CAADAPTER HL7 MAPPING AND TRANSFORMATION SERVICE VERSION 4.3

Installation Guide

Center for Biomedical Informatics
and Information Technology

Credits and Resources

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List	
Users Discussion Forum	https://list.nih.gov/archives/caadapter_users-l.html

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Contents

About This Guide

This section introduces you to the *caAdapter HL7 Mapping and Transformation Service Version 4.3 Installation Guide.* Topics in this section include

- *Purpose* on this page

- *About caAdapter HL7 MTS v4.3* on this page

- *Topics Covered* on page 2

- *Additional References* on page 2

- *Text Conventions Used* on page 3

Purpose

This installation guide provides information about supported configurations, installing, and validating the installation of caAdapter HL7 Mapping and Transformation Service Version 4.3 (caAdapter HL7 MTS v4.3).

About caAdapter HL7 MTS v4.3

caAdapter HL7 MTS v4.3 (http://trials.nci.nih.gov/projects/infrastructureProject/caAdapter) consists of several components that, via messaging standards, support data sharing at CBIIT (http://ncicb.nci.nih.gov) and/or cancer centers as part of the cancer Biomedical Informatics Grid (caBIG) (http://caBIG.nci.nih.gov) solution. The components include a core engine for building, parsing, and validating HL7 v3 messages via an API or web service, and a mapping tool for providing mapping and transformation services using an assortment of messaging standards or formats such as HL7 v2 and c3 and object and data models.

The caAdapter HL7 MTS v4.3 core engine is an open source toolkit for building, parsing and validating HL7 v3 messages from source clinical systems to promote data exchange in an international, standards-based messaging format. The core engine is a messaging framework that is based on an object-oriented data model, the HL7 RIM, and a set of v3 defined data types. This framework enables clinical applications to build and parse HL7 v3 messages based on specific schema definitions and perform structural, vocabulary and schema validation.

caAdapter HL7 MTS v4.3 integrates with CBIIT's cancer Common Ontologic Representation Environment (caCORE) components (http://ncicb.nci.nih.gov/NCICB/infrastructure). To see how caAdapter HL7 MTS v4.fits with the rest of caCORE, see the caCORE Build Process Diagram at https://wiki.nci.nih.gov/x/i5N8. For more information about the caCORE components, visit the CORE wiki (https://wiki.nci.nih.gov/x/BIAe), the caDSR wiki (https://wiki.nci.nih.gov/x/2qSI) and the EVS wiki (https://wiki.nci.nih.gov/x/paSI). caAdapter HL7 MTS v4.3 facilitates data sharing within the common platform needed to build the caBIG network and translational research infrastructure.

caAdapter HL7 MTS v4.3 is an open source application that supports several types of mapping and transformation. It enables analysts and database engineers, who are

knowledgeable about HL7, to create a mapping from Comma Separated Value (CSV) clinical data to an equivalent target HL7 V3 XML format. It provides a front end GUI and a back end engine to support specification of file formats, drag-and-drop mapping between source and target, validation of specifications and data, and transformation of actual CSV data into HL7 V3 XML message instances.

Using similar GUI and mapping features, caAdapter HL7 MTS v4.3 also enables HL7 V2 analysts to convert HL7 V2 messages to HL7 V3 mapping capabilities.

For more information about caAdapter HL7 MTS v4.3, see the *caAdapter HL7 Mapping and Transformation Service v4.3 User's Guide.*

Topics Covered

If you are new to caAdapter HL7 MTS v4.3, read this brief overview, which explains what you will find in each chapter of this guide.

- *Chapter 1, Preparing to Install caAdapter HL7 MTS v4.3,* on page 4 explains the platforms that caAdapter 4.3 was tested on and required software and environment variable settings.

- *Chapter 2, Downloading and Installing caAdapter HL7 MTS v4.3,* on page 8 explains how to download and install each distribution of the software.

- *Chapter 3, Verifying Installation,* on page 11 explains how to verify that you have correctly installed the binary, source, and Windows distributions of caAdapter HL7 MTS v4.3, as well as how to acquire the files required to run HL7-related functions.

Additional References

You can find technical documentation for caAdapter HL7 MTS v4.3 at the following location:
http://ncicb.nci.nih.gov/infrastructure/cacore_overview/caadapter/indexContent/docs/caAdapter_Documentation

The caAdapter HL7 MTS 4.3 technical documentation includes the following documents:

- Core Engine Architecture

- Architecture Diagram

- Release Notes

- User's Guide

- Quick Start Guide

- Design Document

- Javadocs

Text Conventions Used

This section explains conventions used in this guide. The various typefaces represent interface components, keyboard shortcuts, toolbar buttons, dialog box options, and text that you type.

