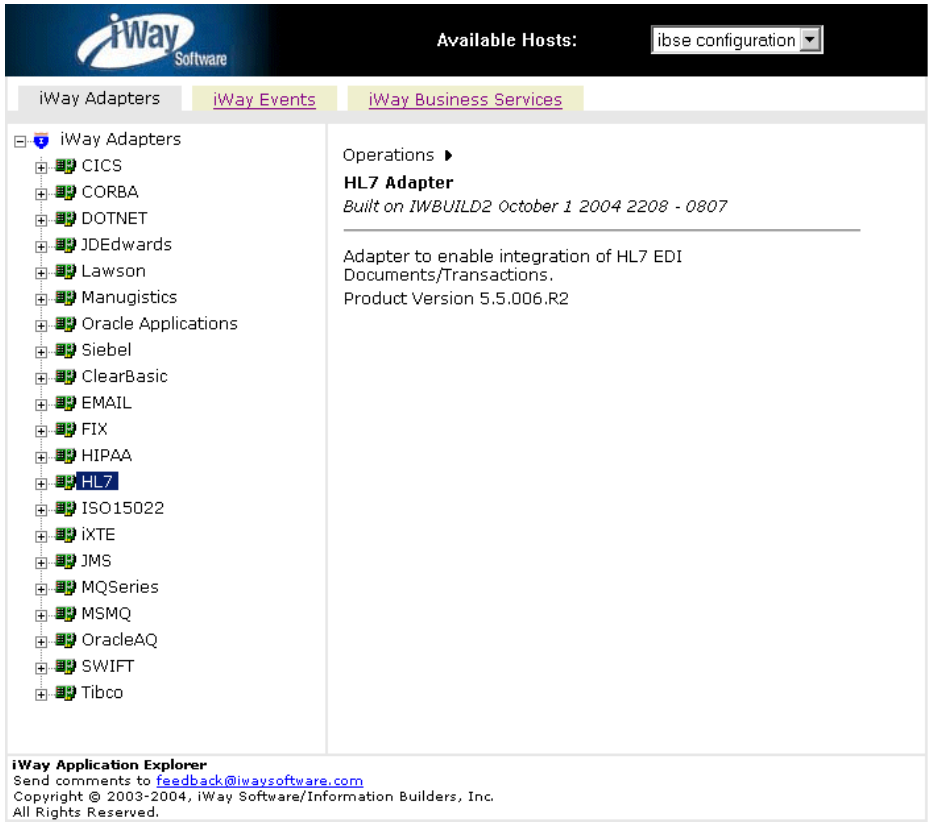
A target serves as your connection point and is automatically saved after you create it. You must establish a connection to HL7 every time you start iWay Application Explorer or after you disconnect from the system.

Creating a New Target

To connect to HL7 for the first time, you must create a new target.

Procedure How to Create a New Target

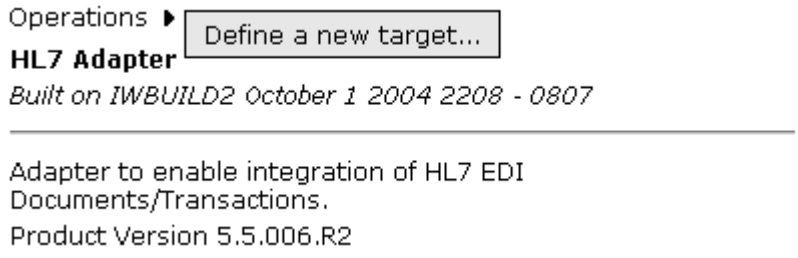
The following graphic shows the list of supported adapters in the left pane and information about the selected adapter in the right pane.



To create a new target:

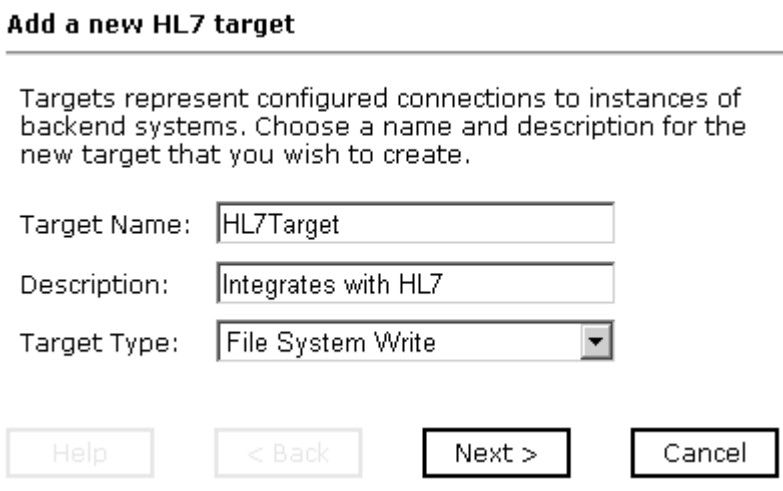
1. In the left pane, click the *HL7* node.

Descriptive information (for example, title and product version) regarding the iWay Adapter for HL7 for BEA WebLogic appears in the right pane.



2. In the right pane, move the pointer over *Operations* and select *Define a new target*.

The Add a new HL7 target pane opens on the right. The following illustration shows the fields in the right pane where you enter connection information for the target.



3. Specify the following information for the HL7 target you are defining.

a. Type a descriptive name and a brief description for the new target.

b. From the Target Type drop-down list, select one of the following transports from the drop-down list:

- File System Write.
- File Transfer Protocol (FTP).
- HyperText Transfer Protocol (HTTP).
- IBM MQSeries (MQ).

- TCP Session.

4. Click *Next*.

   The Set connection info pane appears on the right and includes fields that are specific to the type of transport you selected.

5. Provide the appropriate information that is specific to the transport you selected.

   - For more information on File System Write, see *File System Write Properties* on page 2-6.
   - For more information on File Transfer Protocol (FTP), see *File Transfer Protocol Properties* on page 2-7.
   - For more information on HyperText Transfer Protocol (HTTP), see *HyperText Transfer Protocol Properties* on page 2-8.
   - For more information on IBM MQSeries (MQ), see *MQSeries Properties* on page 2-8.
   - For more information on TCP Session, see *TCP Properties* on page 2-9.

6. Click *Finish*.

   The following graphic shows the HL7 target (HL7Target) that appears below the HL7 node in the left pane.

You are now ready to connect to your HL7 target.

Reference File System Write Properties

The following table provides definitions for the properties required for the File System Write target type.

Property	Definition
HL7 Version	From the drop-down list, select the version of HL7 messages passed to this protocol. The options are: • v2.4 • v2.3.1 • v2.3
Directory	The directory to which output messages are emitted.

Property	Definition
Filename Mask	The output file name (can contain an asterisk), which gets expanded to a timestamp. A pound sign can be used as a mask for a sequence count. Each pound symbol represents a whole number integer value. For example, File## counts up to 99 before restarting at 0, File### counts up to 999 before restarting at 0, and so on.

Reference **File Transfer Protocol Properties**

The following table provides definitions for the properties required for the File Transfer Protocol target type.

Settings tab

Property	Definition
HL7 Version	From the drop-down list, select the version of HL7 messages passed to this protocol. The options are: • v2.4 • v2.3.1 • v2.3
Host	FTP target system.
Port	FTP target system port.
User	User ID to use when connecting to the FTP host.
Password	Password associated with the user ID.
Directory	The directory to which output messages are emitted.
Filename Mask	The output file name (can contain an asterisk), which gets expanded to a timestamp. A pound sign can be used as a mask for a sequence count. Each pound symbol represents a whole number integer value. For example, File## counts up to 99 before restarting at 0, File### counts up to 999 before restarting at 0, and so on.

Advanced tab

Property	Definition
Retry Interval	The maximum wait interval between retries when a connection fails. Retry interval duration in *xx*H:*xx*M:*xx*S format. For example, 1H:2M:3S is 1 hour 2 minutes and 3 seconds.
Maxtries	Maximum number of retry attempts if a write failure occurs.

Reference HyperText Transfer Protocol Properties

The following table provides definitions for the properties required for the File Transfer Protocol target type.

Property	Definition
HL7 Version	From the drop-down list, select the version of HL7 messages passed to this protocol. The options are: • v2.4 • v2.3.1 • v2.3
HTTP URL	The HTTP URL.
Header	The HTTP header field.

Reference MQSeries Properties

The following table provides definitions for the properties required for the MQSeries target type.

Settings tab

Property	Definition
HL7 Version	From the drop-down list, select the version of HL7 messages passed to this protocol. The options are: • v2.4 • v2.3.1 • v2.3

Property	Definition
Queue Manager	Name of the MQSeries queue manager to be used.
Queue Name	Queue on which request documents are received.
Correlation ID	The correlation ID to set in the MQSeries message header.

MQ Client tab

Property	Definition
Host	Name of the MQSeries queue manager to be used.
Port	Queue on which request documents are received.
Channel	The correlation ID to set in the MQSeries message header.

Reference TCP Properties

The following table provides definitions for the properties required for the TCP target type.

Property	Definition
HL7 Version	From the drop-down list, select the version of HL7 messages passed to this protocol. The options are: • v2.4 • v2.3.1 • v2.3
Host	Host name or host address.
Port	TCP listening port.
Encoding	Document character set.

Connecting to a Target

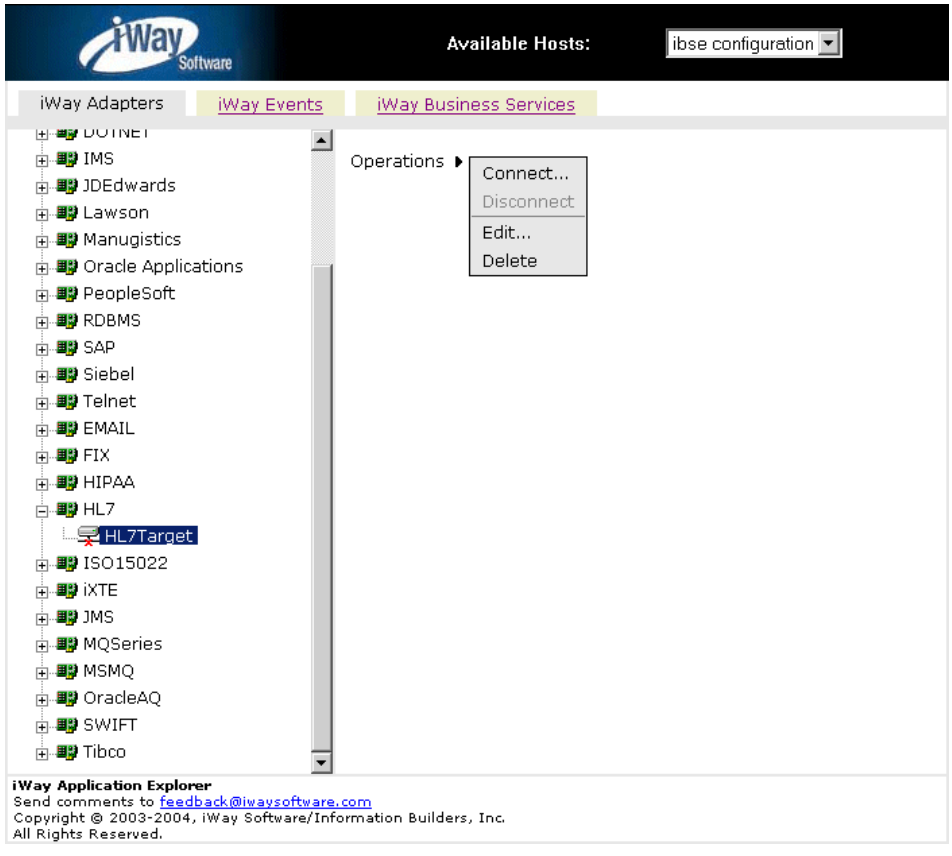
You must use the target you defined to connect to HL7.

Procedure How to Connect to a Target

To connect to a target:

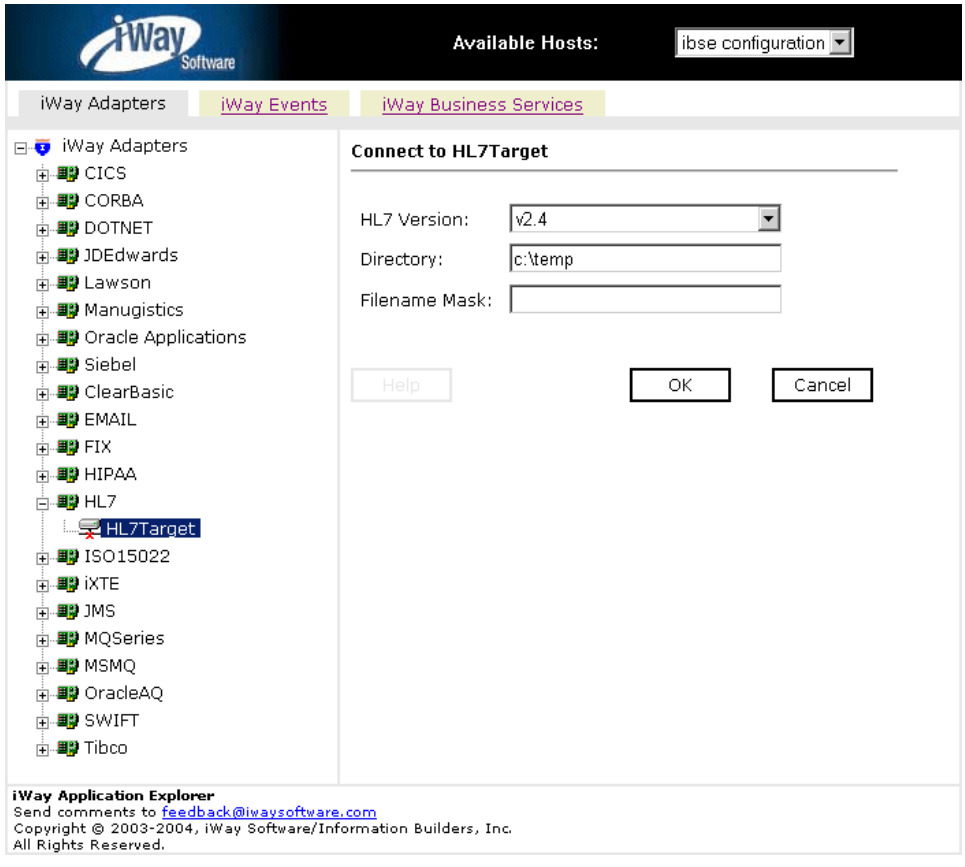
1. In the left pane, expand the *HL7* node and select the target you defined, for example, HL7Target.

The following graphic shows the HL7Target node selected in the left pane and the Operations menu expanded in the right pane.



2. Move the pointer over *Operations* and select *Connect*.

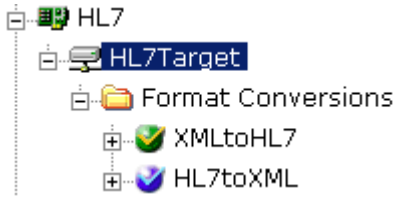
The following graphic shows that the Connect to HL7Target pane opens on the right.



3. Click *OK*.

The following graphic shows that the x icon that appeared previously to the left of the HL7Target node has disappeared, indicating that the node is now connected.

The following graphic shows the expanded HL7Target node.



Disconnecting From a Target

Although you can maintain multiple open connections to different application systems, it is a good practice to close connections when you are not using them.

Procedure How to Disconnect From a Target

To disconnect from a target:

1. From the left pane, click the target, for example, HL7Target, to which you are connected.
2. Move the pointer over *Operation* and select *Disconnect*.

   Disconnecting from the application system drops the connection, but the node remains.

Modifying a Target

After you create a target for HL7 using iWay Servlet Application Explorer, you can edit any of the information that you provided previously.

Procedure How to Edit a Target

To edit a target:

1. In the left pane, click the target, for example, HL7Target.
2. Move the pointer over *Operations* and select *Edit*.
3. Modify the connection information.
4. Click *Next* to continue editing additional fields.
5. When you have completed your edits, click *Finish*.

Deleting a Target

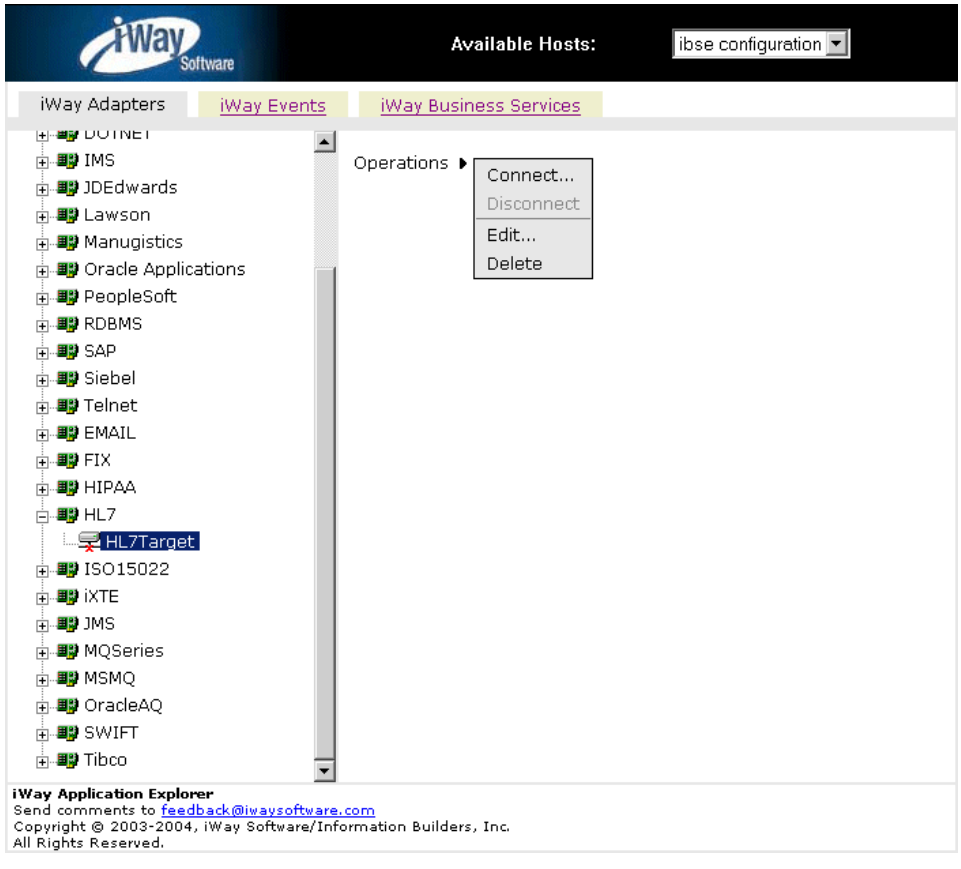
In addition to closing a target, you can delete a target that is no longer required. You can delete it whether or not it is closed. If open, the target automatically closes before it is deleted.

Procedure How to Delete a Target

To delete a target:

1. In the left pane, click the target, for example, HL7Target.

   The following graphic shows the target selected in the left pane, and the operations menu expanded in the right pane.



2. Move the pointer over *Operations* and select *Delete*.
3. To delete the target you selected, click *OK*.

The HL7Target node disappears from the left pane.

Creating a Schema

You can create service schemas for Business Services and Business Components using iWay Application Explorer.

The following topic, *Creating an XML Schema*, describes how to create schemas for the adapter when you deploy the iWay Adapter for HL7 for BEA WebLogic for use either in a JCA (iWay Enterprise Connector for J2EE Connector Architecture) environment or a Web services environment.

If you plan to deploy the iWay Adapter for HL7 for BEA WebLogic in a Web services environment, see also *Creating a Web Service* on page 2-17.

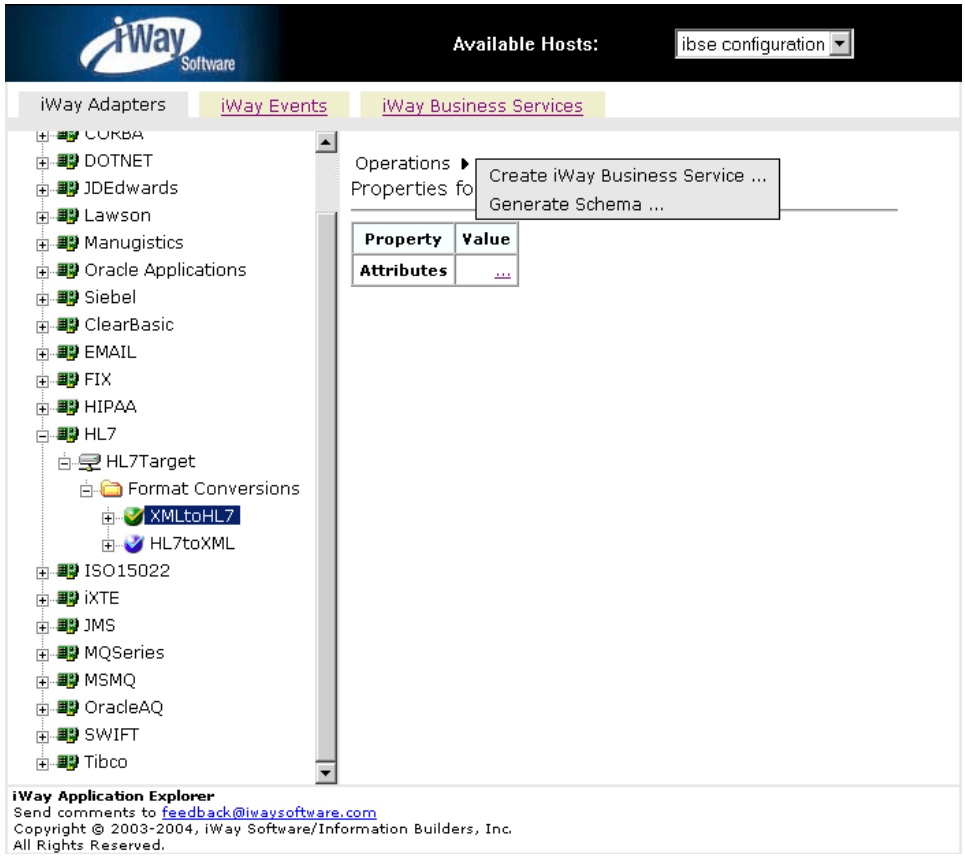
Creating an XML Schema

You create schemas for HL7 using iWay Application Explorer.

Procedure How to Create an XML Schema

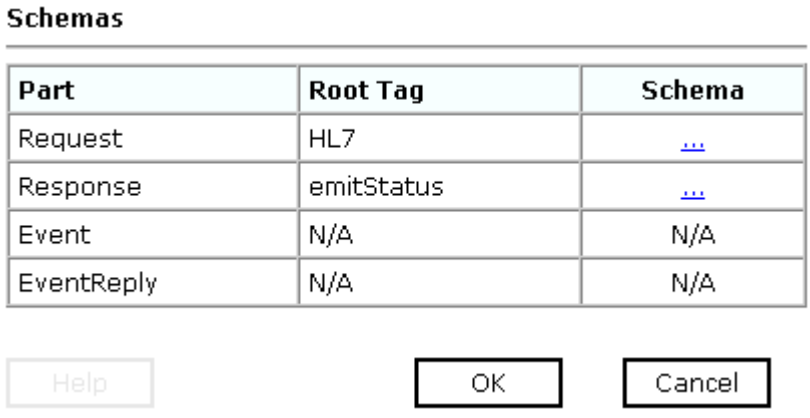
To generate service request and response schemas:

1. If you have not started the explorer, start Application Explorer and connect to your HL7 system.
2. In the left pane, expand the HL7Target node.
3. Continue expanding nodes to get to the Service node.



4. In the right pane, move the cursor over *Operations* and select *Generate Schema*.

Application Explorer builds schemas. A schemas table similar to the following appears in the right pane. This table contains three columns labeled Part, Root Tag, and Schema. The Schema column provides hyperlinks to the different schemas.



Schemas

Part	Root Tag	Schema
Request	HL7	...
Response	emitStatus	...
Event	N/A	N/A
EventReply	N/A	N/A

Help OK Cancel

5. To view a schema, click the ellipsis (…) in the row corresponding to the schema you want to view.

The following is an example of a request schema:

```
<?xml version="1.0" encoding="UTF-8" ?>
<!--  Generated by the iBSE 2004-10-05T23:11:07Z
  -->
- <xs:schema
    xmlns:xs="http://www.w3.org/2001/XMLSchema"
    elementFormDefault="qualified"
    attributeFormDefault="unqualified">
  - <xs:element name="HL7">
    - <xs:complexType>
      - <xs:sequence>
          <xs:any minOccurs="0"
            maxOccurs="unbounded" />
        </xs:sequence>
      </xs:complexType>
    </xs:element>
  </xs:schema>
```

For more information on where the schemas are stored, see the following topic, *Schema Location*.

Reference Schema Location

Application Explorer stores the schemas it creates in subdirectories under the iWay home directory of the machine where it is installed. The exact location of the schemas differs depending on whether you deploy Application Explorer with an iBSE or a JCA configuration.

- When using the adapter with an iBSE configuration, the schemas are stored under a \schemas subdirectory of the iWay home directory, for example,

  ```
  C:\Program Files\iway55\bea\ibse\wsdl\schemas\service\HL7\HL7Target
  ```

  where:

  HL7Target

  Is the name of the connection to HL7 as defined in Application Explorer. Under this directory, Application Explorer creates subdirectories containing schemas.

- When using the adapter with a JCA configuration, the schemas are stored under a \schemas subdirectory of the iWay home directory, for example,

  ```
  C:\Program Files\iWay55\config\base\schemas\HL7\HL7Target
  ```

  where:

  HL7Target

  Is the name of the connection to HL7 as defined in Application Explorer. Application Explorer stores the schemas in this directory.

Creating a Web Service

You can generate a business service (also known as a Web service) for HL7 operations.

Ensure you properly configure the servlet iBSE. For more information on installing and deploying iWay components, see the *iWay Installation and Configuration for BEA WebLogic* manual.

Note: In a J2EE Connector Architecture (JCA) implementation of iWay adapters, Web services are not available. When the adapters are deployed to use the iWay Connector for JCA, the Common Client Interface provides integration services using the iWay adapters. For more information, see the *iWay Installation and Configuration for BEA WebLogic* manual and the i*Way Connector for JCA for BEA WebLogic Server User's Guide*.

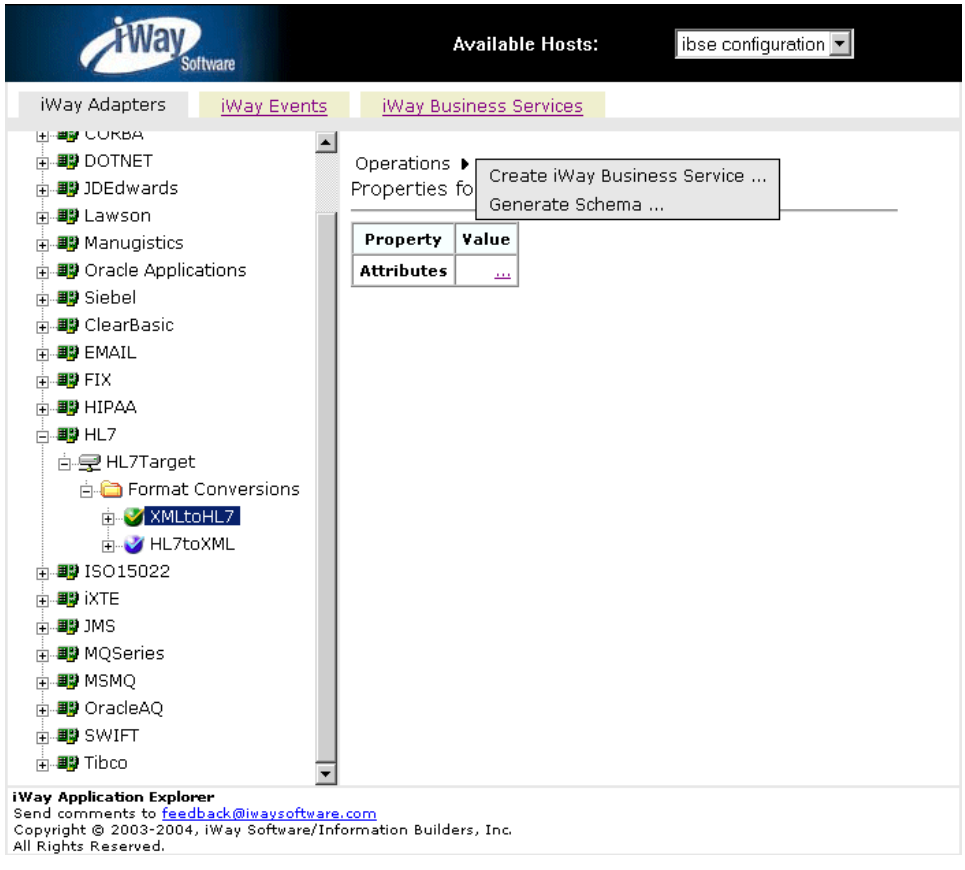
Procedure How to Generate a Web Service

To generate a Web service:

1. If you have not already connected, connect to HL7.

2. Expand the *HL7* node.
3. Continue expanding nodes down to the *Service* level.

   The following graphic shows the left pane with the Service node selected.



4. In the right pane, move the pointer over *Operations* and select *Create iWay Business Service*.

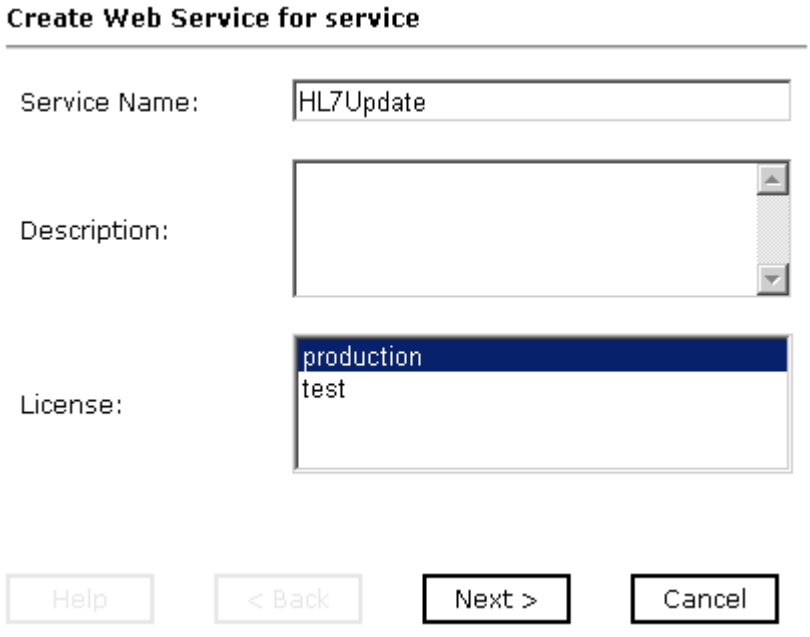
- If this is not the first Web service you want to create and use, choose whether to create a new service or use an existing service.

a. To use a previously created service, select the option to use an existing service and click *Next*.

A drop-down list appears.

b. Select the business service to which you want to add the new service and click *Next*.

- If this is the first Web service you are creating or if you select to create a new service, the Create Web Service pane appears. This pane provides three fields followed by a help button and three action buttons.



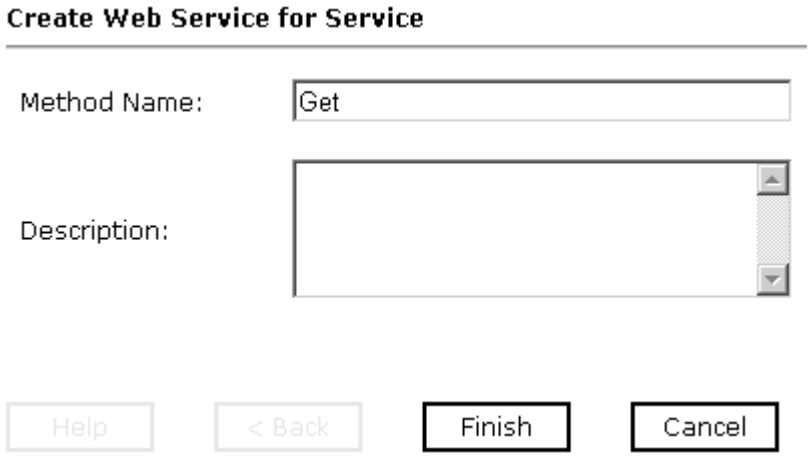
a. In the Service Name field, type a name to identify the Web service (under the Service node in the left pane of the iWay Business Services tab).

b. In the Description field, type a brief description of the Web service.

c. In the License field, select the license(s) with which you want to associate this business service. To select more than one, hold down the *Ctrl* key and click the licenses.

5. Click *Next*.

The right pane displays the next Create Web Service pane, which prompts you for information about the method of the service. It includes two fields, a help button, and three action buttons.

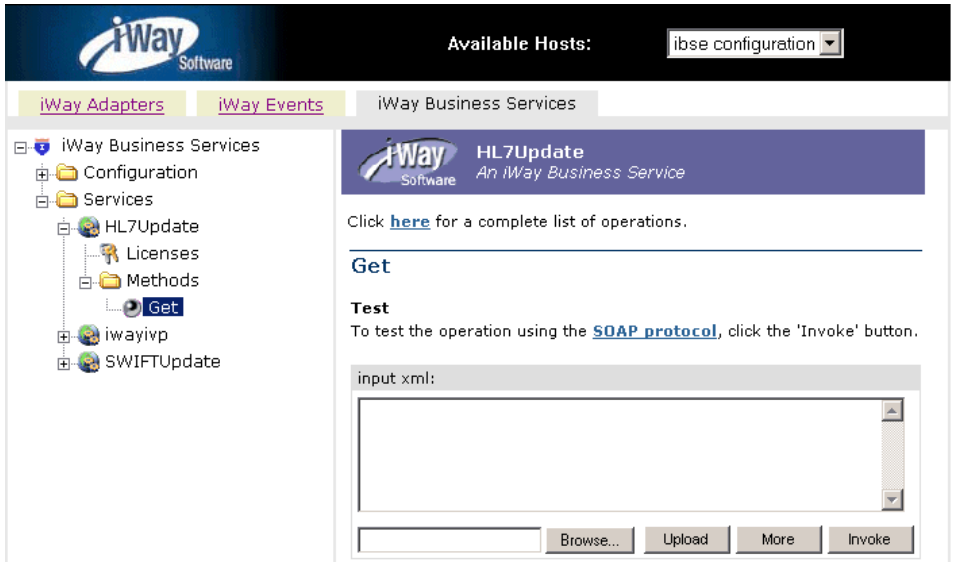


a. In the Method Name field, type a name to specify the name of the method to be added to the business service.

b. In the Description field, type a brief description of the method.

6. Click *Finish*.

Application Explorer switches the view to the iWay Business Services tab, and the new business service appears in the left pane.



Testing a Web Service for a Business Object

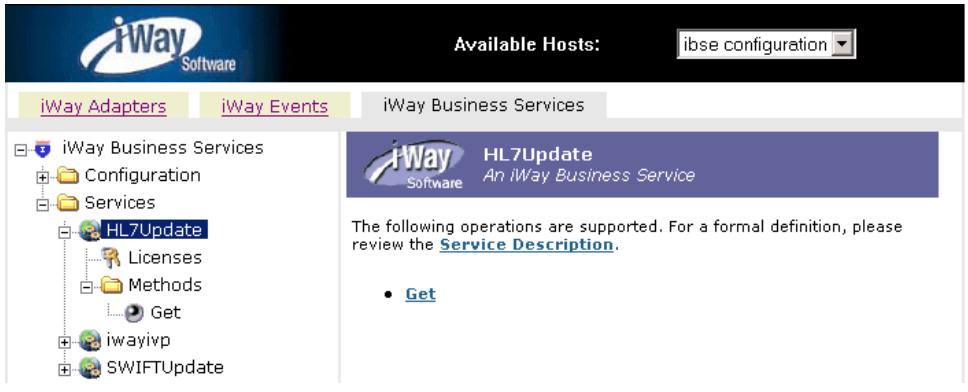
After you create a Web service, test it to ensure it functions properly. Application Explorer includes a test tool for testing a Web service.

Procedure How to Test a Web Service for a Business Object

To test a Web service:

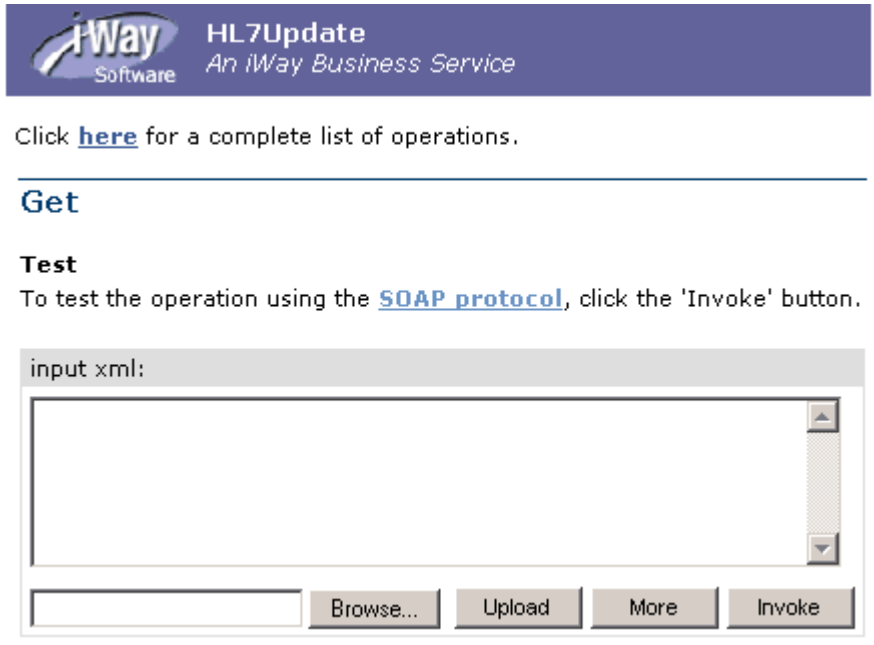
1. If you are not on the iWay Business Services tab of Application Explorer, click the tab to access business services.
2. If it is not expanded, expand the *iWay Business Services* node.
3. Expand the *Services* node.
4. Select the name of the business service you want to test.

   The business service name appears as a link in the right pane, as shown in the following graphic.



5. In the right pane, click the named business services link, for example, *Get*.

   The test option appears in the right pane. This pane provides a text field in which to paste the XML input or browse to a file that can be uploaded.



6. Provide the appropriate XML input.
7. Click *Invoke*.

   Application Explorer displays the results in the results pane on the right.

Credential Mapping

For each SOAP request that is received, iBSE checks to see if a user name and password is included in the SOAP header. If a user name and password is available, iBSE acquires this information and replaces the values retrieved from the repository when pushing the request to the iWay Adapter.

CHAPTER 3

Listening for Events in HL7

Topics:

- Understanding iWay Event Functionality
- Creating an Event Port
- Creating a Channel

iWay Servlet Application Explorer deployed to a BEA WebLogic Server enables you to listen for events.

Although this section describes the Java™ servlet implementation of Application Explorer, other implementations provide the same functionality by means of similar graphical user interfaces.

Understanding iWay Event Functionality

Events are generated as a result of a HL7 document arriving at a particular queue. You can use documents arriving at a queue to trigger an action in your application. For example, information in a message arriving at a queue can be used to update customer information in a database. If your application must perform an action when this happens, your application is a consumer of this event.

After you create a connection to your application system, you can add events using iWay Servlet Application Explorer. To create an iWay event, you must create a port and a channel.

- Port

  A port associates a particular business object exposed by an adapter with a particular disposition. A disposition defines the protocol and location of the event data. The port defines the end point of the event consumption. For more information, see *Creating an Event Port* on page 3-2.

- Channel

  A channel represents configured connections to particular instances of back-end or other types of systems. A channel binds one or more event ports to a particular listener managed by an adapter. For more information, see *Creating a Channel* on page 3-14.

Creating an Event Port

The following procedures describe how to create an event port from the iWay Event Adapters tab for various dispositions using Application Explorer.

The following dispositions are available when using the servlet Application Explorer in conjunction with an iBSE implementation. You can switch between an iBSE and a JCA implementation by choosing one or the other from the drop-down menu in the upper right of the Application Explorer.

- File
- iBSE
- MSMQ
- JMS queue
- SOAP
- HTTP
- MQ Series
- MAIL

Note: The MAIL disposition option will be supported in a future release.

The following dispositions are available when using Application Explorer in conjunction with a JCA connector implementation.

