AcuoSemantix™

Installation and Operations Guide

Release 6.0.1

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AcuoSemantix Installation and Operations Guide

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Introduction

Purpose of this Installation and Operations Guide

Acuo Technologies prides itself on the customized assistance it provides to customers in support of the installation and implementation of new systems. This guide is to be used in conjunction with that process and serves as a reference for how to perform operational tasks for AcuoSemantix.

This guide describes and assumes all AcuoMed features are licensed and available as part of your current implementation. However, certain features are individually licensed and may, therefore, not be part of your currently installed AcuoMed system. Contact Acuo Technologies if you would like to add more capabilities to your current AcuoMed implementation.

Who Should Read this Guide

This guide is written primarily for a system administrator who may typically work with a database administrator responsible for maintaining the Acuo Technologies server and applications. Much of what is involved with actually operating Acuo Technologies' products is installing and configuring them. Someone such as a system administrator or database administrator who is experienced using these types of products on a daily basis will best be able to perform the tasks described in this guide.

How to Use this Guide

Due to the fact that AcuoSemantix works in conjunction with AcuoMed and AcuoStore, it is recommended that you become familiar with those products and reference the user manuals for overviews on functionality that are used within the realm of AcuoSemantix. If you are simply referring to this guide at some point after the initial installation and implementation of the product, you will probably not need to revisit certain material such as the overview and initial installs sections. However, if you are new to Acuo Technologies' products, it is recommended that you read the Overview section to get a better understanding of the general environment in which the products operate and the functions they perform. After that, refer to the other chapters of the guide for specific information on the tasks you need to perform.

Related Documents and Reference Sources

There are a number of very useful related documents and reference sources that you may want to review. These include the following:

- The AcuoMed Image Manager Installation and Operations Guide (included with an AcuoMed install).
- The AcuoStore Digital Asset Manager Installation and Operations Guide (included with an AcuoStore install).
- The AcuoMed Image Manager DICOM Conformance Statement. This document is available in PDF format at the Acuo Technologies Web site: http://www.acuotech.com.
- The *AcuoSemantix HL7 Conformance Statement*. This document is available in PDF format at the Acuo Technologies Web site: http://www.acuotech.com.
- DICOM and HL7 conformance statements for integrated devices.
- The DICOM 3.0 Standard.
- The Windows Server Help System and the Microsoft SQL Server Help System, accessed by choosing Help from the Windows Start menu.
- If you are using tape for near-line or offline storage, refer to the documentation supporting these products. This includes device documentation and related HSM (Hierarchical Storage Management) information such as Microsoft RSS and RSM information in the Microsoft Windows Help System, or other vendor's tape-based storage management systems.

- If you are using tape or other HSM products used as a backup utility, refer to the documentation supporting these products.

Conventions Used in this Guide

It is important to keep in mind a few basic conventions used for presenting information in this document. These conventions are summarized below.

Procedures

As much as possible, instructions for performing installation and operational tasks are presented by means of procedures. A procedure consists of several numbered or lettered steps to be performed in sequence. Procedure steps are numbered and may include additional explanatory information as is appropriate. Here is an example of how procedure steps appear in this manual:

1. Before beginning installation, review configuration recommendations.
2. Backup up the target system databases.
    a. Backup the AcuoMed database.
    b. Backup the AcuoStore database.
    c. Backup all AcuoMed Dicom databases.
3. Perform a full backup of the target system registry.

Optional Procedure Steps

Certain steps in a procedure may not be required in all cases. Procedure steps that contain optional actions are indicated by the word **Optional** followed by a period and a space at the beginning of the procedure step, as shown in the example here:

1. Optional. For maximum protection, make a second backup of your current data before beginning installation.

Keys, Buttons and Entering Text

All references to pushing specific keyboard keys, clicking buttons or entering text generally appear in bold, italics, or double quotation marks, respectively. The following examples are provided for reference:

- Set up a new default prefetch rule and enter the text “esdefault” in the ***Station AE Title*** field.
- Name the Data Point “**Acuo_Datapoint**”, then click the button “Create and Edit”.

Notes

Notes provide additional explanatory information, special instructions, or helpful hints that are deemed significant. The following is an example of a note:

AcuoSemantix functional overview

2-1 General overview

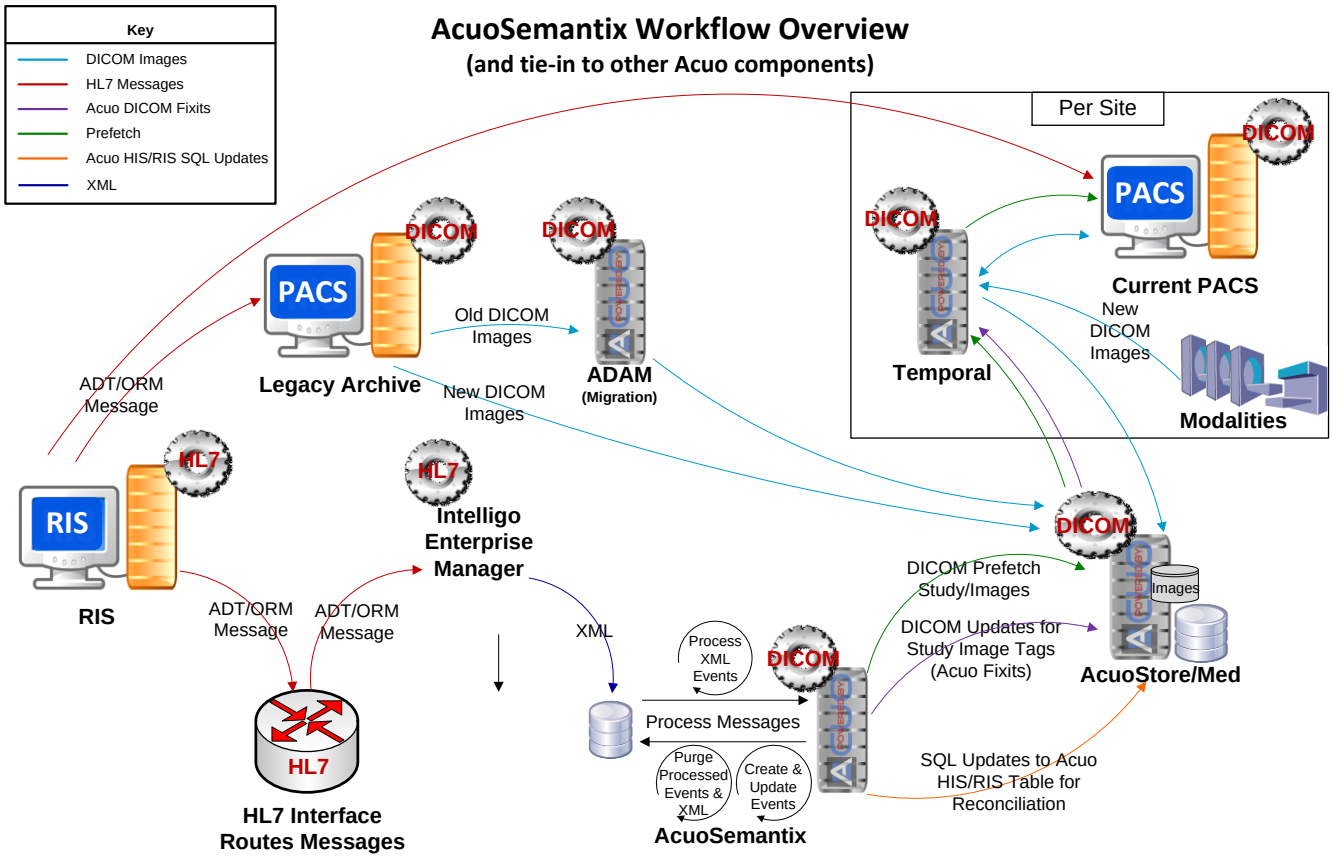
AcuoSemantix is an HL-7/XML/DICOM-based solution that bridges the gap between HIS/RIS environments and DICOM PACS environments. AcuoSemantix receives and decodes HL7 messages and generates DICOM workflow equivalent messages to existing AcuoMed Systems.