Convention	*Description*	*Example*
Bold	Highlights names of option buttons, check boxes, drop-down menus, menu commands, command buttons, or icons.	Click **Search**.
URL	Indicates a Web address.	http://domain.com
text in SMALL CAPS	Indicates a keyboard shortcut.	Press ENTER.
text in SMALL CAPS + text in SMALL CAPS	Indicates keys that are pressed simultaneously.	Press SHIFT + CTRL.
Italics	Highlights references to other documents, sections, figures, and tables.	See *Figure 4.5*.
Italic boldface monospace type	Represents text that you type.	In the **New Subset** text box, enter ***Proprietary Proteins***.
Note:	Highlights information of particular importance.	**Note:** This concept is used throughout this document.
{ }	Surrounds replaceable items.	Replace {last name, first name} with the Principal Investigator's name.

Chapter 1   Preparing to Install caAdapter HL7 MTS v4.3

Before installing caAdapter HL7 MTS v4.3, you must confirm that your system platform has sufficient resources, install prerequisite software, and set environment variables.

This chapter includes the following topics:

- *caAdapter HL7 MTS v4.3 Tested Platforms* on this page
- *caAdapter HL7 MTS v4.3 Software Requirements* on page 5

caAdapter HL7 MTS v4.3 Tested Platforms

caAdapter HL7 MTS v4.3 has been tested at NCI CBIIT on the following system platforms with the stated resources.

	NCI CBIIT Windows Server	*NCI CBIIT Linux App Server*
Model	DELL Optiplex GX270	HP Proliant ML 330
CPU	1 x Intel® Pentium™ 2.8 GHz	1 x Intel® Xeon™ Processor 2.80 GHz
Memory	3.2 GB	4 GB
Local Disk	System = 40 GB	System = 2 x 36 GB (RAID 1) Data = 2 x 146 (RAID 1)
Network	100mb / full duplex	100mb / full duplex
OS	Windows XP	Red Hat Linux ES 3
Resolution (Recommended)	1280 x 1024 1024 x 768	1600x1200 1400x1050 1280x960 1280x864
Resolution (NOT Recommended)	800 x 600 640 x 480	800 x 600 640 x 480

Table 1-1. caAdapter HL7 MTS v4.3 Tested Platforms and Resources

caAdapter HL7 MTS v4.3 Software Requirements

Table 1-2 on page 5 contains detailed information on the software that is required to execute any distribution (binary, source, and Windows) of caAdapter HL7 MTS v4.3. The versions listed below are in accordance with the NCI CBIIT technology stack. You must visit each site of the third-party software to review the license agreement prior to using that software with caAdapter HL7 MTS v4.3.

Software	*Version*	*Description/URL*	*Directory*
Java 2 Platform Enterprise Edition (J2EE) or Standard Edition (J2SE)	1.5.0_04	The J2SE Software Development Kit (SDK) supports creating J2SE applications. http://java.sun.com/j2se/	If your root directory in Windows is `C:\`, then install to the `C:\jdk1.5.0_04` Java home directory.
JGraph	5.10.1	JGraph is an open source Java graph library for the visualization and layout of graphs. http://www.jgraph.com/downloads.html	Copy `jgraph.jar` to caAdapter `lib` directory.
JAXB	2.0 or later	The JAXB Standard Implementation project at Java.Net delivers a production-quality implementation of the JAXB APIs. This implementation is also the Reference Implementation for the specification. https://jaxb.dev.java.net	1. Go to https://jaxb.dev.java.net and click the Download button. 2. Download the binary or source distribution `jar` file. 3. Follow the instructions on the screen to execute the `jar` file. 4. Copy `jaxb-api.jar` and `jsr173_1.0_api.jar` to the caAdapter `lib` directory.