- File
- HTTP
- JMS queue
- MQ Series

Procedure **How to Create an Event Port for the File Disposition**

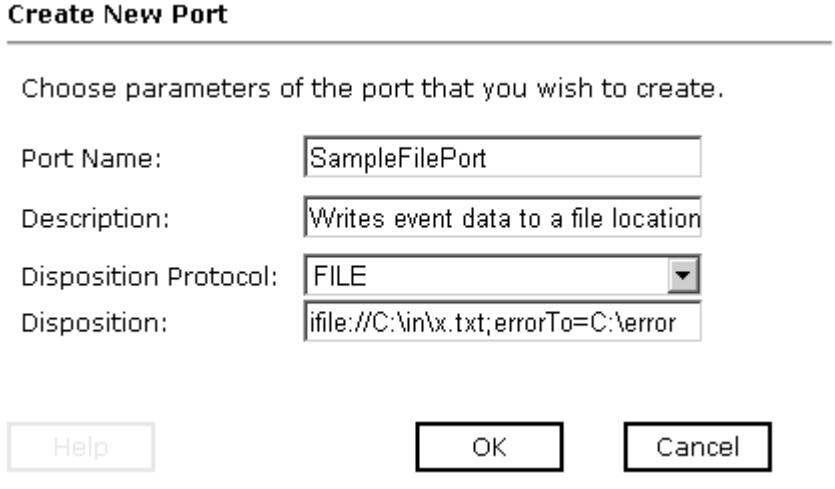
To create a specific event port for the File disposition:

1. Click the *iWay Events* tab.

   The iWay Event Adapters window opens.

2. In the left pane, expand the *HL7* node.
3. Select the *ports* node.
4. Move the pointer over *Operations* and select *Add a new port*.

   The Create New Port fields appear on the right, as shown in the following graphic. This pane provides four fields to define the new port, a help button, and two action buttons.



   a. Type a name for the event port and provide a brief description.

   b. From the Disposition Protocol drop-down list, select *FILE*.

c. In the Disposition field, provide a destination where the event data is written.

When pointing Application Explorer to an **iBSE** deployment, use the following format:

```
ifile://[location];errorTo=[pre-defined port name or another disposition url]
```

For example:

```
ifile://D:\in\x.txt;errorTo=ifile://D:\error
```

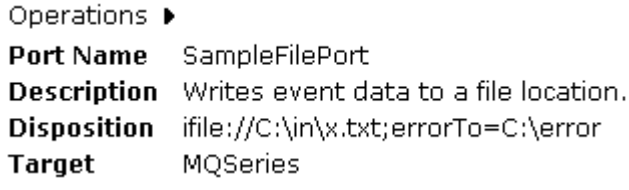
When pointing Application Explorer to a **JCA** deployment, provide the full path to the directory.

The following table defines the parameters for the File disposition.

Parameter	Description
location	The destination and filename of the document where event data is written. For example, C:\in\x.txt.
errorTo	Predefined port name or another disposition URL to which error logs are sent. Optional.

5. Click *OK*.

The event port appears under the ports node in the left pane. In the right pane, a table appears that summarizes the information associated with the event port you created. The summary is shown in the following graphic.



You are ready to associate the event port with a channel. For more information, see *Creating a Channel* on page 3-14.

Procedure How to Create an Event Port for iBSE

You can call a Web Service created through iWay Business Services Engine (iBSE).

To create an event port for iBSE:

1. Click the *iWay Events* tab.

The iWay Event Adapters window opens.

2. In the left pane, expand the *HL7* node.
3. Select the *ports* node.
4. Move the pointer over *Operations* and select *Add a new port*.

   The Create Event Port pane opens on the right.

   a. In the Port Name field, type a name for the connection.

      The name is used to build a repository entry as well as to identify the connection.

   b. In the Description field, type a description for the target name you just created.

   c. From the Disposition Protocol drop-down list, select *iBSE*.

   d. In the Disposition field, enter an iBSE destination in the form of:

      ```
      ibse:svcName.mthName;responseTo=[pre-defined port name or another
      disposition url];errorTo=[pre-defined port name or another
      disposition url]
      ```

   The following table defines the parameters for the disposition.

Parameter	Description
svcName	Name of the service created with iBSE.
mthName	Name of the method created for the Web service.
responseTo	Location where responses to the Web service are posted. A predefined port name or another full URL. Optional.
errorTo	Location where error documents are sent. A predefined port name or another full URL. Optional.

5. Click *OK*.

   In the right pane, a table appears that summarizes the information associated with the event port you created. The event port also appears under the ports node in the left pane.

   You are ready to associate the event port with a channel. For more information, see *Creating a Channel* on page 3-14.

Procedure How to Create an Event Port for a JMS Queue

To create an event port for a JMS queue:

1. Click the *iWay Events* tab.

   The iWay Event Adapters window opens.

2. In the left pane, expand the *HL7* node.
3. Select the *ports* node.
4. Move the pointer over *Operations* and select *Add a new port*.

   The Create Event Port pane opens on the right.

   a. Type a name for the event port and provide a brief description.

   b. From the Disposition Protocol drop-down list, select *JMSQ*.

   c. In the Disposition field, enter a JMS destination.

      When pointing Application Explorer to an **iBSE** deployment, use the following format:

      ```
      jmsq:myQueueName@myQueueFac;jndiurl=[myurl];jndifactory=[myfactory
      ];user=[user];password=[xxx];errorTo=[pre-defined port name or
      another disposition url]
      ```

      When pointing Application Explorer to a **JCA** deployment, use the following format:

      ```
      jms:jmsqueue@jmsfactory;jndiurl=;jndifactory=;
      ```

      The following table defines the parameters for the disposition.

Parameter	Description
queue	JNDI name of a queue to which events are emitted.
Connection Factory	A resource that contains information about the JMS Server. The WebLogic connection factory is: `javax.jms.QueueConnectionFactory`

Parameter	Description
jndiurl	The URL to use to contact the JNDI provider. The syntax of this URL depends on which JNDI provider is being used. This value corresponds to the standard JNDI property, `java.naming.provider.url` For BEA WebLogic Server this is `t3://host:port` where: *host* Is the machine name where WebLogic Server is installed. *port* Is the port on which WebLogic server is listening. The default port if not changed at installation is 7001.
jndifactory	Is JNDI context.INITIAL_CONTEXT_FACTORY and is provided by the JNDI service provider. For WebLogic Server, the WebLogic factory is `weblogic.jndi.WLInitialContextFactory`
user	A valid user name required to access a JMS server.
password	A valid password required to access a JMS server.
errorTo	Location where error documents are sent. A predefined port name or another full URL. Optional.

5. Click *OK*.

   The event port appears under the ports node in the left pane. In the right pane, a table appears that summarizes the information associated with the event port you created. The port listing and summary are shown in the following graphic.

   You are now ready to associate the event port with a channel. For more information, see *Creating a Channel* on page 3-14.

Procedure How to Create an Event Port for MSMQ

To create an event port for MSMQ:

1. Click the *iWay Events* tab.

   The iWay Event Adapters window opens.

2. In the left pane, expand the *HL7* node.
3. Select the *ports* node.
4. Move the pointer over *Operations* and select *Add a new port*.

   The Create Event Port pane opens on the right.

   a. In the Port Name field, type a name for the connection, for example, Queue1_on_NTK.

      The name is used to build a repository entry as well as to identify the connection.

   b. In the Description field, type a description for the target name you just created.

   c. From the Disposition Protocol drop-down list, select *MSMQ*.

   d. In the Disposition field, enter a MSMQ destination in the form of:

      ```
      msmq:/host/private$/qName;errorTo=[pre-defined port name or another disposition url]
      ```

   The following table defines the parameters for the disposition.

Parameter	Description
host	Machine name where the Microsoft Queuing system is running.
Queue Type	Private queues are queues that are not published in Active Directory. They appear only on the local computer that contains them. Private queues are accessible only by Message Queuing applications that recognize the full path name or format name of the queue. For private queues, enter *Private$*.
qName	Name of the private queue where messages are placed.
errorTo	Location where error documents are sent. A predefined port name or another full URL. Optional.

5. Click *OK*.

   The event port appears under the ports node in the left pane. In the right pane, a table appears that summarizes the information associated with the event port you created. The summary is shown in the following graphic.

   You are ready to associate the event port with a channel. For more information, see *Creating a Channel* on page 3-14.

Procedure How to Create a Port for the SOAP Disposition

To create a port for a SOAP disposition:

1. Click the *iWay Events* tab.

   The iWay Event Adapters window opens.

2. In the left pane, expand the *HL7* node.

3. Select the *ports* node.

4. Move the pointer over *Operations* and select *Add a new port*.

   The Create Event Port window opens in the right pane.

   a. Type a name for the event port and provide a brief description.

   b. From the Disposition Protocol drop-down list, select *SOAP*.

   c. In the Disposition field, enter an SOAP destination, using the following format:

   ```
   soap:[wsdl-url];soapaction=[myaction];responseTo=[pre-defined port
   name or another disposition URL];errorTo=[pre-defined port name or
   another disposition url]
   ```

   The following table defines the parameters for the disposition.

Parameter	Description
wsdl-url	The URL to the WSDL file that is required to create the SOAP message. For example: `http://localhost:7001/ibse/IBSEServlet/test/sw2xml2003MQ.ibs?wsdl` This value can be found by navigating to the iWay Business Services tab and opening the *Service Description* link in a new window. The WSDL URL appears in the Address field. You can also open the WSDL file in a third party XML editor (for example, XMLSPY) and view the SOAP request settings to find this value.

Parameter	Description

soapaction	The method that will be called by the disposition. For example:
	`HL7.mt200Request@test@@`
	where
	`HL7`
	Is the name of the Web service you created using Application Explorer.
	`mt200`
	Is the method being used.
	`test`
	Is the license that is being used by the Web service.
	This value can be found by navigating to the iWay Business Services tab and opening the *Service Description* link in a new window. Perform a search for *soapAction*.
	You can also open the WSDL file in a third party XML editor (for example, XMLSPY) and view the SOAP request settings to find this value.

responseTo	The location to which responses are posted. A predefined port name or another full URL. Optional. A predefined port name or another disposition URL. The URL must be complete, including the protocol.
errorTo	The location to which error logs are sent. Optional. A predefined port name or another disposition URL. The URL must be complete, including the protocol.

5. Click *OK*.

   The event port appears under the ports node in the left pane. In the right pane, a table appears that summarizes the information associated with the event port you created.

Procedure **How to Create an Event Port for an HTTP Disposition**

To create an event port for an HTTP disposition:

1. Click the *iWay Events* tab.

   The iWay Event Adapters window opens.

2. In the left pane, expand the *HL7* node.

3. Select the *ports* node.
4. Move the pointer over *Operations* and select *Add a new port*.

   The Create iWay Event Port pane opens on the right.

   a. Type an event port name and a brief description.

   b. From the disposition protocol drop-down list, select *HTTP*.

   c. From the Disposition field, enter an HTTP destination.

      When pointing Application Explorer to an **iBSE** deployment, use the following format:

```
ihttp://[myurl];responseTo=[pre-defined port name or another
disposition url];
```

   where:

   url

   Is the URL target for the post operation, for example,

```
http://myhost:1234/docroot
```

   responseTo

   Is the location where responses are posted (optional).

   When pointing Application Explorer to a **JCA** deployment, use the following format:

```
http://host:port/uri
```

   where:

   host:port

   Is the combination of the name of the host on which the Web server resides and the port on which the server is listening for the post operation.

   uri

   Is the universal resource identifier that completes the url specification.

5. Click *OK*.

   The port appears under the ports node in the left pane.

Procedure How to Create an Event Port for MQ Series Disposition

To create an event port for MQ Series using Application Explorer:

1. Click the *iWay Events* tab.

   The iWay Event Adapters window opens.

2. In the left pane, expand the *HL7* node.

3. Select the *ports* node.
4. Move the pointer over *Operations* and select *Add a new port*.

   The Create iWay Event Port pane opens on the right.

   a. Type an event port name and a brief description.

   b. From the disposition protocol drop-down list, select *MQ Series*.

   c. In the Disposition field, enter an MQ Series destination.

      When pointing Application Explorer to an **iBSE** deployment, use the following format:

      ```
      mqseries:/qManager/
      qName;host=[hostname];port=[port];channel=[channnelname];errorTo=[
      pre-defined port name or another disposition url]
      ```

      When pointing Application Explorer to a **JCA** deployment, use the following format:

      ```
      mq:qmanager@respqueue;host=;port=;channel=
      ```

   The following table defines the parameters for the disposition.

:

Parameter	Description
qManager	Is the name of the queue manager to which the server must connect.
qName or respqueue	Name of the queue where messages are placed.
host	The host on which the MQ Server is located (for the MQ Client only).
port	The number to connect to an MQ Server queue manager (for the MQ client only).
channel	The case-sensitive name of the channel that connects with the remote MQ Server queue manager (for the MQ client only). The default channel name for MQSeries is SYSTEM.DEF.SVRCONN.
errorTo	Location where error documents are sent. This can be a predefined port name or another full URL. Optional.

5. Click *OK*.

   The newly created event port appears under the port section of the event adapter in the left pane.

Editing or Deleting an Event Port

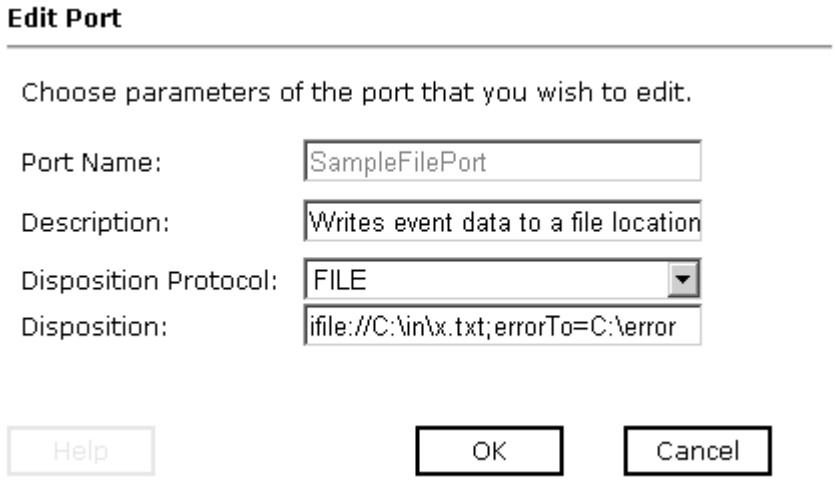
The following procedures provide information on how to modify and delete an event port.

Procedure How to Edit an Event Port

To edit an existing event port:

1. In the left pane, select the event port you want to edit.
2. In the right pane, move the pointer over *Operations* and select *Edit*.

   The Edit Port window opens. This pane provides four fields, a help button, and two action buttons.



3. Make the required changes to the Description, Disposition Protocol, or Disposition fields, and click *OK*.

   Note: The Edit Port pane does not allow you to change the name of the port, only the parameters.

Procedure How to Delete an Event Port

To delete an existing event port:

1. Select the event port you want to delete.
2. In the right pane, move the pointer over *Operations* and select *Delete*.

   A confirmation dialog box opens.

3. To delete the event port you selected, click *OK*.

The event port disappears from the list in the left pane.

Creating a Channel

The following procedure describes how to create a HL7 channel for your iWay Event. You must associate a port to a channel before you can make the channel active.

Procedure How to Create a HL7 Channel

To create a channel using iWay Application Explorer:

1. Click the *iWay Events* tab.

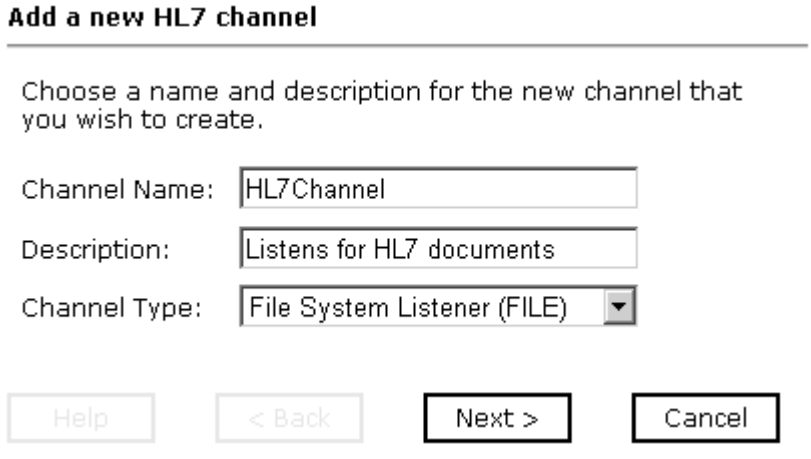
   The iWay Event Adapters window opens. The adapters that appear in the left pane support events.

2. Expand the *HL7* node.

   The ports and channels nodes appear in the left pane.

3. Click the *channels* node.
4. In the right pane, move the pointer over *Operations* and select *Add a new channel*.

   The Add a new channel window opens.



   a. Type a name for the channel, for example, HL7Channel.

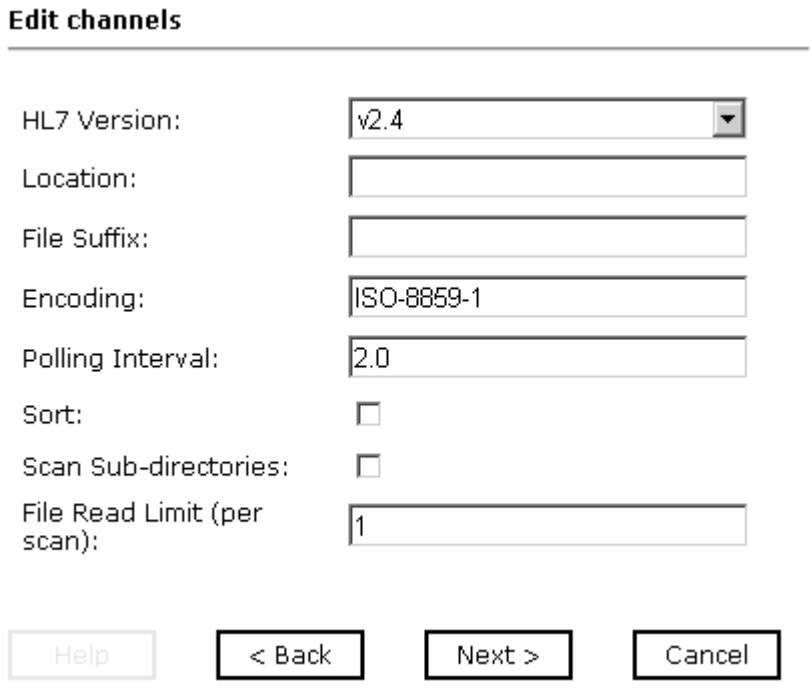
   b. Type a brief description.

c. From the drop-down list, select a type of listener:

- File System Listener (FILE)
- HyperText Transfer Protocol
- TCP Listener (TCP)
- IBM MQ Series (MQ)
- File Transfer Protocol (FTP)

5. Click *Next*.

The Edit Channels window opens in the right pane and includes fields that are specific to the type of listener you selected.



6. Provide the appropriate information that is specific to the listener you selected:

For information on the parameters for a File System Listener (FILE) listener, see *File System Listener (FILE) listener Configuration Parameters* on page 3-17.

For information on the parameters for a HyperText Transfer Protocol listener, see *HyperText Transfer Protocol Listener Configuration Parameters* on page 3-18.

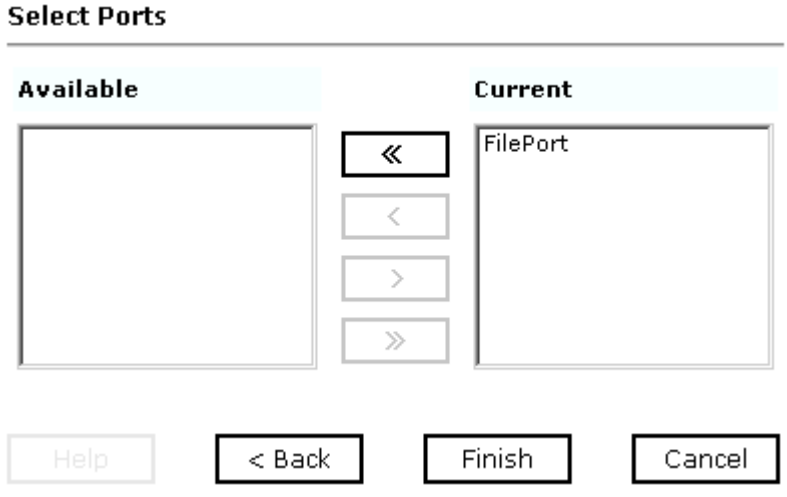
For information on the parameters for a TCP Listener, see *TCP Listener Configuration Parameters* on page 3-19.

For information on the parameters for an IBM MQ Series (MQ) listener, see *IBM MQ Series (MQ) Listener Configuration Parameters* on page 3-20.

For information on the parameters for a File Transfer Protocol (FTP) listener, see *File Transfer Protocol (FTP) Listener Configuration Parameters* on page 3-21.

7. Click *Next*.

The Select Ports pane opens, as shown in the following graphic. A list of available ports appear in Available field on the left, and the ports that are currently associated appear in the Current field on the right. This pane also contains a help button and three action buttons.



a. Select an event port from the list of current ports.

b. Click the single right (>) arrow button to transfer the port to the list of available ports. To associate all the event ports, click the double right (>>) arrow button.

8. Click *Finish*.

A summary window opens in the right pane, showing the channel description, channel status, and available ports.

All the information in the summary is associated with the channel you created.

The channel also appears under the channels node in the left pane. The following graphic shows a sample listing of a channel. An X over the icon, also shown in this graphic, indicates that the channel is currently disconnected. You must start the channel to activate your event configuration.

9. In the right pane, move the pointer over *Operations* and select *Start the channel*.

The channel you created becomes active.

The X that was over the icon disappears.

10. To stop the channel, move the pointer over *Operations* and select *Stop the channel*.

Reference File System Listener (FILE) listener Configuration Parameters

On the Settings tab:

Parameter	Description
Location	The directory where messages are received. DOS-style file patterns are valid for this parameter. You can specify a file pattern as well as a directory. For example, c:\xyz\ab*cd (without a file suffix) takes the file suffix from that parameter. If you use a pattern, files are selected based on the suffix and then the pattern. AB?CD selects ABxCD. AB*CD selects ABxxxCD.
File Suffix	File extension for the file event. This limits input files to those with the specified extensions. The "." is not required. The minus sign ("-") indicated that there is no extension. If the file extension is zip, the unzipped files must conform to the event schema, or they will fail. This function also works with transform configured.
Encoding	The host on which the MQ Server is located (for the MQ Client only).
Polling Interval	This is a time, expressed as xxH:xxM:xxS For example 1 hour, 2 minutes, and 3 seconds is: 1H:2M:3S The maximum interval between checks for new documents. The higher this value, the longer the interval, and the fewer system resources that are used. The side-effect of a high value is that a worker thread cannot respond to a stop command. If this value is set to 0, the listener runs once and terminates. The default value is 2 seconds.
Sort	The case-sensitive name of the channel that connects with the remote MQ Server queue manager (for the MQ client only). The default channel name for MQSeries is SYSTEM.DEF.SVRCONN.

Parameter	Description
Scan Sub-directories	Location where error documents are sent. This can be a predefined port name or another full URL. Optional.

On the Advanced tab:

Parameter	Description
Transform Type	Select the pre-built transform template from the drop-down list. To enable batch processing, select *BatchSplitter* from the drop-down list. The batch splitter preparses an entire EDI document and splits the document into individual transactions. Each transaction retains its Interchange Header/Trailer information. Once the batch splitter is finished splitting the EDI document, the transactions are ready to be transformed into XML.
Location for ack copies	The directory in which the acknowledgement document is placed.

Reference **HyperText Transfer Protocol Listener Configuration Parameters**

On the Settings tab:

Parameter	Description
Port	The port where the adapter listens for the HTTP transfer.
Encoding	The character set encoding for inbound documents. For example, UTF-8. The default is ISO-8859-1 US and Western Europe.

On the Advanced tab:

Parameter	Description
Transform Type	Select the pre-built transform template from the drop-down list. To enable batch processing, select *BatchSplitter* from the drop-down list. The batch splitter preparses an entire EDI document and splits the document into individual transactions. Each transaction retains its Interchange Header/Trailer information. Once the batch splitter is finished splitting the EDI document, the transactions are ready to be transformed into XML.
Location for ack copies	The directory in which the acknowledgement document is placed.

Reference

TCP Listener Configuration Parameters

On the Settings tab:

Parameter	Description
Port	The port where the adapter listens for the TCP transfer.
Encoding	The character set encoding for inbound documents. For example, UTF-8. The default is ISO-8859-1 US and Western Europe.
Allowable Client Host	The name or address of the client restricted to accessing this adapter.

On the Advanced tab:

Parameter	Description
Transform Type	Select the pre-built transform template from the drop-down list. To enable batch processing, select *BatchSplitter* from the drop-down list. The batch splitter preparses an entire EDI document and splits the document into individual transactions. Each transaction retains its Interchange Header/Trailer information. Once the batch splitter is finished splitting the EDI document, the transactions are ready to be transformed into XML.

Parameter	Description
Location for ack copies	The directory in which the acknowledgement document is placed.

Reference IBM MQ Series (MQ) Listener Configuration Parameters

On the Settings tab:

Parameter	Description
Queue Manager	The name of the MQ queue manager to be used.
Queue Name	The name of the MQ Series or WebSphere MQ queue that the HL7 system polls.
Polling Interval	The maximum wait interval (in the format *nn*H:*nn*M:*nn*S) between checks for new documents. The higher this value, the longer the interval, and the fewer system resources that are used. However, with a high value, the worker thread cannot respond to a stop command. If timeout is set to 0, the listener runs once and terminates. The default is 2 seconds.

On the MQ Client tab:

Parameter	Description
Host	The host where the MQ Server is located.
Port	The port number used to connect to an MQ Server.
Channel	The channel between an MQ Client and an MQ Server.

On the Advanced tab:

Parameter	Description
Transform Type	Select the pre-built transform template from the drop-down list. To enable batch processing, select *BatchSplitter* from the drop-down list. The batch splitter preparses an entire EDI document and splits the document into individual transactions. Each transaction retains its Interchange Header/Trailer information. Once the batch splitter is finished splitting the EDI document, the transactions are ready to be transformed into XML.

Parameter	Description
Location for ack copies	The directory in which the acknowledgement document is placed.

Reference

File Transfer Protocol (FTP) Listener Configuration Parameters

On the Settings tab:

Parameter	Description
Host	The name of the FTP host.
Port	The port where the adapter listens on the FTP transfer.
User	The user name to log onto the FTP Server.
Password	The password for the FTP user.
Location	The directory where messages are received. DOS-style file patterns are available for this parameter. You can specify a file pattern as well as a directory. For example, c:\xyz\ab*cd (without a file suffix) takes the file suffix from that parameter. If you use a pattern, files are selected based on the suffix and then the pattern. AB?CD selects ABxCD. AB*CD selects ABxxxCD.
Encoding	The character set encoding for inbound documents. For example, UTF-8. The default is ISO-8859-1 US and Western Europe.
Polling Interval	The maximum wait interval (in the format *nn*H:*nn*M:*nn*S) between checks for new documents. The higher this value, the longer the interval, and the fewer system resources that are used. However, with a high value, the worker thread cannot respond to a stop command. If timeout is set to 0, the listener runs once and terminates. The default is 2 seconds.

On the Advanced tab:

Parameter	Description
Transform Type	Select the pre-built transform template from the drop-down list. To enable batch processing, select *BatchSplitter* from the drop-down list. The batch splitter preparses an entire EDI document and splits the document into individual transactions. Each transaction retains its Interchange Header/Trailer information. Once the batch splitter is finished splitting the EDI document, the transactions are ready to be transformed into XML.
Location for ack copies	The directory in which the acknowledgement document is placed.

Procedure How to Edit a Channel

To edit an existing channel:

1. In the left pane, select the channel you want to edit.
2. In the right pane, move the pointer over *Operations* and select *Edit*.

   The Edit channels window opens.
3. Make the required changes to the channel configuration and click *Finish*.

Procedure How to Delete a Channel

To delete an existing channel:

1. In the left pane, select the channel you want to delete.
2. In the right pane, move the pointer over *Operations* and select *Delete*.

   A confirmation dialog box opens.
3. To delete the channel you selected, click *OK*.

   The channel disappears from the list in the left pane.

CHAPTER 4

Using Web Services Policy-Based Security

Topics:

- Web Services Policy-Based Security
- Configuring Web Services Policy-Based Security

iWay Servlet Application Explorer provides a security feature called Web services policy-based security. The following topics describe how this feature works and how to configure it.

Web Services Policy-Based Security

Web services provide a layer of abstraction between the back-end business logic they invoke and the user or application running the Web service. This enables easy application integration but raises the issue of controlling the use and execution of critical and sensitive business logic that is run as a Web service.

iWay Servlet Application Explorer controls the use of Web services that use iWay adapters using a feature called policy-based security. This feature enables an administrator to apply "policies" to iWay Business Services (Web services) to deny or permit their execution.

A policy is a set of privileges dealing with the execution of an iWay Business Service (iBS) that can be applied to an existing or new iBS. When you set specific rights or privileges inside a policy, you do not have to recreate privileges for every iBS that has security concerns in common with other iWay Business Services. Instead, you can use one policy for many iWay Business Services.

The goal of the feature is to secure requests at both the transport and the SOAP request level transmitted on the wire. Some policies do not deal with security issues directly but do effect the run-time behavior of the Web services to which they are applied.

The iBS administrator creates an "instance" of a policy type, names it, associates individual users and/or groups (a collection of users), and then applies that policy to one or more iWay Business Services.

You can assign a policy to an iBS, or to a method within an iBS. If a policy is applied only to a method, other methods in that iBS are not governed by it. However, if a policy is applied to the iBS, all methods are governed by it. At run time, the user ID and password that are sent to iBSE in the SOAP request message are checked against the list of users for all policies applied to that specific iBS. The policy type that is supported is Resource Execution, which dictates who can or cannot execute the iBS.

When a policy is not applied, the default value for an iBS is to "grant all". For example, anybody can execute the iBS, until the Resource Execution policy is associated to the iBS. At that time, only those granted execution permission, or users who are not part of a group that was denied execution permissions, have access to the iBS.

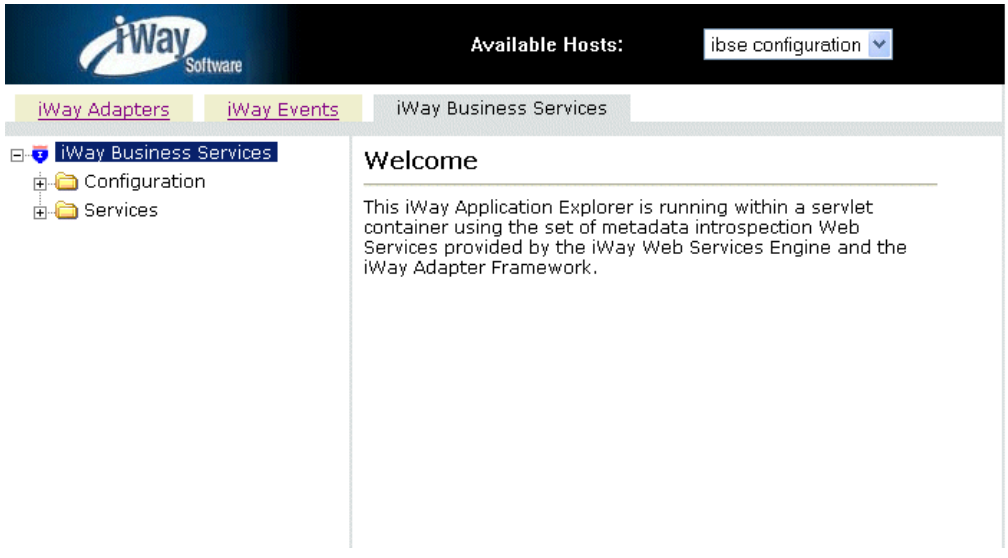
Configuring Web Services Policy-Based Security

The following procedure describes how to configure iBSE policy-based security.

Procedure How to Create and Associate a User With a Policy

Before you create instances of policies, you must have a minimum of one user or one group to associate to an instance. You can create users and groups using iWay Servlet Application Explorer.

1. Open *iWay Servlet Application Explorer*.



   a. Select the *iWay Business Services* tab.

   b. Expand the *Configuration* node.

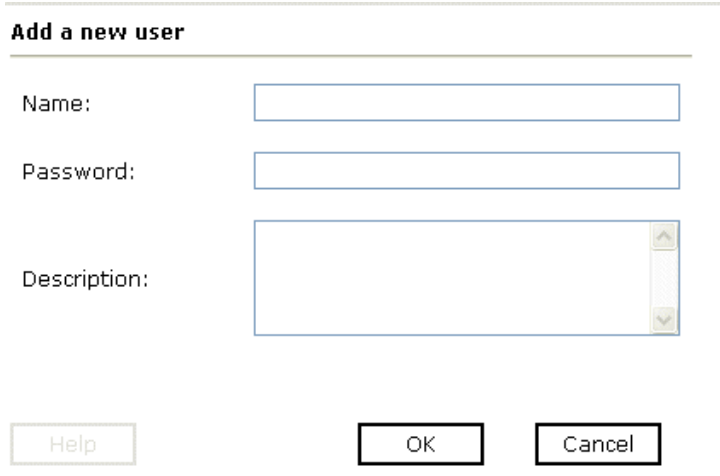
   c. Expand the *Security* node.

   d. Expand the *Users and Groups* node.

   e. Select *Users*.

2. In the right pane, move the pointer over *Operations* and select *Add*.

The Add a new user pane opens.



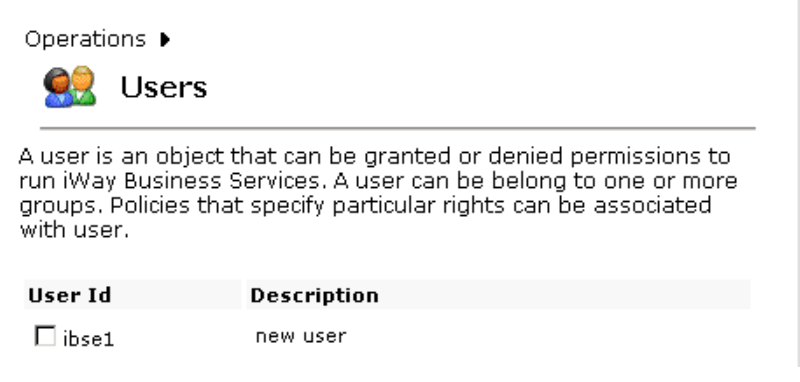
a. In the Name field, type a user ID.

b. In the Password field, type the password associated with the user ID.

c. In the Description field, type a description of the user (optional).

3. Click *OK*.

The new user is added to the configuration.

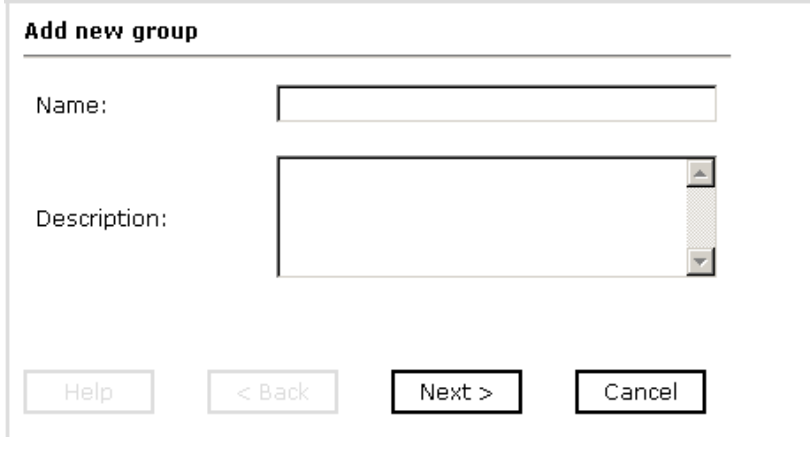


Procedure How to Create a Group to Use With a Policy

To create a group to use with a policy:

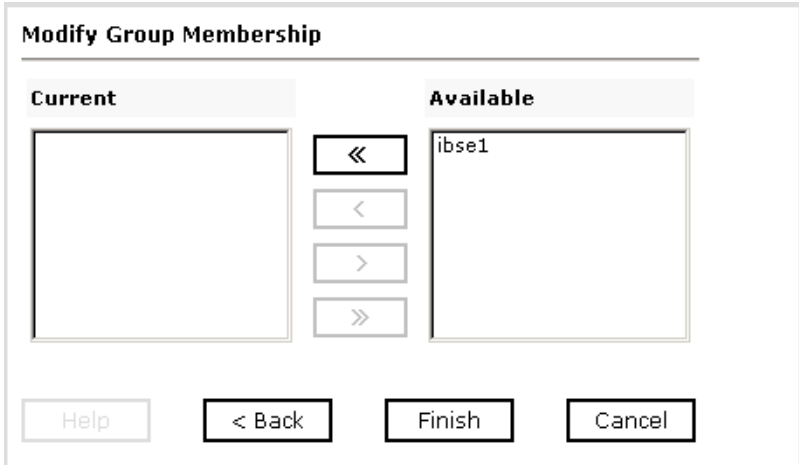
1. Open *iWay Servlet Application Explorer*.
   a. Select the *iWay Business Services* tab.
   b. Expand the *Configuration* node.
   c. Expand the *Security* node.
   d. Expand the *Users and Groups* node.
   e. Select *Groups*.
2. In the right pane, move the pointer over *Operations* and click *Add*.

   The Add new group pane opens.



   a. In the Name field, type a a name for the group.
   b. In the Description field, type a description for the group (optional).
3. Click *Next*.

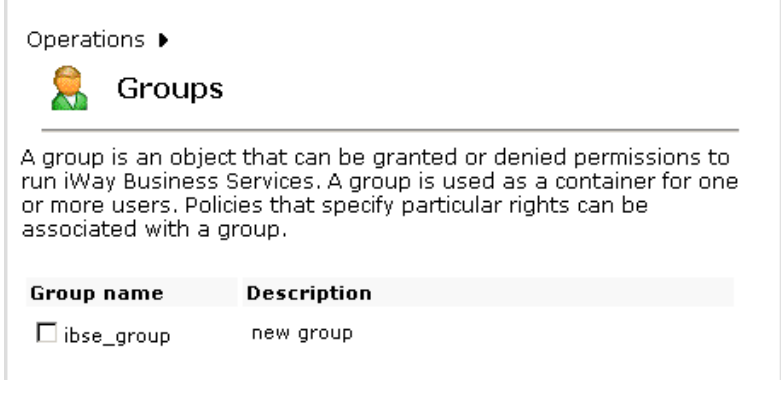
The Modify Group Membership pane opens.



You can either highlight a single user in the list of available users and add it by clicking the left arrow, or you can click the double left arrow to add all users in the list of available users to the group.

4. After you select a minimum of one user, click *Finish*.

   The new group is added to the configuration.



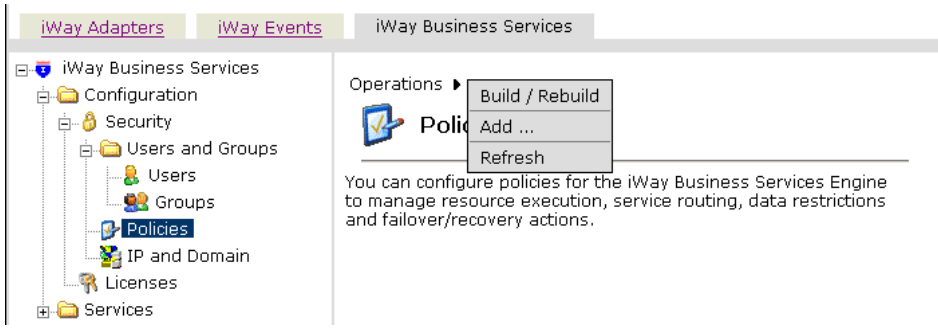
Procedure How to Create an Execution Policy

An execution policy governs who can execute the iBS to which the policy is applied.

To create a group to use with a policy:

1. Open *iWay Servlet Application Explorer*.
   a. Select the *iWay Business Services* tab.

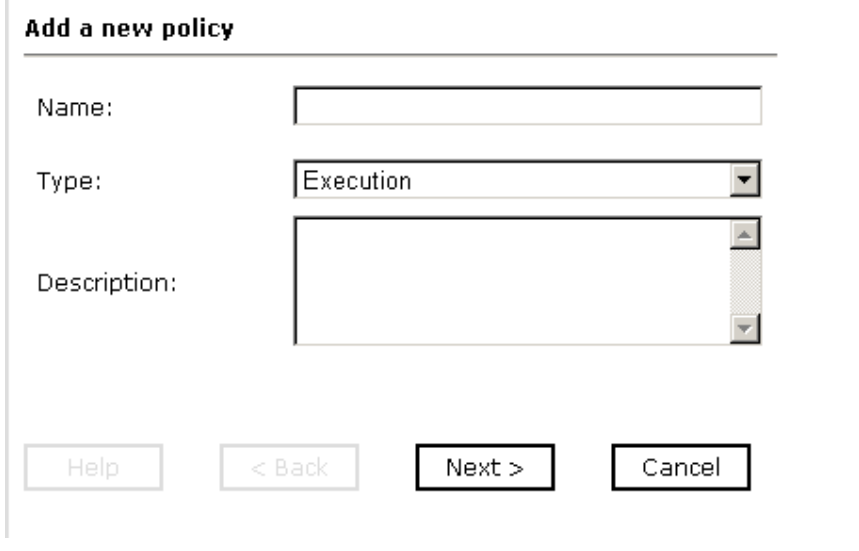
b. Expand the *Configuration* node.



c. Select *Policies*.