AcuoSemantix creates an environment that supports multiple HIS/RIS and AcuoMed installations in a single solution which can be rapidly added to any existing installation, without the need for a broker. Further, AcuoSemantix can scale centrally or control a fully decentralized network of AcuoMed nodes.

AcuoSemantix receives messages from one or more HIS/RIS systems and stores messages XML in an SQL database. These events are then converted into DICOM workflow messages and transmitted to an AcuoMed Image Manager for PACS synchronization, keeping Patient info and Study info in sync, prefetching, and reconciliation.

AcuoMed's distributed nature is capable of creating a highly customized environment where workflow and intelligence live closest to the user/modality. This facilitates automated routing, reconciliation, and storage of DICOM objects based upon AcuoSemantix messaging.

Refer to the image below for an overview on AcuoSemantix workflow and tie-in to other Acuo components.



2-2 Detailed overview

The General overview section gives a high-level summary on what AcuoSemantix does and how it is tied into workflow. This section is intended to provide details into the functionality of AcuoSemantix, from the initial message receipt to the resulting activities that may occur.

One of the pre-requisites for running AcuoSemantix is the installation and configuration of Medicalis' Intelligo Enterprise Manager. Intelligo Enterprise Manager provides the ability to build and manage interfaces to allow different applications to communicate seamlessly across a healthcare enterprise.

The following steps describe the flow of activity as Intelligo Enterprise Manager first receives an HL7 message, and how it leads to resulting actions initiated by AcuoSemantix:

1. An HL7 message is sent from an HL7 source, HIS/RIS, to Intelligo Enterprise Manager. In other environments, the HIS/RIS may send to an intermediary HL7 interface that acts as an HL7 router and forwards the message to Intelligo.

2. The HL7 message is received by Intelligo Enterprise Manager.

3. Intelligo Enterprise Manager takes the HL7 message, converts it to XML, and inserts it into the "**T_ARPS_HL7_TO_XML_REPRESENTATION**" table of the AcuoSemantix database.

Note The insert time of the entry is logged into the column "ARPS_HX_INSERTDATETIME". This logs the Greenwich Mean Time, GMT, when the event was inserted. This information may be useful in troubleshooting scenarios when the timing between message receipt and resulting actions needs to be investigated.

4. After an entry is inserted into the "T_ARPS_HL7_TO_XML_REPRESENTATION" table by Intelligo, AcuoSemantix recognizes the entry and then logs a corresponding event in the "**T_ARPS_RIS_EVENTS**" table. Various information is logged in the "T_ARPS_RIS_EVENTS" table, including insert time, message type, and whether it has been processed or validated. It essentially indicates the status of all messages that have been received. At this point in time, AcuoSemantix takes over the processing of the message and resulting activities.

Notes:

- The interval of time that AcuoSemantix checks for new messages or new entries inserted into the "T_ARPS_HL7_TO_XML_REPRESENTATION" table is configured in the **HL7MessagePollingTimer** parameter of the **AcuoSemantixConfig.xml** file. See the section below "Configure AcuoSemantix" for further details.
- The table that Intelligo inserts into ("…XML_REPRESENTATION") and the table that AcuoSemantix correspondingly inserts into ("…RIS_EVENTS") should generally remain in-sync and have the same number of entries present. If these two tables are not in-sync and the number of entries starts to drift significantly, further analysis should occur as this tends to indicate issues or delays with message processing. In some scenarios where a large amount of messages are received in a short period of time, messages may get inserted by Intelligo faster than they are processed. Thus, the difference in number of entries between the above two tables may be more likely to rise during that time.

5. After AcuoSemantix properly picks up the message and puts it into the "T_ARPS_RIS_EVENTS" table, the next step is to determine which activities or resulting actions should be performed. This information comes from the configuration file **ActivityList.xml**, found at *C:\Program Files (x86)\Acuo Technologies\AcuoSemantix.* All actions performed by AcuoSemantix involve sending information to a connected AcuoMed/AcuoStore system. For further details, see the section "Configure AcuoSemantix" below. Generally, the resulting actions that may occur are:
    - Prefetching - queuing Batch Move jobs on an AcuoMed system.
    - Updating the Acuo HIS/RIS tables – commonly used in conjunction with the Reconciliation and Auto-Mapping feature inside AcuoMed. This is the most recent up-to-date Patient/Study information populated from a receipt of HL7 messages.
    - Generating the following patient or study update messages to keep Acuo Databases in-sync, these are referred to as Acuo "Fixit" messages:
        i. Patient Update Messages - update patient demographic information
        ii. Study Update Messages - update study/order information
        iii. Patient Merge Messages - merging 2 patients into one

Install and configure AcuoMed/AcuoStore

AcuoSemantix requires a separate install of AcuoMed/AcuoStore that will receive RIS updates and DICOM messages from AcuoSemantix. Reference the most recent Acuo Release Notes for the currently supported operating systems, versions of SQL Server, and corresponding Service Packs.

The following steps are required for the AcuoMed/AcuoStore system:

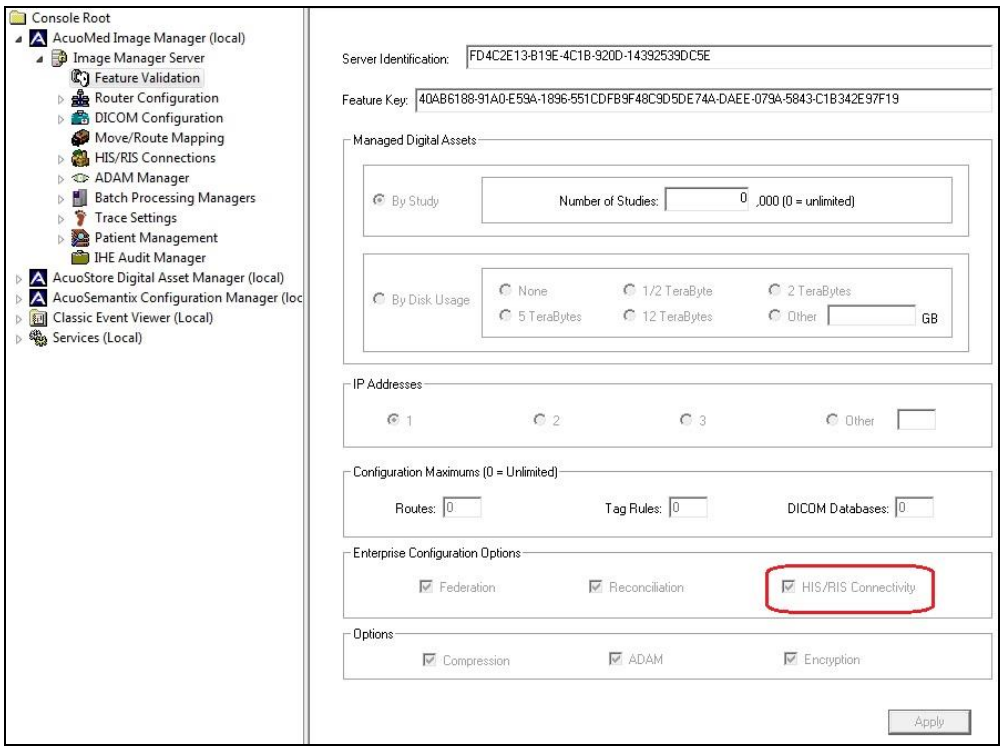
1. Install and configure AcuoMed/AcuoStore. Refer to the AcuoMed and AcuoStore installation and operations guides for more details.