Table 1-2. Required Software for All caAdapter HL7 MTS v4.3 Distributions

Adding the JAVA_HOME Variable

For all distributions of caAdapter HL7 MTS v4.3, verify that the JAVA_HOME environment variable is set and add it to your PATH. Perform the following steps to do this in Windows:

Step	Action
1	Right-click **My Computer** > **Properties** and select the **Advanced** tab.
2	Click the **Environment Variables** button.
3	JAVA_HOME must be listed in the User variables or System variables section of the dialog box. To add a new variable, click the **New** button below either section.
4	In the New User Variable dialog box, add the Variable and Variable Value for your home directory. Examples: **Variable** = JAVA_HOME; **Variable Value** = C:\jdk1.5.0_04
5	Find the PATH environment variable, double-click it or click the **Edit** button and add %JAVA_HOME%\bin to the end of its value. Click all **OK** buttons to confirm the changes.
6	To verify that the PATH statement listed in the Environment Variables dialog box includes JAVA_HOME, open a command window (**Start** > **Command Prompt**). Type **path** at the prompt and then press **Enter** to display your path. For example, C:\jdk1.5.0_04 should be at the end of your path. If you were successful, you can run java anywhere in your system. To verify the java version type java – version at the command prompt.

Ant Required for Source Distribution

If you are installing source code, you must download and install Ant, which is not included with caAdapter HL7 MTS v4.3. Table 1-3 contains detailed information about Ant and where to download it. The version is in accordance with the NCI CBIIT technology stack.

Software	Version	Description/URL	Example Directory
Ant	1.6.2	Apache Ant is a Java-based build tool http://ant.apache.org/	If your root directory in Windows is `C:\`, then install to `C:\apache-ant-1.6.2` Ant home directory

Table 1-3. Required Software for caAdapter HL7 MTS v4.3 Source Distribution

Adding the `ANT_HOME` Variable

Verify that the `ANT_HOME` environment variable is set and add it to your `PATH`. Perform the following steps to do this in Windows:

Step	Action
1	Right click **My Computer** > **Properties** and select the **Advanced** tab.
2	Click the **Environment Variables** button.
3	`ANT_HOME` must be listed in the User variables or System variables section of the dialog box. To add a new variable, click the **New** button below either section.

4	In the **New User Variable** dialog box, add the **Variable** and **Variable Value** for your home directories.
	Examples:
	`Variable = ANT_HOME`
	`Variable Value = C:\apache-ant-1.6.2`

5	Find the `PATH` environment variable and either double-click it or click the **Edit** button. Add `%ANT_HOME%\bin` to the end of its value. Click all **OK** buttons to confirm the changes.
6	To verify that the `PATH` statement listed in the **Environment Variables** dialog box includes `ANT_HOME`, open a command window (**Start** > **Command Prompt**). Type `path` at the prompt and then press **enter** to display your path. For example, `C:\apache-ant-1.6.2\bin` should be at the end of your path. If you were successful, you can run `ant` anywhere in your system.

Chapter 2   Downloading and Installing caAdapter HL7 MTS v4.3

This chapter includes the following topics:

- *Upgrading to caAdapter HL7 MTS v4.3* on this page
- *Downloading caAdapter HL7 MTS v4.3* on this page
- *Installing caAdapter HL7 MTS 4.3* on page 9

Upgrading to caAdapter HL7 MTS v4.3

If you are using a previous caAdapter version, it is recommended that you uninstall it and upgrade to caAdapter HL7 MTS v4.3 to perform HL7 mapping and transformation.

Downloading caAdapter HL7 MTS v4.3

Complete the following steps to download caAdapter HL7 MTS v4.3:

Step	Action
1	Go to the NCI CBIIT download web site: http://ncicb.nci.nih.gov/download/index.jsp.
2	Provide your email, name, and institution. Click **Enter the Download Area**.
3	Select **Download** from the **caAdapter** section. Check the box labeled **Checking this box indicates that you agree to the above terms** to indicate agreement to the caAdapter HL7 MTS v4.3 license.
4	Select the appropriate distribution as listed below and save it to a temporary directory on your computer (for example, `C:\temp` in Windows). caAdapter HL7 MTS v4.3 requires the Health Level 7 (HL7) standards and message specification files to perform HL7 transformations. They are not included with any distribution. These specification files are licensed for HL7 members only. Users are required to register their own membership with HL7 and to obtain these files directly from the HL7 organization at http://www.hl7.org. • **Binary Distribution**: The caAdapter HL7 MTS v4.3 binary distribution file contains the binary code, Javadocs, release notes, example messages, and licenses. <table><tr><td>*Binary Zip File Name*</td><td>*Description*</td></tr><tr><td>`caadapterv4.3_bin.zip`</td><td>Binary file</td></tr></table> • **Source Distribution**: The caAdapter HL7 MTS v4.3 source distribution file contains the source java code, `build.xml`, Javadocs, release notes, `readme.txt`, example messages, and licenses. <table><tr><td>*Source Zip File Name*</td><td>*Description*</td></tr><tr><td>`caadapterv4.3_src.zip`</td><td>Source file</td></tr></table>

Step	Action
	Windows Distribution: The caAdapter HL7 MTS v4.3 Windows distribution file contains binary code, release notes, `readme.txt`, example messages, and licenses.