2. In the right pane, move the pointer over *Operations* and click *Add*.

The Add a new policy pane opens.



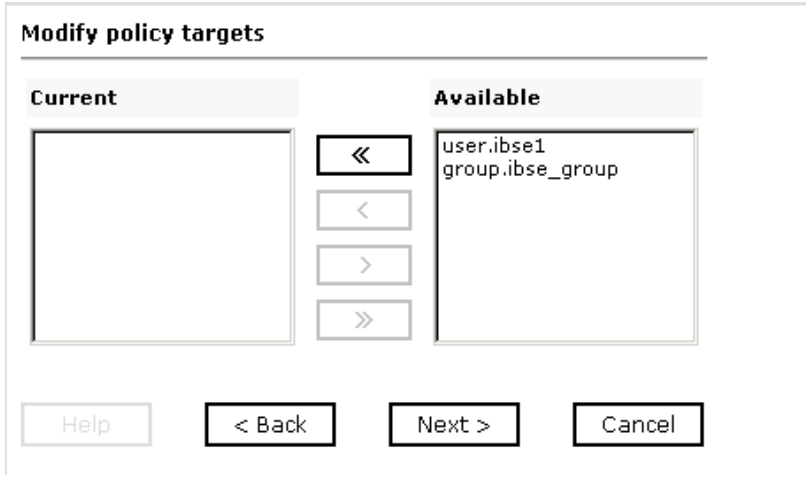
a. In the Name field, type a a name for the policy.

b. From the Type drop-down list, select *Execution*.

c. In the Description field, type a description for the policy (optional).

3. Click *Next*.

The Modify policy targets pane opens.

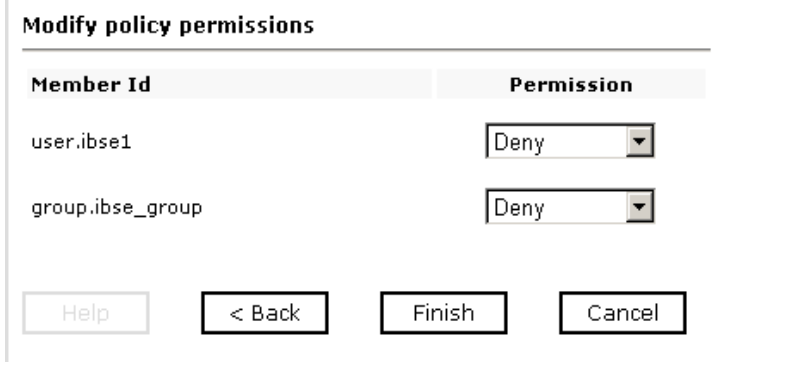


4. Select a minimum of one user or group from the Available pane.

   Note: This user ID is checked against the value in the user ID element of the SOAP header sent to iBSE in a SOAP request.

5. Click *Next*.

   The Modify policy permissions pane opens.

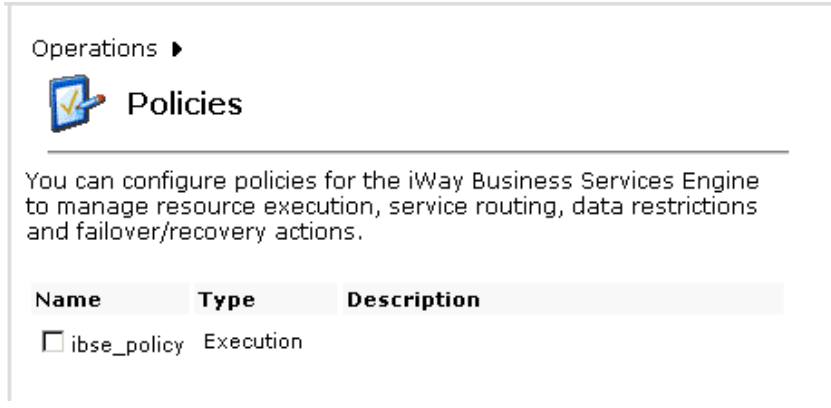


   You select whether users or groups may execute the iBS.

6. From the Permission drop-down lists, select *Grant* to permit execution or *Deny* to restrict execution.

7. Click *Finish*.

The following pane summarizes your configuration.



Configuring the IP and Domain Restrictions Policy Type

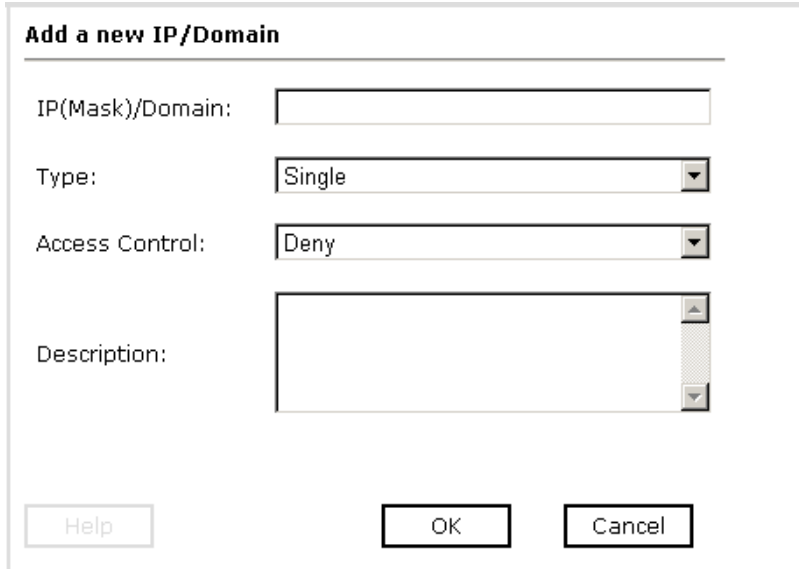
You configure the IP and Domain Restriction policy type slightly differently from other policy types. The IP and Domain Restriction policy type controls connection access to iBSE and therefore need not be applied to individual Web services. You need not create a policy, however, you must enable the Security Policy option in iWay Servlet Application Explorer.

Procedure How to Configure IP and Domain Restrictions

1. Open *iWay Servlet Application Explorer*.
   a. Select the *iWay Business Services* tab.
   b. Expand the *Configuration* node.
   c. Expand the *Security* node.

   d. Select *IP and Domain*.
2. In the right pane, move the pointer over *Operations* and click *Add*.

The Add a new IP/Domain pane opens.



a. From the Type drop-down list, select the type of restriction.

b. In the IP(Mask)/Domain field, type the IP or domain name using the following guidelines.

If you select Single (Computer) from the Type drop-down list, you must provide the IP address for that computer. If you only know the DNS name for the computer, click *DNS Lookup* to obtain the IP Address based on the DNS name.

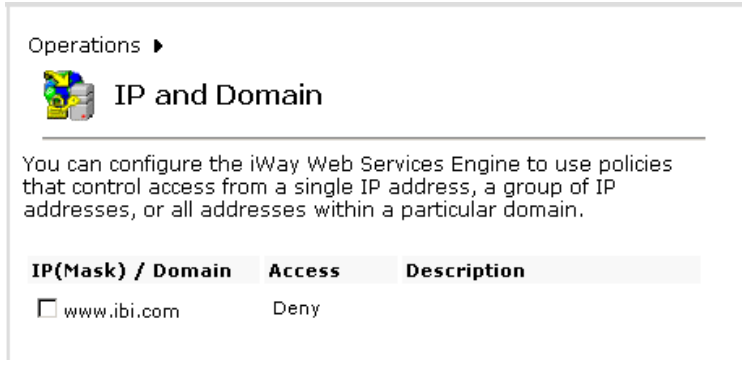
If you select Group (of Computers), you must provide the IP address and subnet mask for the computer group.

If you select Domain, you must provide the domain name, for example, yahoo.com.

3. From the Access Control drop-down list, select *Grant* to permit access or *Deny* to restrict access for the IP addresses and domain names you are adding.

4. Click *OK*.

The following pane summarizes your configuration.



CHAPTER 5

Management and Monitoring

Topics:

- Managing and Monitoring Services and Events Using iBSE
- Managing and Monitoring Services and Events Using iWay JCA
- Setting Engine Log Levels
- Configuring Connection Pool Sizes

Once you have created services and events using iWay Application Explorer, you can use managing and monitoring tools provided by iBSE and JCA to gauge the performance of your run-time environment. The following section describe how to configure and use these features.

Managing and Monitoring Services and Events Using iBSE

iBSE provides a console to manage and monitor services and events currently in use and display resource usage and invocation statistics. These indicators can help you adjust your environment for optimum efficiency.

The following monitoring levels are available for services:

- System
- Service
- Method

The following monitoring levels are available for events:

- System
- Channel
- Port

Procedure How to Access the Monitoring Console

To access the monitoring console:

1. Ensure that BEA WebLogic Server is started.
2. Enter the following URL in your Web browser:

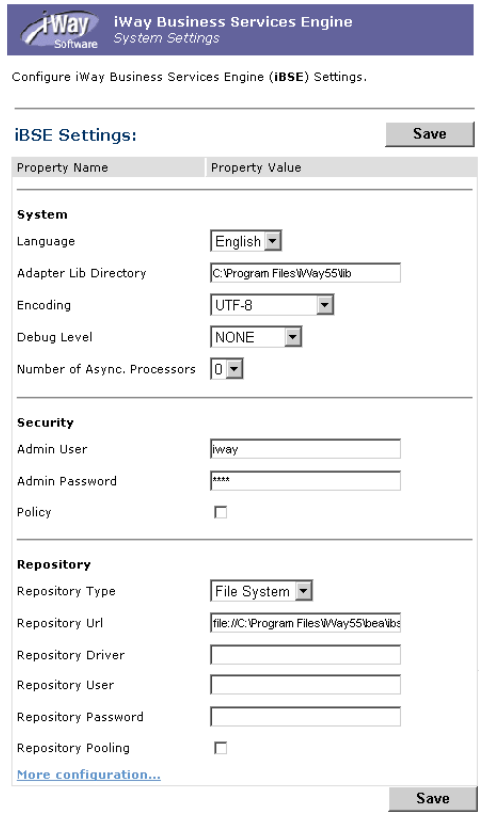
   `http://localhost:7001/ibse/IBSEConfig`

   where:

   localhost

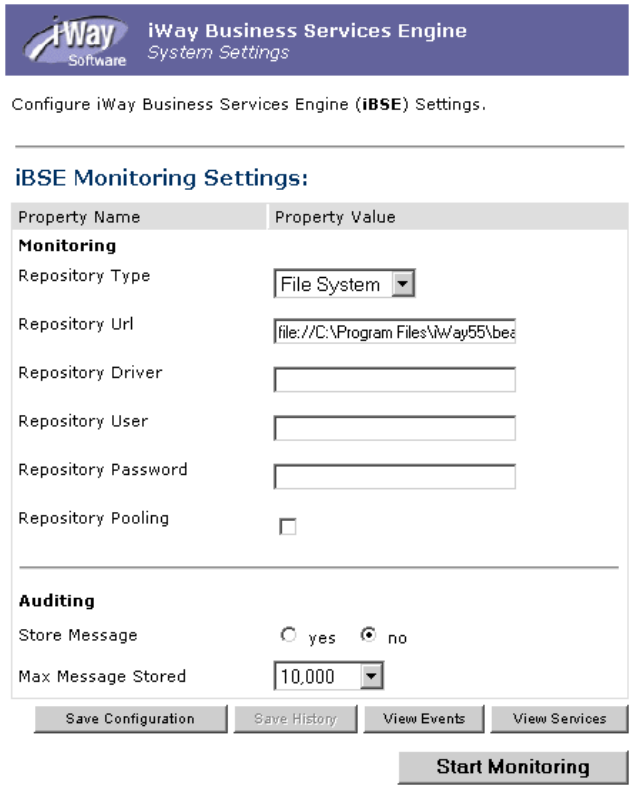
   Is where your application server is running.

The iBSE Settings page opens:



3. Scroll to the bottom of the page and click *More configuration*.

The iBSE Monitoring Settings page opens:



Tip: To access the monitoring console directly, enter the following URL in your Web browser:

`http://localhost:7001/ibse/IBSEStatus`

where:

localhost

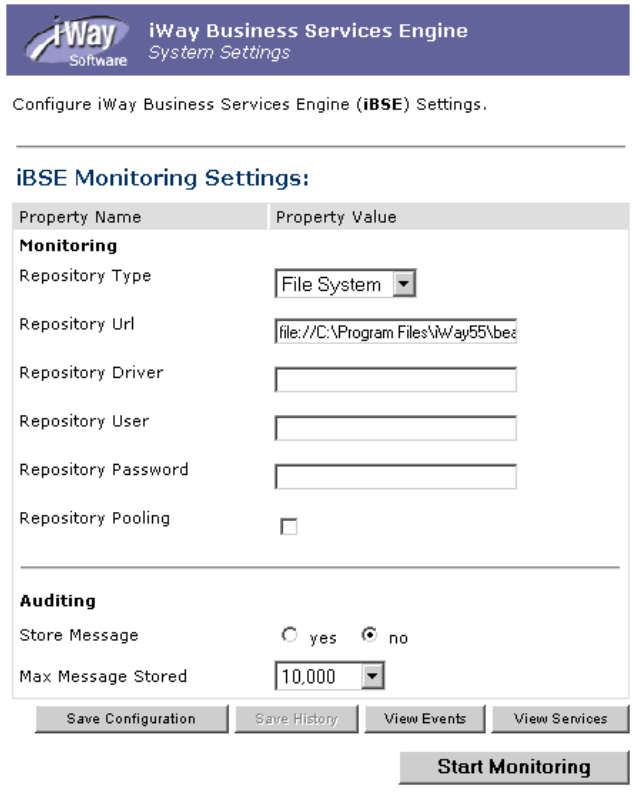
Is where your application server is running.

Procedure How to Configure Monitoring Settings

To configure monitoring settings:

1. Ensure that BEA WebLogic Server is started.
2. Access the monitoring console.

The iBSE Monitoring Settings page opens:



3. Perform the following steps in the Monitoring section:
   a. Select the type of repository you are using from the Repository Type drop-down list.
   b. Enter a JDBC URL to connect to the database in the Repository URL field.
   c. Enter a JDBC Class to connect to the database in the Repository Driver field.
   d. Enter a user ID and password to access the monitoring repository database.
   e. Click the *Repository pooling* check box if you want to enable pooling.
4. Perform the following steps in the Auditing section:
   a. Select *yes* if you want to store messages. This option is disabled by default.

      Note: You must start and then stop monitoring to enable this option.
   b. Select the maximum number of messages you want to store. By default, 10,000 is selected.

Note: Depending on your environment and the number of messages that are exchanged, storing a large number of messages may affect system performance. If you need more information about your system's resources, consult your system administrator.

5. Click *Save Configuration*.
6. Click *Start Monitoring*.

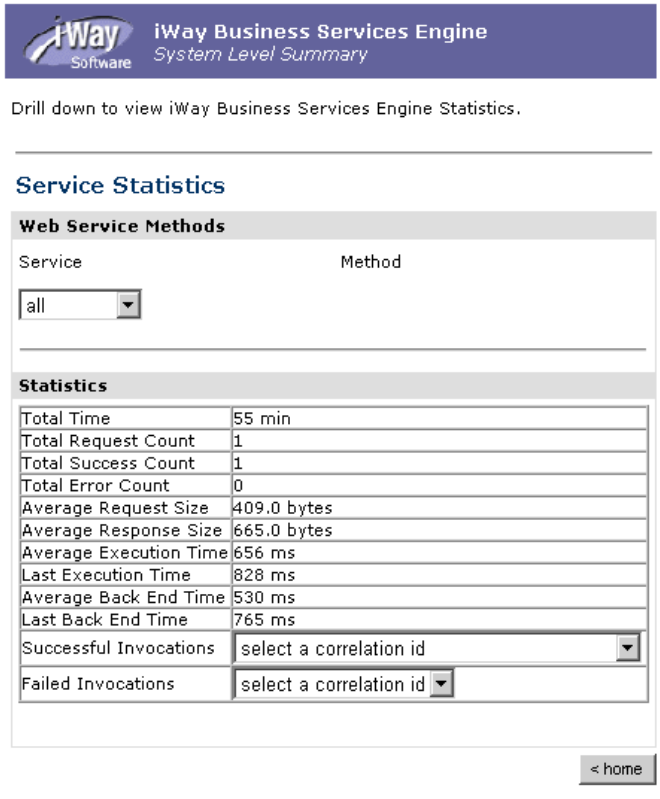
iBSE begins to monitor all services and events currently in use and store messages, if you selected this option. If you want to stop monitoring, click *Stop Monitoring*.

Procedure **How to Monitor Services**

To monitor services:

1. Ensure that BEA WebLogic Server is started.
2. Click *Start Monitoring* from the iBSE Monitoring Settings page.
3. Click *View Services*.

The System Level Summary page opens.



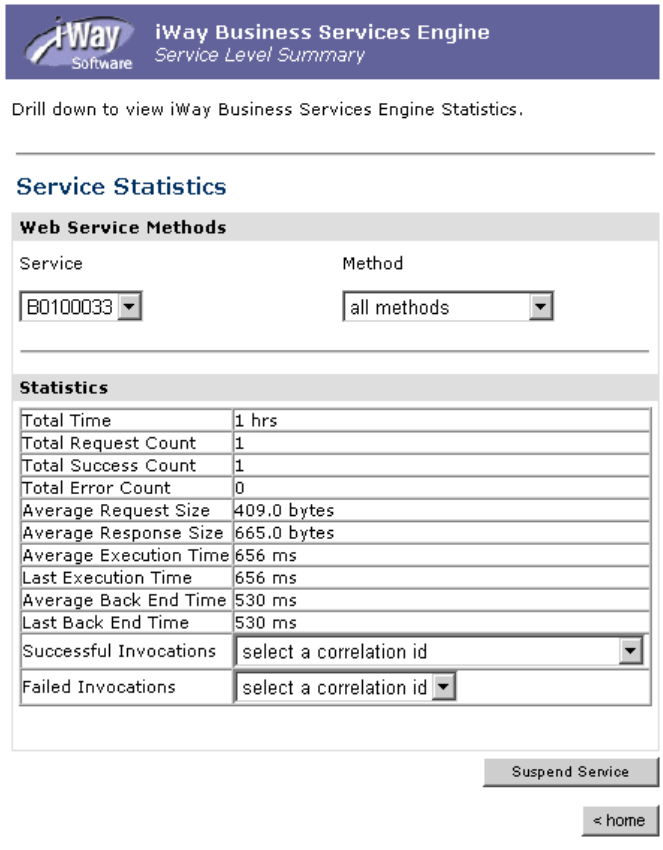
The system level summary provides services statistics at a system level. The following table provides a description of each statistic.

Statistic	Description
Total Time	The total amount of time iBSE is monitoring services. This time starts when you click *Start Monitoring* from the iBSE Monitoring Settings page.
Total Request Count	The total number of services requests that were made during this monitoring session.
Total Success Count	The total number of successful service executions.

Statistic	Description
Total Error Count	The total number of errors that were encountered.
Average Request Size	The average size of a service request that is available.
Average Response Size	The average size of a service response size that is available.
Average Execution Time	The average execution time for a service.
Last Execution Time	The last execution time for a service.
Average Back End Time	The average back end time.
Last Back End Time	The last back end time.
Successful Invocations	A list of successful services listed by correlation ID. Select a service from the drop-down list to retrieve more information for that service.
Failed Invocations	A list of failed services listed by correlation ID. Select a service from the drop-down list to retrieve more information for that service.

4. Select a service from the drop-down list.

The Service Level Summary page opens.



A list of available methods for that service appears in the Method drop-down list.

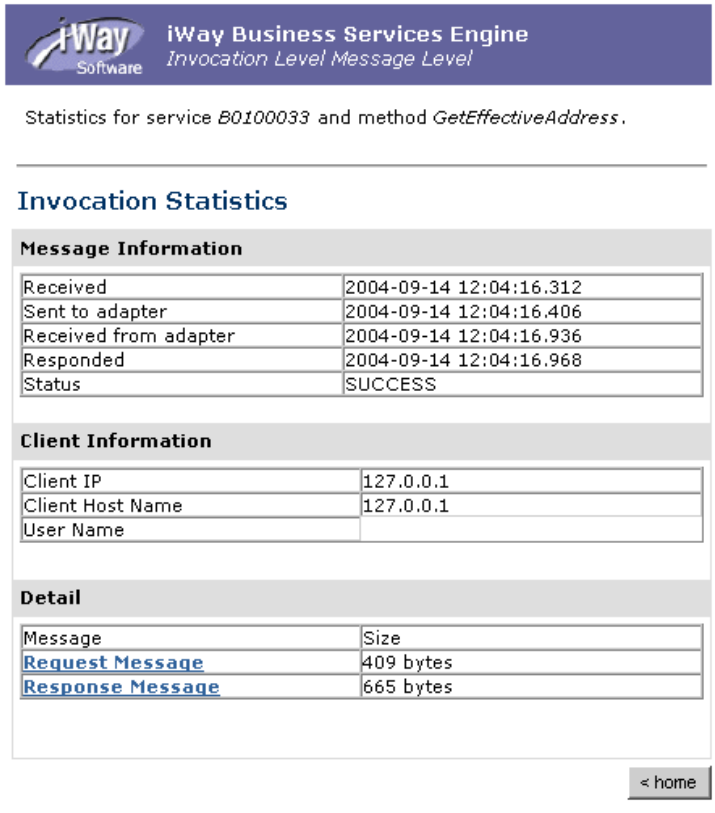
To stop a service at any time, click *Suspend Service*. To start the service, click *Resume Service*.

5. Select a method for the service from the Method drop-down list.

The Method Level Summary page opens.

6. For additional information about a service and its method that is successful, select a service based on its correlation ID from the Successful Invocation drop-down list.

The Invocation Level Statistics page opens.



Information pertaining to the message and client is provided.

7. Click the *Request Message* link to view the XML request document in your Web browser.

   You can also view the XML response document for the service.

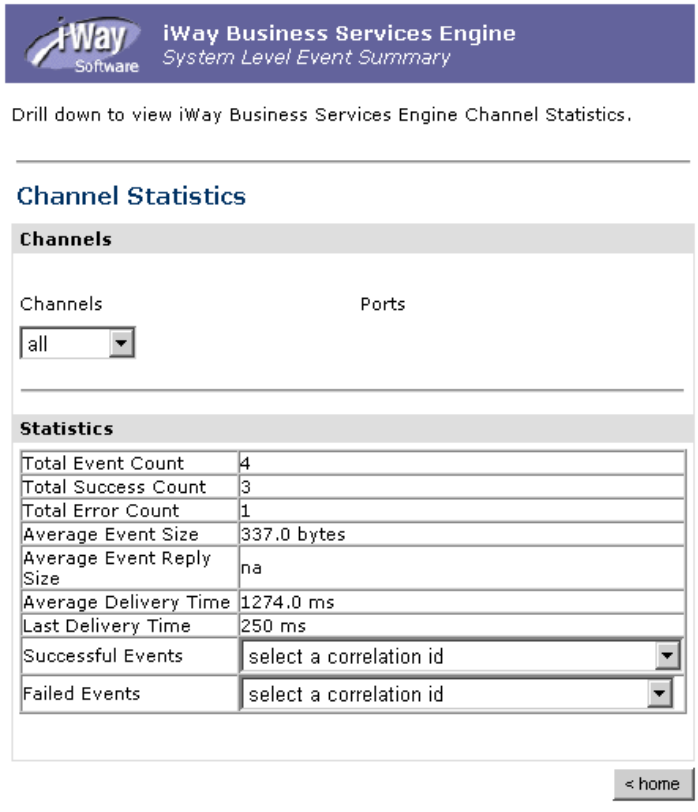
8. Click *home* to return to the iBSE Monitoring Settings page.

Procedure How to Monitor Events

To monitor events:

1. Ensure that BEA WebLogic Server is started.
2. Click *Start Monitoring* from the iBSE Monitoring Settings page.
3. Click *View Events.*

   The System Level Summary page opens.



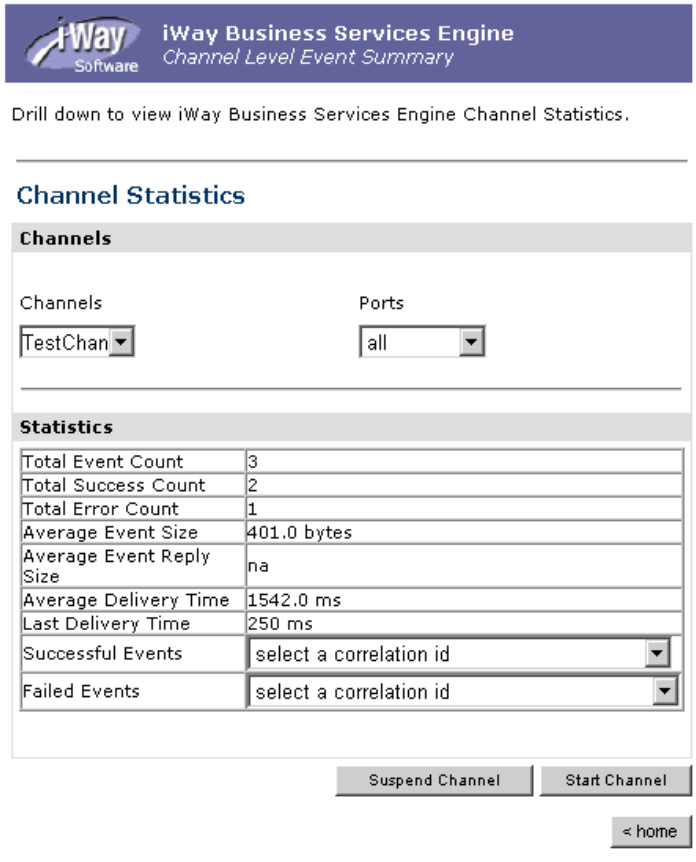
The system level summary provides event statistics at a system level. The following table provides a description of each statistic.

Statistic	Description
Total Event Count	The total number of events.
Total Success Count	The total number of successful event executions.
Total Error Count	The total number of errors that were encountered.
Average Event Size	The average size of an event request that is available.
Average Event Reply Size	The average size of an event response that is available.

Statistic	Description
Average Delivery Time	The average delivery time for an event.
Last Execution Time	The last execution time for an event.
Last Delivery Time	The last delivery time.
Successful Events	A list of successful events listed by correlation ID. Select an event from the drop-down list to retrieve more information for that event.
Failed Events	A list of failed events listed by correlation ID. Select an event from the drop-down list to retrieve more information for that event.

4. Select a channel from the drop-down list.

The Channel Level Event Summary page opens.

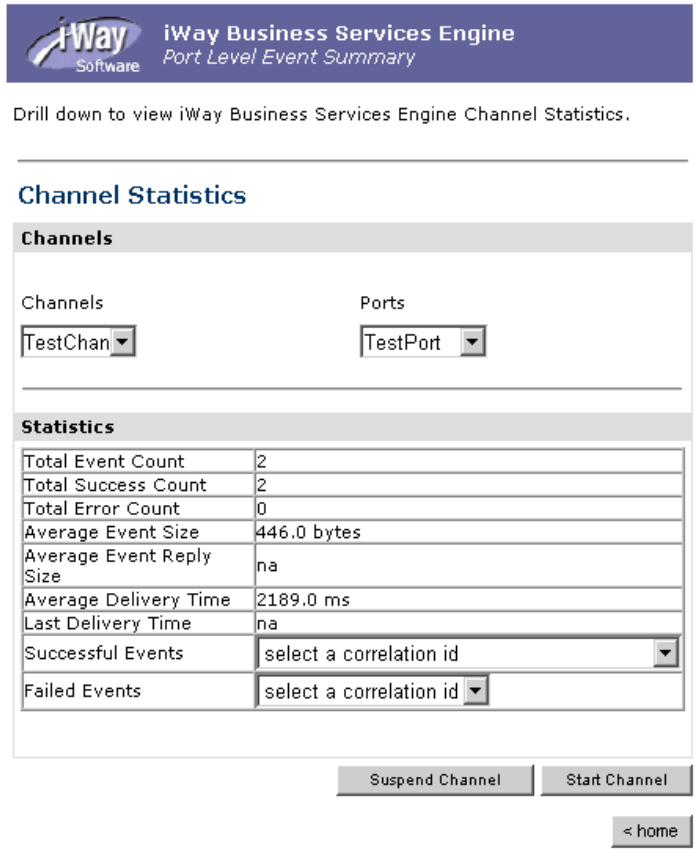


A list of available ports for that channel appears in the Ports drop-down list.

To stop a channel at any time, click *Suspend Channel*. To start the service, click *Start Channel*.

5. Select a port for the channel from the Ports drop-down list.

The Port Level Event Summary page opens.



6. For additional information about an event and its port that is successful, select an event based on its correlation ID from the Successful Events drop-down list.

The Event Level Statistics page for the channel and port you selected opens.

Information pertaining to the event message is provided.

7. Click the *Event Message* link to view the XML event document in your Web browser.
8. Click *home* to return to the iBSE Monitoring Settings page.

Managing and Monitoring Services and Events Using iWay JCA

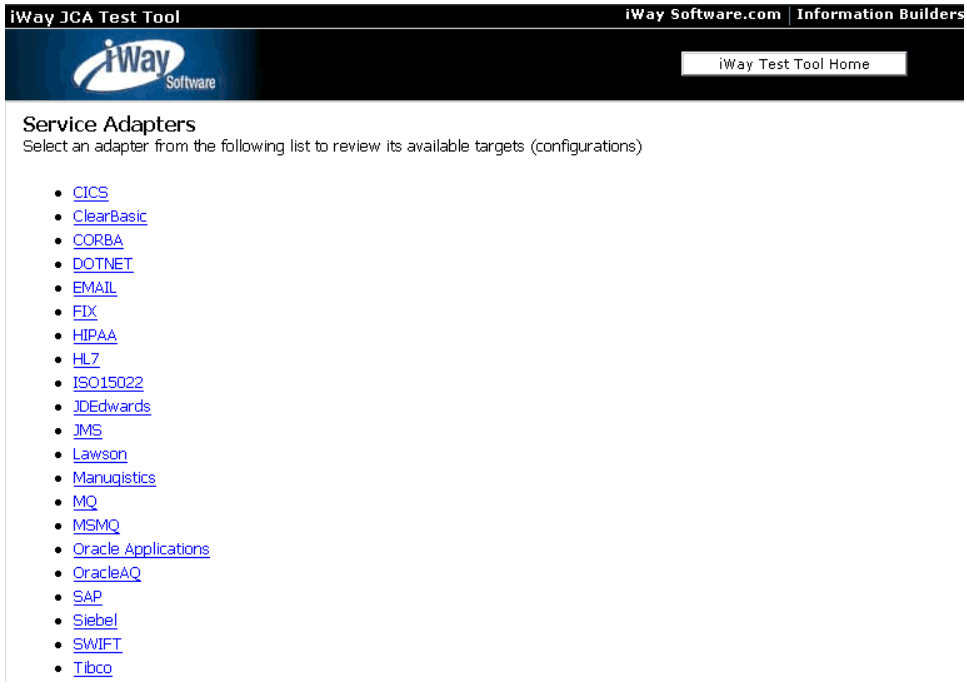
The following topics describe how to test service and event adapters using the iWay JCA Installation Verification Program (IVP).

Procedure How to Test the iWay Service Adapters

To test the iWay service adapters using the IVP:

1. To ensure that the targets you configured in iWay Application Explorer appear in the IVP, click *Refresh Manage Connection Factory.*
2. To display the available adapters, click the *Service adapters* link.

The following window, showing the list of deployed service adapters, opens.



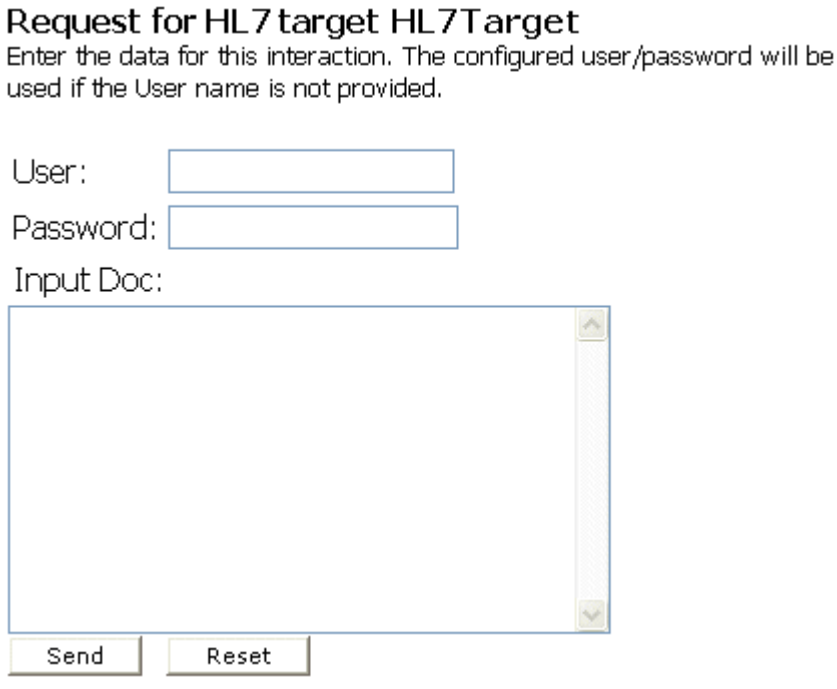
3. Select the adapter that you want to test.

The adapter displays all of the targets currently configured in the iWay repository for that adapter.

The following window shows that there is one target, HL7Target, configured for the iWay Adapter for HL7.

4. Click the desired target, for example, *HL7Target*.

   The following pane, showing an input area in which you can provide XML code with which to test the adapter, opens.



5. Enter a username and password to connect to HL7.
6. In the input area, enter a request document built from the iWay request schema.
7. Click *Send*.

   A response is returned from HL7.

Testing the iWay Event Adapters Using the IVP

The iWay JCA Installation Verification Program (IVP) enables you to start and stop iWay event channels.

The tool also enables you to monitor events and provides statistics on channels.

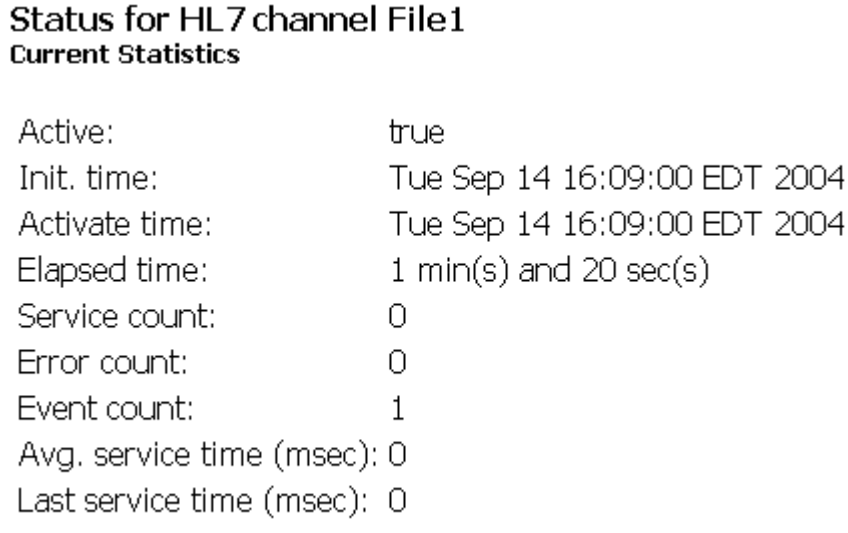
Procedure How to Test the iWay Event Adapters

To test the iWay event adapters using the IVP:

1. Click *Refresh Manage Connection Factory.*
2. To display the available adapters, click the *Events adapter* link.
3. Select the adapter that you want to monitor, for example, HL7.

   The tool displays the channels that you already configured.

4. Click the *start* hyperlink to start the channel.



   Statistics for the event channel are returned, including:

   - The status of the channel.
   - The time the channel was initialized.
   - The number of events.
   - The event response time.

5. To stop the channel, click the *stop* hyperlink.

Monitoring Services

The following section describes how to use the iWay JCA Installation Verification Program (IVP) in Managed mode and monitor services in BEA WebLogic.

Procedure How to Use iWay JCA IVP in Managed Mode.

To use iWay JCA IVP in managed mode:

1. Open the *web.xml* file in a text editor.

   It is located in the following directory:

   ```
   <installDir>\bea\iwjcaivp\WEB-INF\web.xml
   ```

   where:

   <installDir>

   Is the location of your iWay 5.5 installation.

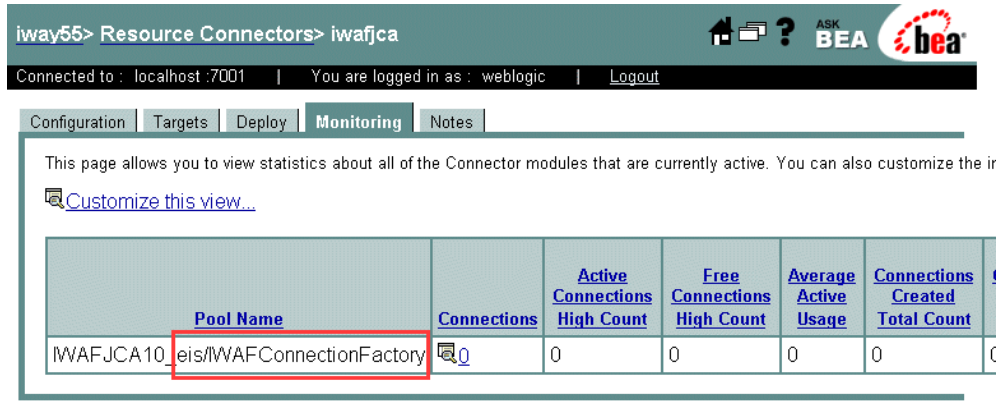
2. Locate the following lines:

   ```
   <context-param><param-name>iway.jndi</param-name><param-value></param-value><description>JNDI name for the IWAF JCA Resource Adapter. If not provided, the application will create a new one based on iway.home, iway.config and iway.loglevel.</description></context-param>
   ```

3. Enter the path to the JCA module for the iway.jndi parameter, for example:

   ```
   <param-value>eis/IWAFConnectionFactory</param-value>
   ```

   You can find this value by browsing to the Resource Connectors section in BEA WebLogic and checking the Pool Name for the JCA connector module. For example:



4. Restart WebLogic Server or redeploy the JCA connector module.

5. Open a browser to:

`http://hostname:port/iwjcaivp`

where:

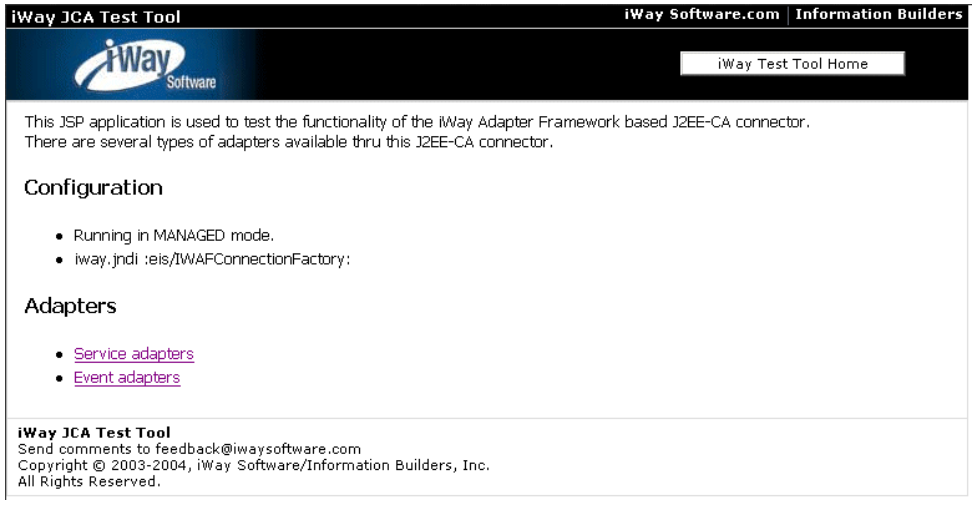
hostname

Is the name of the machine where your application server is running.