2. If fixit messages are generated by AcuoSemantix and sent to AcuoMed, at least one SOP must be configured as accepted under the configuration of the Called AE Name that will receive fixit messages.

Note The Called AE Name that receives fixit messages is configured in the **AcuoSemantixConfig.xml** file under the "**AETitle_AcuoMed"** parameter. Refer to the section below "Configure AcuoSemantix" for details on how to configure AcuoSemantix to send fixit messages.

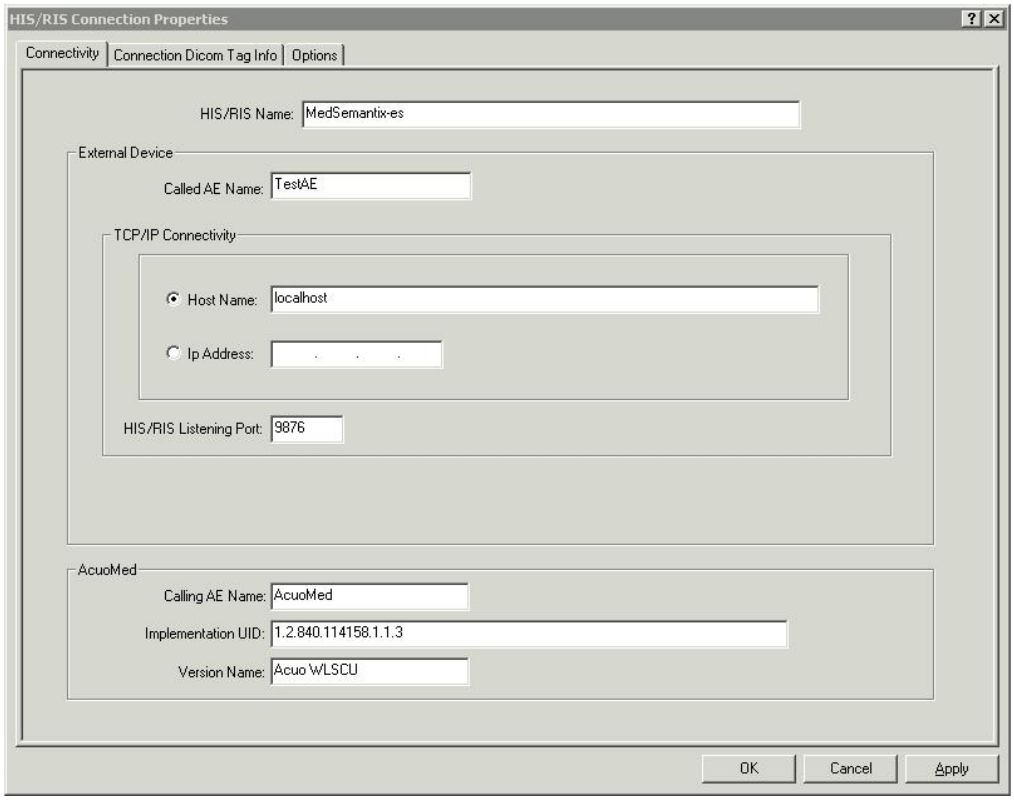
3. Apply a feature key which includes "HIS/RIS Connectivity". This is minimally required for AcuoSemantix.

Note The AcuoMed Database must be installed before a feature key can be applied. Feature keys are obtained by contacting Acuo's Professional Services Team.

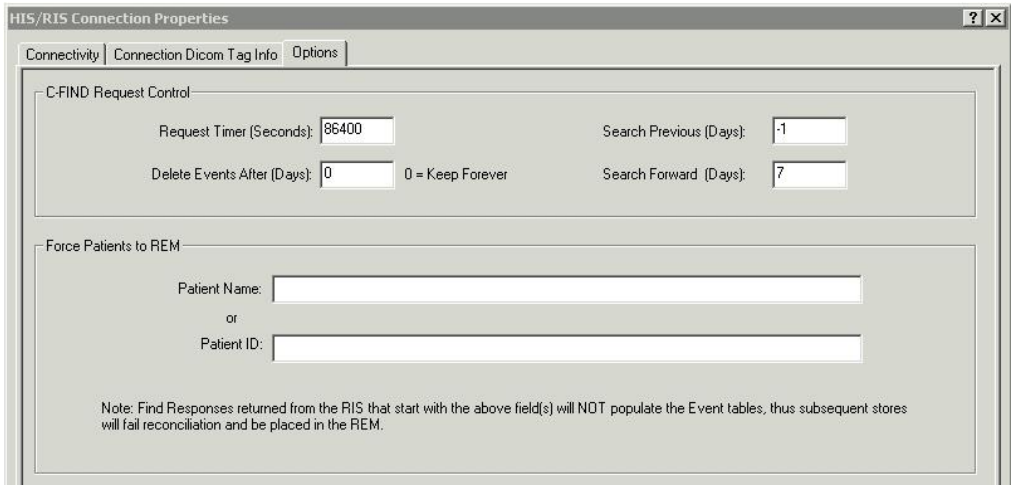


4. Set up a new HIS/RIS connection and perform the following steps:
    a. On the **Connectivity** tab, enter data in all empty fields: HIS/RIS Name, Called AE Name, Host Name or IP, Listening Port, Calling AE Name.
        - The HIS/RIS Name is simply a text description of the connection.