Binary Zip File Name	Description
`caadapterv4.3.msi`	Windows file

Installing caAdapter HL7 MTS 4.3

Complete the appropriate steps for your distribution to install caAdapter HL7 MTS v4.3.

Installing the Source and Binary Distributions

Extract the contents of the caAdapter HL7 MTS v4.3 source or binary distribution zip file to the file system of your computer. For example, if you extract the zip file to `C:\temp\MySoftware`, then your caAdapter HL7 MTS v4.3 home directory becomes `C:\temp\MySoftware\caadapter`.

Note: The `caadapter` directory is created for you during installation of the Windows distribution.

Table 2-1 contains the directory structure after installation.

Installing the Windows Distribution

Double-click the `.msi` file and follow the instructions provided to complete the installation. Table 2-1 below contains the folder structure after installation.

Directory	Contents
build	Binaries (`.class` files) (only for source distribution and is created at runtime)
conf	Application configuration files
dist	Contains the `.jar` file, `.war` files, and the `run.bat` file (only for source distribution and is created at runtime)
doc	caAdapter HL7 MTS v4.3 documentation and help system
etc	Important supplementary files (only for source distribution and the its contents will be packed with compiled codes as build the project)
lib	Java libraries and dependencies
hl7_home	HL7 v3 Schema and MIF files. caAdapter HL7 MTS v4.3 supports the multi version (normative) of HL7 V3 specification. It is recommended that you create one sub-folder here for each normative.
src	Source code (`.java` files) (only for source distribution)
workingspace	Default directory where you can save project files. It contains log files and HL7 v3 XML instances. It also contains an `examples` directory with sample data.

Table 2-1. Directory Structure of caAdapter HL7 MTS v4.3

Chapter 3 Verifying Installation

This chapter includes the following topics. Perform the appropriate processes for your distribution to confirm that the installation was successful.

- *Verifying the Binary Installation* on this page
- *Verifying the Source Installation* on this page
- *Building the Web Service Module* on page 12
- *Verifying Application Resources* on page 13
- *Understanding HL7 Specification Files* on page 13

Verifying the Binary Installation

Perform the following steps to launch caAdapter HL7 MTS v4.3:

Step	Action
1	In a **Command Prompt** window, enter `cd {home_directory}` to go to your home directory (for example, in Windows `C:\caadapter`).
2	Enter `run.bat`. caAdapter HL7 MTS v4.3 appears.

Verifying the Source Installation

Perform the following steps to launch caAdapter HL7 MTS v4.3.

Step	Action
1	In a **Command Prompt** window, enter `cd {home_directory}` to go to your home directory (for example, in Windows `C:\caadapter`).
2	Enter `ant`
3	Enter `cd dist`
4	Enter `run.bat` caAdapter HL7 MTS v4.3 appears.

Building the Web Service Module

If you installed the source distribution successfully, you can optionally build the caAdapter Web Service module.

To build the caAdapter Web Service module

1. Modify `build.properties` in the caAdapter HL7 MTS v4.3 home directory to include the Web Service module. The resulting code should be as follows:
   `caadapter.release.ws.include=true`