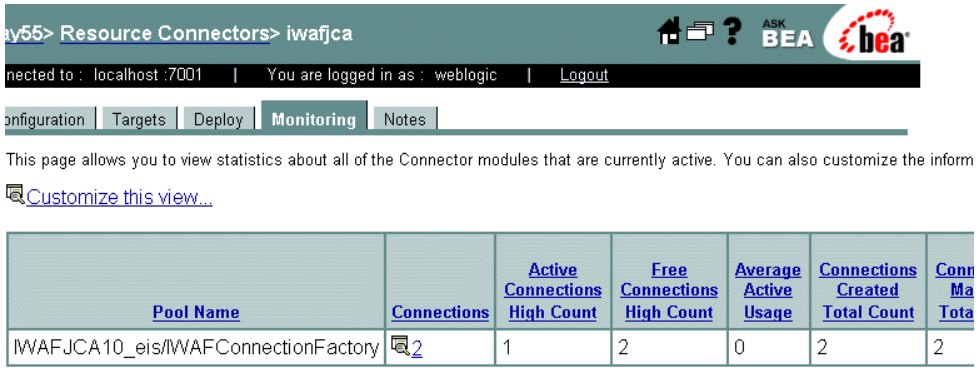
port

Is the port for the domain you are using for iWay. The port for the default domain is 7001.

The iWay JCA Test Tool window opens and provides links for viewing iWay Service or Event adapters. Notice that it is now running in managed mode.



6. Test a service you have created for an iWay Adapter using Application Explorer.
7. Return to the Resource Connectors section in BEA WebLogic.



Monitoring statistics pertaining to the services you have executed are now available.

Setting Engine Log Levels

The following section describes how to set engine log levels for Servlet iBSE and JCA. For more information, see the *iWay Installation and Configuration for BEA WebLogic* documentation.

Procedure How to Enable Tracing for Servlet iBSE

To enable tracing for Servlet iBSE:

1. Open the Servlet iBSE configuration page:

   `http://hostname:port/ibse/IBSEConfig`

   where:

   hostname

   Is the hostname of the application server machine.

   port

   Is the port for the domain you are using for iWay. The port for the default domain is 7001.

   For example:

   `http://localhost:7001/ibse/IBSEConfig`

2. In the top *System* area, specify the level of tracing from the *Debug* drop-down list.
3. Click *Save*.

The default location for the trace information on Windows is:

`C:\Program FIles\bea\ibse\ibselogs`

Procedure How to Enable Tracing for JCA

To enable tracing for JCA:

1. Open the extracted ra.xml file in a text editor.
2. Locate and change the following setting:

   LogLevel. This can be set to DEBUG, INFO, or ERROR.

```
<context-param>
<config-property>
    <config-property-name>LogLevel</config-property-name>
    <config-property-type>java.lang.String</config-property-type>
    <config-property-value></config-property-value>
</config-property>
```

For example:

```
<config-property-value>DEBUG</config-property-value>
```

A directory in the configuration directory contains the logs. Also, be sure to review logs generated by your application server.

Leave the remainder of this file unchanged.

3. Save the file and exit the editor.
4. Redeploy the connector.

Configuring Connection Pool Sizes

The following section describes how to configure connection pool sizes using JCA.

Procedure How to Configure Connection Pool Sizes

To configure connection pool sizes:

1. Open the extracted weblogic-ra.xml file in a text editor.
2. Locate and change the following setting:

   pool-params. The JCA Resource Connector has an initial capacity value of 0 by default, and cannot be changed. The maximum capacity value is 10 by default and can be changed to a higher value.

```
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE weblogic-connection-factory-dd (View Source for full
doctype...)>
- <weblogic-connection-factory-dd>
  <connection-factory-name>IWAFJCA</connection-factory-name>
  <jndi-name>eis/IWAFConnectionFactory</jndi-name>
  - <pool-params>
    <initial-capacity>0</initial-capacity>
    <max-capacity>10</max-capacity>
    <capacity-increment>1</capacity-increment>
    <shrinking-enabled>false</shrinking-enabled>
    <shrink-period-minutes>200</shrink-period-minutes>
  </pool-params>
  <security-principal-map />
</weblogic-connection-factory-dd>
```

3. Save the file and exit the editor.
4. Redeploy the connector.

CHAPTER 6

Customizing HL7 Messages

Topics:

- The HL7 Reference Interface Model (RIM)
- Defining a Z Segment

This section describes customizing HL7 messages using the Reference Interface Model (RIM), including customizing existing HL7 messages using Z segments.

The HL7 Reference Interface Model (RIM)

The HL7 Reference Interface Model (RIM) documents the standards for the various types of HL7 messages, all of which can be used with the iWay Adapter for HL7.

As mentioned previously, the structure of an HL7 message is defined by the data dictionaries supplied (messages.xsd, segments.xsd, fields.xsd, and datatypes.xsd). For more information, see Chapter 1, *Introducing the iWay Adapter for HL7 for BEA WebLogic*.

The messages.xsd defines the shape of an HL7 message by defining the type and order of segments as in the following example:

```
<ADT_A01>
   <element maxOccurs="1" minOccurs="1" ref="MSH" group="0"/>
   <element maxOccurs="1" minOccurs="1" ref="EVN" group="0"/>
   <element maxOccurs="1" minOccurs="1" ref="PID" group="0"/>
   <element maxOccurs="1" minOccurs="0" ref="PD1" group="0"/>
   <element maxOccurs="unbounded" minOccurs="0" ref="NK1" group="0"/>
   <element maxOccurs="1" minOccurs="1" ref="PV1" group="0"/>
   <element maxOccurs="1" minOccurs="0" ref="PV2" group="0"/>
   <element maxOccurs="unbounded" minOccurs="0" ref="DB1" group="0"/>
   <element maxOccurs="unbounded" minOccurs="0" ref="OBX" group="0"/>
   <element maxOccurs="unbounded" minOccurs="0" ref="AL1" group="0"/>
   <element maxOccurs="unbounded" minOccurs="0" ref="DG1" group="0"/>
   <element maxOccurs="unbounded" minOccurs="0" ref="ADT_A01.GROUP.1"
group="1"/>
   <element maxOccurs="unbounded" minOccurs="0" ref="GT1" group="0"/>
   <element maxOccurs="unbounded" minOccurs="0" ref="ADT_A01.GROUP.2"
group="1"/>
   <element maxOccurs="1" minOccurs="0" ref="ACC" group="0"/>
   <element maxOccurs="1" minOccurs="0" ref="UB1" group="0"/>
   <element maxOccurs="1" minOccurs="0" ref="UB2" group="0"/>
</ADT_A01>
```

The previous example is an excerpt from the messages.xsd file that defines the structure of the ADT_A01 message. Each element definition defines a segment in the HL7 document and basic rules relating to that segment. For example, the first element (ref=MSH or the message header) is defined as only occurring once in a message (minoccurs and maxoccurs are set to 1). The group setting is set to zero to indicate that the message header is a core element in the message.

Groups of messages can be defined where rules (such as occurrence) can apply to a group of segments. Note there is an element reference of "ADT_A01.GROUP.1"; this group of segments can occur repeatedly as a group or not at all (maxOccurs=unbounded, minOccurs=0). However, there also can be rules that occur within that group. This is handled when defining the group as follows:

```
<ADT_A01.GROUP.1>
   <element maxOccurs="1" minOccurs="1" ref="PR1" group="0"/>
   <element maxOccurs="unbounded" minOccurs="0" ref="ROL" group="0"/>
</ADT_A01.GROUP.1>
```

The element referenced as PR1 must be present every time the group of segments is present (maxOccurs="1" minOccurs="1"), whereas the ROL segment need not be present when the group of segments occurs.

Note that groups can reference other groups, so complex looping segments can be managed using this process.

messages.xsd The messages.xsd file defines the structure of the message by defining the segments present, as well as their order and cardinality. However, the segments are also data structures made of fields that also must be defined.

segments.xsd The next level in a data dictionary is called segments.xsd. Using the following MSH (Message Header) segment as an example, note how each of the segments is defined in the segments.xsd file discussed in the previous example:

```
<MSH>
   <element maxOccurs="1" minOccurs="1" ref="MSH_FIELD_SEP"/>
   <element maxOccurs="1" minOccurs="1" ref="MSH_ENCDNG_CHRS"/>
   <element maxOccurs="1" minOccurs="0" ref="MSH_SND_APP"/>
   <element maxOccurs="1" minOccurs="0" ref="MSH_SND_FAC"/>
   <element maxOccurs="1" minOccurs="0" ref="MSH_RCV_APP"/>
   <element maxOccurs="1" minOccurs="0" ref="MSH_RCV_FAC"/>
   <element maxOccurs="1" minOccurs="0" ref="MSH_MSG_DATETIME"/>
   <element maxOccurs="1" minOccurs="0" ref="MSH_SECURITY"/>
   <element maxOccurs="1" minOccurs="1" ref="MSH_MSG_TYPE"/>
   <element maxOccurs="1" minOccurs="0" ref="MSH_MSG_CNTRL_ID"/>
   <element maxOccurs="1" minOccurs="1" ref="MSH_PRCSNG_ID"/>
   <element maxOccurs="1" minOccurs="1" ref="MSH_VRSN_ID"/>
   <element maxOccurs="1" minOccurs="0" ref="MSH_SQNC_NM"/>
   <element maxOccurs="1" minOccurs="0" ref="MSH_CNTN_PNTR"/>
   <element maxOccurs="1" minOccurs="0" ref="MSH_ACCPT_ACK_TYP"/>
   <element maxOccurs="1" minOccurs="0" ref="MSH_APP_ACK_TYP"/>
   <element maxOccurs="1" minOccurs="0" ref="MSH_CNTRY_CDE"/>
   <element maxOccurs="unbounded" minOccurs="0" ref="MSH_CHAR_SET"/>
   <element maxOccurs="1" minOccurs="0" ref="MSH_MSG_LANG"/>
</MSH>
```

This example is an excerpt from the segments.xsd file. Note how the structure of the segment is separated into fields and the rules regarding those fields. For example, MSH_FIELD_SEP and MSH_ENCDNG_CHRS are mandatory (minOccurs is set to 1) and can only occur once (maxOccurs set to 1). Other fields such as MSH_SND_FAC are optional. Just as messages.xsd defines the structure of a message, segments.xsd defines the structure of a segment, by documenting what fields make up that particular segment.

fields.xsd The definition of the fields is stored in the fields.xsd file. This file describes the fields that are referenced in the segments.xsd file. The file defines the longname for the field and its data type as follows:

```
<MSH_MSG_LANG longName="Principal Language Of Message" type="CE"/>
```

datatype.xsd The field MSH_MSG_LANG translates to "Principal Language Of Message," and it has a data type of C. To understand what that data type means, view the data dictionary's datatype.xsd file. This file is the last referenced when validating the structure or building a message as it describes what each field should look like.

Data types can be split into two categories, simple and complex. Simple data types are easily defined (for example, String – ST, Numeric – NM, DT – Date). These data types are well defined in the HL7 RIM.

Complex data types can be a combination of fields in a specified order as is the data type CE referred to previously. The data type definition for CE is a grouping of subfields with their own data types. For example:

```
<CE type="Complex">
   <element minOccurs="0" maxOccurs="1" ref="CE_ID" longName="identifer
(ID)" lookupTab="0" type="ID" />
   <element minOccurs="0" maxOccurs="1" ref="TXT" longName="text"
lookupTab="0" type="ST" />
   <element minOccurs="0" maxOccurs="1" ref="CODE_SYS" longName="name of
coding system" lookupTab="396" type="IS" />
   <element minOccurs="0" maxOccurs="1" ref="ALT_ID" longName="alternate
identifier" lookupTab="0" type="ST" />
   <element minOccurs="0" maxOccurs="1" ref="ALT_TXT" longName="alternate
text" lookupTab="0" type="ST" />
   <element minOccurs="0" maxOccurs="1" ref="ALT_CODE_SYS" longName="name
of alternate coding system" lookupTab="396" type="IS" />
</CE>
```

MSH_MSG_LANG is not a simple field but a group of fields that represents the complex type, CE.

The Reference Interface Model describes data types in great detail. The following is an example of the HL7 definition of a CE data type:

CE	Coded element	<identifier (ST)> ^ <text (ST)> ^ <name of coding system (ST)> ^ <alternate identifier (ST)> ^ <alternate text (ST)> ^ <name of alternate coding system (ST)>

The example of complex type also references simple data types when defining the subfields (in this case, the subfields are all ST or Strings).

Defining a Z Segment

The HL7 Reference Interface Model (RIM) also enables you to customize messages in the form of Z segments.

Z segments are user-defined segments that enable you to add extra information to an existing HL7 message, that is not in the RIM. Often, common Z segments become defined as part of the RIM. However, the capability to define Z segments must be provided to customers in any case.

When defining a Z segment, you must amend three data dictionary files:

- messages.xsd: Modify the message definition to add the new Z segment.
- segments.xsd: Define the new segment.
- fields.xsd: Define a new set of fields (because you are defining a new segment).

The following is an example of how a Z segment was created and added to the ORU_R01 message.

MESSAGES.XSD

```
<ORU_R01.GROUP.2>
   <element maxOccurs="1" minOccurs="0" ref="ORC" group="0"/>
   <element maxOccurs="1" minOccurs="1" ref="OBR" group="0"/>
   <element maxOccurs="1" minOccurs="1" ref="ZLR" group="0"/>
   <element maxOccurs="unbounded" minOccurs="0" ref="NTE" group="0"/>
   <element maxOccurs="unbounded" minOccurs="1" ref="ORU_R01.GROUP.1"
group="1"/>
   <element maxOccurs="unbounded" minOccurs="0" ref="CTI" group="0"/>
</ORU_R01.GROUP.2>
```

The ZLR segment was added to a group definition in the messages.xsd file. Wherever this group of segments occurs, a ZLR segment is present.

SEGMENTS.XSD

```
<ZLR>
   <element maxOccurs="1" minOccurs="0" ref="ZLR_ORD_PROVIDER_ADD" />
   <element maxOccurs="1" minOccurs="0" ref="ZLR_ORD_FAC_NAME" />
   <element maxOccurs="1" minOccurs="0" ref="ZLR_ORD_FAC_ADD" />
   <element maxOccurs="1" minOccurs="0" ref="ZLR_ORD_FAC_PHONE" />
   <element maxOccurs="1" minOccurs="0" ref="ZLR_PATIENT_AGE" />
   <element maxOccurs="1" minOccurs="0" ref="ZLR_NEXT_KIN_NAME" />
   <element maxOccurs="1" minOccurs="0" ref="ZLR_NEXT_KIN_RELATION" />
   <element maxOccurs="1" minOccurs="0" ref="ZLR_NEXT_KIN_ADD" />
   <element maxOccurs="1" minOccurs="0" ref="ZLR_NEXT_KIN_PHONE" />
</ZLR>
```

In the segments.xsd file, you define each field that makes up the new ZLR segment.

FIELDS.XSD

```
<ZLR_ORD_PROVIDER_ADD   longName="Ordering Providers Address" type="XAD"
/>
<ZLR_ORD_FAC_NAME       longName="Ordering Facility Name" type="XON" />
<ZLR_ORD_FAC_ADD        longName="Ordering Facility Address" type="XAD" /
>
<ZLR_ORD_FAC_PHONE      longName="Ordering Facility Phone" type="XTN" />
<ZLR_PATIENT_AGE        longName="Patient Age" type="SN" />
<ZLR_NEXT_KIN_NAME      longName="Next of Kin/Assoc. Name" type="XPN" />
<ZLR_NEXT_KIN_RELATION  longName="Next of Kin/Assoc. Relationship"
type="CE" />
<ZLR_NEXT_KIN_ADD       longName="Next of Kin/Assoc. Address" type="XAD"
/>
<ZLR_NEXT_KIN_PHONE     longName="Next of Kin/Assoc. Phone"   type="XTN"
/>
```

In the fields.xsd file, you define the fields and associate data types to each field. Note that all of the data types are defined in the HL7 RIM. It is unusual that new data types also are defined. By manipulating these three data dictionary files, any new Z segment can be defined and added to a number of messages.

APPENDIX A

Using Application Explorer in BEA WebLogic Workshop

Topics:

- Starting Application Explorer in BEA WebLogic Workshop
- Creating a New Configuration
- Connecting to HL7
- Creating an XML Schema
- Creating an iWay Business Service
- Understanding iWay Event Functionality
- Creating an Event Port
- Modifying an Event Port
- Creating a Channel
- Modifying a Channel
- Deploying iWay Components in a Clustered BEA WebLogic Environment
- Adding a Control for an iWay Resource in BEA WebLogic Workshop
- Adding an iWay Extensible CCI Control to a BEA WebLogic Workshop Application

This section describes how to use iWay Java Swing Application Explorer running in BEA WebLogic Workshop to create XML schemas for HL7. In addition, this section provides information on listening for events in HL7 and creating Web services that are published by the iWay Business Services Engine (iBSE).

Starting Application Explorer in BEA WebLogic Workshop

The server must be started where iWay Application Explorer is running. Before you can use Application Explorer, you must start BEA WebLogic server.

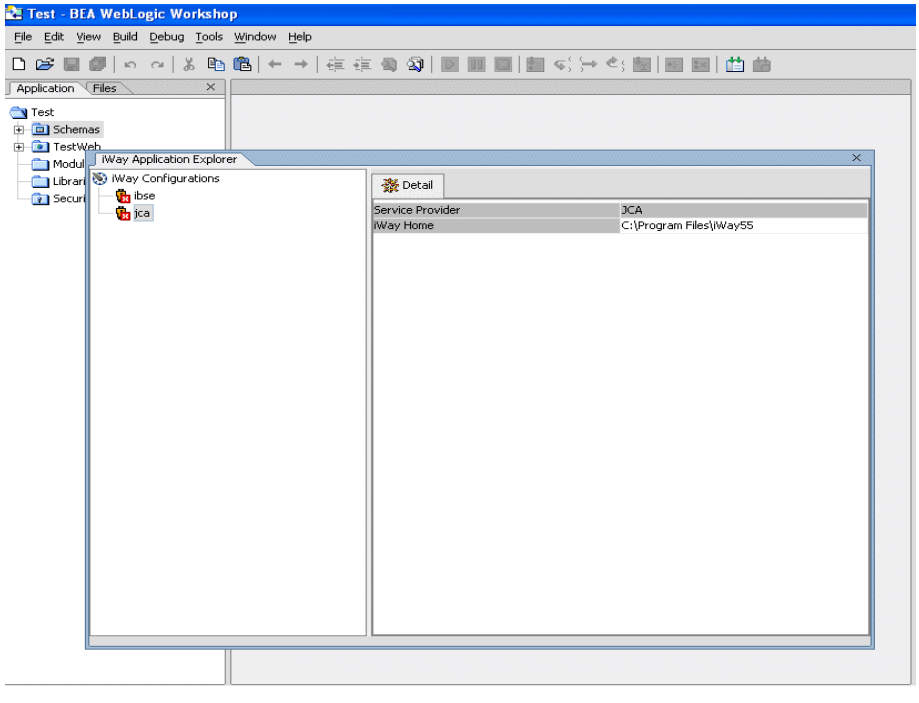
You can run Application Explorer in BEA WebLogic Workshop using an iWay Business Services Engine (iBSE) configuration. If you want to use Application Explorer with a JCA configuration instead of iBSE, you must use the servlet version of Application Explorer that runs outside of WebLogic Workshop. For more information about the servlet version, see Chapter 2, *Creating XML Schemas or Web Services for the iWay Adapter for HIPAA for BEA WebLogic*.

Procedure How to Start Application Explorer in BEA WebLogic Workshop

To start Application Explorer running in BEA WebLogic Workshop:

1. Before starting Application Explorer, ensure that BEA WebLogic Server is running.
2. Start BEA WebLogic Workshop.
3. From the BEA WebLogic Workshop View menu, select *Windows* and then, *iWay Application Explorer.*

   Application Explorer opens in BEA WebLogic Workshop.



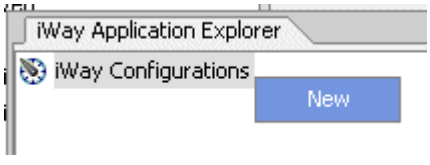
You can resize and drag-and-drop the Application Explorer window within BEA WebLogic Workshop. For example, you can drag it to the upper part of BEA WebLogic Workshop.

Creating a New Configuration

Before you can start using Application Explorer, you must define a new configuration for iBSE or JCA.

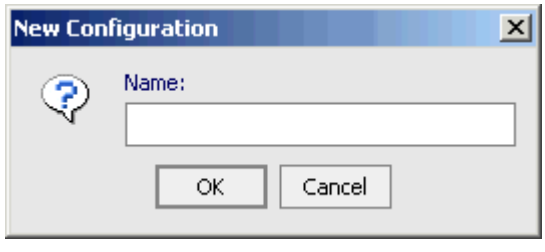
Procedure **How to Create a New Configuration for iBSE or JCA**

To create a new configuration:



1. Right-click *iWay Configurations* and select *New*.

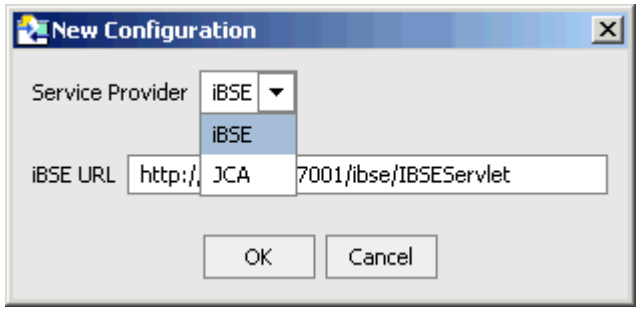
   The New Configuration dialog box opens.



2. Type the name of the new configuration and click *OK*.

   Note: If you are creating a new JCA configuration, type *base* in the name field. You must use this value if you are pointing to the default iWay configuration.

   The following dialog box opens.



3. From the Service Provider drop-down list, select *iBSE* or *JCA*.

- If you select iBSE, type the URL for iBSE, for example,

```
http://localhost:7001/ibse/IBSEServlet
```

where:

localhost

Is where your application server is running.

- If you select JCA, enter the full path to the directory where iWay 5.5 is installed, for example,

```
C:\Program Files\iWay55
```

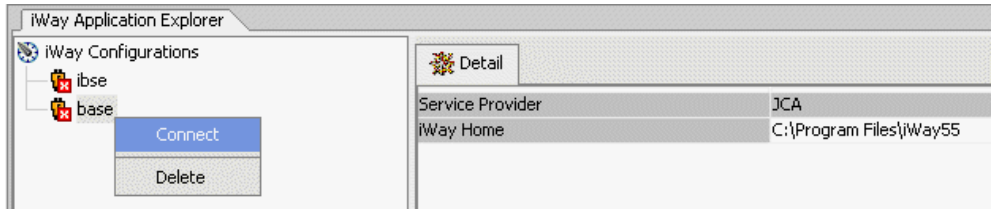
where:

iWay55

Is the full path to your iWay installation.

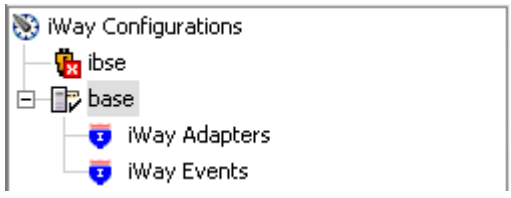
A node representing the new configuration appears under the iWay Configurations node. The right pane provides details of the configuration you created.

After you add your configuration, you must connect to it.

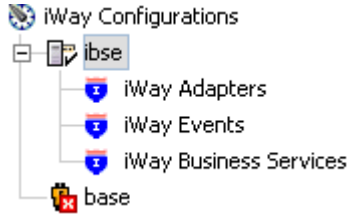


4. Right-click the configuration to which you want to connect, for example, base, and select *Connect*.

The iWay Adapters and iWay Events nodes appear.



When you connect to iBSE, the iWay Adapters, iWay Events, and iWay Business Services nodes appear.



5. To display the service and event adapters that are installed, expand each node.

   The iWay Adapters list includes an HL7 node that enables you to connect to HL7 metadata and create XML request and response schemas to use to listen for events or create Web Services. For more information, see *Creating an iWay Business Service* on page A-14.

   The iWay Events list includes an HL7 node that enables you to create ports and channels for HL7 event handling. For more information, see *Understanding iWay Event Functionality* on page A-18.

Connecting to HL7

To browse HL7, you must create an HL7 target and connect to it. The target serves as your connection point. You must establish a connection to HL7 every time you start iWay Application Explorer or after you disconnect from HL7.

The left pane displays the application systems supported by Application Explorer. These are based on the iWay adapters you installed and are licensed to use.

Creating and Connecting to a Target

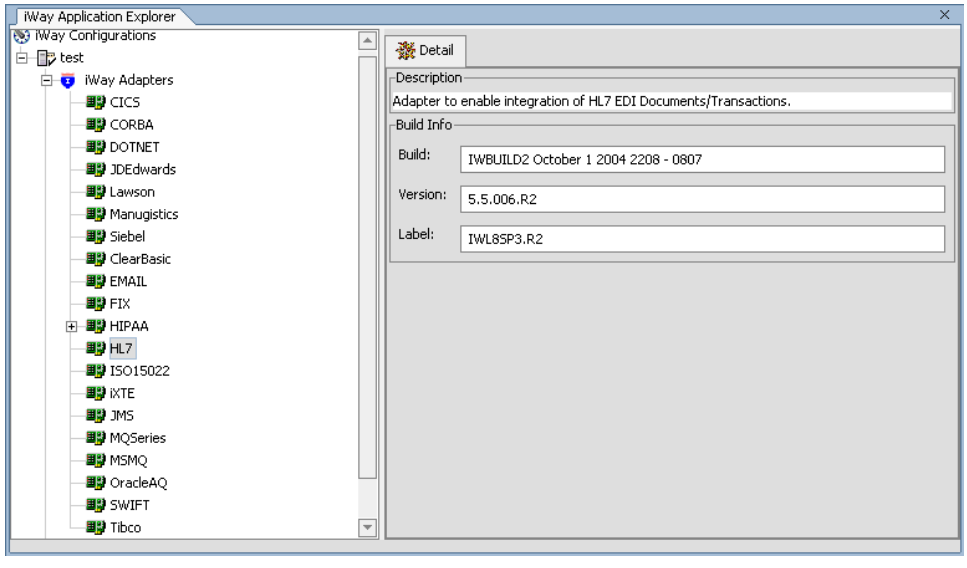
To connect to HL7 for the first time, you must create a new target. The target is automatically saved after it is created.

Procedure How to Create a New Target

To create a target:

1. In the left pane, expand *iWay Adapters* and click the *HL7* node.

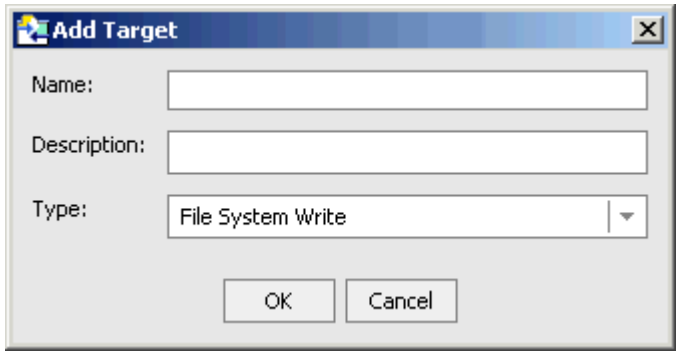
   Descriptive information (for example, title and product version) for the iWay Adapter for HL7 appears in the right pane.



2. To view the options, right-click the *HL7* node.

3. Select *Add Target*.

The Add target dialog box opens.



a. In the Name field, type a descriptive name for the target, for example, HL7Target.

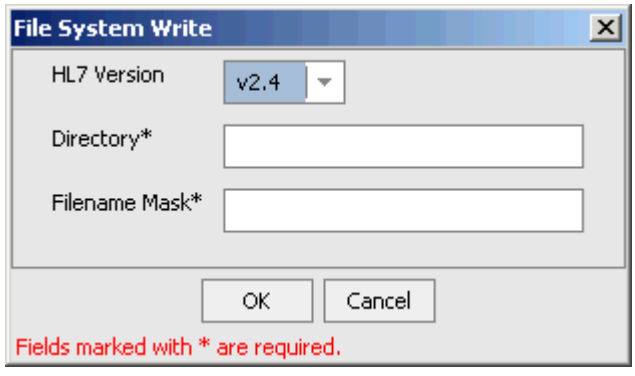
b. In the Description field, type a brief description of the target.

c. From the Target Type drop-down list, select one of the following transports from the drop-down list:

- File System Write. For more information on the properties required, see *File System Write Properties* on page A-8.
- File Transfer Protocol (FTP). For more information on the properties required, see *File Transfer Protocol Properties* on page A-9.
- HyperText Transfer Protocol (HTTP). For more information on the properties required, see *HyperText Transfer Protocol Properties* on page A-9.
- IBM MQSeries (MQ). For more information on the properties required, see *MQSeries Properties* on page A-10.
- TCP Session. For more information on the properties required, see *TCP Properties* on page A-10.

4. Click *OK*.

The File System Write dialog box opens.



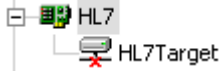
a. From the HL7 Version drop-down list, select the HL7 version you are using.

b. In the Directory field, type the location where the output of the service is placed.

c. In the Filename Mask field, type a file pattern, which can contain an asterisk which gets expanded to a fine timestamp.

5. Click *OK*.

In the left pane, the new target (HL7Target) appears below the HL7 node.



You can now connect to the target you defined.

Reference File System Write Properties

The following table provides definitions for the properties required for the File System Write target type.

Property	Definition
Directory	The directory to which output messages are emitted.
Filename Mask	The output file name (can contain an asterisk), which gets expanded to a timestamp. A pound sign can be used as a mask for a sequence count. Each pound symbol represents a whole number integer value. For example, File## counts up to 99 before restarting at 0, File### counts up to 999 before restarting at 0, and so on.

Reference File Transfer Protocol Properties

The following table provides definitions for the properties required for the File Transfer Protocol target type.

Settings tab

Property	Definition
Host	FTP target system.
Port	FTP target system port.
User	User ID to use when connecting to the FTP host.
Password	Password associated with the user ID.
Directory	The directory to which output messages are emitted.
Filename Mask	The output file name (can contain an asterisk), which gets expanded to a timestamp. A pound sign can be used as a mask for a sequence count. Each pound symbol represents a whole number integer value. For example, File## counts up to 99 before restarting at 0, File### counts up to 999 before restarting at 0, and so on.

Advanced tab

Property	Definition
Retry Interval	The maximum wait interval between retries when a connection fails. Retry interval duration in *xx*H:*xx*M:*xx*S format. For example, 1H:2M:3S is 1 hour 2 minutes and 3 seconds.
Maxtries	Maximum number of retry attempts if a write failure occurs.

Reference HyperText Transfer Protocol Properties

The following table provides definitions for the properties required for the File Transfer Protocol target type.

Property	Definition
HTTP URL	The HTTP URL.

Property	Definition
Header	The HTTP header field.

Reference **MQSeries Properties**

The following table provides definitions for the properties required for the MQSeries target type.

Settings tab

Property	Definition
Queue Manager	Name of the MQSeries queue manager to be used.
Queue Name	Queue on which request documents are received.
Correlation ID	The correlation ID to set in the MQSeries message header.

MQ Client tab

Property	Definition
Host	Name of the MQSeries queue manager to be used.
Port	Queue on which request documents are received.
Channel	The correlation ID to set in the MQSeries message header.

Reference **TCP Properties**

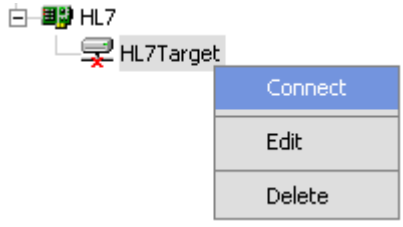
The following table provides definitions for the properties required for the TCP target type.

Property	Definition
Host	Host name or host address.
Port	TCP listening port.
Encoding	Document character set.

Procedure **How to Connect to a Target**

To connect to an HL7 target:

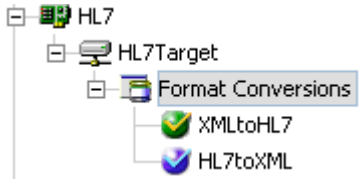
1. In the left pane, expand the *HL7* node and select the target to which you want to connect, for example, HL7Target.



2. In the left pane, right-click the target and select *Connect*.

   The HL7Target node in the left pane changes to reflect that a connection was made.

3. Expand the target node to reveal the list of HL7 interfaces.



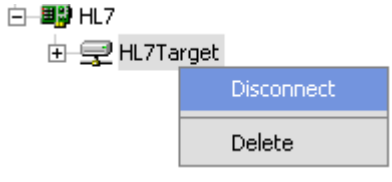
Managing a Target

Although you can maintain multiple open connections to different application systems, iWay Software recommends that you close connections when they are not in use. After you disconnect, you can modify an existing target.

You can modify the connection parameters when your system properties change. You also can delete a target. The following procedures describe how to disconnect from a target, edit a target, and delete a target.

Procedure How to Disconnect From a Target

To disconnect from a target:



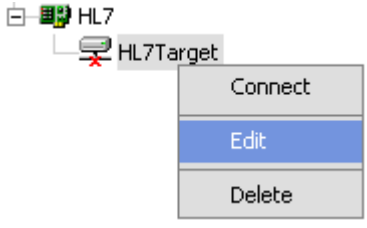
1. Right-click the HL7 target from which you want to disconnect.
2. Select *Disconnect*.

   Disconnecting from the application system drops the connection, but the node remains. The HL7Target node in the left pane changes to reflect that you disconnected from the target.

Procedure How to Edit a Target

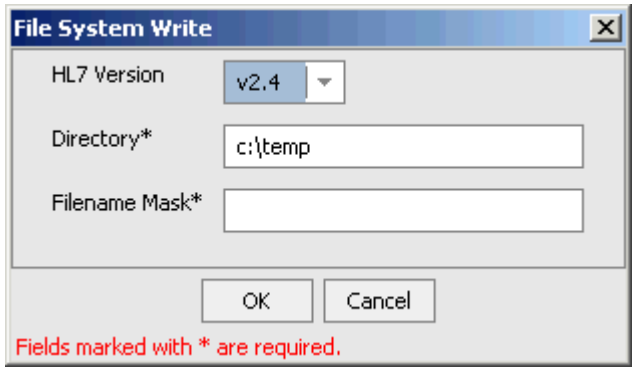
To edit a target:

1. Ensure that the target you want to edit is disconnected.



2. In the left pane, right-click the target and select *Edit*.

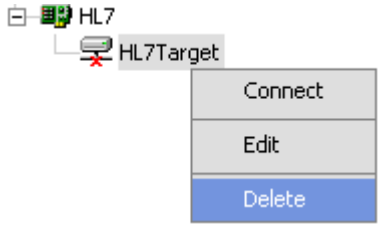
   The following dialog box opens.



3. Change the properties in the dialog box as required and click *OK*.

Procedure How to Delete a Target

To delete a target:



1. In the left pane, right-click the target.
2. Select *Delete*.

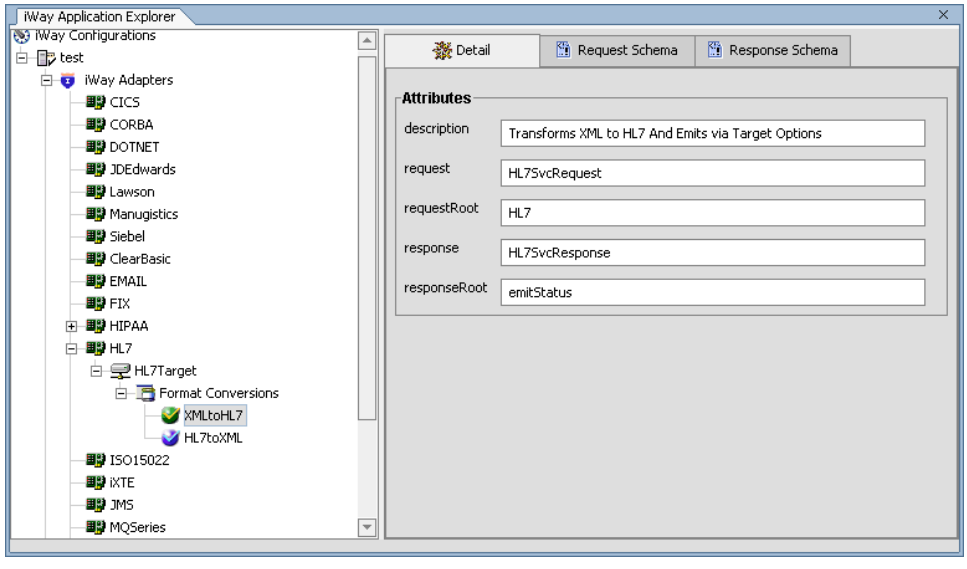
The HL7Target node disappears from the left pane.

Creating an XML Schema

After you create a new configuration and connect to HL7, iWay Application Explorer enables you to create a request or response schema.

Procedure How to Create a Request and Response Schema

To create a request and response schema:



1. Expand the HL7 node and select the node for which you want to create the schema.

   The following XML schemas appear for the interface:

   - Request
   - Response

2. To view the appropriate schema in the right pane, click the *Request Schema* or the *Response Schema* tab.

Reference Schema Location

After you browse the Component Interfaces and make a selection, the request and response XML schemas are automatically created for that Component Interface and stored in the repository you created, for example:

```
drive:\Program Files\iWay55\bea\ibse\wsdl\schemas\service\HL7
\HL7Target\SA45280C
```

where:

HL7Target

Is the name of the HL7 target.

SA45280C

Is a randomly generated folder name indicating where the schemas are stored.

Creating an iWay Business Service

You can create an iWay business service (also known as a Web service) for objects you want to use with your adapter. To generate a business service, you must deploy the iWay Adapter for HL7 using the iWay Business Services Engine (iBSE). iBSE exposes functionality as Web services and serves as a gateway to heterogeneous back-end applications and databases.

A Web service is a self-contained, modularized function that can be published and accessed across a network using open standards. It is the implementation of an interface by a component and is an executable entity. For the caller or sender, a Web service can be considered as a "black box" that may require input and delivers a result. Web services integrate within an enterprise as well as across enterprises on any communication technology stack, whether asynchronous or synchronous, in any format.

You can make a Web service available to other services within a host server by generating WSDL (Web Services Description Language) from the Web service.

Because Application Explorer runs within BEA WebLogic Workshop, you can easily incorporate iWay Web services into BEA WebLogic Workflows. To enable BEA WebLogic Workshop to use iWay Web services, you export the WSDL to a directory accessible to BEA WebLogic Workshop.

Note: In a J2EE Connector Architecture (JCA) implementation of iWay adapters, Web services are not available. When the adapters are deployed to use the iWay Connector for JCA, the Common Client Interface provides integration services using the iWay adapters. For more information, see the *iWay Installation and Configuration for BEA WebLogic* manual and the i*Way Connector for JCA for BEA WebLogic Server User's Guide*.

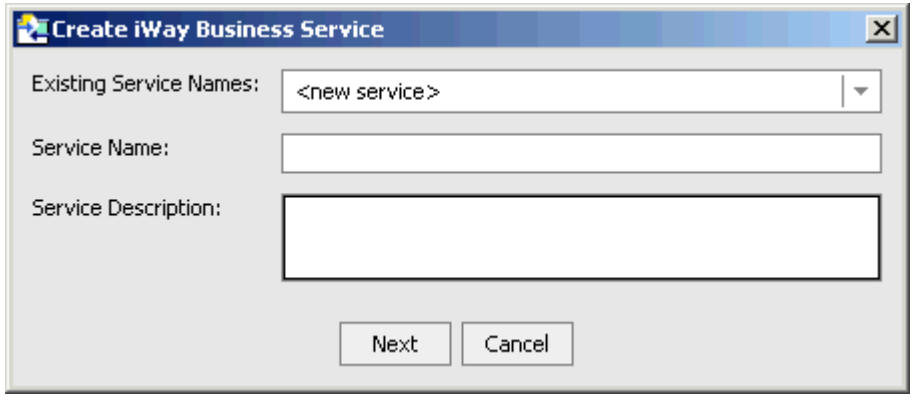
Procedure How to Create an iWay Business Service

To create an iWay Business service:

1. Expand the HL7 node and select the interface for which you want to create a business service.

2. Right-click and select *Create iWay Business Service*.

   The Create iWay Business Service dialog box opens.



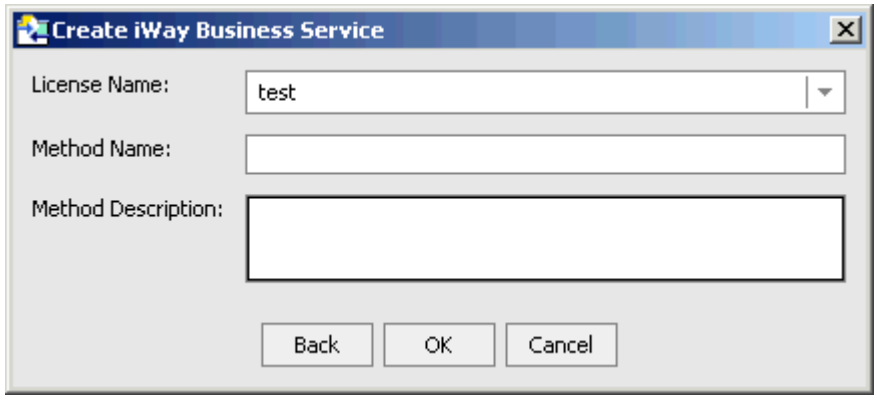
   a. From the Existing Service Names drop-down list, select whether you want to create a new service name or use an existing service name.

   b. In the Service Name field, type a name for the business service, for example, HL7Service.

   c. In the Service Description field, type a brief description of the business service.