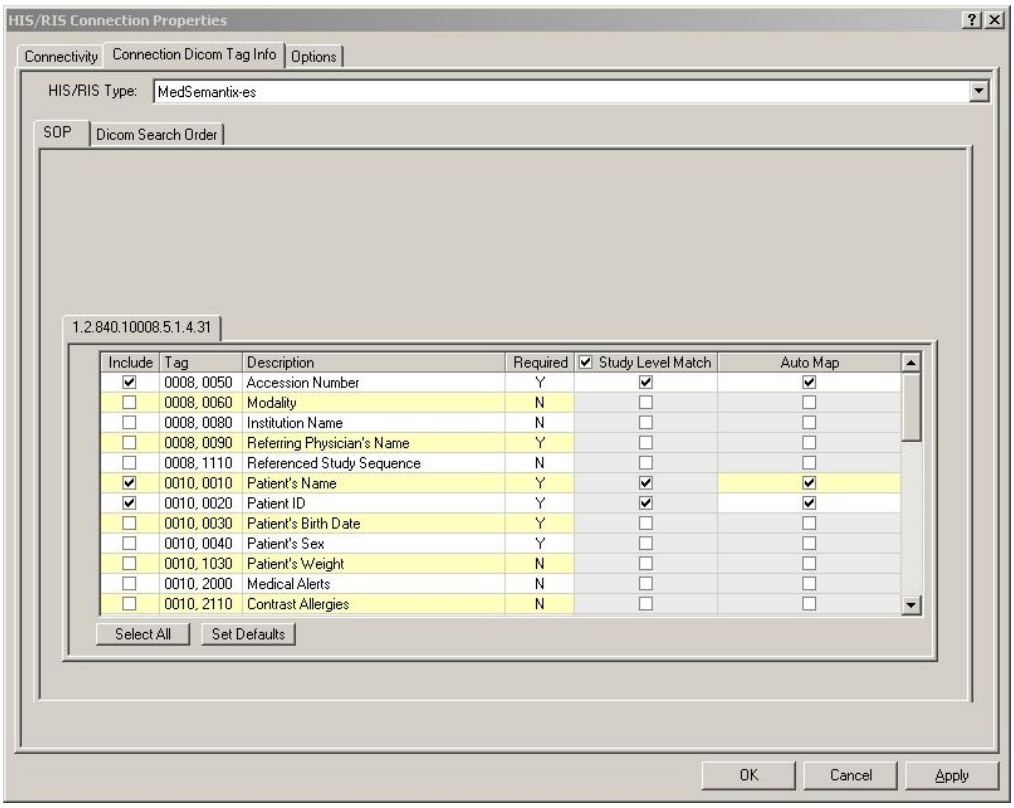
- Anything can be entered in the other fields for they are not used for AcuoSemantix.



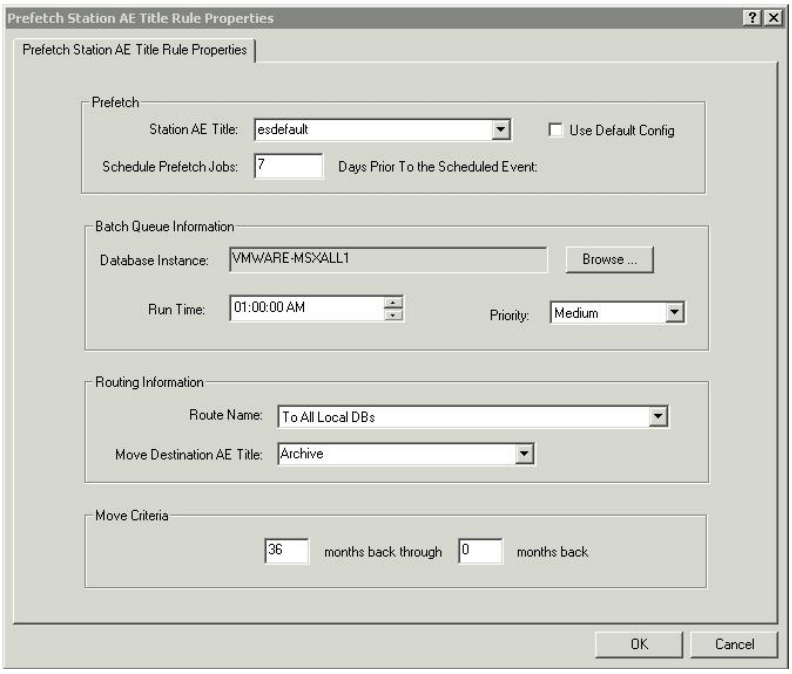
b. On the **Options** tab, change the **Request Timer (Seconds)** to 86400 and **Delete Events After (Days)** to 0. Leave the **Search Previous (Days)** and **Search Forward (Days)** fields at their defaults of -1 and 7, respectively.



c. On the **Connection Dicom Tag Info** tab, select **MedSemantix-es** as the HIS/RIS Type. If reconciliation is used, select the appropriate Matching and Auto-Mapping tags. Leave all other defaults as is. Click **OK** to add the connection.



5. Set up a new default prefetch rule and enter the text **esdefault** in the **Station AE Title** field. Edit all other fields in the Prefetch Station AE Title Rule Properties screen as necessary such as the Batch Queue Information, Routing Information, and Move Criteria sections. Click **OK** to add the prefetch rule.



Note The default prefetch rule used by AcuoSemantix is “esdefault”. This is minimally required to utilize prefetching, which is the queuing of Batch Move jobs to an AcuoMed system. Other prefetch rules may optionally be set up to do prefetching. However, the Station AE Title of the prefetch rule must match the Assigned Patient Location in the PV1-3 segment, or another defined segment, of the incoming HL7 message in order to take effect. For further information, see the “PrefetchStationMapping” parameter in the **Modify AcuoSemantixConfig.xml** section, a sub-section under Configure AcuoSemantix below.

AcuoSemantix System Pre-Requisites

Reference the most recent Acuo Release Notes for currently supported operating systems, versions of SQL Server, and corresponding Service Packs.

Install AcuoSemantix

5-1 General Installation & Upgrade Requirements

There are specific requirements for installing, uninstalling, and upgrading Acuo products when AcuoSemantix is involved. The following is the initial install order when AcuoSemantix, AcuoStore, and AcuoMed are all on the same system:

- Reference the most recent release notes for installation of other Acuo components. The information listed here is a subset of the full installation instructions, and is intended to indicate when AcuoSemantix should be installed relative to AcuoMed/AcuoStore.

General Installation Order:

1. Install AcuoStore
2. Install AcuoMed
3. Install AcuoSemantix

Note If AcuoStore, AcuoMed or AcuoSemantix need to be subsequently upgraded at a Patch or Hotfix level, the upgrades can be performed without completely removing or uninstalling through the Control Panel / Programs and Features > Add or Remove Programs in Windows 2003.

AcuoStore or AcuoMed If you need to upgrade at a Service Pack level or above, AcuoSemantix should be manually removed through "Programs and Features" before performing the upgrade. All XML files in the *C:\Program Files (x86)\Acuo Technologies\AcuoSemantix* directory should be backed up prior to performing a Service Pack level upgrade for AcuoStore/AcuoMed. See the section below titled AcuoSemantix Upgrade Installation for details.

AcuoSemantix If this is the only Acuo product you are upgrading at a Service Pack level, the AcuoSemantix upgrade may occur without removing AcuoMed or AcuoStore. See the section below titled AcuoSemantix Upgrade Installation for details.

If all Acuo products are to be completely removed or upgraded, the uninstall order is the reverse of the install order listed above - uninstall AcuoSemantix, uninstall AcuoMed, uninstall AcuoStore.

General Uninstall Order (for Service Pack level upgrades and above):

1. Uninstall AcuoSemantix
2. Uninstall AcuoMed
3. Uninstall AcuoStore

5-2 AcuoSemantix new installation

For new installations of AcuoSemantix, perform the following steps:

Notes:

- The 6.0.1 version of AcuoSemantix is ONLY compatible with 6.0.1 versions of AcuoStore/AcuoMed. As subsequent Service Packs for Acuo products are released, contact Acuo Technologies Support for supported version combinations.
- Version numbers referenced or seen in screenshots below may vary.