2. Run ant again. The `caAdapterWS.war` file is created in the `dist` folder.

3. Copy `caAdapterWS.war` to the deployment folder of your J2EE web server.

4. Launch the Web Services Management Portal.

   For example, if you run the J2EE web server on your local machine on port 8080, you can perform step 4 above using http://localhost:8080/caAdapterWS/. The following dialog box appears.
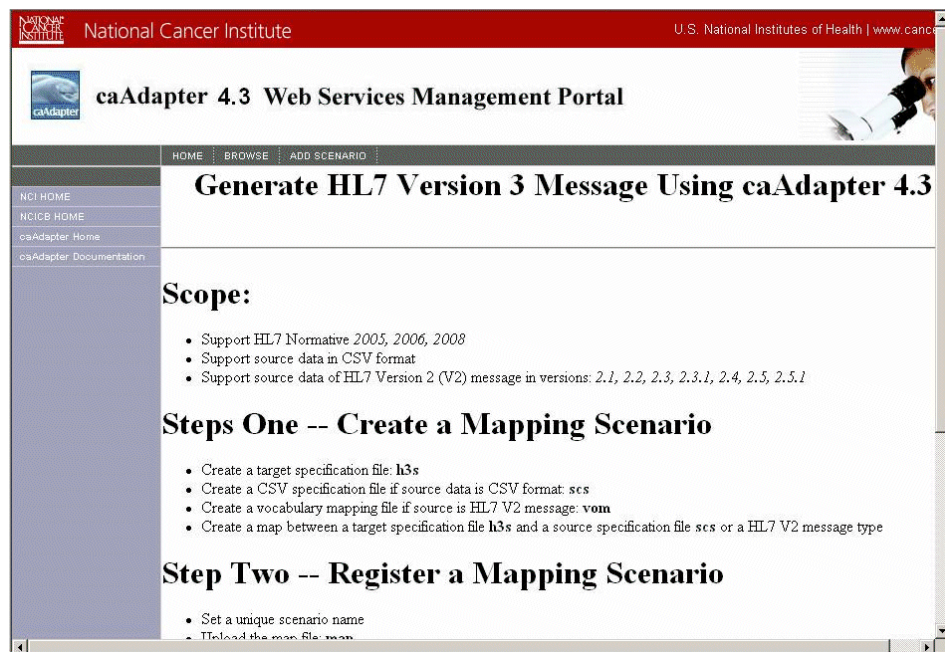
Figure 3-1. Home page of the caAdapter HL7 MTS v4.3 Web Services Management Portal

Verifying the Windows Installation

Perform the following steps to launch caAdapter HL7 MTS v4.3.

Step	Action
1	Select **Start** > **caAdapter**. caAdapter HL7 MTS v4.3 appears.

If you can see the caAdapter HL7 MTS v4.3 home page, your installation was successful. See the *caAdapter HL7 MTS v4.3 User's Guide* for detailed information on using caAdapter HL7 MTS v4.3.

Verifying Application Resources

After installing caAdapter HL7 MTS v4.3, edit the modules you would like to use. To do this, open the `conf` folder and edit `caadapter-component.properties` as follows.

`caadapter.hl7.transformation.activated=true`

`caadapter.hl7.csv.transformation.activated=true`

`caadapter.hl7.v2v3.conversion.activated=true`

`caadapter.web.service.activated=`

`caadapter.help.menu.activated=true`

Understanding HL7 Specification Files

caAdapter HL7 MTS v4.3 requires HL7 V3 specification files to transfer a CSV data or HL7 v2 message into a HL7 v3 message.

The following steps describe how to load the HL7 specification file and set up the application configuration file to support multiple HL7 normatives.

To use the caAdapter HL7 MTS v4.3, you must get the following three resources from the HL7 organization:

- HL7 V3 MIF file (`mif.zip`)
- `Coreschemas` file folder
- `Multicacheschemas` file folder

The MIF file defines an individual HL7 v3 message. The `coreschema` file defines HL7 v3 datatypes.

Only HL7 members may access these resources. See www.hl7.org/membership for membership information.

Once you have the HL7 resources, do the following:

1. Copy the resources to the file system of your local computer; for example, you can save them to `c:\temp\hl7Resource\Normative_yyyy`. caAdapter HL7 MTS v4.3 loads the resource files and registers them later.

2. Load the resources into caAdapter HL7 MTS v4.3. For more information, see *Loading HL7 Normative Edition Artifacts*, below.

Loading HL7 Normative Edition Artifacts

Do the following to load HL7 v3 normative edition artifacts into caAdapter HL7 MTS v4.3.