3. Click *Next*.

The Create iWay Business Service dialog box displays additional fields.



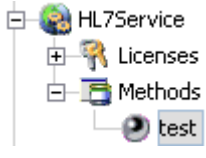
a. From the License Name drop-down list, select a license.

b. In the Method Name field, type a name for the method.

c. In the Method Description field, type a brief description for the method.

4. Click *OK*.

The business service and method appear below the iWay Business Services node.



In the left pane, all the available business services that were created appear.

5. Click the node for which you created the business service in the right pane.

The test pane opens in a new browser window.

6. To invoke the service, enter a sample XML document in the input xml field.
7. Click *Invoke*.

   The result appears in the right pane.

Exporting iWay WSDL for Use in BEA WebLogic Workshop Workflows

Because iWay Application Explorer runs within BEA WebLogic Workshop, you can easily incorporate iWay Web services into BEA WebLogic Workflows. To enable BEA WebLogic Workshop to use iWay Web services, you simply export the WSDL to a directory accessible to BEA WebLogic Workshop.

Procedure How to Export iWay WSDL for Use in BEA WebLogic Workshop Workflows

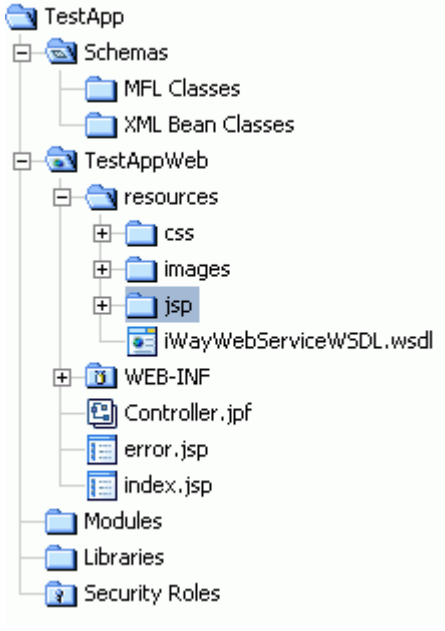
To export WSDL to a directory accessible to BEA WebLogic Workshop:

1. After you create a Web service, right-click the Web service name and select *Export WSDL*.

   The Save dialog box appears.

2. Save the WSDL to a directory accessible to BEA WebLogic Workshop, for example, the \resources directory in your BEA WebLogic Workshop Web application directory structure.

   The WSDL file appears under the resources folder of your Web application:



Understanding iWay Event Functionality

Events are generated as a result of activity in an application system. You can use events to trigger an action in your application. For example, HL7 may generate an event when customer information is updated. If your application must perform in response to activity, your application is a consumer of this event.

After you create a connection to your application system, you can add events using Application Explorer. To define an iWay event, you must create a port and a channel.

- Port

A port associates a particular business object exposed by the adapter with a particular disposition. A disposition defines the protocol and location of the event data. The port defines the end point of the event consumption. For more information, see *Creating an Event Port*.

- Channel

  A channel represents configured connections to particular instances of back-end systems. A channel binds one or more event ports to a particular listener managed by the adapter. For more information, see *Creating a Channel* on page A-34.

Creating an Event Port

The following procedures describe how to create an event port using iWay Application Explorer. The following port dispositions are available when using an iBSE implementation:

- File
- iBSE
- MSMQ
- JMSQ
- SOAP
- HTTP
- MQ Series
- Mail

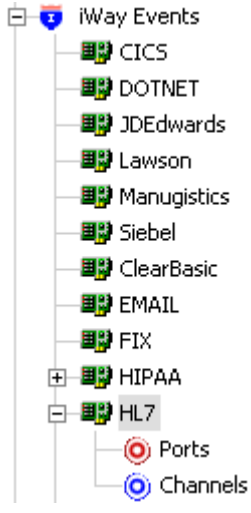
Note: The MAIL disposition option will be supported in a future release.

With a JCA implementation, the following port dispositions are available:

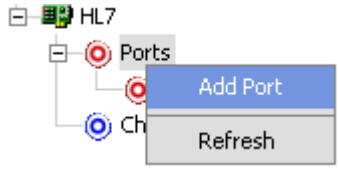
- File
- JMSQ
- MQ Series
- HTTP

Procedure How to Create an Event Port for File

To create an event port for File:

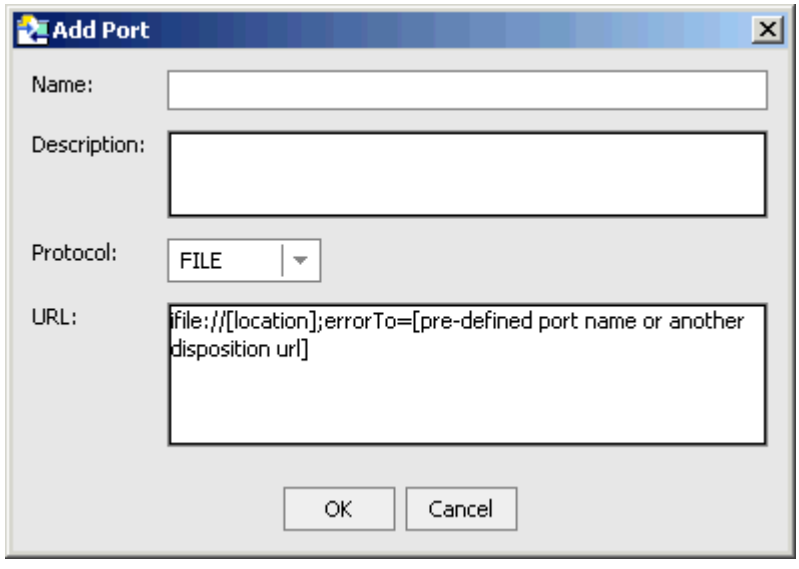


1. In the left pane of Application Explorer, expand the HL7 node under iWay Events, and then select *Ports*.



2. Right-click and select *Add Port*.

The Add Port dialog box opens.



a. In the Name field, type a name for the event port, for example, HL7File.

b. In the Description field, type a brief description.

c. From the Protocol drop-down list, select *FILE*.

d. In the URL field, type a destination file to which the event data is written, using the following format:

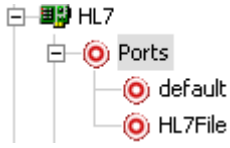
```
file://location[;errorTo=errorDest]
```

The following table describes the URL parameters.

Parameter	Description
location	The full directory path and file name to which the data is written.
errorTo	Location where error logs are sent. Optional. A predefined port name or another disposition URL. The URL must be complete, including the protocol.

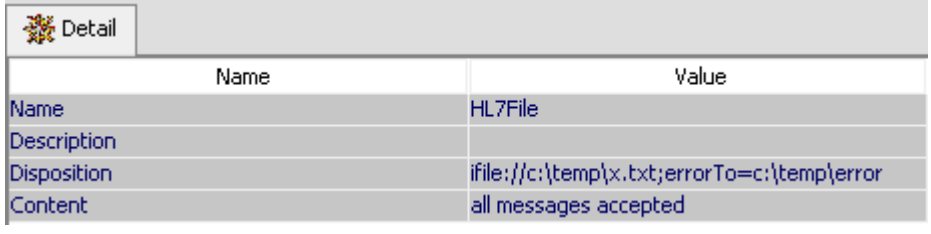
3. Click *OK*.

In the left pane, the event port appears below the Ports node.



4. To review the port settings, select the port name.

   In the right pane, a table appears that summarizes the information associated with the event port you created.



Name	Value
Name	HL7File
Description	
Disposition	ifile://c:\temp\x.txt;errorTo=c:\temp\error
Content	all messages accepted

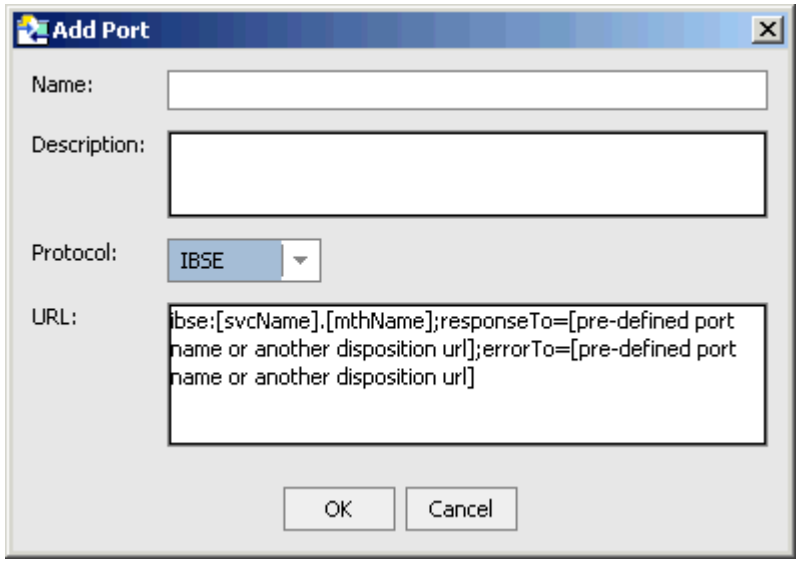
   You are ready to associate the event port with a channel. For more information, see *Creating a Channel* on page A-34.

Procedure How to Create an Event Port for iBSE

To create an event port for iBSE:

1. In the left pane of Application Explorer, expand the HL7 node under iWay Events, and then select *Ports*.
2. Right-click and select *Add Port*.

The Add Port dialog box opens.



a. In the Name field, type a name for the event port, for example, HL7iBSE.

b. In the Description field, type a brief description.

c. From the Protocol drop-down list, select *IBSE*.

d. In the URL field, enter an iBSE destination using the following format:

```
ibse:/svcName.methName[;responseTo=respDest][;errorTo=errorDest]
```

The following table describes the disposition parameters.

Parameter	Description
svcName	Name of the service created with iBSE.
methName	Name of the method created for the Web service.
respDest	Location where responses to the Web service are posted. Optional. A predefined port name or another disposition URL. The URL must be complete, including the protocol.
errorDest	Location where error logs are sent. Optional. A predefined port name or another disposition URL. The URL must be complete, including the protocol.

3. Click *OK*.

In the left pane, the event port appears below the Ports node.

4. To review the port settings, select the port name.

   In the right pane, a table appears that summarizes the information associated with the event port you created.

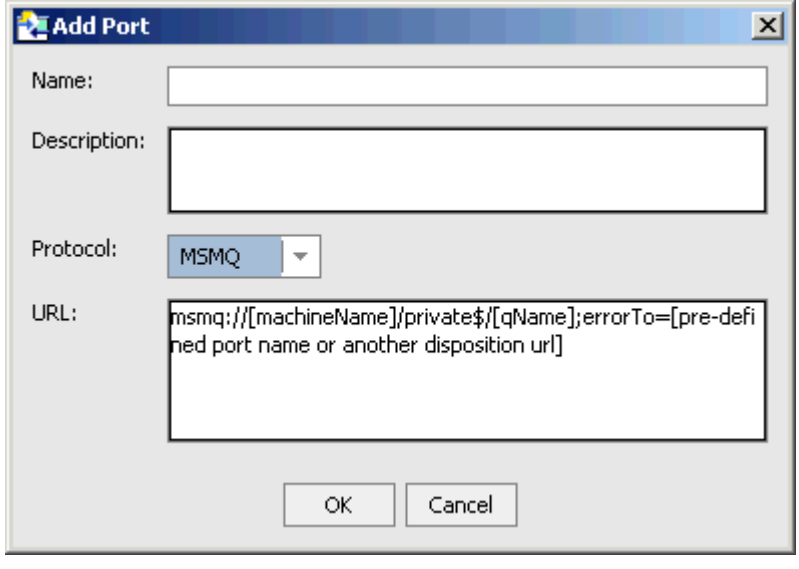
   You are ready to associate the event port with a channel. For more information, see *Creating a Channel* on page A-34.

Procedure How to Create an Event Port for MSMQ

To create an event port for a Microsoft Message Queuing (MSMQ) queue:

1. In the left pane of Application Explorer, expand the HL7 node under iWay Events, and then select *Ports*.
2. Right-click and select *Add Port*.

   The Add Port dialog box opens.



   a. In the Name field, type a name for the connection, for example, HL7MSMQ.
   b. In the Description field, type a description for the target name you just created.
   c. From the Protocol drop-down list, select *MSMQ*.
   d. In the URL field, enter an MSMQ destination in the following format:

      `msmq:/host/queueType/queueName[;errorTo=errorDest]`

The following table defines the disposition parameters.

Parameter	Description
host	Name of the host on which the Microsoft Queuing system runs.
queueType	The type of queue. For private queues, enter *Private$*. Private queues are queues that are not published in Active Directory. They appear only on the local computer that contains them. Private queues are accessible only by Message Queuing applications that recognize the full path name or format name of the queue.
queueName	Name of the queue where messages are placed.
errorDest	Location where error logs are sent. Optional. A predefined port name or another disposition URL. The URL must be complete, including the protocol.

3. Click *OK*.

   In the left pane, the event port appears below the Ports node.

4. To review the port settings, select the port name.

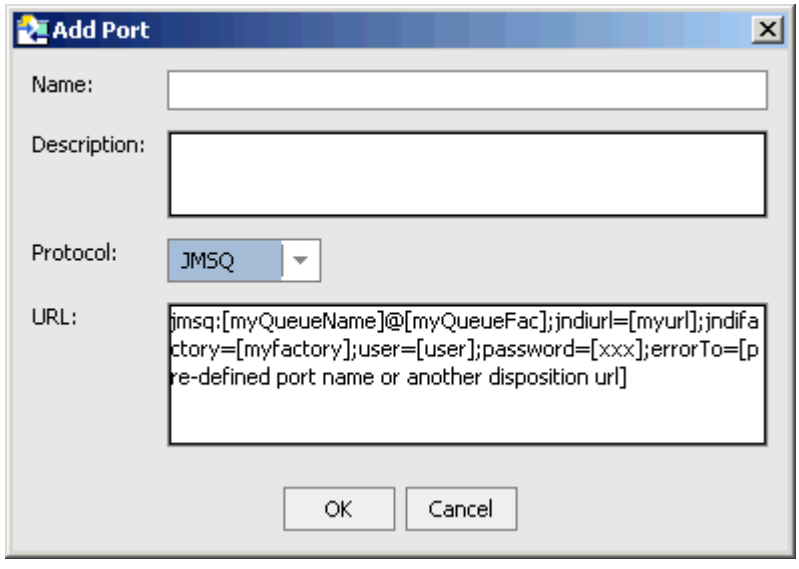
   In the right pane, a table appears that summarizes the information associated with the port you created. You are ready to associate the event port with a channel. For more information, see *Creating a Channel* on page A-34.

Procedure How to Create a Port for JMS

To create a port for a JMS queue:

1. In the left pane of Application Explorer, expand the HL7 node under iWay Events, and then select *Ports*.
2. Right-click and select *Add Port*.

The Add Port dialog box opens.



a. In the Name field, type a name for the event port, for example, HL7JMSQ.

b. In the Description field, type a brief description.

c. From the Protocol drop-down list, select *JMSQ*.

d. In the URL field, enter a JMSQ destination using the following format:

```
jmsq:queue@conn_factory;jndiurl=jndi_url;jndifactory=jndi_factory;
user=userID;password=pass[;errorTo=errorDest]
```

The following table describes the URL parameters.

Parameter	Description
queue	Name of a queue to which events are emitted.
conn_factory	The connection factory, a resource that contains information about the JMS Server. The WebLogic connection factory is: `javax.jms.QueueConnectionFactory`

Parameter	Description
jndi_url	The URL of the application server. For BEA WebLogic Server, the URL is `t3://host:port` where: *host* Is the machine name where BEA WebLogic Server resides. *port* Is the port on which BEA WebLogic Server is listening. The default port if not changed at installation, is 7001.
jndi_factory	Is JNDI context.INITIAL_CONTEXT_FACTORY and is provided by the JNDI service provider. For BEA WebLogic Server, the WebLogic factory is weblogic.jndi.WLInitialContextFactory.
userID	User ID associated with this queue.
pass	Password associated with this user ID.
errorDest	Location where error logs are sent. Optional. A predefined port name or another disposition URL. The URL must be complete, including the protocol.

3. Click *OK*.

   The event port appears below the Ports node in the left pane.

4. To review the port settings, select the port name.

   In the right pane, a table appears that summarizes the information associated with the event port you created.

   You are ready to associate the event port with a channel. For more information, see *Creating a Channel* on page A-34.

Procedure How to Create a Port for the SOAP Disposition

This topic describes how to configure the SOAP disposition for synchronous event processing.

The SOAP disposition allows an event response to launch a Web service specified by a WSDL file. A soapaction is optional, the default is "".

To create a port for a SOAP disposition using Application Explorer:

1. Click the *iWay Events* tab.

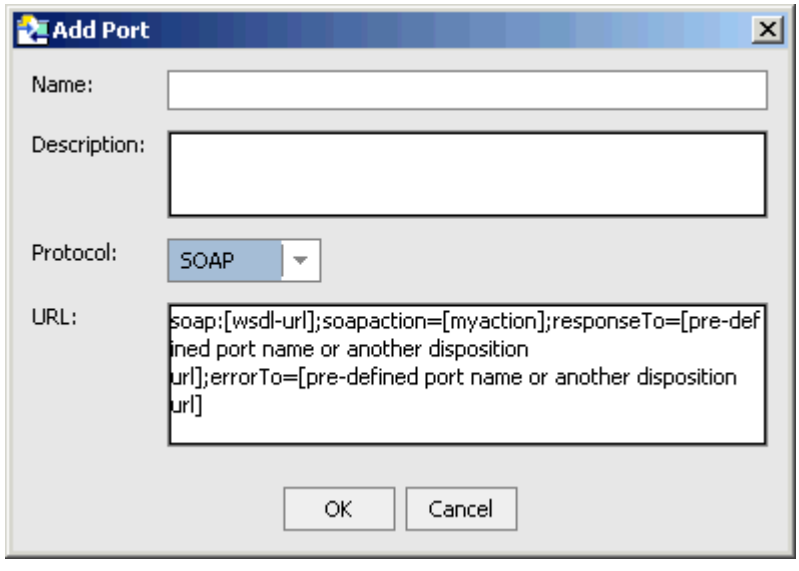
   The iWay Event Adapters window opens.

2. In the left pane, expand the HL7 adapter node.

3. Select the *ports* node.

4. Move the pointer over *Operations* and select *Add a new port*.

   The Add Port dialog box opens.



   a. Type a name for the event port and provide a brief description.

   b. From the Disposition Protocol drop-down list, select *SOAP*.

   c. In the Disposition field, enter a SOAP destination using the following format:

```
soap:wsdl-url;soapaction=action[;responseTo=respDest]
   [;errorTo=errorDest]
```

The following table lists and describes the disposition parameters for SOAP.

Parameter	Description
wsdl-url	The URL to the WSDL file that is required to create the SOAP message. For example: `http://localhost:7001/ibse/IBSEServlet/test/sw2xml2003MQ.ibs?wsdl` This value can be found by navigating to the iWay Business Services tab and opening the *Service Description* link in a new window. The WSDL URL appears in the Address field. You can also open the WSDL file in a third party XML editor (for example, XMLSPY) and view the SOAP request settings to find this value.

action	The method that will be called by the disposition. For example:
	`HL7.mt200Request@test@@`
	where
	`HL7`
	Is the name of the Web service you created using Application Explorer.
	`mt200`
	Is the method being used.
	`test`
	Is the license that is being used by the Web service.
	This value can be found by navigating to the iWay Business Services tab and opening the *Service Description* link in a new window. Perform a search for *soapAction*.
	You can also open the WSDL file in a third party XML editor (for example, XMLSPY) and view the SOAP request settings to find this value.

respDest	The location to which responses are posted. A predefined port name or another full URL. Optional. A predefined port name or another disposition URL. The URL must be complete, including the protocol.

Parameter	Description
errorDest	The location to which error logs are sent. Optional. A predefined port name or another disposition URL. The URL must be complete, including the protocol.

5. Click *OK*.

The port appears under the ports node in the left pane. In the right pane, a table appears that summarizes the information associated with the port you created.

You are ready to associate the event port with a channel. For more information, see *Creating a Channel* on page A-34.

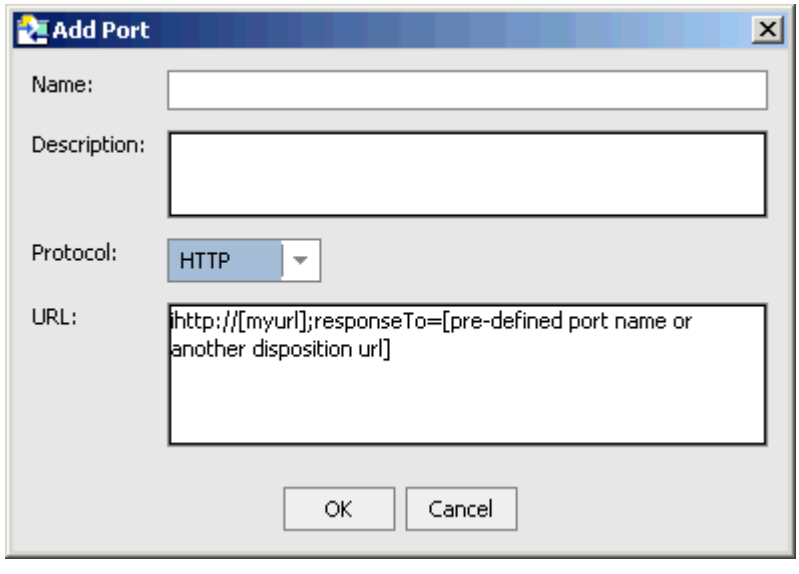
Procedure How to Create an Event Port for HTTP

The HTTP disposition uses an HTTP URL to specify an HTTP end point to which the event document is posted.

To create an event port for HTTP disposition:

1. In the left pane of Application Explorer, expand the HL7 node under iWay Events, and then select *Ports*.
2. Right-click and select *Add Port*.

   The Add Port dialog box opens.



a. In the Name field, type a name for the event port, for example, HL7HTTP.

b. In the Description field, type a brief description.

c. From the Protocol drop-down list, select *HTTP*.

d. In the URL field, enter an HTTP destination using the following format:

```
ihttp://url;responseTo=respDest
```

The following table describes the URL parameters.

Parameter	Description
url	The URL target for the post operation.
respDest	Location where responses are posted. Optional. A predefined port name or another disposition URL. The URL must be complete, including the protocol.
host	Name of the host on which the Web server resides.
port	Port number on which the Web server is listening.

3. Click *OK*.

The event port appears below the Ports node in the left pane.

4. To review the port settings, select the port name.

In the right pane, a table appears that summarizes the information associated with the event port you created.

You are ready to associate the event port with a channel. For more information, see *Creating a Channel* on page A-34.

Procedure How to Create an Event Port for MQ Series

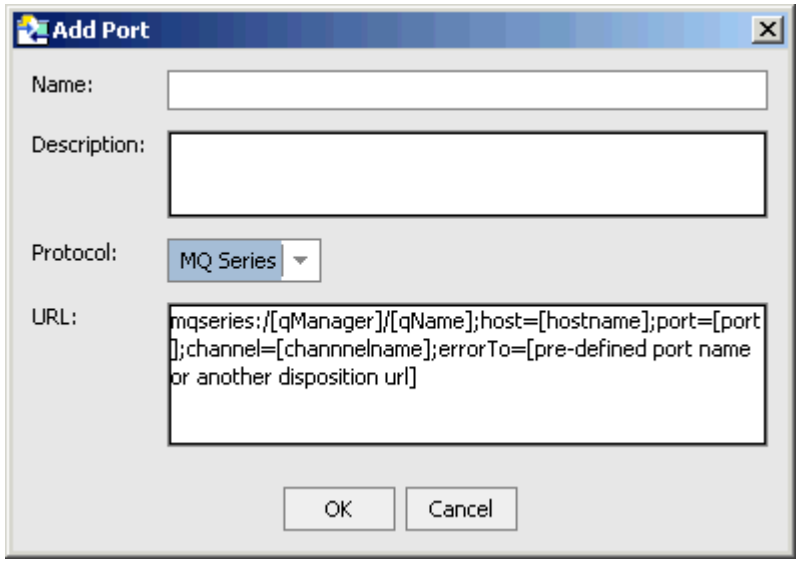
The MQ Series disposition allows an event to be enqueued to an MQ Series queue. Both queue manager and queue name may be specified.

To create a port for an MQ Series queue:

1. In the left pane of Application Explorer, expand the HL7 node under iWay Events, and then select *Ports*.

2. Right-click and select *Add Port*.

The Add Port dialog box opens.



a. In the Name field, type a name for the event port, for example, HL7MQSeries.

b. In the Description field, type a brief description.

c. From the Protocol drop-down list, select *MQ Series*.

d. In the URL field, enter an MQ Series destination using the following format:

```
mqseries:/qManager/qName;host=hostName;port=portNum;
channel=chanName[;errorTo=errorDest]
```

The following table describes the URL parameters.

Parameter	Description
qManager	Name of queue manager to which the server must connect.
qName	Name of the queue where messages are placed.
hostName	Name of the host on which MQ Series resides (MQ client only).
portNum	Port number for connecting to an MQ Server queue manager (MQ client only).
chanName	Case-sensitive name of the channel that connects with the remote MQ Server queue manager (MQ client only). The default MQ Series channel name is SYSTEM.DEF.SVRCONN.

Parameter	Description
errorDest	Location where error logs are sent. Optional. A predefined port name or another disposition URL. The URL must be complete, including the protocol.

3. Click *OK*.

   The event port appears below the Ports node in the left pane.

4. To review the port settings, select the port name.

   In the right pane, a table appears that summarizes the information associated with the event port you created.

   You are ready to associate the event port with a channel. For more information, see *Creating a Channel* on page A-34.

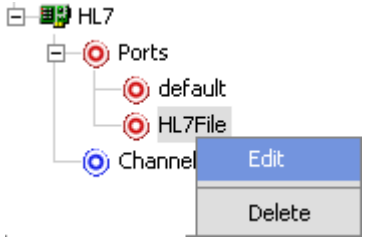
Modifying an Event Port

The following procedures describe how to edit and delete an event port using iWay Application Explorer. To review the port settings, select the port name. In the right pane, a table appears that summarizes the information associated with the event port you created.

Procedure How to Edit an Event Port

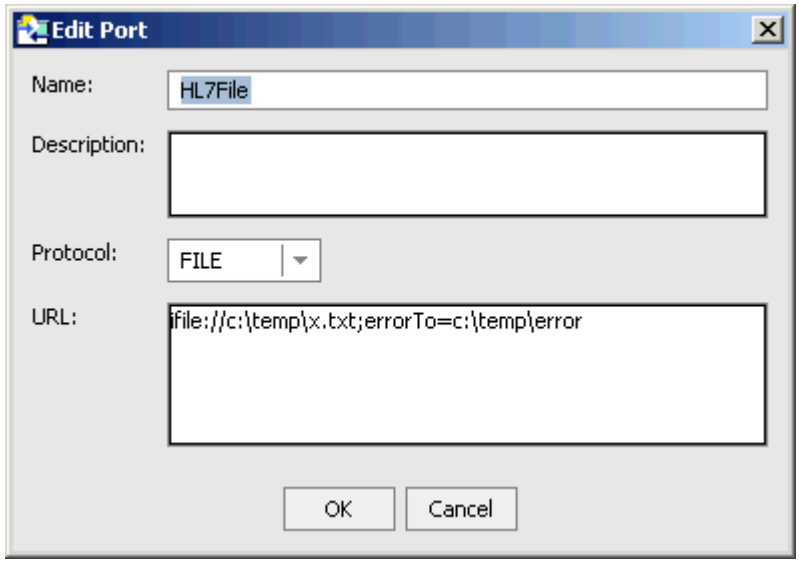
To edit an event port:

1. To view the available ports, click the *Ports* node in the left pane.



2. Right-click the port you want to edit, and select *Edit*.

The Edit Port dialog box opens.



3. Make the required changes and click *OK*.

Procedure How to Delete an Event Port

To delete an existing event port:

1. To view the available ports, click the *Ports* node in the left pane.

2. Right-click the port you want to remove, and select *Delete*.

   The event port node disappears from the ports list in the left pane.

Creating a Channel

The following procedure describes how to create a channel for a HL7 event. All defined event ports must be associated with a channel.

You can create the following types of channels using Application Explorer:

- File System Listener (File)
- Hypertext Transfer Protocol (HTTP)
- TCP Listener (TCP)
- IBM MQSeries (MQ)
- File Transfer Protocol (FTP)

Procedure **How to Create a Channel for a File System Listener**

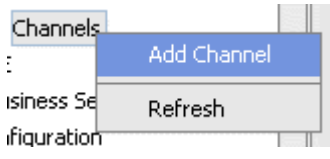
To create a channel for a File System Listener (FILE):

1. In the left pane, below the configuration you created, expand the *iWay Events* node.

   The list of adapters appears.

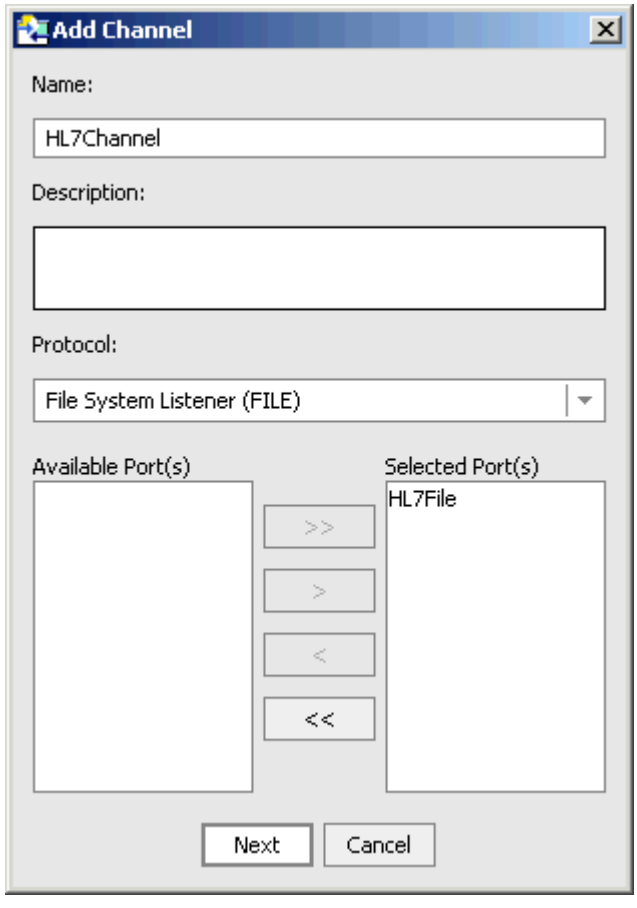
2. Click the adapter node, for example, HL7.

   The node expands and displays the Ports and Channels nodes.



3. Right-click the *Channels* node and select *Add Channel*.

The Add Channel dialog box opens.



a. In the Name field, type a name for the channel, for example, HL7Channel.

b. In the Description field, type a brief description.

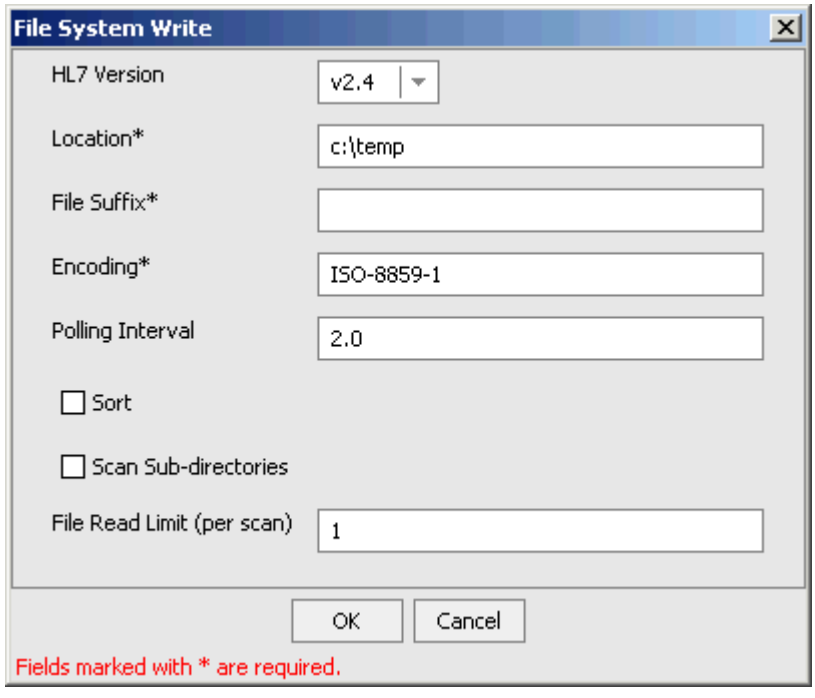
c. From the Protocol drop-down list, select a type of listener:

- File System Listener (FILE)
- HyperText Transfer Protocol
- TCP Listener (TCP)
- IBM MQ Series (MQ)

d. To associate one or more available ports with this channel, select the port in the Available box and click the double right arrow (>>) button to move it to the Selected box.

4. Click *Next*.

A dialog box opens that is specific to the protocol you selected.



5. Enter values for the parameters that are listed.

For information on the parameters for a File System Listener (FILE) listener, see *File System Listener (FILE) listener Configuration Parameters* on page A-39.

For information on the parameters for a HyperText Transfer Protocol listener, see *HyperText Transfer Protocol Listener Configuration Parameters* on page A-40.

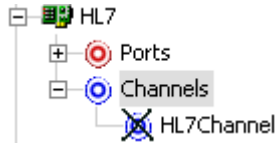
For information on the parameters for a TCP Listener, see *TCP Listener Configuration Parameters* on page A-41.

For information on the parameters for an IBM MQ Series (MQ) listener, see *IBM MQ Series (MQ) Listener Configuration Parameters* on page A-41.

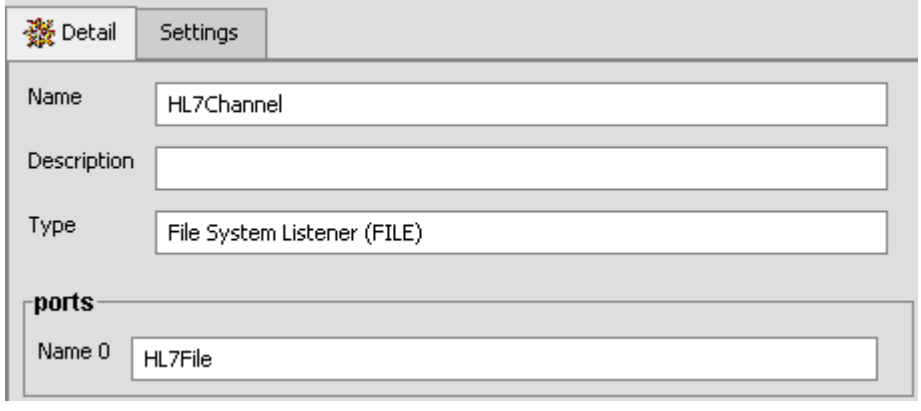
For information on the parameters for a File Transfer Protocol (FTP) listener, see *File Transfer Protocol (FTP) Listener Configuration Parameters* on page A-42.

6. Click *OK*.

The channel appears below the Channels node in the left pane.

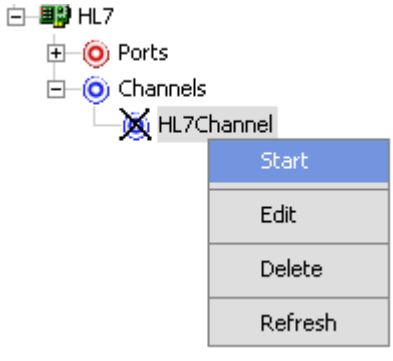


When you select the event port, the channel information appears in the right pane.



A Ports area appears on the Details tab that displays the name of the event port you assigned to this channel.

You are ready to start your channel to listen for events.



7. To activate your event configuration, right-click the channel node, for example, HL7Channel.

a. Select *Start*.

b. To stop the channel at any time, right-click the channel and select *Stop*.

Reference File System Listener (FILE) listener Configuration Parameters

On the Settings tab:

Parameter	Description
Location	The directory where messages are received. DOS-style file patterns are valid for this parameter. You can specify a file pattern as well as a directory. For example, c:\xyz\ab*cd (without a file suffix) takes the file suffix from that parameter. If you use a pattern, files are selected based on the suffix and then the pattern. AB?CD selects ABxCD. AB*CD selects ABxxxCD.
File Suffix	File extension for the file event. This limits input files to those with the specified extensions. The "." is not required. The minus sign ("-") indicated that there is no extension. If the file extension is zip, the unzipped files must conform to the event schema, or they will fail. This function also works with transform configured.
Encoding	The host on which the MQ Server is located (for the MQ Client only).
Polling Interval	This is a time, expressed as xxH:xxM:xxS For example 1 hour, 2 minutes, and 3 seconds is: 1H:2M:3S The maximum interval between checks for new documents. The higher this value, the longer the interval, and the fewer system resources that are used. The side-effect of a high value is that a worker thread cannot respond to a stop command. If this value is set to 0, the listener runs once and terminates. The default value is 2 seconds.
Sort	The case-sensitive name of the channel that connects with the remote MQ Server queue manager (for the MQ client only). The default channel name for MQSeries is SYSTEM.DEF.SVRCONN.
Scan Sub-directories	Location where error documents are sent. This can be a predefined port name or another full URL. Optional.

On the Advanced tab:

Parameter	Description
Transform Type	Select the pre-built transform template from the drop-down list. To enable batch processing, select *BatchSplitter* from the drop-down list. The batch splitter preparses an entire EDI document and splits the document into individual transactions. Each transaction retains its Interchange Header/Trailer information. Once the batch splitter is finished splitting the EDI document, the transactions are ready to be transformed into XML.
Location for ack copies	The directory in which the acknowledgement document is placed.

Reference **HyperText Transfer Protocol Listener Configuration Parameters**

On the Settings tab:

Parameter	Description
Port	The port where the adapter listens for the HTTP transfer.
Encoding	The character set encoding for inbound documents. For example, UTF-8. The default is ISO-8859-1 US and Western Europe.

On the Advanced tab:

Parameter	Description
Transform Type	Select the pre-built transform template from the drop-down list. To enable batch processing, select *BatchSplitter* from the drop-down list. The batch splitter preparses an entire EDI document and splits the document into individual transactions. Each transaction retains its Interchange Header/Trailer information. Once the batch splitter is finished splitting the EDI document, the transactions are ready to be transformed into XML.
Location for ack copies	The directory in which the acknowledgement document is placed.

Reference TCP Listener Configuration Parameters

On the Settings tab:

Parameter	Description
Port	The port where the adapter listens for the TCP transfer.
Encoding	The character set encoding for inbound documents. For example, UTF-8. The default is ISO-8859-1 US and Western Europe.
Allowable Client Host	The name or address of the client restricted to accessing this adapter.

On the Advanced tab:

Parameter	Description
Transform Type	Select the pre-built transform template from the drop-down list. To enable batch processing, select *BatchSplitter* from the drop-down list. The batch splitter preparses an entire EDI document and splits the document into individual transactions. Each transaction retains its Interchange Header/Trailer information. Once the batch splitter is finished splitting the EDI document, the transactions are ready to be transformed into XML.
Location for ack copies	The directory in which the acknowledgement document is placed.

Reference IBM MQ Series (MQ) Listener Configuration Parameters

On the Settings tab:

Parameter	Description
Queue Manager	The name of the MQ queue manager to be used.
Queue Name	The name of the MQ Series or WebSphere MQ queue that the HL7 system polls.

Parameter	Description
Polling Interval	The maximum wait interval (in the format *nn*H:*nn*M:*nn*S) between checks for new documents. The higher this value, the longer the interval, and the fewer system resources that are used. However, with a high value, the worker thread cannot respond to a stop command. If timeout is set to 0, the listener runs once and terminates. The default is 2 seconds.

On the MQ Client tab:

Parameter	Description
Host	The host where the MQ Server is located.
Port	The port number used to connect to an MQ Server.
Channel	The channel between an MQ Client and an MQ Server.

On the Advanced tab:

Parameter	Description
Transform Type	Select the pre-built transform template from the drop-down list. To enable batch processing, select *BatchSplitter* from the drop-down list. The batch splitter preparses an entire EDI document and splits the document into individual transactions. Each transaction retains its Interchange Header/Trailer information. Once the batch splitter is finished splitting the EDI document, the transactions are ready to be transformed into XML.
Location for ack copies	The directory in which the acknowledgement document is placed.

Reference **File Transfer Protocol (FTP) Listener Configuration Parameters**

On the Settings tab:

Parameter	Description
Host	The name of the FTP host.
Port	The port where the adapter listens on the FTP transfer.