1. Double click the **Setup.exe** file to run the installer.

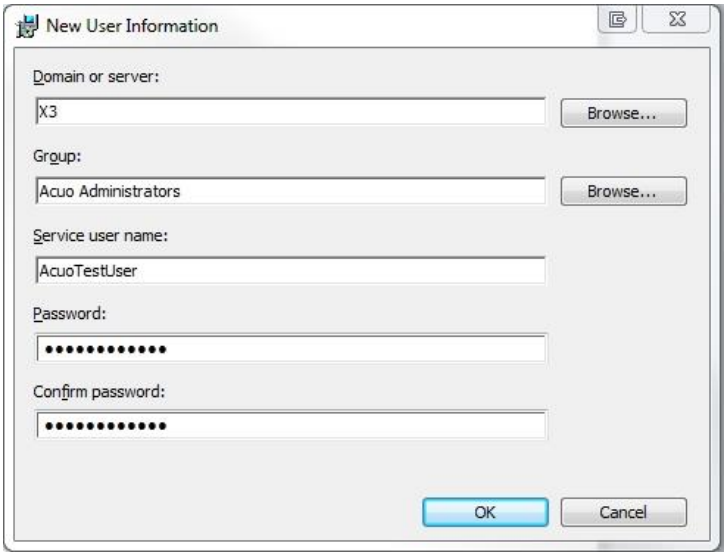
1. This will typically be in the following location inside the install folder for AcuoSemantix: …**\Version 6.0.1\AcuoSemantix 6.0.1.XX\DiskImages\DISK1**

2. Click **Next** on the welcome screen.

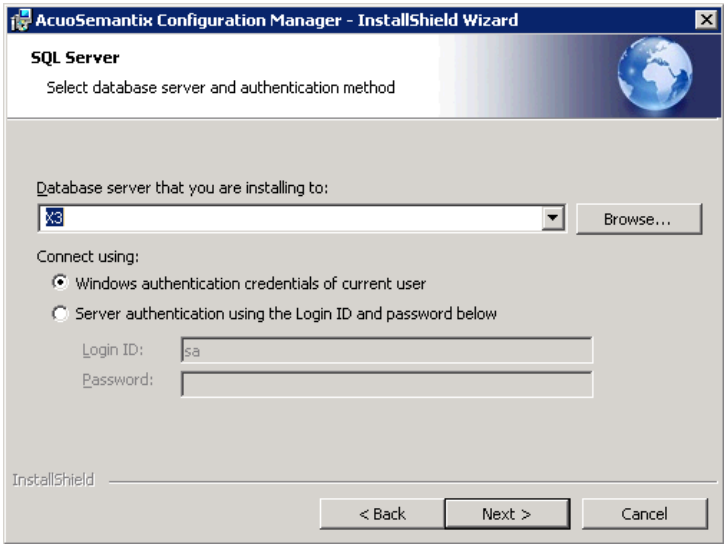
3. Select the option to accept the license agreement, and then click **Next**.

4. Enter the Service User Name and Password that will be used to run the AcuoSemantix service.

5. If needed, click **New User Information** to create a new user.



6. On the SQL Server screen, select the database server you are installing the AcuoSemantix database to, as well as the authentication method, Windows authentication or SQL Server authentication using a login and password:



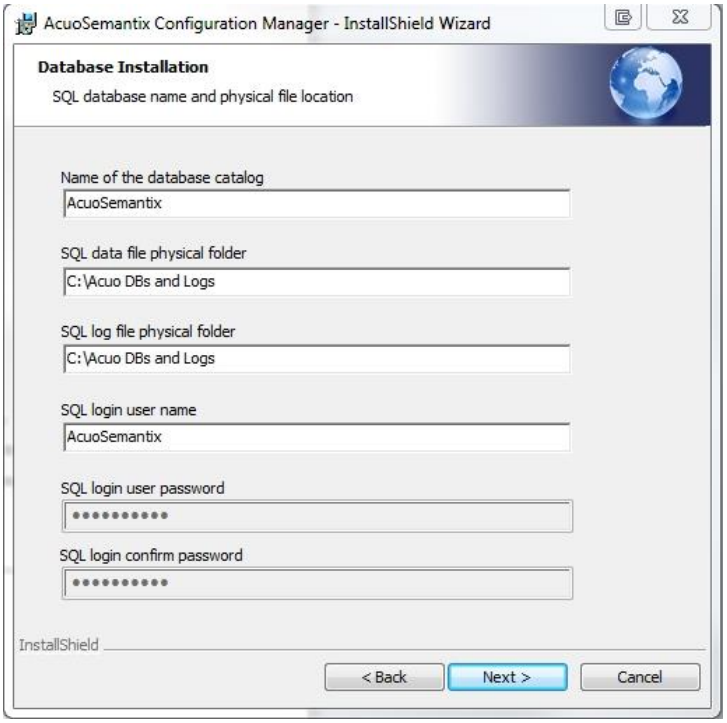
7. On the Database Installation screen, enter the following:
   1. Database Name - name of the database catalog field
   2. The location where the AcuoSemantix database file and log file will be saved.
      i. The default text for these fields is **DEFAULT.** If "**DEFAULT**" is specified in these fields, the location of the database file and log file will be determined by the default SQL Server database directory. To find the default directory, open up SQL Server Management Studio, right click on the instance name and select Properties. Select the "**Database Settings**" page, and go to the "**Database Default Locations**" section (Data and Log fields).

         Notes

         - If the default directories are changed in SQL Server, it is necessary to restart the SQL Server.
         - Prior to AcuoSemantix version 5.3.1, the location of these files could not be changed in the AcuoSemantix installer. Therefore, the default SQL Server location was used for the location of the database file and log file.

ii. It is generally recommended that explicit paths be entered for the AcuoSemantix database file and log file locations, rather than leave the two fields set to **DEFAULT**.

3. Enter the Database Login Name.
    i. If this is an upgrade installation from a version prior to 5.3.1, the login name will generally default to **MedSemantix-es**.
4. The Password field cannot be changed. Contact Acuo Technologies Support if this information is needed.



8. Select **Complete** for the Setup Type, and then click **Next**.

9. Click **Install** to begin the installation.

10. The following message is displayed upon a successful installation. If errors are encountered, contact Acuo Technologies Support for assistance:

5-3 AcuoSemantix Upgrade Installation

If an existing version of AcuoSemantix is already installed, reference the Acuo Release Notes for upgrade details.

Configure AcuoSemantix

There are three general steps to configure AcuoSemantix.

6-1 Modify AcuoSemantixConfig.xml

The **AcuoSemantixConfig.xml** file is located at C:\Program Files (x86)\Acuo Technologies\AcuoSemantix. This file is used to specify where AcuoSemantix will send update and merge messages, Acuo Fixits, along with other configuration options used by AcuoSemantix related to message processing and error handling. The AcuoSemantix Service needs to be restarted if any changes are made to this file. See Figure 6-1 below for a screenshot showing a sample **AcuoSemantixConfig.xml** file. A description of all parameters and steps to edit this file follow.