1. Select **Tools** > **Load HL7 V3 Normative Edition Artifacts**. The Load HL7 V3 Normative Edition Artifacts dialog box appears.
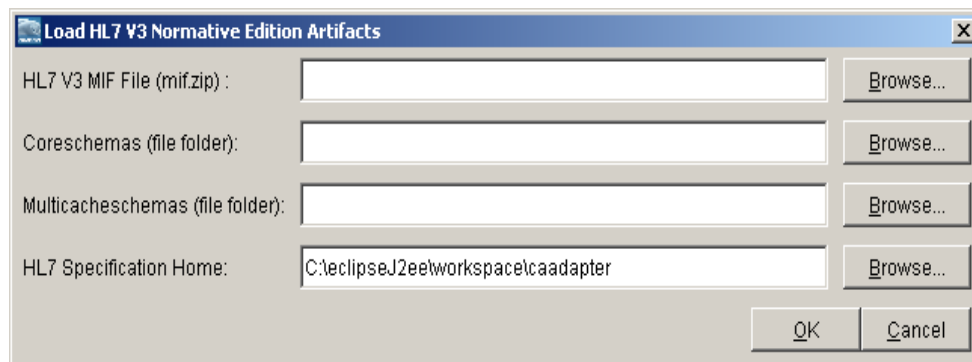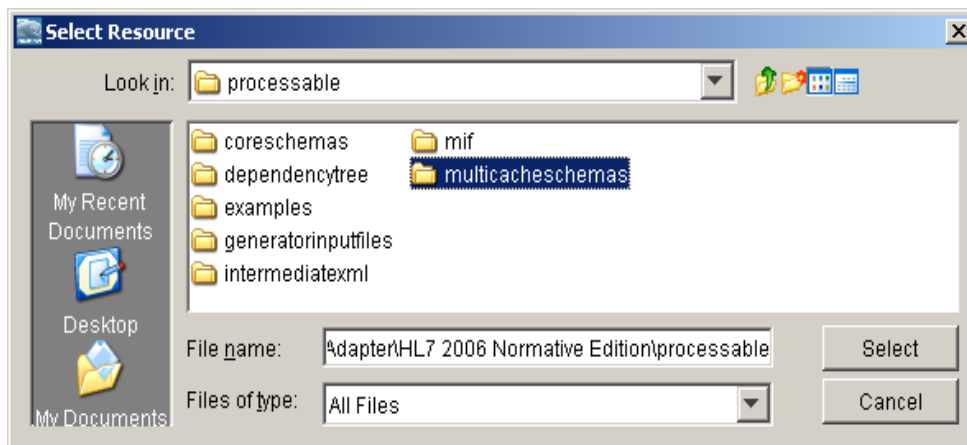

2. Click **Browse** to locate the `mif.zip` file on your computer. The Select Resource dialog box appears. Select it and click **Open**.
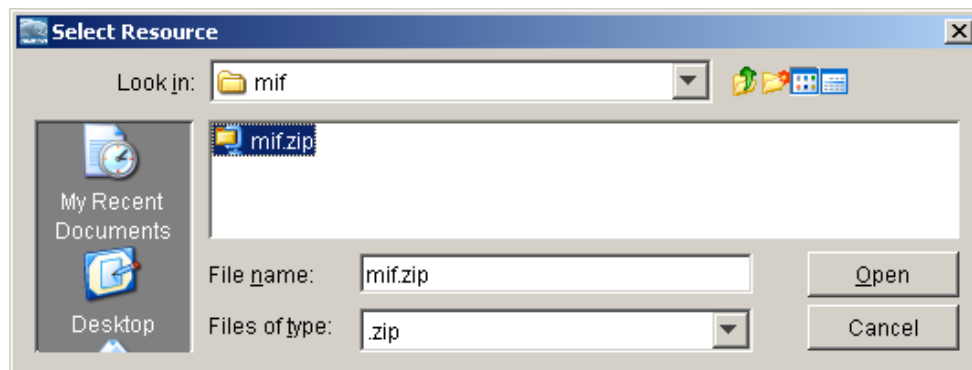
3. Click **Browse** to locate the `coreschemas` folder on your computer. The Select Resource dialog box appears. Select it and click **Open**.
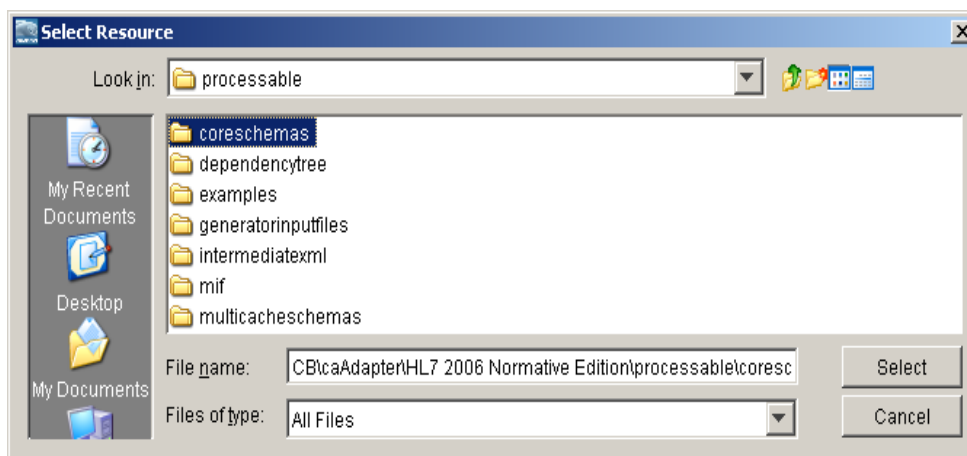

4. Click **Browse** to locate the `multicacheschemas` folder on your computer. The Select Resource dialog box appears. Select it and click **Open**.