Parameter	Description
User	The user name to log onto the FTP Server.
Password	The password for the FTP user.
Location	The directory where messages are received. DOS-style file patterns are available for this parameter. You can specify a file pattern as well as a directory. For example, c:\xyz\ab*cd (without a file suffix) takes the file suffix from that parameter. If you use a pattern, files are selected based on the suffix and then the pattern. AB?CD selects ABxCD. AB*CD selects ABxxxCD.
Encoding	The character set encoding for inbound documents. For example, UTF-8. The default is ISO-8859-1 US and Western Europe.
Polling Interval	The maximum wait interval (in the format *nn*H:*nn*M:*nn*S) between checks for new documents. The higher this value, the longer the interval, and the fewer system resources that are used. However, with a high value, the worker thread cannot respond to a stop command. If timeout is set to 0, the listener runs once and terminates. The default is 2 seconds.

On the Advanced tab:

Parameter	Description
Transform Type	Select the pre-built transform template from the drop-down list. To enable batch processing, select *BatchSplitter* from the drop-down list. The batch splitter preparses an entire EDI document and splits the document into individual transactions. Each transaction retains its Interchange Header/Trailer information. Once the batch splitter is finished splitting the EDI document, the transactions are ready to be transformed into XML.
Location for ack copies	The directory in which the acknowledgement document is placed.

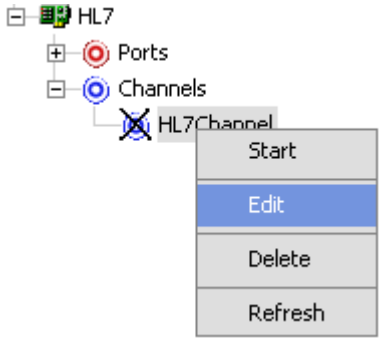
Modifying a Channel

The following procedures describe how to edit and delete a channel using Application Explorer. To review the channel settings, you select the channel name. In the right pane, a table appears that summarizes the information associated with the channel you created.

Procedure How to Edit a Channel

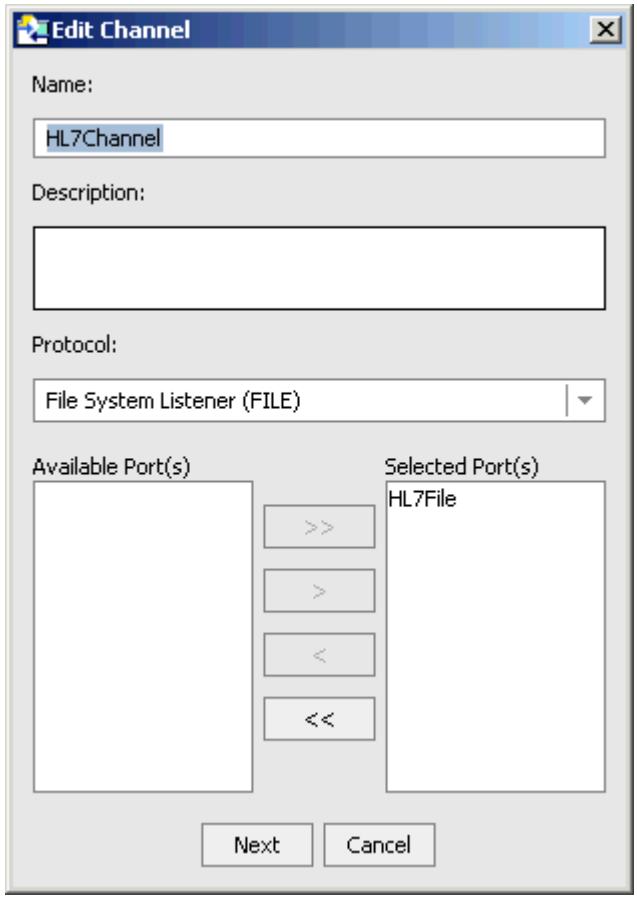
To edit a channel:

1. To view the available channels, click the *Channels* node in the left pane.



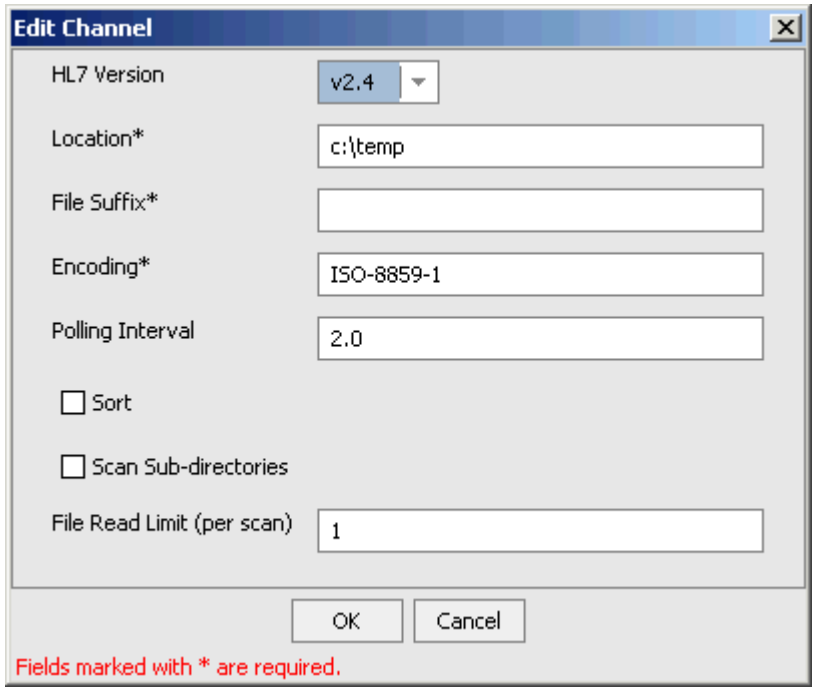
2. Right-click the channel you want to edit, for example, HL7Channel, and select *Edit*.

The Edit Channel dialog box opens.



3. Make the required changes to the channel configuration.
4. Click *Next*.

The following dialog box opens.

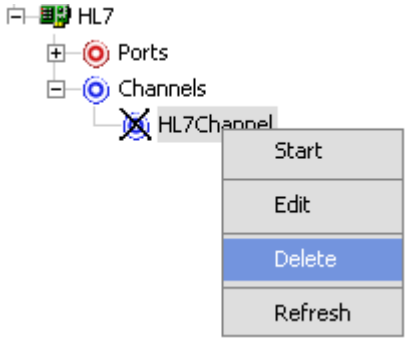


5. Make the required changes and click *OK*.

Procedure How to Delete a Channel

To delete an existing channel:

1. In the left pane, right-click the channel, for example, HL7Channel.



2. Select *Delete*.

   The channel disappears from the Channels list.

Deploying iWay Components in a Clustered BEA WebLogic Environment

iWay events can be configured in a clustered BEA WebLogic environment.

A cluster consists of multiple server instances running simultaneously, yet appears to clients to be a single server instance. The server instances that contain a cluster can be run on one machine, but are usually run on multiple machines.

Clustering provides the following benefits:

- Load balancing
- High availability

Service requests are processed through the HTTP router and routed to an available managed server.

Events are server-specific and are not processed through the HTTP router. You must configure each server separately.

Procedure How to Deploy iWay Components in a Clustered Environment

To deploy iWay components in a clustered environment:

1. Using the BEA Configuration Wizard:
   a. Configure an administrative server to manage the managed servers.
   b. Add and configure as many managed servers as required.
   c. Add and configure an HTTP router. This does not have to be a part of WebLogic and can be an outside component.
   d. If you configure the HTTP router within WebLogic, start it by entering the following command:

   ```
   StartManagedWebLogic HTTPROUTER http://localhost:7001
   ```

   where:

   HTTPROUTER

   Is the name of the server on which the HTTP router is running.

   `http://localhost:7001`

   Is the location of the admin console.

   e. Add the managed servers to your cluster/clusters.

   For more information on configuring WebLogic Integration for deployment in a clustered environment, see *Deploying WebLogic Integration Solutions*.

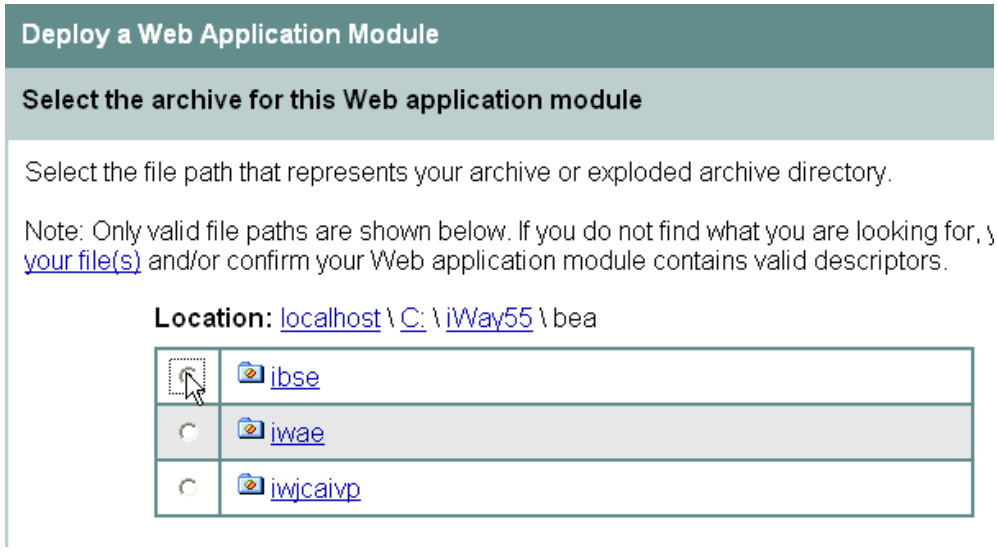
2. Start the WebLogic Server and open WebLogic Server Console.

3. Deploy iBSE to the cluster by selecting *Web Application Modules* from the Domain Configurations section, and clicking *Deploy a new Web Application Module*.

   A page appears for you to specify where the Web application is located.

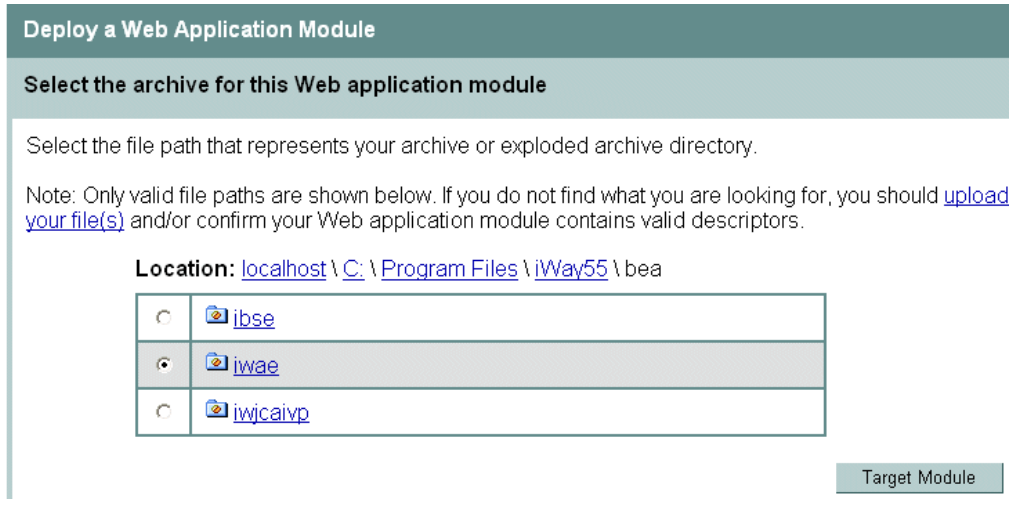
   Note: You can deploy JCA to a cluster, but you can only point it to one directory, and to the machine on which it is installed.

4. To deploy iBSE, select the option button next to the ibse directory and then click *Target Module*.

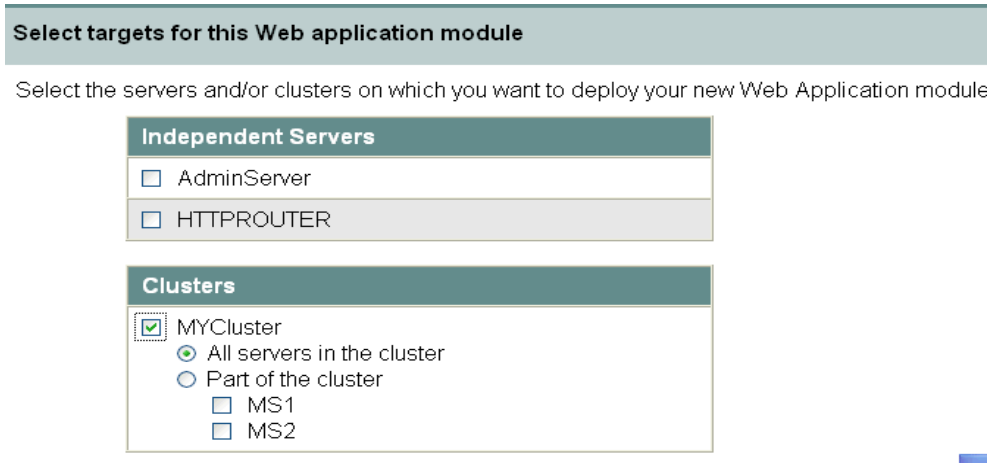


5. To deploy servlet Application Explorer, select the option button next to the iwae directory and then click *Target Module*.

   If you are using servlet Application Explorer, deploy it only on the admin server or one of the managed servers.

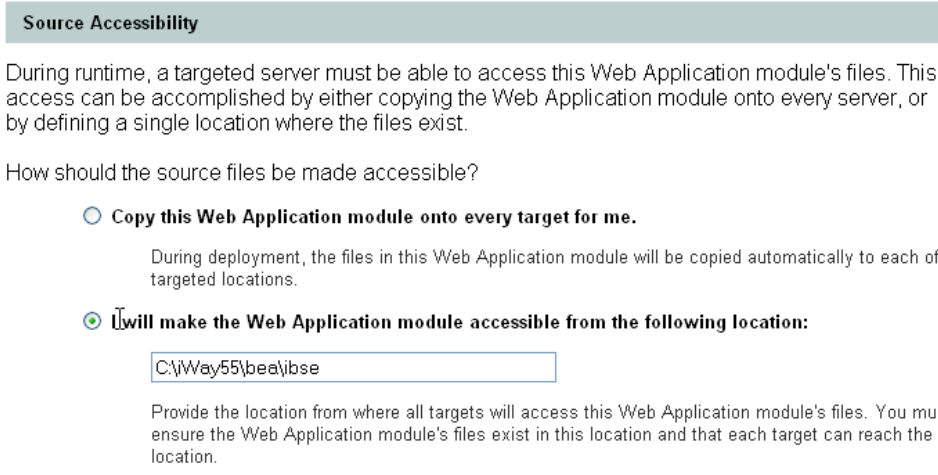


The following window opens.



6. Select the servers and/or clusters on which you want to deploy the application and click *Continue*.

The following window opens.



7. Select the *I will make the Web Application module accessible from the following location* option button and provide the location from which all targets will access iBSE.

   iWay Software recommends that you use a single instance of iBSE, rather than copying iBSE onto every target.

   Note: iBSE must use a database repository (SQL or Oracle). Do not use a file repository. You can select this in the Repository Type drop-down list in the iBSE monitoring page. After configuring a database repository, you must restart all of the managed servers.

   `http://hostname:port/ibse/IBSEConfig/`

   where:

   hostname

   Is where your application server is running. Use the IP address or machine name in the URL; do not use localhost.

   port

   Is the port specific to each server, since you deploy iBSE to an entire cluster. For example, 8001, 8002, or any other port that is specified for each managed node.

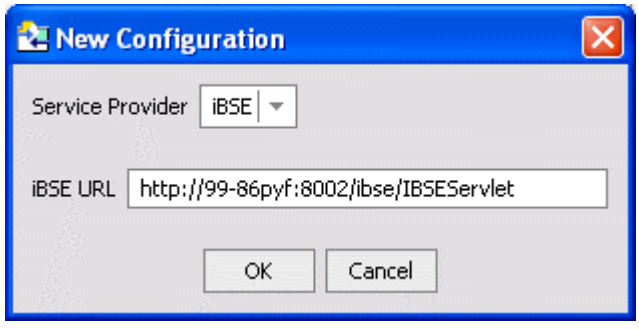
8. Click *Deploy*.

Procedure Configuring Ports and Channels in a Clustered Environment

To configure ports and channels in a clustered environment:

1. Open Swing Application Explorer in BEA WebLogic Workshop.

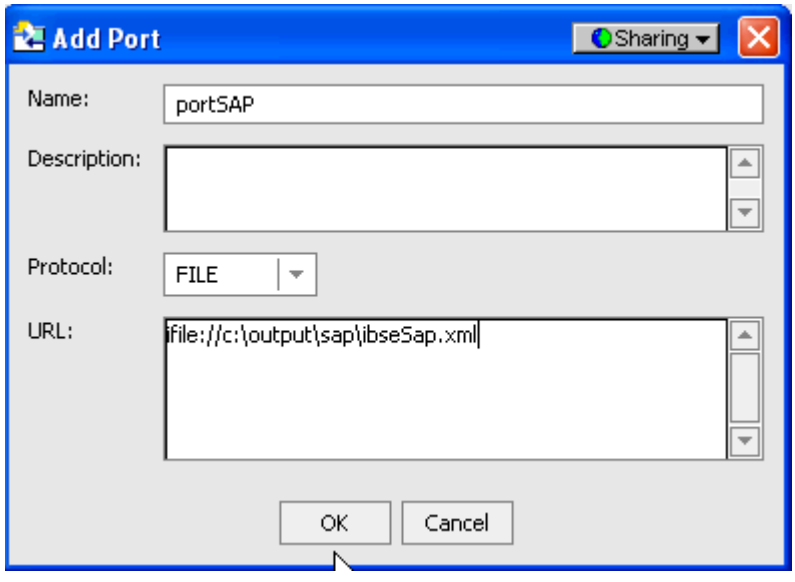
2. Create a new connection to the iBSE instance. For information on creating a new configuration, see *Creating a New Configuration* on page A-3.



Note: Use the IP address or machine name in the URL; do not use localhost.

3. Connect to the new configuration and select the iWay Events node in the left pane of Application Explorer.

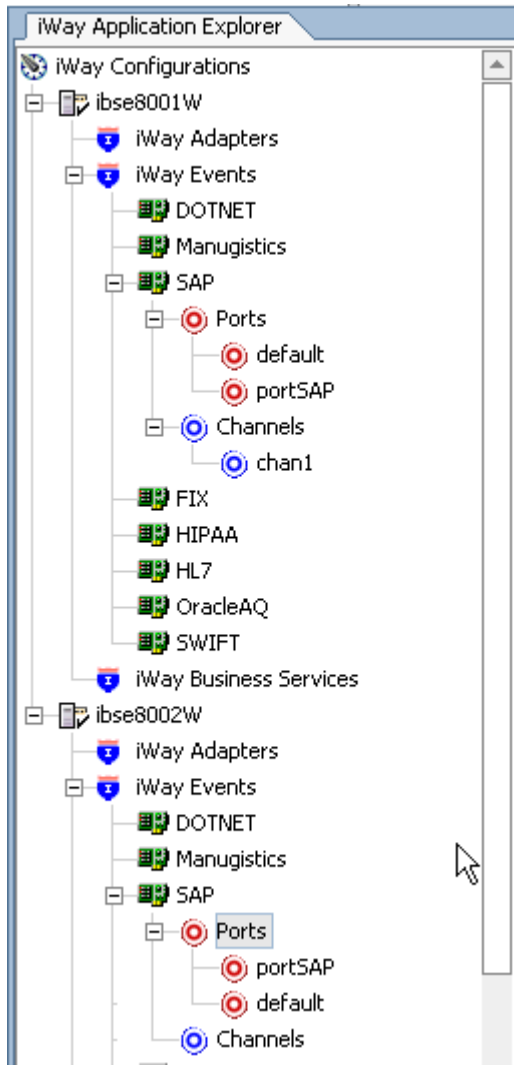
4. Select an adapter from the adapter list (in this example, SAP) and add a new port. For more information, see *Creating an Event Port* on page A-19.



5. Create a channel and add the port you created. For more information, see *Creating a Channel* on page A-34.
6. Click *Next* and enter the application server parameters.
7. Start the channel.
8. Create a new configuration and connect to the second iBSE instance.

   The connection to iBSE must be configured to each instance of the managed server.

The following graphic shows two configurations.



The following operations performed on one managed server will be replicated on all other managed servers:

- Create port and channel: Creates the channel and port under all available servers.
- Delete port and channel. Deletes the port and channel under all available servers.

The following operations must be performed on each server:

- Start channel. Starts the channel for the specific server.

- Stop channel. Stops the channel for the specific server.

Adding a Control for an iWay Resource in BEA WebLogic Workshop

Java controls provide a convenient way to incorporate access to iWay resources. You can add controls in BEA WebLogic Workshop to use Web services created by the Java Swing version of iWay Application Explorer, or you can add controls that enable you to take advantage of the JCA resources of Application Explorer.

Adding a Web Service Control to a BEA WebLogic Workshop Application

After you create an iWay Web service using Application Explorer and export the WSDL file, you can create a control for the Web service.

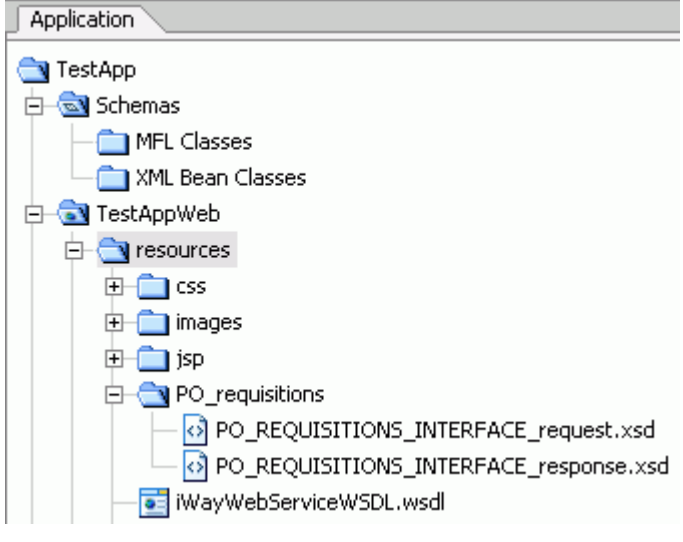
For more information on exporting a WSDL file, see *How to Export iWay WSDL for Use in BEA WebLogic Workshop Workflows* on page A-17.

Procedure How to Add a Web Service Control

To add a Web service control:

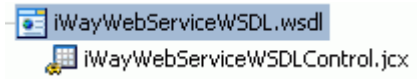
1. After exporting the WSDL file from Application Explorer, locate the file in the Application tab of your BEA WebLogic Workshop application.

   For example, a WSDL file saved to the \resources directory in your BEA WebLogic Workshop Web application directory structure appears as follows.



2. Right-click the *WSDL* file and select *Generate Service Control*.

The control for the WSDL appears below the WSDL file in the resources tree.



Adding an iWay Extensible CCI Control to a BEA WebLogic Workshop Application

An iWay control enables access to resources provided by Application Explorer when it is used in conjunction with a JCA deployment. You must add an iWay control before using it in a BEA WebLogic Workshop application. You must add the control in each application you create with BEA WebLogic Workshop.

The following section describes the enhanced CCI control, which is extensible and provides JCX with typed inputs and outputs for JCA in BEA WebLogic Workshop.

Overview

The extensible iWay CCI control provides:

- **Method and tag validation.** BEA WebLogic Workshop provides warnings regarding invalid methods and tags.
- **Improved error handling.**

You can now define new methods that rely on the generic *service* and *authService* methods. For example, you can define a JCX with a new method such as the following, without having to write casting code or explicit transformations:

```
sapComDocumentSapRfcFunctions.BAPIMATERIALGETDETAILResponseDocument
getDetail(sapComDocumentSapRfcFunctions.BAPIMATERIALGETDETAILDocument
aRequest) throws java.lang.Exception
```

In addition, the extensible CCI control now generates a JCX file to which you can add your own methods.

Using the Extensible CCI Control

The extensible CCI control functions much like a database control since it generates JCX files to which you can add your own methods.

Your own methods can use the correct input and output types rather than the generic XmlObject types that the JCA control uses. Since the control is just a proxy that uses a reflection to call the relevant method, it will take care of the casting for you. There is no longer a need to write custom code that does the cast or transformations that are cast between an XmlObject.

For example, instead of the generic XmlObject:

```
XmlObject service(XmlObject input) throws java.lang.Exception;
```

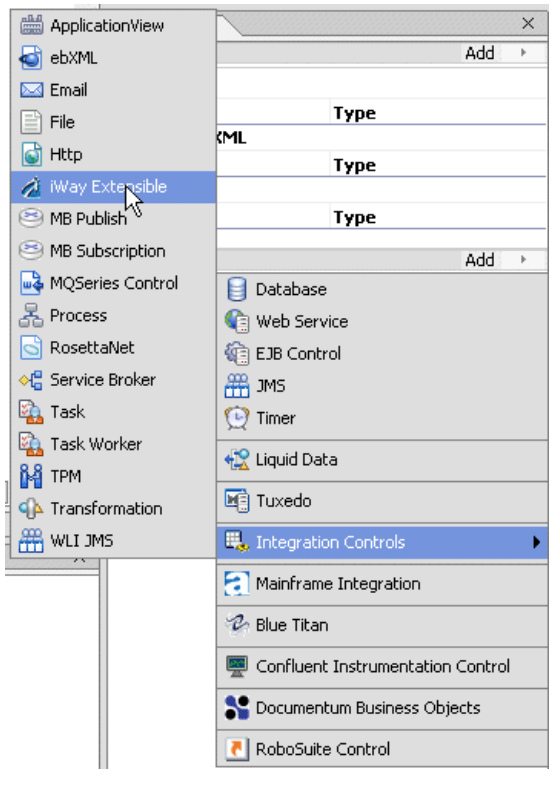
you will be calling:

```
BAPIMATERIALGETDETAILResponseDocument
getDetail(BAPIMATERIALGETDETAILDocument aRequest) throws
java.lang.Exception;
```

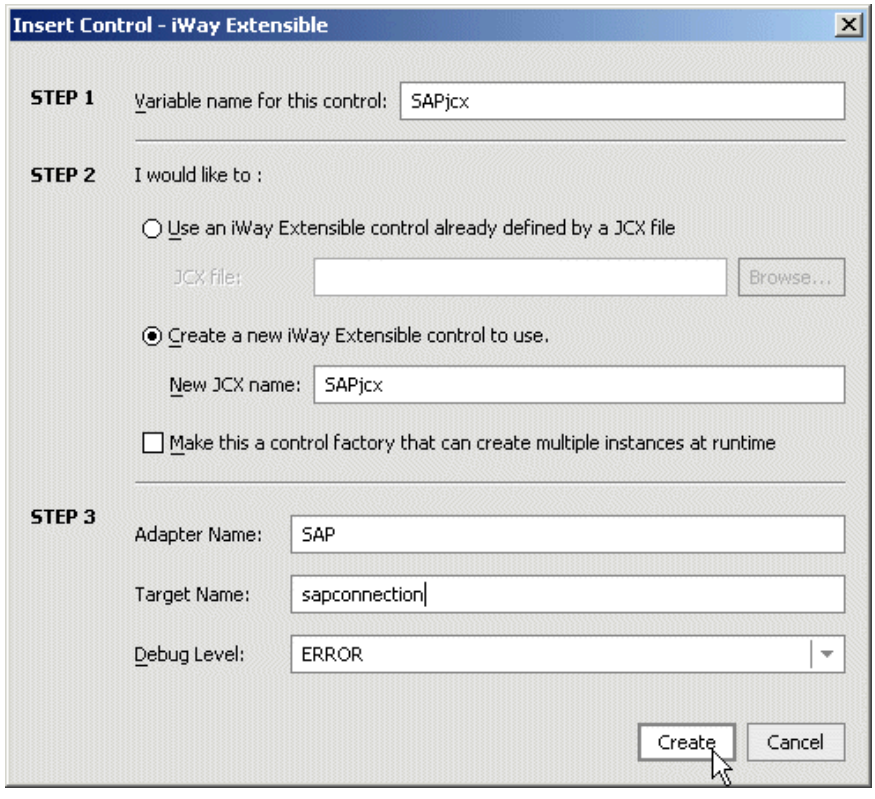
Example Defining a Control Using the Extensible CCI Control

The following sample JCX demonstrates how to define a control that uses the SAP BAPI_MATERIAL_GET_DATA using the extensible CCI control in BEA WebLogic Workshop.

1. Start BEA WebLogic Workshop and create a new project.
2. Click *Integration Controls* and select *iWay Extensible*.



The Insert Control - iWay Extensible dialog box opens.



3. Perform the following steps:

a. Provide a variable name for this control.

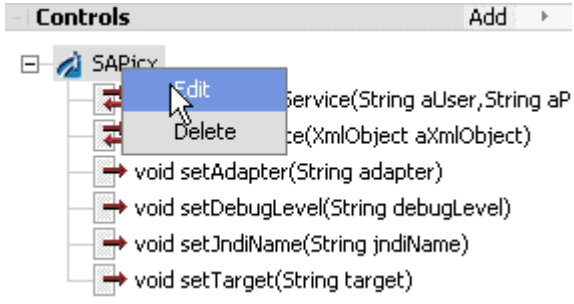
b. Click *Create a new iWay Extensible control* to use and provide a new JCX name.

c. Enter the adapter name, target name, and select a debug level from the drop-down list.

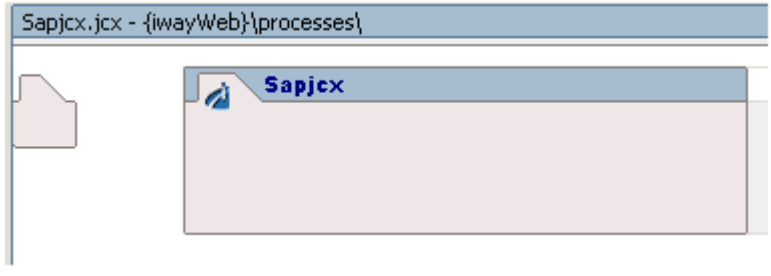
4. Click *Create*.

A new JCX file is created.

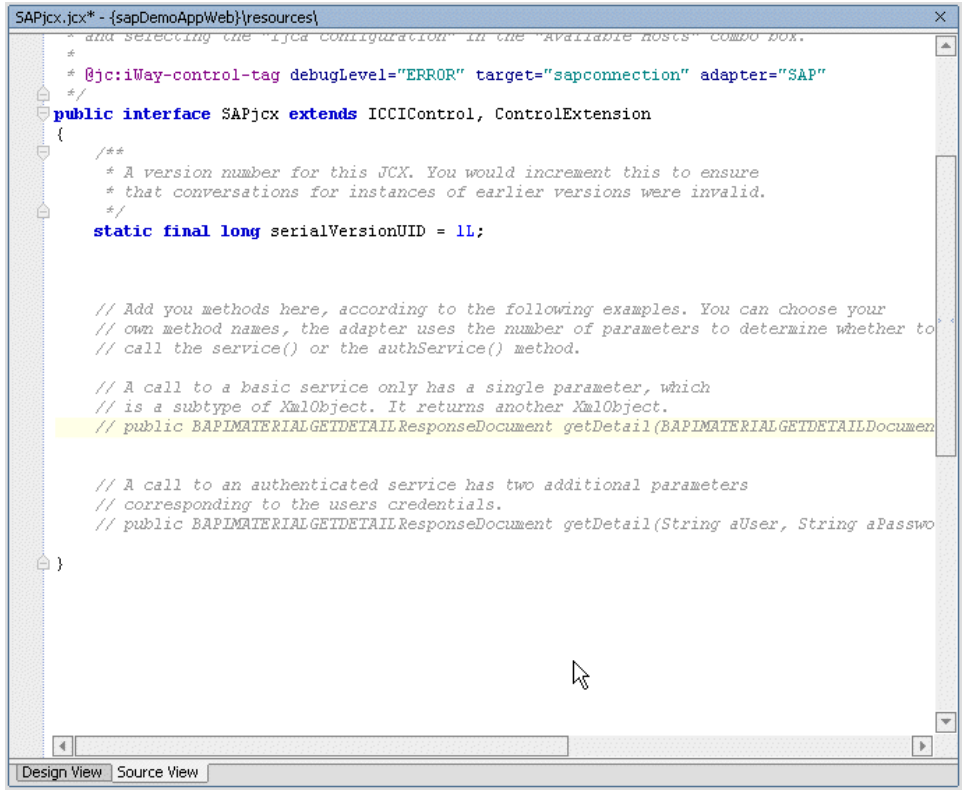
To edit an existing control, right click the control and select *Edit*.



The Design view is displayed.



5. Click *Source View*.



You can add your own methods that call the adapter's services

APPENDIX B

HL7 Document Index

Topics:

- Message Definition Files
- Field Definitions
- Data Type Definitions
- Lookup ValidationLookup Validation
- Sample Conversion
- Validation Rules File
- Error Codes

This appendix includes reference material that is supplied with the iWay Adapter for HL7 for BEA WebLogic.

Message Definition Files

The following section discusses the two main schema files that describe the HL7 messages (Message.xsd and Segments.xsd). These files describe to the HL7 parser how the HL7 messages are formatted.

Messages.xsd

Messages.xsd

```
<?xml version = "1.0" encoding = "ISO-8859-1" ?>
 <schema>
  <!-- MESSAGE ORU_R01 -->
 <!-- .. groups used in message ORU_R01 -->
 <element name="ORU_R01.GROUP.1">
  <complexType>
    <sequence>
      <element minOccurs="0" maxOccurs="1" ref="OBX" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NTE" />
    </sequence>
  </complexType>

</element>
<element name="ORU_R01.GROUP.2">
  <complexType>
    <sequence>
      <element minOccurs="0" maxOccurs="1" ref="ORC" />
      <element minOccurs="1" maxOccurs="1" ref="OBR" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NTE" />
      <element minOccurs="1" maxOccurs="unbounded" ref="ORU_R01.GROUP.1" />
      <element minOccurs="0" maxOccurs="unbounded" ref="CTI" />
    </sequence>
  </complexType>
</element>

<element name="ORU_R01.GROUP.3">
  <complexType>
    <sequence>
      <element minOccurs="1" maxOccurs="1" ref="PID" />
      <element minOccurs="0" maxOccurs="1" ref="PD1" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NTE" />
      <element minOccurs="0" maxOccurs="1" ref="ORU_R01.GROUP.5" />
    </sequence>
  </complexType>
</element>
```

```
<element name="ORU_R01.GROUP.4">
  <complexType>
    <sequence>
      <element minOccurs="0" maxOccurs="1" ref="ORU_R01.GROUP.3" />
      <element minOccurs="1" maxOccurs="unbounded" ref="ORU_R01.GROUP.2" />
    </sequence>
  </complexType>
</element>

<element name="ORU_R01.GROUP.5">
  <complexType>
    <sequence>
      <element minOccurs="1" maxOccurs="1" ref="PV1" />
      <element minOccurs="0" maxOccurs="1" ref="PV2" />
    </sequence>
  </complexType>
</element>

<!-- .. message definition ORU_R01 -->

<element name="ORU_R01">
  <complexType>
    <sequence>
      <element minOccurs="1" maxOccurs="1" ref="MSH" />
      <element minOccurs="1" maxOccurs="unbounded" ref="ORU_R01.GROUP.4" />
      <element minOccurs="0" maxOccurs="1" ref="DSC" />
    </sequence>
  </complexType>
</element>

</schema>
```

This section from the schema file defines the message type ORU of event R01. There are numerous groups and sub-groups, which detail the sub-sections of the message. Some of these sub-sections are required, for example, ORU_RO1.GROUP.4, and others are allowed to occur numerous times, for example, ORU_RO1.GROUP.2.

Segments.xsd

The following schema describes all the fields that make up each of the segments used in message ORU of event R01.