Notes:

- In versions prior to 5.3.1, the **AcuoSemantixConfig.xml** file was called **ARPSConfig.xml**. In 5.3.1, some of the existing parameters from **ARPSConfig.xml** have been renamed, and there are also some new parameters in 5.3.1 that did not exist previously. The **ARPSConfig.xml** file is no longer valid in 5.3.1, but some parameters may contain data that has not change, such as server names and Called AE names.
- Parameters that have been renamed between 5.2.1 and 5.3.1 are noted below with the text “renamed in 5.3.1” in parenthesis after the name of the parameter. Parameters that are new in 5.3.1 are noted with the text “new in 5.3.1”.

Figure 6-1: AcuoSemantixConfig.xml (Sample File)

```
<?xml version="1.0" encoding="UTF-8"?>
- <AcuoSemantixConfig Version="5.3.1">
        <!-- Message Identification Parameters -->
    <MsgTypeField1>//MSH//MSH_9_MessageType//CM_MSG_MessageType[1]</MsgTypeField1>
    <MsgTypeField2>//MSH//MSH_9_MessageType//CM_MSG_TriggerEvent[1]</MsgTypeField2>
    <SourcePath>//MSH//MSH_3_SendingApplication//HD_NamespaceId[1]</SourcePath>
        <!-- Fixit Parameters -->
    <HostName>localhost</HostName>
    <ListeningPort>4321</ListeningPort>
    <AETitle_AcuoMed>AcuoMed</AETitle_AcuoMed>
    <AETitle>AcuoSemantix</AETitle>
    <ImplementationUID>1.2.840.114158.1.4.1</ImplementationUID>
    <ImplementationName>AcuoSemantix531</ImplementationName>
    <UpdateDelayInMinutes/>
    <UseHisRisAsFilter>NO</UseHisRisAsFilter>
    <EnableFixitStudyStatus/>
    <EnableDefaultFixitForDomain>NO</EnableDefaultFixitForDomain>
  - <FixItDests>
    - <Dest>
          <IssuerPIDValue>1234</IssuerPIDValue>
          <HostName/>
          <Port>4321</Port>
          <SCPAETitle>AcuoMedFixit</SCPAETitle>
      </Dest>
    - <Dest>
          <IssuerPIDValue>9876</IssuerPIDValue>
          <HostName/>
          <Port>4321</Port>
          <SCPAETitle>AcuoMedFixit2</SCPAETitle>
      </Dest>
    </FixItDests>
        <!-- Batch Move (Prefetch) Parameters -->
    <PrefetchStationMapping>//PV1//PV1_3_AssignedPatientLocation//PL_FacilityHd//HD_NamespaceId[1]</PrefetchStationMapping>
    <AcuoBatchMoveServer>localhost</AcuoBatchMoveServer>
    <EnableBatchMoveDBFilter>YES</EnableBatchMoveDBFilter>
    <EnableBatchMoveStudyStatus/>
    <DisablePIDOnMove>NO</DisablePIDOnMove>
    <ExpediteBatchMoveServer/>
    <ExpediteBatchMoveDaysAhead>30</ExpediteBatchMoveDaysAhead>
    <ExpediteBatchMovePriority>4</ExpediteBatchMovePriority>
        <!-- Error Processing Parameters -->
    <SkipHL7MessagesWithErrors>YES</SkipHL7MessagesWithErrors>
        <!-- Miscellaneous Parameters -->
    <MasterDBServerName>localhost</MasterDBServerName>
    <HL7MessagePollingTimer>1</HL7MessagePollingTimer>
    <CleanUpDelayDays>2</CleanUpDelayDays>
    <EnableXMLFiles>NO</EnableXMLFiles>
    <TempFolderPath/>
</AcuoSemantixConfig>
```

Open the **AcuoSemantixConfig.xml** file in Notepad or in an xml editor to edit it. The following is a description of all parameters in this file.

Note Many of the parameters in the **AcupSemantixConfig.xml** file correspond to information pertaining to Acuo Fixit messages sent from AcuoSemantix (see the first 10 parameters below). An Acuo Fixit message is a message sent from one Acuo system to another to keep modified patient and study data in sync across an enterprise solution. Fixit messages are most commonly generated in AcuoSemantix when there are changes to patient demographic information, such as ADT-A08, or when two patients are merged, such as ADT-A18 or ADT-A40. When a fixit message is generated by AcuoSemantix, a job is queued on the AcuoMed system inside the Batch Patient Update Manager queue (Batch Processing Managers node). For more information, refer to the Batch Patient Update Manager section of the AcuoMed Installation and Operations Guide.

1. **MsgTypeField1:** The segment of the incoming message listing the message type, such as ORM, being sent. The information in this field, along with MsgTypeField2, serves as the basis for AcuoSemantix message processing. The data in this field should not be changed.

2. **MsgTypeField2:** The segment of the incoming message listing the event type, such as O01, being sent. The information in this field, along with MsgTypeField1, serves as the basis for AcuoSemantix message processing. The data in this field should not be changed.

Note The parameters MsgTypeField1 and MsgTypeField2 can vary by site and are generally determined and set during initial implementation.

3. **SourcePath:** The segment of the incoming message listing the sending application. The data in this field should not be changed.

4. **HostName:** The AcuoMed server name where fixits will be sent. Change this value to the AcuoMed server name where fixits will be sent.

5. **ListeningPort:** The port number on the AcuoMed system where fixits will be sent. The port number here, along with the Called AE Name in the next parameter, AETitle_AcuoMed, need to match what is configured on the AcuoMed system receiving fixits.

6. **AETitle_AcuoMed**: The Called AE Name on the AcuoMed system where fixits will be sent. The Called AE Name configured here, along with the Port Number from the previous setting, ListeningPort, should match those configured on the AcuoMed system. Change the value in this field to match a Called AE Name on the AcuoMed system.
    - At this point, you may wish to revert back to the AcuoMed system and edit an existing Called AE Name or set up a new one specifically for receiving fixits.

Note The above parameters HostName, ListeningPort, and AETitle_AcuoMed are generally considered the default location where fixits will be sent. Alternatively, fixits may be sent to other destinations if functionality in other parameters is enabled. See the EnableDefaultFixitForDomain and FixItDests parameters below.

7. **AETitle**: This is the Calling AE Name that will be used in the outbound association from AcuoSemantix to AcuoMed when fixits are sent. It is recommended that the default of AcuoSemantix remain unchanged.

8. **ImplementationUID**: This is the Implementation UID that will be used in the outbound association from AcuoSemantix to AcuoMed when fixits are sent. It is recommended that the default of 1.2.840.114158.1.4.1 remain unchanged.

9. **ImplementationName**: This is the Implementation Name that will be used in the outbound association from AcuoSemantix to AcuoMed when fixits are sent. It is recommended that the default of AcuoSemantix531 remain unchanged.

Note As indicated above, the parameters AETitle, ImplementationUID, and ImplementationName should generally remain unchanged from their default values. These fields have no functional ramifications attached to them, unless External SCU Authorization is configured on the Called AE Name that receives fixits. The information in these fields would typically be visible in the AcuoMed Activity Log, the Calling AE Name, or a captured hex trace on the AcuoMed server receiving fixits. This information may be helpful in troubleshooting situations by identifying the source of incoming data.