5. Click **Browse** to specify the location of the `HL7 Specification Home` folder on your computer. This is the location where you will store all HL7 artifacts. Locate this folder within your caAdapter HL7 MTS v4.3 installation folder. The recommended folder name is `hl7_home/Normative_yyyy`.

   The Select Resource dialog box appears. Select it and click **Open**.
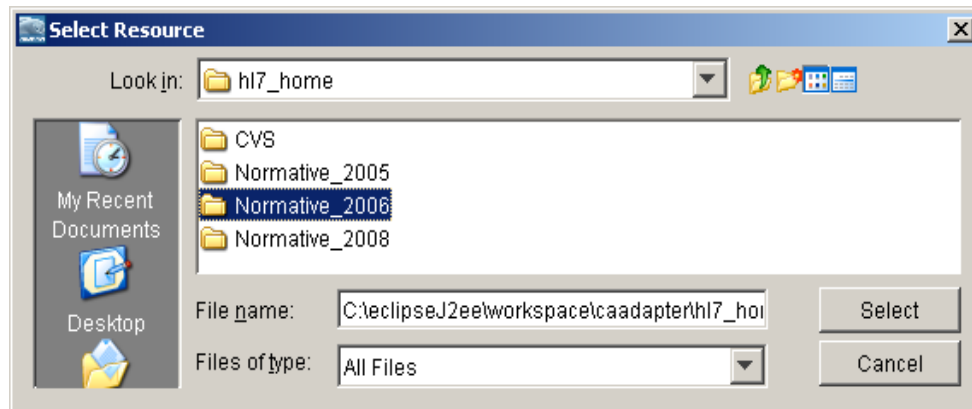
The Load HL7 V3 Normative Edition Artifacts dialog box now lists all of your selections.
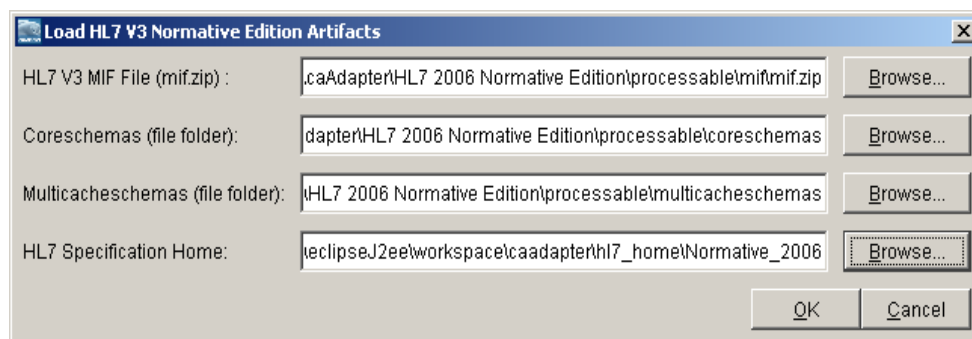
6. Click **OK**.