Segments.xsd

```
<?xml version = "1.0" encoding = "ISO-8859-1" ?>

<schema>

<!-- SEGMENT MSH -->

<element name="MSH">
  <complexType>
    <sequence>
      <element minOccurs="1" maxOccurs="1" ref="MSH.FIELD_SEP" />
      <element minOccurs="1" maxOccurs="1" ref="MSH.ENCDNG_CHRS" />
      <element minOccurs="0" maxOccurs="1" ref="MSH.SND_APP" />
      <element minOccurs="0" maxOccurs="1" ref="MSH.SND_FAC" />
      <element minOccurs="0" maxOccurs="1" ref="MSH.RCV_APP" />
      <element minOccurs="0" maxOccurs="1" ref="MSH.RCV_FAC" />
      <element minOccurs="1" maxOccurs="1" ref="MSH.MSG_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="MSH.SECURITY" />
      <element minOccurs="1" maxOccurs="1" ref="MSH.MSG_TYPE" />
      <element minOccurs="1" maxOccurs="1" ref="MSH.MSG_CNTRL_ID" />
      <element minOccurs="1" maxOccurs="1" ref="MSH.PRCSNG_ID" />
      <element minOccurs="1" maxOccurs="1" ref="MSH.VRSN_ID" />
      <element minOccurs="0" maxOccurs="1" ref="MSH.SQNC_NM" />
      <element minOccurs="0" maxOccurs="1" ref="MSH.CNTN_PNTR" />
      <element minOccurs="0" maxOccurs="1" ref="MSH.ACCPT_ACK_TYP" />
      <element minOccurs="0" maxOccurs="1" ref="MSH.APP_ACK_TYP" />
      <element minOccurs="0" maxOccurs="1" ref="MSH.CNTRY_CDE" />
      <element minOccurs="0" maxOccurs="unbounded" ref="MSH.CHAR_SET" />
      <element minOccurs="0" maxOccurs="1" ref="MSH.MSG_LANG" />
      <element minOccurs="0" maxOccurs="1" ref="MSH.ALT_CHAR_SET" />
    </sequence>
  </complexType>
</element>
```

```
<!-- SEGMENT PID -->

<!-- Patient Identificaion segment -->

<element name="PID">
  <complexType>
    <sequence>
      <element minOccurs="0" maxOccurs="1" ref="PID.SET_ID" />
      <element minOccurs="0" maxOccurs="1" ref="PID.PATNT_ID" />
      <element minOccurs="1" maxOccurs="unbounded" ref="PID.PATNT_ID_LST" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PID.ALT_PATNT_ID" />
      <element minOccurs="1" maxOccurs="unbounded" ref="PID.PATNT_NAME" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PID.MTHR_MDN_NME" />
      <element minOccurs="0" maxOccurs="1" ref="PID.DOB" />
      <element minOccurs="0" maxOccurs="1" ref="PID.SEX" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PID.ALIAS" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PID.RACE" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PID.PATNT_ADDRSS" />
      <element minOccurs="0" maxOccurs="1" ref="PID.COUNTY_CDE" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PID.PHNE_HME" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PID.PHNE_BUS" />
      <element minOccurs="0" maxOccurs="1" ref="PID.PRMRY_LANG" />
      <element minOccurs="0" maxOccurs="1" ref="PID.MRTL_STS" />
      <element minOccurs="0" maxOccurs="1" ref="PID.RLGN" />
      <element minOccurs="0" maxOccurs="1" ref="PID.PATNT_ACC_NM" />
      <element minOccurs="0" maxOccurs="1" ref="PID.SSN_NM" />
      <element minOccurs="0" maxOccurs="1" ref="PID.DRVR_LCNS_NM" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PID.MTHR_ID" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PID.ETHNIC_GRP" />
      <element minOccurs="0" maxOccurs="1" ref="PID.BRTH_PLC" />
      <element minOccurs="0" maxOccurs="1" ref="PID.MLTPL_BRTH_IND" />
      <element minOccurs="0" maxOccurs="1" ref="PID.BRTH_ORDR" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PID.CTZNSHP" />
      <element minOccurs="0" maxOccurs="1" ref="PID.VTRNS_MIL_STS" />
      <element minOccurs="0" maxOccurs="1" ref="PID.NTNLTY" />
      <element minOccurs="0" maxOccurs="1" ref="PID.PATNT_DTH_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="PID.PATNT_DTH_IND" />
    </sequence>
  </complexType>
</element>
```

```
<!-- SEGMENT PD1 -->

<!-- Patient Additional Demographic segment -->

<element name="PD1">
  <complexType>
    <sequence>
      <element minOccurs="0" maxOccurs="unbounded" ref="PD1.LVNG_DPNDCY" />
      <element minOccurs="0" maxOccurs="1" ref="PD1.LVNG_ARRNGMNT" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PD1.PATNT_PRM_FAC" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PD1.PATNT_PRM_CARE_PRV" />
      <element minOccurs="0" maxOccurs="1" ref="PD1.STDNT_IND" />
      <element minOccurs="0" maxOccurs="1" ref="PD1.HANDICAP" />
      <element minOccurs="0" maxOccurs="1" ref="PD1.LVNG_WILL" />
      <element minOccurs="0" maxOccurs="1" ref="PD1.ORGN_DNR" />
      <element minOccurs="0" maxOccurs="1" ref="PD1.SEPARATE_BILL" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PD1.DUP_PATNT" />
      <element minOccurs="0" maxOccurs="1" ref="PD1.PBLCTY_CDE" />
      <element minOccurs="0" maxOccurs="1" ref="PD1.PRTCTN_IND" />
    </sequence>
  </complexType>
</element>
```

```
<!-- SEGMENT NK1 -->

<!-- Next of kin / associated parties segment  -->

<element name="NK1">
  <complexType>
    <sequence>
      <element minOccurs="1" maxOccurs="1" ref="NK1.SET_ID" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.NME" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.RLTNSHP" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.ADDRSS" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.PHNE_NM " />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.BUS_PHNE_NM" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.CNTCT_RLE" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.STRT_DTE" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.END_DTE" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.KIN_JOB_TITLE" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.KIN_JOB_CDE" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.KIN_EMP_NM" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.ORG_NME" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.MRTL_STS" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.SEX" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.DOB" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.LVNG_DPNDCY" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.AMBLTRY_STS" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.CTZNSHP" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.PRM_LANG" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.LVNG_ARNGMNT" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.PBLCTY_CDE" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.PRTCTN_IND" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.STDNT_IND" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.RLGN" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.MOTH_MDN_NME" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.NTNLTY" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.ETHNC_GRP" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.CNTCT_RSN" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.CNTCT_PRSN_NME" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.CNTCT_PRSN_NUM" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.CNTCT_PRSN_ADD" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.KIN_ID" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.JOB_STS" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NK1.RACE" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.HANDICAP" />
      <element minOccurs="0" maxOccurs="1" ref="NK1.CNTCT_PRSN_SSN" />
    </sequence>
  </complexType>
</element>
```

```
<!-- SEGMENT NTE -->

<!-- Notes and comments segment -->

<element name="NTE">
  <complexType>
    <sequence>
      <element minOccurs="0" maxOccurs="1" ref="NTE.SET_ID" />
      <element minOccurs="0" maxOccurs="1" ref="NTE.SRC" />
      <element minOccurs="0" maxOccurs="unbounded" ref="NTE.CMNT" />
      <element minOccurs="0" maxOccurs="1" ref="NTE.CMNT_TYP" />
    </sequence>
  </complexType>
</element>
```

```
<!-- SEGMENT PV1 -->

<!-- Patient visit segment -->

<element name="PV1">
  <complexType>
    <sequence>
      <element minOccurs="0" maxOccurs="1" ref="PV1.SET_ID" />
      <element minOccurs="1" maxOccurs="1" ref="PV1.PATNT_CLSS" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.ASGND_PATNT_LCTN" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.ADMSN_TYP" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.PREADMT_NUM" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.PRIOR_PATNT_LOC" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV1.ATNDNG_DCTR" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV1.RFRNG_DCTR" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV1.CNSLTNG_DCTR" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.HSPTL_SRVCE" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.TMP_LOC" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.PREADMIT_TST_IND" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.READMSSN_IND" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.ADMNT_SRC" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV1.AMBLTRY_STS" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.VIP_IND" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV1.ADMTTNG_DCTR" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.PATNT_TYP" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.VST_NUM" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV1.FNCL_CLSS" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.CHRG_PRC_IND" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.CRTSY_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.CRDT_RTNG" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV1.CNTRCT_CODE" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV1.CNTRCT_EFFCTV_DTE" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV1.CNTRCT_AMMNT" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV1.CNTRCT_PRD" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.INTRST_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.TRNSFR_BAD_DEBT_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.TRNSFR_BAD_DEBT_DTE" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.BAD_DEBT_AGNCY_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.BAD_DEBT_TRNSFR_AMNT" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.BAD_DEBT_RCVRY_AMNT" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.DLT_ACCNT_IND" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.DLT_ACCNT_DTE" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.DSCHRG_DSPSTN" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.DSCHRG_LOC" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.DIET_TYP" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.SRVCNG_FAC" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.BED_STS" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.ACCNT_STS" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.PNDNG_LOC" />
```

```
      <element minOccurs="0" maxOccurs="1" ref="PV1.PRIOR_TMP_LOC" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.ADMT_DTE" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV1.DSCHRG_DTE" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.CRRNT_PATNT_BLNC" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.TOT_CHRGS" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.TOT_ADJSMNTS" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.TOT_PYMNTS" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.ALTRNT_VST_ID" />
      <element minOccurs="0" maxOccurs="1" ref="PV1.VST_IND" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV1.OTHR_HLTHCR_PRVDR" />
    </sequence>
  </complexType>
</element>

<!-- SEGMENT PV2 -->

<!--atient visit additional information segment -->
```

```
<element name="PV2">
  <complexType>
    <sequence>
      <element minOccurs="0" maxOccurs="1" ref="PV2.PRIOR_PNDNG_LOC" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.ACCMMDTN_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.ADMT_RSN" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.TRNSFR_RSN" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV2.PATNT_VAL" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.PATNT_VAL_LOC" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV2.VST_USR_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.EXPCTD_ADMT_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.EXPCTD_DSCHRG_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.ESTMTD_LNGTH_INPATNT_STAY" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.ACTL_LNGTH_INPATNT_STAY" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.VST_DSCRPTN" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV2.RFRRL_SRC_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.PRVS_SRVC_DTE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.EMPLYMNT_ILLNSS_RLTD_IND" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.PRG_STS_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.PRG_STS_DTE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.SPCL_PRGM_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.RTNTN_IND" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.EXPCTD_NUM_INSRNC_PLNS" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.VST_PBLCTY_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.VST_PRTCTN_IND" />
      <element minOccurs="0" maxOccurs="unbounded" ref="PV2.CLNC_ORG_NAME" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.PATNT_STS_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.VST_PRTY_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.PRVS_TRTMNT_DTE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.EXPCTD_DSCHRGE_DSPSTN" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.SGNTRE_ON_FILE_DTE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.FRST_SMLR_ILLNSS_DTE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.PATNT_CHRGE_ADJSTMNT_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.RCRRNG_SRVCE_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.BLLNG_MEDIA_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.EXPCTD_SRGRY_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.MLTRY_PRTNRSHP_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.MLTRY_NON_AVLBLTY_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.NWBRN_BABY_IND" />
      <element minOccurs="0" maxOccurs="1" ref="PV2.BABY_DTND_IND" />
    </sequence>
  </complexType>
</element>
```

```
<!-- SEGMENT ORC -->

<!-- Common Order segment -->

<element name="ORC">
  <complexType>
    <sequence>
      <element minOccurs="0" maxOccurs="1" ref="ORC.ORDR_CNTRL" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.PLCR_ORDR_NUM" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.FLLR_ORDR_NUM" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.PLCR_GRP_NUM" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.ORDR_STS" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.RSPNS_FLG" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.QNTY_TMNG" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.PARENT" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.XN_DATETIME" />
      <element minOccurs="0" maxOccurs="unbounded" ref="ORC.ENTRD_BY" />
      <element minOccurs="0" maxOccurs="unbounded" ref="ORC.VRFD_BY" />
      <element minOccurs="0" maxOccurs="unbounded" ref="ORC.ORDRNG_PRVDR" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.ENTRS_LOC" />
      <element minOccurs="0" maxOccurs="unbounded" ref="ORC.14" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.CLL_BCK_PHNE_NUM" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.ORDR_EFF_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.ORDR_CNTRL_CODE_RSN" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.ENTRNG_ORG” />
      <element minOccurs="0" maxOccurs="unbounded" ref="ORC.ENTRNG_DVCE" />
      <element minOccurs="0" maxOccurs="1" ref="ORC.ADNVCD_BNFCRY_NTCE_CODE" />
    </sequence>
  </complexType>
</element>

<!-- SEGMENT OBR -->
<!-- Observation request segment -->

<element name="OBR">
```

```
  <complexType>
    <sequence>
      <element minOccurs="0" maxOccurs="1" ref="OBR.SET_ID" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.PLCR_ORDR_NUM" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.FLLR_ORDR_NUM" />
      <element minOccurs="1" maxOccurs="1" ref="OBR.UNVRSL_SRVCE_ID" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.PRIORITY" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.RQSTD_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.OBSRVTN_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.OBSRVTN_END_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.CLLCTN_VLME" />
      <element minOccurs="0" maxOccurs="unbounded" ref="OBR.CLLCTN_ID" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.SPCMN_ACTN_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.DNGR_CODE" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.RLVNT_CLNCL_INF" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.SPCMEN_RCVD_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.SPCMEN_SRC" />
      <element minOccurs="0" maxOccurs="unbounded" ref=" OBR.ORDRNG_PRVDR " />
      <element minOccurs="0" maxOccurs="unbounded" ref="OBR.ORDR_CLLBCK_PHNE_NUM" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.PLCR_FLD_1" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.PLCR_FLD_2" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.FLLR_FLD_1" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.FLLR_FLD_2" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.RPRT_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.CHRG_TO_PRCTCE" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.DGNSTC_SRV_SCT_ID" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.RSLT_STS" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.PRNT_RSLT" />
      <element minOccurs="0" maxOccurs="unbounded" ref="OBR.QNTY_TMNG" />
      <element minOccurs="0" maxOccurs="unbounded" ref="OBR.RSLT_COPIES_TO" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.PRNT" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.TRNSPRTN_MDE" />
      <element minOccurs="0" maxOccurs="unbounded" ref="OBR.RSN_FOR_STDY" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.PRNCPL_RSLT_INTRPRTR" />
      <element minOccurs="0" maxOccurs="unbounded" ref="OBR.ASSTNT_RSLT_INTRPRTR" />
      <element minOccurs="0" maxOccurs="unbounded" ref="OBR.TCHNCN" />
      <element minOccurs="0" maxOccurs="unbounded" ref="OBR.TRNSCRPTNST" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.SCHDLD_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.NUM_SMPL_CNTNRS" />
      <element minOccurs="0" maxOccurs="unbounded" ref="OBR.TRNSPRT_LGSTCS" />
      <element minOccurs="0" maxOccurs="unbounded" ref="OBR.CLLCTRS_CMMNT" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.TRNSPRT_ARRNGMNT_RSPNSBLTY" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.TRNSPRT_ARRNGD" />
      <element minOccurs="0" maxOccurs="1" ref="OBR.ESCRT_RQRD" />
      <element minOccurs="0" maxOccurs="unbounded"
ref="OBR.PLNND_PATNT_TRNSPRT_CMMNT" />
    </sequence>
  </complexType>
```

```
</element>

<!-- SEGMENT OBX -->

<!-- Observation/result segment -->

<element name="OBX">
  <complexType>
    <sequence>
      <element minOccurs="0" maxOccurs="1" ref="OBX.SET_ID" />
      <element minOccurs="1" maxOccurs="1" ref="OBX.VALUE_TYP" />
      <element minOccurs="1" maxOccurs="1" ref="OBX.OBSRVTN_ID" />
      <element minOccurs="0" maxOccurs="1" ref="OBX.OBSRVTN_SUB_ID" />
      <element minOccurs="1" maxOccurs="1" ref="OBX.OBSRVTN_VALUE" />
      <element minOccurs="0" maxOccurs="1" ref="OBX.UNITS" />
      <element minOccurs="0" maxOccurs="1" ref="OBX.RFRNCS_RNG" />
      <element minOccurs="0" maxOccurs="1" ref="OBX.ABNRML_FLGS" />
      <element minOccurs="0" maxOccurs="unbounded" ref="OBX.PRBLTY" />
      <element minOccurs="0" maxOccurs="1" ref="OBX.NATURE_OF_ABNRML_TST" />
      <element minOccurs="1" maxOccurs="1" ref="OBX.OBSRV_RSLT_STS" />
      <element minOccurs="0" maxOccurs="1" ref="OBX.DATE_LST_OBS_NRML_VAL" />
      <element minOccurs="0" maxOccurs="1" ref="OBX.USR_DFND_ACCSS_CHKS" />
      <element minOccurs="0" maxOccurs="1" ref="OBX.OBSV_DATETIME" />
      <element minOccurs="0" maxOccurs="1" ref="OBX.PRDCERS_ID" />
      <element minOccurs="0" maxOccurs="1" ref="OBX.RSPNSBLE_OBSRVR" />
      <element minOccurs="0" maxOccurs="unbounded" ref="OBX.OBSRVTN_MTHD" />
    </sequence>
  </complexType>
</element>

<!-- SEGMENT CTI -->

<element name="CTI">
  <complexType>
    <sequence>
      <element minOccurs="1" maxOccurs="1" ref="CTI.SPNSR_STDY_ID" />
      <element minOccurs="0" maxOccurs="1" ref="CTI.STDY_PHSE_ID" />
      <element minOccurs="0" maxOccurs="1" ref="CTI.STDY_SCHDLD_TIME_PNT" />
    </sequence>
  </complexType>
</element>
```

```
<!-- SEGMENT DSC -->

<element name="DSC">
  <complexType>
    <sequence>
      <element minOccurs="0" maxOccurs="1" ref="DSC.CNTNTN_PNTR" />
    </sequence>
  </complexType>
</element>

</schema>
```

Field Definitions

The field definitions file, FIELDS.xsd, defines field definitions. The field definition includes a long name (descriptive definition) and a reference to the data type. For more information about the data type definition, see <Hyperlink>"Data Type Definitions" on page 32.

```
<?xml version="1.0" encoding="ISO-8859-1"?>

<schema>

   <ACC_DATE_TIME longName="Date Time" type="TS"/>
   <ACC_CODE longName="Code" type="CE"/>
   <ACC_LOCATION longName="Location Time" type="ST"/>
   <ACC_AUTO_STATE longName="State Auto Accident occured in" type="CE"/>
   <ACC_JOB_IND longName="Job Accident Indicator" type="ID"/>
   <ACC_DEATH_IND longName="Death Indicator" type="ID"/>
   <AL1_ID longName="ID" type="SI"/>
   <AL1_ALLERGEN_TYPE longName="Allergen Type Code" type="IS"/>
   <AL1_ALLERGEN_DESC longName="Allergen Code Description" type="CE"/>
   <AL1_ALLERGY_SEVERITY longName="Allergy severity code" type="IS"/>
   <AL1_ALLERGY_REACTION longName="Allergy Reacation code" type="ST"/>
   <AL1_ID_DATE longName="Identification Date" type="DT"/>

   <DB1_ID longName="ID" type="SI"/>
   <DB1_PERSON_CODE longName="Disabled Person Code" type="IS"/>
   <DB1_PERSON_ID longName="Disabled Person Identifier" type="CX"/>
   <DB1_INDICATOR longName="Disability Indicator" type="ID"/>
   <DB1_START_DATE longName="Disability Start Date" type="DT"/>
   <DB1_END_DATE longName="Disability End Date" type="DT"/>
   <DB1_RETURN_WORK longName="Disability Return to Work Date" type="DT"/>
   <DB1_UNABLE_WORK longName="Disability Unable to Work Date" type="DT"/>
```

```
<DG1_ID longName="ID" type="SI"/>
<DG1_CODE_METHOD longName="Diagnosis Coding Method" type="ID"/>
<DG1_CODE longName="Diagnosis Code" type="CE"/>
<DG1_DESC longName="Diagnosis Description" type="ST"/>
<DG1_DATE longName="Diagnosis Date Time" type="TS"/>
<DG1_TYPE longName="Diagnosis Type" type="IS"/>
<DG1_MAJOR_CAT longName="Major diagnosis category" type="CE"/>
<DG1_RELATED_GROUP longName="Diagnostic Related Group" type="CE"/>
<DG1_DRG_APP_IND longName="DRG Approval Indicator" type="ID"/>
<DG1_DRG_GRP_REV_CODE longName="DRG Grouper Review code" type="IS"/>
<DG1_OUTLIER_TYPE longName="Outlier Type" type="CE"/>
<DG1_OUTLIER_DAYS longName="Outlier Days" type="NM"/>
<DG1_OUTLIER_COST longName="Outlier Cost" type="CP"/>
<DG1_GRP_VER_TYPE longName="Grouper Version and Type" type="ST"/>
<DG1_PRIORITY longName="Diagnosis Priority" type="ID"/>
<DG1_CLINICIAN longName="Diagnosing Clinician" type="XCN"/>
<DG1_CLASS longName="Diagnosis Classification" type="IS"/>
<DG1_CONFID_IND longName="Confidential Indicator" type="ID"/>
<DG1_ATTESTATION_DATE longName="Attestation DateTime" type="TS"/>

<DRG_RELATED_GROUP longName="Diagnostic Related Group" type="CE"/>
<DRG_ASSIGNED_DATE longName="DRG Assigned Date Time" type="TS"/>
<DRG_APP_IND longName="DRG Approval Indicator" type="ID"/>
<DRG_GRP_REV_CODE longName="DRG Grouper Review Code" type="IS"/>
<DRG_OUTLIER_TYPE longName="Outlier Type" type="CE"/>
<DRG_OUTLIER_DAYS longName="Outlier Days" type="NM"/>
<DRG_OUTLIER_COST longName="Outlier Cost" type="CP"/>
<DRG_PAYOR longName="DRG Payor" type="IS"/>
<DRG_OUTLIER_REIMBUR longName="Outlier Reimbursement" type="CP"/>
<DRG_CONFID_IND longName="Confidential Indicator" type="ID"/>

<EVN_TYPE_CODE longName="Event Type Code" type="ID"/>
<EVN_RECORD_DATE longName="Recorded Date Time" type="TS"/>
<EVN_DATE_PLANNED_EVN longName="Date Time Planned Event" type="TS"/>
<EVN_REASON_CODE longName="Event Reason Code" type="IS"/>
<EVN_OP_ID longName="Operator ID" type="XCN"/>
<EVN_OCCURRED longName="Event Occurred" type="TS"/>
```

```
<GT1_ID longName="ID" type="SI"/>
<GT1_NUMBER longName="Guarantor Number" type="CX"/>
<GT1_NAME longName="Guarantor Name" type="XPN"/>
<GT1_SPOUSE_NAME longName="Guarantor Spouse Name" type="XPN"/>
<GT1_ADDRESS longName="Guarantor Address" type="XAD"/>
<GT1_PHONE_HOME longName="Guarantor Phone number Home" type="XTN"/>
<GT1_PHONE_BUSINESS longName="Guarantor Phone number business" type="XTN"/>
<GT1_DOB longName="Guarantor Date Time of Birth" type="TS"/>
<GT1_ADMIN_SEX longName="Guarantor Administrative sex" type="IS"/>
<GT1_TYPE longName="Guarantor type" type="IS"/>
<GT1_RELATIONSHIP longName="Guarantor relationship" type="CE"/>
<GT1_SSN longName="Guarantor SSN" type="ST"/>
<GT1_DATE_BEGIN longName="Guarantor Date Begin" type="DT"/>
<GT1_DATE_END longName="Guarantor Date End" type="DT"/>
<GT1_PRIORITY longName="Guarantor Priority" type="NM"/>
<GT1_EMPLOYER_NAME longName="Guarantor Employer Name" type="XPN"/>
<GT1_EMPLOYER_ADD longName="Guarantor Employer Address" type="XAD"/>
<GT1_EMPLOYER_PHONE longName="Guarantor Employer Phone" type="XTN"/>
<GT1_EMPLOYEE_ID longName="Guarantor Employee ID" type="CX"/>
<GT1_EMPLOYMENT_STATUS longName="Guarantor Employment Status" type="IS"/>
<GT1_ORG_NAME longName="Guarantor Organization Name" type="XON"/>
<GT1_BILL_HOLD_FLG longName="Guarantor Billing Hold Flag" type="ID"/>
<GT1_CREDIT_RATING longName="Guarantor Credit Rating Code" type="CE"/>
<GT1_DEATH_DATE longName="Guarantor Death Date and Time" type="TS"/>
<GT1_DEATH_FLG longName="Guarantor Death Flag" type="ID"/>
<GT1_CHARGE_ADJ longName="Guarantor Charge Adjustment Code" type="CE"/>
<GT1_HOUSEHOLD_INCOME longName="Guarantor Houshold annual income" type="CP"/>
<GT1_HOUSEHOLD_SIZE longName="Guarantor Household size" type="NM"/>
<GT1_EMPLOYER_ID longName="Guarantor Employer ID Number" type="CX"/>
<GT1_MARITAL_STATUS longName="Guarantor Maritial Status code" type="CE"/>
<GT1_HIRE_EFF_DATE longName="Guarantor Hire Effective Date" type="DT"/>
<GT1_EMPLOY_STOP_DATE longName="Employment Stop Date" type="DT"/>
<GT1_LIVING_DEPEND longName="Living Dependency" type="IS"/>
<GT1_AMBULATORY_STAT longName="Ambulatory Status" type="IS"/>
<GT1_CITIZEN longName="Citzenship" type="CE"/>
<GT1_PRIMARY_LANG longName="Primary Language" type="CE"/>
<GT1_LIVING_ARRANG longName="Living Arrangement" type="IS"/>
<GT1_PUB_CODE longName="Publicity Code" type="CE"/>
<GT1_PROTECT_IND longName="Protection Indicator" type="ID"/>
<GT1_STUDENT_IND longName="Student Indicator" type="IS"/>
<GT1_RELIGION longName="Religion" type="CE"/>
<GT1_MOTHER_MAIDEN_NAME longName="Mother Maiden Name" type="XPN"/>
<GT1_NATIONALITY longName="Nationality" type="CE"/>
<GT1_ETHNIC_GROUP longName="Ethnic Group" type="CE"/>
<GT1_CONTACT_NAME longName="Contact Persons Name" type="XPN"/>
<GT1_CONTACT_PHONE longName="Contact Persons Phone number" type="XTN"/>
<GT1_CONTACT_REASON longName="Contact Reason" type="CE"/>
<GT1_CONTACT_RELATION longName="Contact relationship" type="IS"/>
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<GT1_JOB_TITLE longName="Job title" type="ST"/>
<GT1_JOB_CODE longName="Job code" type="JCC"/>
<GT1_EMP_ORG_NAME longName="Guarantor Employers Organization Name" type="XON"/>
<GT1_HANDICAP longName="Handicap" type="IS"/>
<GT1_JOB_STATUS longName="Job Status" type="IS"/>
<GT1_FIN_CLASS longName="Guarantor Financial Class" type="FC"/>
<GT1_RACE longName="Guarantor Race" type="CE"/>
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<IN1_ID longName="ID" type="SI"/>
<IN1_PLAN_ID longName="Insurance Plan ID" type="CE"/>
<IN1_COMPANY_ID longName="Insurance Company ID" type="CX"/>
<IN1_COMPANY_NAME longName="Insurance Company Name" type="XON"/>
<IN1_COMPANY_ADD longName="Insurance Company Address" type="XAD"/>
<IN1_COMPANY_CONTACT longName="Insurance Company Contact" type="XPN"/>
<IN1_COMPANY_CONTACT_TEL longName="Insurance Company Tel No" type="XTN"/>
<IN1_GROUP_NUMBER longName="Group Number" type="ST"/>
<IN1_GROUP_NAME longName="Group Name" type="XON"/>
<IN1_GROUP_EMP_ID longName="Insured Group Emp Id" type="CX"/>
<IN1_GROUP_EMP_NAME longName="Insured Group Emp Name" type="XON"/>
<IN1_PLAN_EFF_DATE longName="Plan Effective Date" type="DT"/>
<IN1_PLAN_EXP_DATE longName="Plan Expiration Date" type="DT"/>
<IN1_AUTH_INFO longName="Authorization Information" type="CM_AI"/>
<IN1_PLAN_TYPE longName="Plan Type" type="IS"/>
<IN1_NAME_INSURED longName="Name of Insured" type="XPN"/>
<IN1_INSURED_RELATION longName="Insured relationship to Patient" type="CE"/>
<IN1_INSURED_DOB longName="Insured Date Of Birth" type="TS"/>
<IN1_INSURED_ADD longName="Insured Address" type="XAD"/>
<IN1_ASSIGN_BENEFIT longName="Assignment of Benefits" type="IS"/>
<IN1_COORD_BENEFIT longName="Coordination of Benefits" type="IS"/>
<IN1_COORD_BENEFIT_PRIOR longName="Coord of Benefits priority" type="ST"/>
<IN1_NOTICE_ADMIS_FLG longName="Notice of Admission Flag" type="ID"/>
<IN1_NOTICE_ADMIS_DATE longName="Notice of Admission Date" type="DT"/>
<IN1_REP_ELIG_FLG longName="Report of Eligibility Flag" type="ID"/>
<IN1_REP_ELIG_DATE longName="Report of Eligibility Date" type="DT"/>
<IN1_RELEASE_INFO_CODE longName="Release Information Code" type="IS"/>
<IN1_PREADMIT_CERT longName="PreAdmit Certificate" type="ST"/>
<IN1_VERIFICATION_DATE longName="Verification Date Time" type="TS"/>
<IN1_VERIFICATION_BY longName="Verificaiton By" type="XCN"/>
<IN1_TYPE_AGREE_CODE longName="Type of Agreement code" type="IS"/>
<IN1_BILLING_STATUS longName="Billing Status" type="IS"/>
<IN1_LIFETIME_RESERVE_DAYS longName="Lifetime Reserve Days" type="NM"/>
<IN1_DELAY_BEFORE_LR_DAY longName="Delay Before LR Days" type="NM"/>
<IN1_COMPANY_PLAN_CODE longName="Company Plan Code" type="IS"/>
<IN1_POLICY_NUMBER longName="Policy Number" type="ST"/>
<IN1_POLICY_DEDUCT longName="Policy Deductible" type="CP"/>
<IN1_POLICY_LIMIT_AMT longName="Policy Limit Amount" type="CP"/>
<IN1_POLICY_LIMIT_DAYS longName="Policy Limit Days" type="NM"/>
<IN1_ROOM_RATE_SEMI_PRIV longName="Room Rate Semi private" type="CP"/>
<IN1_ROOM_RATE_PRIV longName="Room Rate private" type="CP"/>
<IN1_INSURED_EMPLOY_STAT longName="Insured Employment Status" type="CE"/>
<IN1_INSURED_ADMIN_SEX longName="Insured Administrative Sex" type="IS"/>
<IN1_INSURED_EMPLOYER_ADD longName="Insured Employers Address" type="XAD"/>
<IN1_VERIFICATION_STAT longName="Verification Status" type="ST"/>
<IN1_PRIOR_INS_PLAN longName="Prior Insurance Plan ID" type="IS"/>
<IN1_COVER_TYPE longName="Coverage Type" type="IS"/>
<IN1_HANDICAP longName="Handicap" type="IS"/>
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   <IN1_INSURED_ID longName="Insured ID Number" type="CX"/>
   <IN2_EMPLOYEE_ID longName="Insureds Employee ID" type="CX"/>
   <IN2_SSN longName="Insureds Social Security Number" type="ST"/>
   <IN2_EMPLOYER_NAME longName="Insureds Employers Name and ID" type="XCN"/>
   <IN2_EMPLOYER_INFO longName="Employer Information Data" type="IS"/>
   <IN2_MAIL_CLAIM_PARTY longName="Mail Claim Party" type="IS"/>
   <IN2_MEDICARE_CARD_NO longName="Medicare Health Ins Card Number" type="ST"/>
   <IN2_MEDICAID_CASE_NAME longName="Medicaid Case Name" type="XPN"/>
   <IN2_MEDICAID_CASE_NUMBER longName="Medicaid Case Number" type="ST"/>
   <IN2_MILITARY_SPONSOR longName="Military Sponsor Name" type="XPN"/>
   <IN2_MILITARY_ID longName="Military ID Number" type="ST"/>
   <IN2_DEP_MILITARY_RECIPIENT longName="Dependent Of Military Recipient"
type="CE"/>
   <IN2_MILITARY_ORG longName="Military Organization" type="ST"/>
   <IN2_MILITARY_STATION longName="Military Station" type="ST"/>
   <IN2_MILITARY_SERVICE longName="Military Service" type="IS"/>
   <IN2_MILITARY_RANK longName="Military Rank" type="IS"/>
   <IN2_MILITARY_STATUS longName="Military Status" type="IS"/>
   <IN2_MILITARY_RETIRE_DATE longName="Military Retire Date" type="DT"/>
   <IN2_MILITARY_NON_AVAIL_COF longName="Military Non-Avail Cert On File"
type="ID"/>
   <IN2_BABY_COVERAGE longName="Baby Coverage" type="ID"/>
   <IN2_COMBINE_BABY_BILL longName="Combine Baby Bill" type="ID"/>
   <IN2_BLOOD_DEUCT longName="Blood Deductible" type="ST"/>
   <IN2_SPEC_COVER_APP_NAME longName="Special Coverage Approval Name" type="XPN"/>
   <IN2_SPEC_COVER_APP_TITLE longName="Special Coverage Approval Title" type="ST"/>
   <IN2_NON_COVER_INS_CODE longName="Non-Covered Insurance Code" type="IS"/>
   <IN2_PAYOR_ID longName="Payor ID" type="CX"/>
   <IN2_PAYOR_SUBSCRIBE_ID longName="Payor Subscriber ID" type="CX"/>
   <IN2_ELIG_SOURCE longName="Eligibility Source" type="IS"/>
   <IN2_ROOM_COVER_TYPE longName="Room Coverage Type Amount" type="CM_RMC"/>
   <IN2_POLICY_TYPE longName="Policy Type Amount" type="CM_PTA"/>
   <IN2_DAILY_DEDUCT longName="Daily Deductible" type="CM_DDI"/>
   <IN2_LIVING_DEPEND longName="Living Dependency" type="IS"/>
   <IN2_AMBULATORY_STATUS longName="Ambulatory Status" type="IS"/>
   <IN2_CITIZEN longName="Citizenship" type="CE"/>
   <IN2_PRIMARY_LANG longName="Primary Language" type="CE"/>
   <IN2_LIVING_ARRANG longName="Living Arrangement" type="IS"/>
   <IN2_PUB_CODE longName="Publicity Code" type="CE"/>
   <IN2_PROTECT_IND longName="Protection Indicator" type="ID"/>
   <IN2_STUDENT_IND longName="Student Indicator" type="IS"/>
   <IN2_RELIGION longName="Religion" type="CE"/>
   <IN2_MOTHER_MAIDEN_NAME longName="Mothers Maiden Name" type="XPN"/>
   <IN2_NATIONALITY longName="Nationality" type="CE"/>
   <IN2_ETHNIC_GROUP longName="Ethnic Group" type="CE"/>
   <IN2_MARITAL_STATUS longName="Marital Status" type="CE"/>
   <IN2_EMPLOY_START_DATE longName="Insureds Employment Start Date" type="DT"/>
   <IN2_EMPLOY_STOP_DATE longName="Employment Stop Date" type="DT"/>
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   <IN2_JOB_TITLE longName="Job Title" type="ST"/>
   <IN2_JOB_CODE longName="Job Code Class" type="JCC"/>
   <IN2_JOB_STATUS longName="Job Status" type="IS"/>
   <IN2_EMPLOYER_CONTACT_NAME longName="Employer Contact Person Name" type="XPN"/>
   <IN2_EMPLOYER_CONTACT_TEL longName="Employer Contact Person Phone Number"
type="XTN"/>
   <IN2_EMPLOYER_CONTACT_REASON longName="Employer Contact Reason" type="IS"/>
   <IN2_INSURED_CONTACT_NAME longName="Insureds Contact Persons Name" type="XPN"/>
   <IN2_INSURED_CONTACT_TEL longName="Insureds Contact Person Phone Number"
type="XTN"/>
   <IN2_INSURED_CONTACT_REASON longName="Insureds Contact Person Reason" type="IS"/>
   <IN2_RELATION_START_DATE longName="Relationship To The Patient Start Date"
type="DT"/>
   <IN2_RELATION_STOP_DATE longName="Relationship To The Patient Stop Date"
type="DT"/>
   <IN2_INS_CONTACT_REASON longName="Insurance Co. Contact Reason" type="IS"/>
   <IN2_INS_CONTACT_TEL longName="Insurance Co Contact Phone Number" type="XTN"/>
   <IN2_POLICY_SCOPE longName="Policy Scope" type="IS"/>
   <IN2_POLICY_SOURCE longName="Policy Source" type="IS"/>
   <IN2_PATIENT_MEMBER_NO longName="Patient Member Number" type="CX"/>
   <IN2_GUARANTOR_RELATION longName="Guarantors Relationship To Insured" type="CE"/>
   <IN2_INSURED_TEL longName="Insureds Phone Number - Home" type="XTN"/>
   <IN2_INSURED_EMPLOYER_TEL longName="Insureds Employer Phone Number" type="XTN"/>
   <IN2_MILITARY_HANDICAP_PROG longName="Military Handicapped Program" type="CE"/>
   <IN2_SUSPEND_FLG longName="Suspend Flag" type="ID"/>
   <IN2_COPAY_LIMIT_FLG longName="Copay Limit Flag" type="ID"/>
   <IN2_STOPLOSS_LIMIT_FLG longName="Stoploss Limit Flag" type="ID"/>
   <IN2_INSURED_ORG_NAME longName="Insured Organization Name And ID" type="XON"/>
   <IN2_INSURED_EMPLOYER_ORG longName="Insured Employer Organization Name And ID"
type="XON"/>
   <IN2_RACE longName="Race" type="CE"/>
   <IN2_HCFA_RELATION longName="HCFA Patients Relationship to Insured" type="CE"/>
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<IN3_ID longName="Set ID - IN3" type="SI"/>
<IN3_CERT_NO longName="Certification Number" type="CX"/>
<IN3_CERT_BY longName="Certified By" type="XCN"/>
<IN3_CERT_REQ longName="Certification Required" type="ID"/>
<IN3_PENALTY longName="Penalty" type="CM_PEN"/>
<IN3_CERT_DATE longName="Certification Date/Time" type="TS"/>
<IN3_CERT_MOD_DATE longName="Certification Modify Date/Time" type="TS"/>
<IN3_OPERATOR longName="Operator" type="XCN"/>
<IN3_CERT_BEGIN_DATE longName="Certification Begin Date" type="DT"/>
<IN3_CERT_END_DATE longName="Certification End Date" type="DT"/>
<IN3_DAYS longName="Days" type="CM_DTN"/>
<IN3_NONCONCUR_CODE longName="Non-Concur Code/Description" type="CE"/>
<IN3_NONCONCUR_EFF_DATE longName="Non-Concur Effective Date/Time" type="TS"/>
<IN3_PHYS_REV longName="Physician Reviewer" type="XCN"/>
<IN3_CERT_CONTACT longName="Certification Contact" type="ST"/>
<IN3_CERT_CONTACT_TEL longName="Certification Contact Phone Number" type="XTN"/>
<IN3_APPEAL_REASON longName="Appeal Reason" type="CE"/>
<IN3_CERT_AGENCY longName="Certification Agency" type="CE"/>
<IN3_CERT_AGENCY_TEL longName="Certification Agency Phone Number" type="XTN"/>
<IN3_PRECERT_REQ_WIN longName="Pre-Certification Req/Window" type="CM_PCF"/>
<IN3_CASE_MANAGER longName="Case Manager" type="ST"/>
<IN3_SEC_OPN_DATE longName="Second Opinion Date" type="DT"/>
<IN3_SEC_OPN_STATUS longName="Second Opinion Status" type="IS"/>
<IN3_SEC_OPN_DOC_RX longName="Second Opinion Documentation Received" type="IS"/>
<IN3_SEC_OPN_PHYS longName="Second Opinion Physician" type="XCN"/>

<PR1_ID longName="Set ID - PR1" type="SI"/>
<PR1_PROC_CODE_METHOD longName="Procedure Coding Method" type="IS"/>
<PR1_PROC_CODE longName="Procedure Code" type="CE"/>
<PR1_PROC_DESC longName="Procedure Description" type="ST"/>
<PR1_PROC_DATE longName="Procedure Date/Time" type="TS"/>
<PR1_PROC_FUNC_TYPE longName="Procedure Functional Type" type="IS"/>
<PR1_PROC_MINS longName="Procedure Minutes" type="NM"/>
<PR1_ANESTHESIOLOGIST longName="Anesthesiologist" type="XCN"/>
<PR1_ANESTH_CODE longName="Anesthesia Code" type="IS"/>
<PR1_ANESTH_MINS longName="Anesthesia Minutes" type="NM"/>
<PR1_SURGEON longName="Surgeon" type="XCN"/>
<PR1_PROC_PRAC longName="Procedure Practitioner" type="XCN"/>
<PR1_CONSENT_CODE longName="Consent Code" type="CE"/>
<PR1_PROC_PRIORITY longName="Procedure Priority" type="ID"/>
<PR1_ASS_DIAG_CODE longName="Associated Diagnosis Code" type="CE"/>
<PR1_PROC_CODE_MOD longName="Procedure Code Modifier" type="CE"/>
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<ROL_ID longName="Role Instance ID" type="EI"/>
<ROL_ACT_CODE longName="Action Code" type="ID"/>
<ROL_ROLE longName="Role-ROL" type="CE"/>
<ROL_PERSON longName="Role Person" type="XCN"/>
<ROL_BEGIN_DATE longName="Role Begin Date/Time" type="TS"/>
<ROL_END_DATE longName="Role End Date/Time" type="TS"/>
<ROL_DURATION longName="Role Duration" type="CE"/>
<ROL_ACT_REASON longName="Role Action Reason" type="CE"/>

<UB1_ID longName="Set ID - UB1" type="SI"/>
<UB1_BLOOD_DEDUCT longName="Blood Deductible  (43)" type="NM"/>
<UB1_BLOOD_FURNISHED longName="Blood Furnished-Pints Of (40)" type="NM"/>
<UB1_BLOOD_REPLACED longName="Blood Replaced-Pints (41)" type="NM"/>
<UB1_BLOOD_NOT_REPLACED longName="Blood Not Replaced-Pints(42)" type="NM"/>
<UB1_CO_INS_DAYS longName="Co-Insurance Days (25)" type="NM"/>
<UB1_COND_CODE longName="Condition Code (35-39)" type="IS"/>
<UB1_COVER_DAYS longName="Covered Days - (23)" type="NM"/>
<UB1_NON_COVER_DAYS longName="Non Covered Days - (24)" type="NM"/>
<UB1_VALUE_AMT_CODE longName="Value Amount and Code (46-49)" type="CM_UVC"/>
<UB1_GRACE_DAYS longName="Number Of Grace Days (90)" type="NM"/>
<UB1_SPEC_PROG_IND longName="Special Program Indicator (44)" type="CE"/>
<UB1_PSRO_UR_APP_IND longName="PSRO/UR Approval Indicator (87)" type="CE"/>
<UB1_PSRO_UR_APP_FROM longName="PSRO/UR Approved Stay-Fm (88)" type="DT"/>
<UB1_PSRO_UR_APP_TO longName="PSRO/UR Approved Stay-To (89)" type="DT"/>
<UB1_OCCURRENCE longName="Occurrence (28-32)" type="CM_OCD"/>
<UB1_OCCURRENCE_SPAN longName="Occurrence Span (33)" type="CE"/>
<UB1_OCCUR_SPAN_START_DATE longName="Occur Span Start Date(33)" type="DT"/>
<UB1_OCCUR_SPAN_END_DATE longName="Occur Span End Date (33)" type="DT"/>
<UB1_UB82_LOC2 longName="UB-82 Locator 2" type="ST"/>
<UB1_UB82_LOC9 longName="UB-82 Locator 9" type="ST"/>
<UB1_UB82_LOC27 longName="UB-82 Locator 27" type="ST"/>
<UB1_UB82_LOC45 longName="UB-82 Locator 45" type="ST"/>
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<UB2_ID longName="Set ID - UB2" type="SI"/>
<UB2_CO_INS_DAYS longName="Co-Insurance Days (9)" type="ST"/>
<UB2_COND_CODE longName="Condition Code (24-30)" type="IS"/>
<UB2_COVER_DAYS longName="Covered Days (7)" type="ST"/>
<UB2_NON_COVER_DAYS longName="Non-Covered Days (8)" type="ST"/>
<UB2_VALUE_AMT_CODE longName="Value Amount and Code" type="CM_UVC"/>
<UB2_OCCURRENCE_CODE longName="Occurrence Code and Date (32-35)" type="CM_OCD"/>
<UB2_OCCURRENCE_SPAN longName="Occurrence Span Code/Dates (36)" type="CM_OSP"/>
<UB2_UB92_LOC2 longName="UB92 Locator 2 (State)" type="ST"/>
<UB2_UB92_LOC11 longName="UB92 Locator 11 (State)" type="ST"/>
<UB2_UB92_LOC31 longName="UB92 Locator 31 (National)" type="ST"/>
<UB2_DOC_CTRL_NO longName="Document Control Number" type="ST"/>
<UB2_UB92_LOC49 longName="UB92 Locator 49 (National)" type="ST"/>
<UB2_UB92_LOC56 longName="UB92 Locator 56 (State)" type="ST"/>
<UB2_UB92_LOC57 longName="UB92 Locator 57 (National)" type="ST"/>
<UB2_UB92_LOC78 longName="UB92 Locator 78 (State)" type="ST"/>
<UB2_SPEC_VISIT_CNT longName="Special Visit Count" type="NM"/>

<CTI_SPNSR_STDY_ID longName="Sponsor Study ID" type="EI"/>
<CTI_STDY_PHSE_ID longName="Study Phase Identifier" type="CE"/>
<CTI_STDY_SCHDLD_TIME_PNT longName="Study Scheduled Time Point" type="CE"/>

<DSC_CNT_PNTR longName="Continuation Pointer" type="ST"/>

<MSH_FIELD_SEP longName="Field Separator" type="ST"/>
<MSH_ENCDNG_CHRS longName="Encoding Characters" type="ST"/>
<MSH_SND_APP longName="Sending Application" type="HD"/>
<MSH_SND_FAC longName="Sending Facility" type="HD"/>
<MSH_RCV_APP longName="Receiving Application" type="HD"/>
<MSH_RCV_FAC longName="Receiving Facility" type="HD"/>
<MSH_MSG_DATETIME longName="Date/Time Of Message" type="TS"/>
<MSH_SECURITY longName="Security" type="ST"/>
<MSH_MSG_TYPE longName="Message Type" type="CM"/>
<MSH_MSG_CNTRL_ID longName="Message Control ID" type="ST"/>
<MSH_PRCSNG_ID longName="Processing ID" type="PT"/>
<MSH_VRSN_ID longName="Version ID" type="ID"/>
<MSH_SQNC_NM longName="Sequence Number" type="NM"/>
<MSH_CNTN_PNTR longName="Continuation Pointer" type="ST"/>
<MSH_ACCPT_ACK_TYP longName="Accept Acknowledgment Type" type="ID"/>
<MSH_APP_ACK_TYP longName="Application Acknowledgment Type" type="ID"/>
<MSH_CNTRY_CDE longName="Country Code" type="ID"/>
<MSH_CHAR_SET longName="Character Set" type="ID"/>
<MSH_MSG_LANG longName="Principal Language Of Message" type="CE"/>
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   <NK1_SET_ID longName="Set ID - NK1" type="SI"/>
   <NK1_NME longName="Name" type="XPN"/>
   <NK1_RLTNSHP longName="Relationship" type="CE"/>
   <NK1_ADDRSS longName="Address" type="XAD"/>
   <NK1_PHNE_NM longName="Phone Number" type="XTN"/>
   <NK1_BUS_PHNE_NM longName="Business Phone Number" type="XTN"/>
   <NK1_CNTCT_RLE longName="Contact Role" type="CE"/>
   <NK1_STRT_DTE longName="Start Date" type="DT"/>
   <NK1_END_DTE longName="End Date" type="DT"/>
   <NK1_KIN_JOB_TITLE longName="Next of Kin / Associated Parties Job Title"
type="ST"/>
   <NK1_KIN_JOB_CDE longName="Next of Kin / Associated Parties Job Code/Class"
type="JCC"/>
   <NK1_KIN_EMP_NM longName="Next of Kin / Associated Parties Employee Number"
type="CX"/>
   <NK1_ORG_NME longName="Organization Name - NK1" type="XON"/>
   <NK1_MRTL_STS longName="Marital Status" type="CE"/>
   <NK1_SEX longName="Sex" type="IS"/>
   <NK1_DOB longName="Date/Time Of Birth" type="TS"/>
   <NK1_LVNG_DPNDCY longName="Living Dependency" type="IS"/>
   <NK1_AMBLTRY_STS longName="Ambulatory Status" type="IS"/>
   <NK1_CTZNSHP longName="Citizenship" type="CE"/>
   <NK1_PRM_LANG longName="Primary Language" type="CE"/>
   <NK1_LVNG_ARNGMNT longName="Living Arrangement" type="IS"/>
   <NK1_PBLCTY_CDE longName="Publicity Code" type="CE"/>
   <NK1_PRTCTN_IND longName="Protection Indicator" type="ID"/>
   <NK1_STDNT_IND longName="Student Indicator" type="IS"/>
   <NK1_RLGN longName="Religion" type="CE"/>
   <NK1_MOTH_MDN_NME longName="Mother?s Maiden Name" type="XPN"/>
   <NK1_NTNLTY longName="Nationality" type="CE"/>
   <NK1_ETHNC_GRP longName="Ethnic Group" type="CE"/>
   <NK1_CNTCT_RSN longName="Contact Reason" type="CE"/>
   <NK1_CNTCT_PRSN_NME longName="Contact Person?s Name" type="XPN"/>
   <NK1_CNTCT_PRSN_NUM longName="Contact Person?s Telephone Number" type="XTN"/>
   <NK1_CNTCT_PRSN_ADD longName="Contact Person?s Address" type="XAD"/>
   <NK1_KIN_ID longName="Next of Kin/Associated Party?s Identifiers" type="CX"/>
   <NK1_JOB_STS longName="Job Status" type="IS"/>
   <NK1_RACE longName="Race" type="CE"/>
   <NK1_HANDICAP longName="Handicap" type="IS"/>
   <NK1_CNTCT_PRSN_SSN longName="Contact Person Social Security Number" type="ST"/>

   <NTE_SET_ID longName="Set ID - NTE" type="SI"/>
   <NTE_SRC longName="Source of Comment" type="ID"/>
   <NTE_CMNT longName="Comment" type="FT"/>
   <NTE_CMNT_TYP longName="Comment Type" type="CE"/>
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   <OBR_SET_ID longName="Set ID - OBR" type="SI"/>
   <OBR_PLCR_ORDR_NUM longName="Placer Order Number" type="EI"/>
   <OBR_FLLR_ORDR_NUM longName="Filler Order Number" type="EI"/>
   <OBR_UNVRSL_SRVCE_ID longName="Universal Service ID" type="CE"/>
   <OBR_PRIORITY longName="Priority-OBR" type="ID"/>
   <OBR_RQSTD_DATETIME longName="Requested Date/time" type="TS"/>
   <OBR_OBSRVTN_DATETIME longName="Observation Date/Time #" type="TS"/>
   <OBR_OBSRVTN_END_DATETIME longName="Observation End Date/Time #" type="TS"/>
   <OBR_CLLCTN_VLME longName="Collection Volume *" type="CQ"/>
   <OBR_CLLCTN_ID longName="Collector Identifier *" type="XCN"/>
   <OBR_SPCMN_ACTN_CODE longName="Specimen Action Code *" type="ID"/>
   <OBR_DNGR_CODE longName="Danger Code" type="CE"/>
   <OBR_RLVNT_CLNCL_INF longName="Relevant Clinical Info." type="ST"/>
   <OBR_SPCMEN_RCVD_DATETIME longName="Specimen Received Date/Time *" type="TS"/>
   <OBR_SPCMEN_SRC longName="Specimen Source *" type="CM_SPS"/>
   <OBR_ORDRNG_PRVDR longName="Ordering Provider" type="XCN"/>
   <OBR_ORDR_CLLBCK_PHNE_NUM longName="Order Callback Phone Number" type="XTN"/>
   <OBR_PLCR_FLD_1 longName="Placer Field 1" type="ST"/>
   <OBR_PLCR_FLD_2 longName="Placer Field 2" type="ST"/>
   <OBR_FLLR_FLD_1 longName="Filler Field 1 +" type="ST"/>
   <OBR_FLLR_FLD_2 longName="Filler Field 2 +" type="ST"/>
   <OBR_RPRT_DATETIME longName="Results Rpt/Status Chng - Date/Time +" type="TS"/>
   <OBR_CHRG_TO_PRCTCE longName="Charge to Practice +" type="CM"/>
   <OBR_DGNSTC_SRV_SCT_ID longName="Diagnostic Serv Sect ID" type="ID"/>
   <OBR_RSLT_STS longName="Result Status +" type="ID"/>
   <OBR_PRNT_RSLT longName="Parent Result +" type="CM_PRL"/>
   <OBR_QNTY_TMNG longName="Quantity/Timing" type="TQ"/>
   <OBR_RSLT_COPIES_TO longName="Result Copies To" type="XCN"/>
   <OBR_PRNT longName="Parent" type="CM"/>
   <OBR_TRNSPRTN_MDE longName="Transportation Mode" type="ID"/>
   <OBR_RSN_FOR_STDY longName="Reason for Study" type="CE"/>
   <OBR_PRNCPL_RSLT_INTRPRTR longName="Principal Result Interpreter +"
type="CM_NDL"/>
   <OBR_ASSTNT_RSLT_INTRPRTR longName="Assistant Result Interpreter +"
type="CM_NDL"/>
   <OBR_TCHNCN longName="Technician +" type="CM_NDL"/>
   <OBR_TRNSCRPTNST longName="Transcriptionist +" type="CM_NDL"/>
   <OBR_SCHDLD_DATETIME longName="Scheduled Date/Time +" type="TS"/>
   <OBR_NUM_SMPL_CNTNRS longName="Number of Sample Containers *" type="NM"/>
   <OBR_TRNSPRT_LGSTCS longName="Transport Logistics of Collected Sample *"
type="CE"/>
   <OBR_CLLCTRS_CMMNT longName="Collector?s Comment *" type="CE"/>
   <OBR_TRNSPRT_ARRNGMNT_RSPNSBLTY longName="Transport Arrangement Responsibility"
type="CE"/>
   <OBR_TRNSPRT_ARRNGD longName="Transport Arranged" type="ID"/>
   <OBR_ESCRT_RQRD longName="Escort Required" type="ID"/>
   <OBR_PLNND_PATNT_TRNSPRT_CMMNT longName="Planned Patient Transport Comment"
type="CE"/>
```

```
   <OBX_SET_ID longName="Set ID - OBX" type="SI"/>
   <OBX_VALUE_TYP longName="Value Type" type="ID"/>
   <OBX_OBSRVTN_ID longName="Observation Identifier" type="CE"/>
   <OBX_OBSRVTN_SUB_ID longName="Observation Sub-ID" type="ST"/>
   <OBX_OBSRVTN_VALUE longName="Observation Value" type="@OBX_VALUE_TYP"/>
   <OBX_UNITS longName="Units" type="CE"/>
   <OBX_RFRNCS_RNG longName="References Range" type="ST"/>
   <OBX_ABNRML_FLGS longName="Abnormal Flags" type="ID"/>
   <OBX_PRBLTY longName="Probability" type="NM"/>
   <OBX_NATURE_OF_ABNRML_TST longName="Nature of Abnormal Test" type="ID"/>
   <OBX_OBSRV_RSLT_STS longName="Observation Result Status" type="ID"/>
   <OBX_DATE_LST_OBS_NRML_VAL longName="Date Last Obs Normal Values" type="TS"/>
   <OBX_USR_DFND_ACCSS_CHKS longName="User Defined Access Checks" type="ST"/>
   <OBX_OBSV_DATETIME longName="Date/Time of the Observation" type="TS"/>
   <OBX_PRDCERS_ID longName="Producer's ID" type="CE"/>
   <OBX_RSPNSBLE_OBSRVR longName="Responsible Observer" type="XCN"/>
   <OBX_OBSRVTN_MTHD longName="Observation Method" type="CE"/>

   <ORC_ORDR_CNTRL longName="Order Control" type="ID"/>
   <ORC_PLCR_ORDR_NUM longName="Placer Order Number" type="EI"/>
   <ORC_FLLR_ORDR_NUM longName="Filler Order Number" type="EI"/>
   <ORC_PLCR_GRP_NUM longName="Placer Group Number" type="EI"/>
   <ORC_ORDR_STS longName="Order Status" type="ID"/>
   <ORC_RSPNS_FLG longName="Response Flag" type="ID"/>
   <ORC_QNTY_TMNG longName="Quantity/Timing" type="TQ"/>
   <ORC_PARENT longName="Parent" type="CM"/>
   <ORC_XN_DATETIME longName="Date/Time of Transaction" type="TS"/>
   <ORC_ENTRD_BY longName="Entered By" type="XCN"/>
   <ORC_VRFD_BY longName="Verified By" type="XCN"/>
   <ORC_ORDRNG_PRVDR longName="Ordering Provider" type="XCN"/>
   <ORC_ENTRS_LOC longName="Enterer?s Location" type="PL"/>
   <ORC_ENTRS_LOC longName="Call Back Phone Number" type="XTN"/>
   <ORC_CLL_BCK_PHNE_NUM longName="Order Effective Date/Time" type="TS"/>
   <ORC_ORDR_EFF_DATETIME longName="Order Control Code Reason" type="CE"/>
   <ORC_ORDR_CNTRL_CODE_RSN longName="Entering Organization" type="CE"/>
   <ORC_ENTRNG_ORG longName="Entering Device" type="CE"/>
   <ORC_ENTRNG_DVCE longName="Action By" type="XCN"/>
   <ORC_ADNVCD_BNFCRY_NTCE_CODE longName="Advanced Beneficiary Notice Code"
type="CE"/>
   <ORC_ORD_FAC_NAME longName="Ordering Facility Name" type="XON"/>
   <ORC_ORD_FAC_ADD longName="Ordering Facility Address" type="XAD"/>
   <ORC_ORD_FAC_PHONE longName="Ordering Facility Phone Number" type="XTN"/>
   <ORC_ORD_PROV_ADD longName="Ordering Provider Address" type="XAD"/>
```

```
   <PD1_LVNG_DPNDCY longName="Living Dependency" type="IS"/>
   <PD1_LVNG_ARRNGMNT longName="Living Arrangement" type="IS"/>
   <PD1_PATNT_PRM_FAC longName="Patient Primary Facility" type="XON"/>
   <PD1_PATNT_PRM_CARE_PRV longName="Patient Primary Care Provider Name "
type="XCN"/>
   <PD1_STDNT_IND longName="Student Indicator" type="IS"/>
   <PD1_HANDICAP longName="Handicap" type="IS"/>
   <PD1_LVNG_WILL longName="Living Will" type="IS"/>
   <PD1_ORGN_DNR longName="Organ Donor" type="IS"/>
   <PD1_SEPARATE_BILL longName="Separate Bill" type="ID"/>
   <PD1_DUP_PATNT longName="Duplicate Patient" type="CX"/>
   <PD1_PBLCTY_CDE longName="Publicity Code" type="CE"/>
   <PD1_PRTCTN_IND longName="Protection Indicator" type="ID"/>

   <PID_SET_ID longName="Set ID - PID" type="SI"/>
   <PID_PATNT_ID longName="Patient ID" type="CX"/>
   <PID_PATNT_ID_LST longName="Patient Identifier List" type="CX"/>
   <PID_ALT_PATNT_ID longName="Alternate Patient ID - PID" type="CX"/>
   <PID_PATNT_NAME longName="Patient Name" type="XPN"/>
   <PID_MTHR_MDN_NME longName="Mother?s Maiden Name" type="XPN"/>
   <PID_DOB longName="Date/Time Of Birth" type="TS"/>
   <PID_SEX longName="Sex" type="IS"/>
   <PID_ALIAS longName="Patient Alias" type="XPN"/>
   <PID_RACE longName="Race" type="CE"/>
   <PID_PATNT_ADDRSS longName="Patient Address" type="XAD"/>
   <PID_COUNTY_CDE longName="County Code" type="IS"/>
   <PID_PHNE_HME longName="Phone Number - Home" type="XTN"/>
   <PID_PHNE_BUS longName="Phone Number - Business" type="XTN"/>
   <PID_PRMRY_LANG longName="Primary Language" type="CE"/>
   <PID_MRTL_STS longName="Marital Status" type="CE"/>
   <PID_RLGN longName="Religion" type="CE"/>
   <PID_PATNT_ACC_NM longName="Patient Account Number" type="CX"/>
   <PID_SSN_NM longName="SSN Number - Patient" type="ST"/>
   <PID_DRVR_LCNS_NM longName="Driver's License Number - Patient" type="DLN"/>
   <PID_MTHR_ID longName="Mother's Identifier" type="CX"/>
   <PID_ETHNIC_GRP longName="Ethnic Group" type="CE"/>
   <PID_BRTH_PLC longName="Birth Place" type="ST"/>
   <PID_MLTPL_BRTH_IND longName="Multiple Birth Indicator" type="ID"/>
   <PID_BRTH_ORDR longName="Birth Order" type="NM"/>
   <PID_CTZNSHP longName="Citizenship" type="CE"/>
   <PID_VTRNS_MIL_STS longName="Veterans Military Status" type="CE"/>
   <PID_NTNLTY longName="Nationality" type="CE"/>
   <PID_PATNT_DTH_DATETIME longName="Patient Death Date and Time" type="TS"/>
   <PID_PATNT_DTH_IND longName="Patient Death Indicator" type="ID"/>
```

```
<PV1_SET_ID longName="Set ID - PV1" type="SI"/>
<PV1_PATNT_CLSS longName="Patient Class" type="IS"/>
<PV1_ASGND_PATNT_LCTN longName="Assigned Patient Location" type="PL"/>
<PV1_ADMSN_TYP longName="Admission Type" type="IS"/>
<PV1_PREADMT_NUM longName="Preadmit Number" type="CX"/>
<PV1_PRIOR_PATNT_LOC longName="Prior Patient Location" type="PL"/>
<PV1_ATNDNG_DCTR longName="Attending Doctor" type="XCN"/>
<PV1_RFRNG_DCTR longName="Referring Doctor" type="XCN"/>
<PV1_CNSLTNG_DCTR longName="Consulting Doctor" type="XCN"/>
<PV1_HSPTL_SRVCE longName="Hospital Service" type="IS"/>
<PV1_TMP_LOC longName="Temporary Location" type="PL"/>
<PV1_PREADMIT_TST_IND longName="Preadmit Test Indicator" type="IS"/>
<PV1_READMSSN_IND longName="Re-admission Indicator" type="IS"/>
<PV1_ADMNT_SRC longName="Admit Source" type="IS"/>
<PV1_AMBLTRY_STS longName="Ambulatory Status" type="IS"/>
<PV1_VIP_IND longName="VIP Indicator" type="IS"/>
<PV1_ADMTTNG_DCTR longName="Admitting Doctor" type="XCN"/>
<PV1_PATNT_TYP longName="Patient Type" type="IS"/>
<PV1_VST_NUM longName="Visit Number" type="CX"/>
<PV1_FNCL_CLSS longName="Financial Class" type="FC"/>
<PV1_CHRG_PRC_IND longName="Charge Price Indicator" type="IS"/>
<PV1_CRTSY_CODE longName="Courtesy Code" type="IS"/>
<PV1_CRDT_RTNG longName="Credit Rating" type="IS"/>
<PV1_CNTRCT_CODE longName="Contract Code" type="IS"/>
<PV1_CNTRCT_EFFCTV_DTE longName="Contract Effective Date" type="DT"/>
<PV1_CNTRCT_AMMNT longName="Contract Amount" type="NM"/>
<PV1_CNTRCT_PRD longName="Contract Period" type="NM"/>
<PV1_INTRST_CODE longName="Interest Code" type="IS"/>
<PV1_TRNSFR_BAD_DEBT_CODE longName="Transfer to Bad Debt Code" type="IS"/>
<PV1_TRNSFR_BAD_DEBT_DTE longName="Transfer to Bad Debt Date" type="DT"/>
<PV1_BAD_DEBT_AGNCY_CODE longName="Bad Debt Agency Code" type="IS"/>
<PV1_BAD_DEBT_TRNSFR_AMNT longName="Bad Debt Transfer Amount" type="NM"/>
<PV1_BAD_DEBT_RCVRY_AMNT longName="Bad Debt Recovery Amount" type="NM"/>
<PV1_DLT_ACCNT_IND longName="Delete Account Indicator" type="IS"/>
<PV1_DLT_ACCNT_DTE longName="Delete Account Date" type="DT"/>
<PV1_DSCHRG_DSPSTN longName="Discharge Disposition" type="IS"/>
<PV1_DSCHRG_LOC longName="Discharged to Location" type="CM"/>
<PV1_DIET_TYP longName="Diet Type" type="CE"/>
<PV1_SRVCNG_FAC longName="Servicing Facility" type="IS"/>
<PV1_BED_STS longName="Bed Status" type="IS"/>
<PV1_ACCNT_STS longName="Account Status" type="IS"/>
<PV1_PNDNG_LOC longName="Pending Location" type="PL"/>
<PV1_PRIOR_TMP_LOC longName="Prior Temporary Location" type="PL"/>
<PV1_ADMT_DTE longName="Admit Date/Time" type="TS"/>
<PV1_DSCHRG_DTE longName="Discharge Date/Time" type="TS"/>
<PV1_CRRNT_PATNT_BLNC longName="Current Patient Balance" type="NM"/>
<PV1_TOT_CHRGS longName="Total Charges" type="NM"/>
<PV1_TOT_ADJSMNTS longName="Total Adjustments" type="NM"/>
```

```
   <PV1_TOT_PYMNTS longName="Total Payments" type="NM"/>
   <PV1_ALTRNT_VST_ID longName="Alternate Visit ID" type="CX"/>
   <PV1_VST_IND longName="Visit Indicator" type="IS"/>
   <PV1_OTHR_HLTHCR_PRVDR longName="Other Healthcare Provider" type="XCN"/>

   <PV2_PRIOR_PNDNG_LOC longName="Prior Pending Location" type="PL"/>
   <PV2_ACCMMDTN_CODE longName="Accommodation Code" type="CE"/>
   <PV2_ADMT_RSN longName="Admit Reason" type="CE"/>
   <PV2_TRNSFR_RSN longName="Transfer Reason" type="CE"/>
   <PV2_PATNT_VAL longName="Patient Valuables" type="ST"/>
   <PV2_PATNT_VAL_LOC longName="Patient Valuables Location" type="ST"/>
   <PV2_VST_USR_CODE longName="Visit User Code" type="IS"/>
   <PV2_EXPCTD_ADMT_DATETIME longName="Expected Admit Date/Time" type="TS"/>
   <PV2_EXPCTD_DSCHRG_DATETIME longName="Expected Discharge Date/Time" type="TS"/>
   <PV2_ESTMTD_LNGTH_INPATNT_STAY longName="Estimated Length of Inpatient Stay"
type="NM"/>
   <PV2_ACTL_LNGTH_INPATNT_STAY longName="Actual Length of Inpatient Stay"
type="NM"/>
   <PV2_VST_DSCRPTN longName="Visit Description" type="ST"/>
   <PV2_RFRRL_SRC_CODE longName="Referral Source Code" type="XCN"/>
   <PV2_PRVS_SRVC_DTE longName="Previous Service Date" type="DT"/>
   <PV2_EMPLYMNT_ILLNSS_RLTD_IND longName="Employment Illness Related Indicator"
type="ID"/>
   <PV2_PRG_STS_CODE longName="Purge Status Code" type="IS"/>
   <PV2_PRG_STS_DTE longName="Purge Status Date" type="DT"/>
   <PV2_SPCL_PRGM_CODE longName="Special Program Code" type="IS"/>
   <PV2_RTNTN_IND longName="Retention Indicator" type="ID"/>
   <PV2_EXPCTD_NUM_INSRNC_PLNS longName="Expected Number of Insurance Plans"
type="NM"/>
   <PV2_VST_PBLCTY_CODE longName="Visit Publicity Code" type="IS"/>
   <PV2_VST_PRTCTN_IND longName="Visit Protection Indicator" type="ID"/>
   <PV2_CLNC_ORG_NAME longName="Clinic Organization Name" type="XON"/>
   <PV2_PATNT_STS_CODE longName="Patient Status Code" type="IS"/>
   <PV2_VST_PRTY_CODE longName="Visit Priority Code" type="IS"/>
   <PV2_PRVS_TRTMNT_DTE longName="Previous Treatment Date" type="DT"/>
   <PV2_EXPCTD_DSCHRGE_DSPSTN longName="Expected Discharge Disposition" type="IS"/>
   <PV2_SGNTRE_ON_FILE_DTE longName="Signature on File Date" type="DT"/>
   <PV2_FRST_SMLR_ILLNSS_DTE longName="First Similar Illness Date" type="DT"/>
   <PV2_PATNT_CHRGE_ADJSTMNT_CODE longName="Patient Charge Adjustment Code"
type="CE"/>
   <PV2_RCRRNG_SRVCE_CODE longName="Recurring Service Code" type="IS"/>
   <PV2_BLLNG_MEDIA_CODE longName="Billing Media Code" type="ID"/>
   <PV2_EXPCTD_SRGRY_DATETIME longName="Expected Surgery Date " type="TS"/>
   <PV2_MLTRY_PRTNRSHP_CODE longName="Military Partnership Code" type="ID"/>
   <PV2_MLTRY_NON_AVLBLTY_CODE longName="Military Non-Availability Code" type="ID"/>
   <PV2_NWBRN_BABY_IND longName="Newborn Baby Indicator" type="ID"/>
   <PV2_BABY_DTND_IND longName="Baby Detained Indicator" type="ID"/>
```

```
   <ZLR_ORD_PROVIDER_ADD longName="Ordering Providers Address" type="XAD"/>
   <ZLR_ORD_FAC_NAME longName="Ordering Facility Name" type="XON"/>
   <ZLR_ORD_FAC_ADD longName="Ordering Facility Address" type="XAD"/>
   <ZLR_ORD_FAC_PHONE longName="Ordering Facility Phone" type="XTN"/>
   <ZLR_PATIENT_AGE longName="Patient Age" type="SN"/>
   <ZLR_NEXT_KIN_NAME longName="Next of Kin/Assoc. Name" type="XPN"/>
   <ZLR_NEXT_KIN_RELATION longName="Next of Kin/Assoc. Relationship" type="CE"/>
   <ZLR_NEXT_KIN_ADD longName="Next of Kin/Assoc. Address" type="XAD"/>
   <ZLR_NEXT_KIN_PHONE longName="Next of Kin/Assoc. Phone" type="XTN"/>

<!-- Batch control segments -->

   <FHS_FIELD_SEP longName="Field Sparator" type="ST"/>
   <FHS_ENCDNG_CHRS longName="Encoding Characters" type="ST"/>
   <FHS_SND_APP longName="Sending Application" type="ST"/>
   <FHS_SND_FAC longName="Sending Facility" type="ST"/>
   <FHS_RCV_APP longName="Receiving Application" type="ST"/>
   <FHS_RCV_FAC longName="Receiving Facility" type="ST"/>
   <FHS_DATETIME longName="Creation timestamp" type="TS"/>
   <FHS_SECURITY longName="Security" type="ST"/>
   <FHS_NAME longName="file name/id/type" type="ST"/>
   <FHS_COMMENT longName="Comments" type="ST"/>
   <FHS_CONTROL_ID longName="Control ID" type="ST"/>
   <FHS_REF_CONTROL_ID longName="Reference file control id" type="ST"/>

   <FTS_BATCH_COUNT longName="Batch Count" type="NM"/>
   <FTS_COMMENT longName="File trailer Comment" type="ST"/>

   <BHS_FIELD_SEP longName="Field Sparator" type="ST"/>
   <BHS_ENCDNG_CHRS longName="Encoding Characters" type="ST"/>
   <BHS_SND_APP longName="Sending Application" type="ST"/>
   <BHS_SND_FAC longName="Sending Facility" type="ST"/>
   <BHS_RCV_APP longName="Receiving Application" type="ST"/>
   <BHS_RCV_FAC longName="Receiving Facility" type="ST"/>
   <BHS_DATETIME longName="Creation timestamp" type="TS"/>
   <BHS_SECURITY longName="Security" type="ST"/>
   <BHS_NAME longName="Batch name/id/type" type="ST"/>
   <BHS_COMMENT longName="Comments" type="ST"/>
   <BHS_CONTROL_ID longName="Control ID" type="ST"/>
   <BHS_REF_CONTROL_ID longName="Reference batch control id" type="ST"/>

   <BTS_MSG_COUNT longName="Message Count" type="ST"/>
   <BTS_COMMENT longName="Batch Trailer Comment" type="ST"/>
   <BTS_TOTALS longName="Batch Totals" type="NM"/>

</schema>
```