10. **UpdateDelayInMinutes**: This is the amount of time, in minutes, that fixits jobs queued from AcuoSemantix are delayed from running. The default behavior, when no value is set, is to run fixit jobs immediately.
    - In the Batch Patient Update Manager, any jobs that have a delayed time due to UpdateDelayInMinutes can be associated with the column UTC Created Date. The UTC Created Date should generally be the queued time plus the number of minutes configured in this parameter. The Queued Time column will list the time the job was queued.

11. **UseHisRisAsFilter**: This is set to either **YES** or **NO**. This setting allows Patient Update and Study Update fixit messages to be filtered - suppressed from being sent - if data in the Acuo HIS/RIS tables matches data in an inbound HL7 message for the same patient.
    - If set to **NO**, fixits should be generated for all messages, if the activity is set in the **ActivityList.xml** file.

- If UpdatePatient is configured in the **ActivityList.xml** file for a message, a Patient Level Update fixit will be generated.
- If UpdateStudy is configured in the **ActivityList.xml** file for a message, a Study Level Update fixit will be generated.
- If PatientMerge is configured in the **ActivityList.xml** file for a merge message, a Patient Level Merge fixit will be generated.

- If set to **YES**, AcuoSemantix looks at the Dest tags as configured in either the **PatientUpdate.xml** or **StudyUpdate.xml** file. If there is a difference in one or more of these configured Dest tags between the inbound HL7 message and the data in the HIS/RIS tables, a fixit is generated. If all are the same, no fixit will be generated. Further details are as follows:
  - If UpdatePatient is configured in the **ActivityList.xml** file for a message, the **PatientUpdate.xml** file will generally include the Dest Tags: Patient Name, Birth Date, and Patient Sex. If there are no differences in these tags between the HL7 message and the data in the HIS/RIS Patient table (T_HISRISPATIENTINFO_HRP), a fixit will not be queued. If there is a difference in one or more of the above tags, the configured Dest tags, a fixit will be queued.
  - If UpdateStudy is configured in the **ActivityList.xml** file for a message, such as the **StudyUpdate.xml** file, may be configured with the Dest Tags: Study Description or Referring Physician. If there are no differences in these tags between the HL7 message and the data in the HIS/RIS Event table (T_HISRISEVENTINFO_RIS), a fixit will not be queued. If there is a difference in one or more of the above tags, the configured Dest Tags, a fixit will be queued.
- This setting does not apply for the PatientMerge activity. A Patient Level Merge fixit will always be generated if the PatientMerge activity is configured inside a merge message.
- This setting should apply for any message type, however only if the UpdatePatient or UpdateStudy activity is configured in the **ActivityList.xml** file.
- If a message is logged in error, the UseHisRisAsFilter option becomes disabled and does not take effect for all subsequent retries of the message.
- If a new message is received and nothing exists in the HIS/RIS Patient table, a fixit will be generated.

12. **EnableFixitStudyStatus (renamed in 5.3.1; formerly "ProcessOnORMStudyStatus")**: If configured, AcuoSemantix will only queue a fixit for an Order Message, ORM-O0,) if there is a match between the value configured in the parameter and the value from the incoming HL7 message that is mapped to the Dicom Study Status ID tag 0032, 000a in the **HL7TagMap.xml** file.
    - Example of excerpt from **HL7TagMap.xml** file for the ORMO01 message:
      - <TAGPAIR>
        - <HL7PATH>**//ORC//ORC_1_OrderControl**</HL7PATH>
        - <DICOMTAG>0032,000A</DICOMTAG>
        - <REQUIRED>NO</REQUIRED>
        - <NEWTAGNAME>**ORC_1_OrderControl**</NEWTAGNAME>
        - <OCCURRENCE>1</OCCURRENCE>
      - </TAGPAIR>
    - Using the **HL7TagMap.xml** example file above:
      - If a value is configured in the EnableFixitStudyStatus parameter, the same value must also be found in the following segment of the incoming HL7 message in order for a fixit message to be queued: **//ORC//ORC_1_OrderControl**
    - If no value is configured in this parameter, this functionality should not take effect. This is the default.
    - This value is not case sensitive.
    - This parameter affects both Patient Update and Study Update fixit messages.
      - If this setting is enabled and there is not a match, neither fixit message will be queued.
      - If this setting is enabled and there is a match, both a Patient Update and Study Update fixit will be generated, assuming UpdatePatient and UpdateStudy are configured in the **ActivityList.xml** file for an ORM message.

13. **EnableDefaultFixitForDomain; FixItDests (new in 5.3.1 HF1):** These parameters are new in the AcuoSemantix 5.3.1 Hotfix 1 release. They enable functionality for sending fixit message to different AcuoMed destinations, such as Server, Port, Called AE Name, based on data in the inbound HL7 message. The source data from the inbound HL7 message that is used to determine where to send the fixit is the field mapped to the Issuer of Patient ID tag 0010, 0021 in the **HL7TagMap.xml** file. See below for a description of each parameter.
    - **EnableDefaultFixitForDomain:** This can be set to either **YES** or **NO**. It will default to **NO** if nothing is entered.
        - If set to **NO**, and there is no match to Issuer of PID for any configured Dest, a fixit will not be sent anywhere and the message will not be processed. In addition, a Warning event will be output indicating the message was not processed.
        - If set to **YES**, and there is no match to Issuer of PID for any configured Dest, a fixit will be sent to the default fixit parameters, HostName, ListeningPort, AETitle_AcuoMed.
        - Note that one or more Dests must be configured with a Host Name in order for this parameter to take effect.
    - **FixItDests:** This node contains one or more Dests.
    - **Dest:** Each Dest allows a different Issuer Of PID value to be defined, and parameters for defining where the fixit is to be sent, Host Name, Port, Called AE Name, if there is a match between the configured value and the value from the HL7 message. Each Dest contains the sub-nodes below:
        - **IssuerPIDValue:** Actual value from the HL7 message that is used to determine if a fixit will be sent to this destination. If there is a match between the value configured here and the value from the inbound HL7 message that is mapped to the Issuer of Patient ID tag in the **HL7TagMap.xml** file, a fixit will be sent to the HostName/Port/SCPAETitle for that destination. Each configured Dest should have a different IssuerPIDValue configured.
        - **HostName:** Server name where the fixit will be sent if there is a match. Clearing out the HostName for all Dests effectively disables this functionality and the EnableDefaultFixitForDomain setting above.
        - **Port:** Port where fixit will be sent if there is a match.
        - **SCPAETitle:** Called AE Name where fixit will be sent if there is a match.
    - To set up multiple destinations based on different expected Issuer of PID values, the base node, Dest, and all subnodes can be copied, and values in the subnodes can be changed accordingly while the parent node Dest remains the same. The following is an example of a configuration with two destinations:
        - **<FixItDests>**
            - ***<Dest>***
                - ***<IssuerPIDValue>1234</IssuerPIDValue>***
                - ***<HostName>Server1</HostName>***
                - ***<Port>4321</Port>***
                - ***<SCPAETitle>AcuoMedFixit1</SCPAETitle>***
            - ***</Dest>***
            - ***<Dest>***
                - ***<IssuerPIDValue>5678</IssuerPIDValue>***
                - ***<HostName>Server2</HostName>***
                - ***<Port>4321</Port>***
                - ***<SCPAETitle>AcuoMedFixit2</SCPAETitle>***
            - ***</Dest>***
        - **</FixItDests>**
    - If the Issuer of Patient ID tag in the **HL7TagMap.xml** file is mapped correctly, and this data is present in the incoming HL7 message, it will be inserted into the HRP_ISSUEROFPATIENTID column of the T_HISRISPATIENTINFO_HRP table, the HisRis Patient table.