    caAdapter HL7 MTS v4.3 begins loading HL7 v3 artifacts. A confirmation message appears when caAdapter HL7 MTS v4.3 has completed the process. Refer to the screen below for an example of what your file system should look like after the artifacts are loaded.
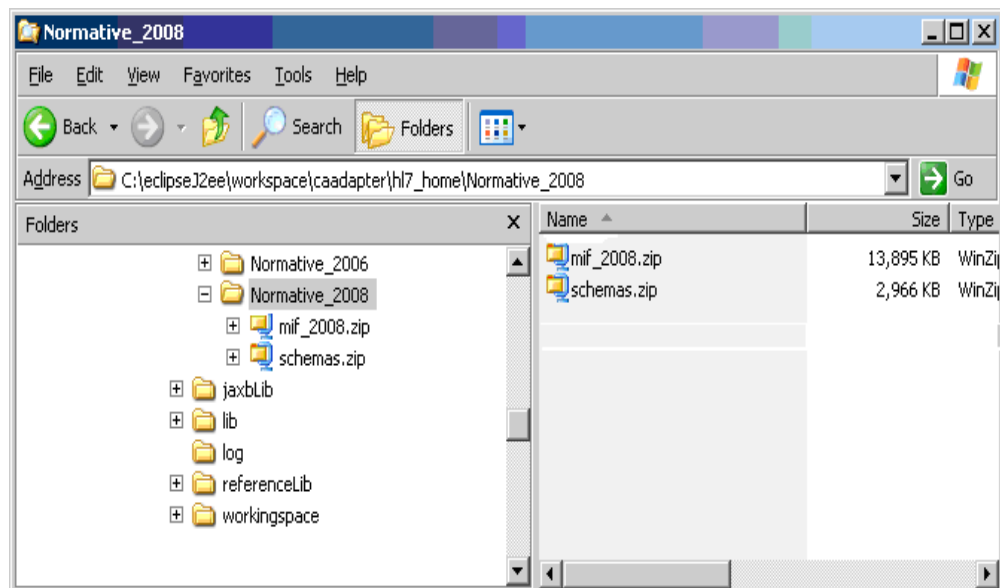
Registering HL7 Normative Edition Artifacts

Since caAdapter HL7 MTS v4.3 supports multiple HL7 normatives, you have the option to load one or more HL7 artifacts (such as year 2005, year 2006, and year 2009). Once the artifacts have been loaded, do the following to register them with caAdapter HL7 MTS v4.3.

1. From the `conf` folder, open the `hl7-normative-setting.xml` file.

2. Create the `normative` element within the `root` element.

   ```
   <normative copyrightYear="2008" description="Normative 2008">
       <mifFile>hl7_home/Normative_2008/mif_2008.zip</mifFile>
       <schemaFile>hl7_home/Normative_2008/schemas.zip</schemaFile>
   </normative>
   ```

3. Set the value for the `copyrightYear` attribute of the `normative` element. This value should be the same as the `copyrightYear` value in the HL7 MIF file and must be unique in the application.

4. Set the value for the `description` attribute of the `normative` element. This is the value that represents the `normative` element in the HLV V3 Specification dialog box, below.
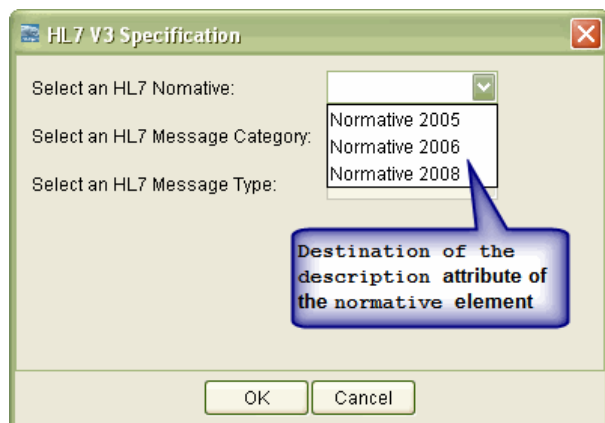
5. Create a child element called `mifFile` for the `normative` element. Set its value as the path of the MIF file, `mif_yyyy.zip`, relative to your caAdapter HL7 MTS v4.3 home directory.

6. Create a child element called `schemaFile` for the `normative` element. Set its value as the path of the schema file, `schemas.zip`, relative to your caAdapter HL7 MTS v4.3 home directory.

Index

H

HL7
 coreschemas folder, 13
 how to get specification files, 13
 loading normative edition artifacts, 14
 mif.zip, 13
 multicacheschemeas folder, 13
 registering normative edition artifacts, 17

I

Installing caAdapter HL7 MTS v4.3
 adding the ANT_HOME variable, 7
 adding the JAVA_HOME variable, 6
 source and binary distributions, 9
 tested platforms, 4
 verifying the binary installation, 11
 verifying the enabling modules, 13
 verifying the source installation, 11
 verifying the Windows installation, 13
 Windows distribution, 10

Installing caAdapter HL7 MTS v4.3HL7 MTS
 v4.3
 software requirements, 5

S

Software requirements
 Apache Ant, 7
 J2EE, 5
 JAXB, 5
 JGraph, 5
Source and binary distributions, 9

V

Verifying the binary installation, 11
Verifying the source installation, 11
Verifying the Windows installation, 13

W

Web Service module, building, 12
Windows distribution, 10