Data Type Definitions

The following data types require format validation. The notation uses square brackets ([ ]) to define optionality.

.

Name	Description	Format
DT	Date	Must be in the format YYYY[[MM]DD].
NM	Numeric	Mustcontain a number. A sign (+/-) is optional. A decimal point is optional.
SI	Sequence ID	Must contain a non-negative integer.
ST	String	Should contain only printable ASCII characters. Should be less than 200 characters.
TM	Time	Should be in the format HH[MM[SS[.S[S[S[S]]]]]][+/-ZZZZ]
TN	Telephone Number	For use in countries conforming to the United States standard. Should be in the format [NN] [(999)] 999-9999 [X99999] [B99999] [C any text] X99999 – an optional extension number B99999 – an optional beeper number C - any comments.
TS	Time Stamp	Should be in the format YYYY[MM[DD[HHMM[SS[.S[S[S[S]]]]]]]] [+/-ZZZZ]

Lookup Validation

The following table shows the various fields of segments of Message ORU that require lookup validation.

Table	HL7/User	Table Number
0001	User	Sex
0002	User	Marital Status
0003	HL7	Event Type
0004	User	Patient Class
0005	User	Race
0006	User	Religion
0007	User	Admission Type
0009	User	Ambulatory Status
0010	User	Physician ID
0018	User	Patient Type
0021	User	Bad debt agency code
0023	User	Admit source
0032	User	Charge/price indicator
0038	HL7	Order status
0044	User	Contract code
0045	User	Courtesy code
0046	User	Credit rating
0063	User	Relationship
0064	User	Financial Class
0069	User	Hospital service
0070	HL7	Specimen source codes
0073	User	Interest rate code

Table	HL7/User	Table Number
0074	HL7	Diagnostic service section ID
0078	HL7	Abnormal flags
0080	HL7	Nature of abnormal testing
0085	HL7	Observation result status codes
0087	User	Preadmit test indicator
0092	User	Re-admission indicator
0099	User	VIP indicator
0104	HL7	Version ID
0105	HL7	Source of comment
0110	User	Transfer to bad debt code
0111	User	Delete account code
0112	User	Discharge disposition
0113	User	Discharged to location
0114	User	Diet type
0115	User	Serving facility
0116	User	Bed status
0117	User	Account status
0119	HL7	Order control codes
0121	HL7	Response flag
0123	HL7	Result status
0124	HL7	Transportation mode
0125	HL7	Value type
0129	User	Accommodation code
0130	User	Visit user code
0131	User	Contact role

Table	HL7/User	Table Number
0136	HL7	Yes/no indicator
0155	HL7	Accept/application acknowledgment conditions
0171	User	Citizenship
0172	User	Veterans Military status
0189	User	Ethnic group
0203	User	Identifier type
0211	HL7	Alternate character sets
0212	User	Nationality
0213	User	Purge status
0215	User	Publicity code
0216	User	Patient status code
0217	User	Visit priority code
0218	User	Patient charge adjustment code
0219	User	Recurring service code
0220	User	Living arrangement
0222	User	Contact reason
0223	User	Living dependency
0224	HL7	Transport arranged
0225	HL7	Escort required
0231	User	Student status
0295	User	Handicap
0296	User	Primary language
0311	User	Job status
0315	User	Living will
0316	User	Organ donor

Table	HL7/User	Table Number
0326	User	Visit indicator
0327	User	Job code/class
0328	User	Employee classification
0339	User	Advanced beneficiary notice code

Sample Conversion

An XML conversion from an HL7 ORU message.

XML Conversion from an HL7 ORU Message

```
<!-- MSH|^~\&|XRAY||CDB||||ORU^R01|K172|P<cr> -->
<!-- PID|1|0123456|1||ROBERTSON^JOHN^H|||||||9821111<cr> -->
<!-- OBR|1|X89?1501^OE|78912^RD|71020^CHEST XRAY AP & -->
<!--                LATERAL|R|198703291530|19873290800|||JBM|N<cr>               -->
<!-- OBX|1|CE|71020^RADIOLOGIST'S IMPRESSION|4||^MASS LEFT LOWER LOBE|1||A||F<cr>-->
<!-- OBX|2|CE|71020|2|^INFILTRATE RIGHT LOWER LOBE|||A||F<cr>                    -->
<!-- OBX|3|CE|71020|3|^HEART SIZE NORMAL|||N||F<cr>                              -->
<!-- OBX|4|FT|71020|1|circular density (2 x 2 cm) is seen in the posterior segment
-->
<!--      of the LLL.A second, less well?defined infiltrated circulation density -->
<!--       is seen in the R mid lung field and appears to cross the minor        -->
<!--      fissure#||||||F<cr>                          -->
<!-- OBX|5|CE|71020||71020^Follow up CXR 1 month||30?45||||F<cr>            -->

<!DOCTYPE ORU>
<ORU>
```

```
<MSH>
   <MSH.FIELD_SEP>|</MSH.FIELD_SEP>
   <MSH.ENCDNG_CHRS>^~\&amp;</MSH.ENCDNG_CHRS>
   <MSH.SND_APP>XRAY</MSH.SND_APP>
   <MSH.RCV_APP>CDB</MSH.RCV_APP>
   <MSH.MSG_TYPE>
      <CM_MSG.MSG_TYP>ORU</CM_MSG.MSG_TYP>
      <CM_MSG.TRGR_TYP>R01</CM_MSG.TRGR_TYP>
   </MSH.MSG_TYPE>
   <MSH.MSG_CNTRL_ID>K172</MSH.MSG_CNTRL_ID>
   <MSH.PRCSNG_ID>P</MSH.PRCSNG_ID>
</MSH>

<PID>
   <PID.SET_ID>1</PID.SET_ID>
   <PID.PATNT_ID>0123456?1</PID.PATNT_ID>
   <PID.ALT_PATNT_ID_LIST>1</PID.ALT_PATNT_ID_LIST>
   <PID.PATNT_NAME>
      <PN.FMLY_NME>ROBERTSON</PN.FMLY_NME>
      <PN.GVN_NME>JOHN</PN.GVN_NME>
      <PN.MDDL_NME>H</PN.MDDL_NME>
   </PID.PATNT_NAME>
   <PID.COUNTY_CDE>9821111</PID.COUNTY_CDE>
</PID>

<OBR>
   <OBR.SET_ID>1</OBR.SET_ID>
   <OBR.PLCR_ORDR_NUM>
      <EI.ENTY_ID>X89?1501</EI.ENTY_ID>
      <EI.NMSPC_ID>OE</EI.NMSPC_ID>
   </OBR.PLCR_ORDR_NUM>
   <OBR.FLLR_ORDR_NUM>
      <EI.ENTY_ID>78912</EI.ENTY_ID>
      <EI.NMSPC_ID>RD</EI.NMSPC_ID>
   </OBR.FLLR_ORDR_NUM>
   <OBR.UNVRSL_SRVCE_ID>
      <CE.ID>71020</CE.ID>
      <CE.TXT>CHEST XRAY AP &amp; LATERAL</CE.TXT>
   </OBR.UNVRSL_SRVCE_ID>
   <OBR.PRIORITY>R</OBR.PRIORITY>
   <OBR.RQSTD_DATETIME>198703291530</OBR.RQSTD_DATETIME>
   <OBR.OBSRVTN_DATETIME>19873290800</OBR.OBSRVTN_DATETIME>
   <OBR.CLLCTN_ID>JBM</OBR.CLLCTN_ID>
   <OBR.SPCMN_ACTN_CODE>N</OBR.SPCMN_ACTN_CODE>
</OBR>
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<OBX>
   <OBX.SET_ID>1</OBX.SET_ID>
   <OBX.VALUE_TYP>CE</OBX.VALUE_TYP>
   <OBX.OBSRVTN_ID>
      <CE.ID>71020</CE.ID>
      <CE.TXT>RADIOLOGIST'S IMPRESSION</CE.TXT>
   </OBX.OBSRVTN_ID>
   <OBX.OBSRVTN_SUB_ID>4</OBX.OBSRVTN_SUB_ID>
   <OBX.UNITS>
      <CE.TXT>MASS LEFT LOWER LOBE</CE.TXT>
   </OBX.UNITS>
   <OBX.RFRNCS_RNG>1</OBX.RFRNCS_RNG>
   <OBX.PRBLTY>A</OBX.PRBLTY>
   <OBX.OBSRV_RSLT_STS>F</OBX.OBSRV_RSLT_STS>
</OBX>

<OBX>
   <OBX.SET_ID>2</OBX.SET_ID>
   <OBX.VALUE_TYP>CE</OBX.VALUE_TYP>
   <OBX.OBSRVTN_ID>
      <CE.ID>71020</CE.ID>
   </OBX.OBSRVTN_ID>
   <OBX.OBSRVTN_SUB_ID>2</OBX.OBSRVTN_SUB_ID>
   <OBX.OBSRVTN_VALUE>
      <CE.TXT>INFILTRATE RIGHT LOWER LOBE</CE.TXT>
   </OBX.OBSRVTN_VALUE>
   <OBX.ABNRML_FLGS>A</OBX.ABNRML_FLGS>
   <OBX.NATURE_OF_ABNRML_TST>F</OBX.NATURE_OF_ABNRML_TST>
</OBX>

<OBX>
   <OBX.SET_ID>3</OBX.SET_ID>
   <OBX.VALUE_TYP>CE</OBX.VALUE_TYP>
   <OBX.OBSRVTN_ID>
      <CE.ID>71020</CE.ID>
   </OBX.OBSRVTN_ID>
   <OBX.OBSRVTN_SUB_ID>3</OBX.OBSRVTN_SUB_ID>
   <OBX.OBSRVTN_VALUE>
      <CE.TXT>HEART SIZE NORMAL</CE.TXT>
   </OBX.OBSRVTN_VALUE>
   <OBX.ABNRML_FLGS>N</OBX.ABNRML_FLGS>
   <OBX.NATURE_OF_ABNRML_TST>F</OBX.NATURE_OF_ABNRML_TST>
</OBX>
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```
   <OBX>
      <OBX.SET_ID>4</OBX.SET_ID>
      <OBX.VALUE_TYP>FT</OBX.VALUE_TYP>
      <OBX.OBSRVTN_ID>
         <CE.ID>71020</CE.ID>
      </OBX.OBSRVTN_ID>
      <OBX.OBSRVTN_SUB_ID>1</OBX.OBSRVTN_SUB_ID>
      <OBX.OBSRVTN_VALUE>
         <CE.TXT>circular density (2 x 2 cm) is seen in the posterior segment of the
LLL.  A second, less well defined infiltrated circulation density is seen in the R
mid lung field and appears to cross the minor fissure#</CE.TXT>
      </OBX.OBSRVTN_VALUE>

   <OBX.NATURE_OF_ABNRML_TST>F</OBX.NATURE_OF_ABNRML_TST>
   </OBX>

   <OBX>
      <OBX.SET_ID>5</OBX.SET_ID>
      <OBX.VALUE_TYP>CE</OBX.VALUE_TYP>
      <OBX.OBSRVTN_ID>
         <CE.ID>71020</CE.ID>
      </OBX.OBSRVTN_ID>
      <OBX.OBSRVTN_VALUE>
         <CE.ID>71020</CE.ID>
         <CE.TXT>Follow up CXR 1 month</CE.TXT>
      </OBX.OBSRVTN_VALUE>
      <OBX.RFRNCS_RNG>30?45</OBX.RFRNCS_RNG>
      <OBX.OBSRV_RSLT_STS>F</OBX.OBSRV_RSLT_STS>
   </OBX>

</ORU>
```

Validation Rules File

The following is a partial rules file that will be used to define the rules of HL7 validation. There are two table lookup methods; one for tables that are defined as part of HL7 and another for user tables that vary from implementation to implementation.

Rules File

```
<ORU>
    <using class="XDHL7Rules">
      <rule tag="MSH.FIELD_SEP" method="isString" code="">
      <rule tag="MSH.ENCDNG_CHRS" method="isString" code="">
      <rule tag="MSH.SND_APP" method="isString" code="">
      <rule tag="MSH.SND_FAC" method="isString" code="">
      <rule tag="MSH.RCV_APP" method="isString" code="">
      <rule tag="MSH.RCV_FAC" method="isString" code="">
      <rule tag="MSH.MSG_DATETIME" method="isDateTime" code="">
      <rule tag="MSH.SECURITY" method="isString" code="">
      <rule tag="MSH.MSG_TYPE" method="inHL7Lookup" code="table=0076">
      <rule tag="MSH.MSG_CNTRL_ID" method="isString" code="">
      <rule tag="MSH.PRCSNG_ID" method="isString" code="">
      <rule tag="MSH.VRSN_ID" method="inHL7Lookup" code="table=0104">
      <rule tag="MSH.SQNC_NM" method="isNumeric" code="">
      <rule tag="MSH.CNTN_PNTR" method="isString" code="">
      <rule tag="MSH.ACCPT_ACK_TYP" method="inUserLookup" code="0155">
      <rule tag="MSH.APP_ACK_TYP" method="inUserLookup" code="0155">
      <rule tag="MSH.CNTRY_CDE" method="isString" code="">
      <rule tag="MSH.CHAR_SET" method="inUserLookup" code="0211">
      <rule tag="MSH.MSG_LANG" method="isString" code="">
      <rule tag="MSH.ALT_CHAR_SET" method="isString" code="">
   </using>
</ORU>
```

Error Codes

The error codes returned in acknowledgment documents are defined in the following HL7 table 0357.

Code	Meaning
0	Message Accepted
100	Segment sequence error
101	Required field missing
102	Data type error
103	Table value not found
200	Unsupported message type
201	Unsupported event code
202	Unsupported processing id
203	Unsupported version id
204	Unknown key identifier
205	Duplicate key identifier
206	Application record locked
207	Application internal error

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