Note The Issuer of PID is the identifier of the Assigning Authority, the system, organization, agency, or department that issued the Patient ID. The standard location in an HL7 message for Issuer of Patient ID is PID-3-4 (Segment PID, Field 3, Component 4; HL7 Version 2). The DICOM equivalent tag is Issuer of Patient ID 0010,0021.

14. **PrefetchStationMapping (renamed in 5.3.1; formerly "DestPath"):** The segment of the incoming message listing the location of the patient or the location where the exam will occur. The data found in this segment can be used to trigger a Batch Move job if it matches the Station AE Title of a prefetch rule configured on the AcuoMed server. If no match occurs, the default prefetch rule of esdefault will be used. The default value in this field may be changed to a different segment path if Batch Moves need to be triggered from some other segment.
    - The default message segment for the **PrefetchStationMapping** setting is: //PV1_3_AssignedPatientLocation[1]//PL_FacilityHd//HD_NamespaceId

15. **AcuoBatchMoveServer (renamed in 5.3.1; formerly "WhereToTableBatchMoveJob"):** The name of the server where the Batch Move job will be queued. This is the AcuoMed system where the default prefetch rule of esdefault is required to be present. Optionally, other prefetch rules could be set up to drive Batch Moves based on the Assigned Patient Location of the incoming HL7 message. See the "PrefetchStationMapping" parameter above.

16. **EnableBatchMoveDBFilter (new in 5.3.1):** This parameter should be set to **YES** or **NO**. If no value is entered, it will default to **YES**. This is the same default behavior for releases prior to 5.3.1.
    - If set to **YES**, a Batch Move job will only be queued if the PID does not already exist in the Batch Move table. If the PID already exists, a Batch Move will not be queued.
    - If set to **NO**, a Batch Move will be queued for every message unless the EnableBatchMoveStudyStatus is enabled. The EnableBatchMoveStudyStatus parameter may effectively override this setting and potentially prevent a Batch Move job from being queued for an ORM-O01 message. See next parameter below.

17. **EnableBatchMoveStudyStatus**: If a value is configured in this parameter and an order message, ORM-O01, is received, a batch move will only be queued if the value in the ORC-1 Order Control segment matches the value configured here. If no match occurs, no Batch Move will be queued. To turn this functionality off, delete the value in this parameter.
    - This setting only takes effect if SendBatchMove is configured in the **ActivityList.xml** file for one or more message types.
    - **Example** The value NW may be present in the ORC-1 segment to indicate it is a new order. If NW is configured for this parameter in the configuration file, batch moves will only be queued if there is a match or if a new order is received. Subsequent ORM messages with a different order status will not generate an additional Batch Move job.

18. **DisablePIDOnMove**: Controls whether a Batch Move job queued from AcuoSemantix uses PID or Patient Name as the move criteria.
    - If set to **NO**, Batch Moves will be queued using Patient ID, PID, as the move criteria. A wildcard character (*) will be used for Patient Name. This is the default.
    - If set to **YES**, the Patient Name will be used as the move criteria, and a wildcard will be used for PID. If set to **YES,** the components used for the Patient Name are last name and the first initial of the first name.
    - This setting only takes effect if SendBatchMove is configured in the **ActivityList.xml** file for one or more message types.

19. **ExpediteBatchMoveServer; ExpediteBatchMoveDaysAhead; ExpediteBatchMovePriority:**
    - These three parameters work in conjunction with one another. They control functionality that will automatically expedite the run time of an existing Batch Move job if an HL7 message is received that generates a Batch Move for the same patient. If a Batch Move job is already present on the target server, and an HL7 message is received that generates a move for the same patient, the Next Run Time will be modified to one year back from the current date, and the Priority will be changed according to a parameter in the config file, generally to Expedited priority.
    - The following is a description of all three parameters:
        - ExpediteBatchMoveServer
            - This is the target server name where existing Batch Move jobs can be expedited.

- Clearing out the value in this parameter to NULL will effectively disable the Expedite Batch Move Functionality, which is the default. This will also disable the functionality related to the other expedite settings that follow.

- ExpediteBatchMoveDaysAhead
  - If the Next Run Time of a Batch Move job is within today and the number days in this setting, the job will be expedited if the PID already exists.
    - **Example** If today is 5-5-2011 and this parameter is set to 15, all Batch Move jobs with a Next Run Time of 5-20-2011 or earlier will be expedited, if the PID already exists.
- ExpediteBatchMovePriority
  - If a Batch Move job is being expedited, this allows the Priority of the job to be changed according to the following:
    - 4 = Expedited
    - 3 = High
    - 2 = Medium
    - 1 = Low

- Other notes on the Expedite Batch Move functionality:
  - In the **ActivityList.xml** file, the SendBatchMove activity must be configured for the message type where Batch Moves are being generated or expedited.
  - In the **AcuoSemantixConfig.xml** file:
    - The AcuoBatchMoveServer parameter must be configured with a valid AcuoMed server name. This field cannot be null.
    - If the ExpediteBatchMoveServer is invalid or unreachable, the ARPS_RE_EVENT_PROCESSED column of the T_ARPS_RIS_EVENTS table will be populated with the value 4096 (update/expedite Batch Move error). This message, with the 4096 error, should be automatically retried and thus should run successfully once a valid server is entered or alternatively the row in the T_ARPS_RIS_EVENTS table can be deleted to retry the message.
  - If the AcuoBatchMoveServer and ExpediteBatchMoveServer parameters have the same server configured, all new jobs will be expedited if their run times fall within the ExpediteBatchMoveDaysAhead parameter.

    Note For a newly queued job under this scenario, the resulting run time is equal to the Scheduled Study Date minus the number of days configured to prefetch ahead of time according to the esdefault prefetch rule.
    - **Example** Current date is 5-5-2011. An HL7 message is received that generates a Batch Move, and the Scheduled Study Date is 5-23-2011. The esdefault prefetch rule is configured to schedule prefetch jobs 7 days prior, thus on 5-16-2011. If the ExpediteBatchMoveDaysAhead parameter is set to 15, any newly queued Batch Move job will run have its run time set to one year earlier since 5-16 is less than 5-20.

20. **SkipHL7MessagesWithErrors (new in 5.3.1)**: This setting is related to message retry behavior for messages in error that are considered retryable. The status of a message that has been processed or failed processing is logged in the T_ARPS_RIS_EVENTS table, ARPS_RE_EVENT_PROCESSED column of the AcuoSemantix database. The following are the general states/values that may be logged into this column:
    - ARPS_RE_EVENT_PROCESSED = 0
      - A value of 0 is set momentarily for all messages just before they are processed.
    - ARPS_RE_EVENT_PROCESSED = 1
      - A value of 1 indicates the message was processed successfully.
    - ARPS_RE_EVENT_PROCESSED >= 2 and <= 15
      - A value between 2 and 15 indicates a non-retryable error. If a message is logged with a non-retryable error, it will never be retried again on its own. If this message needs to be processed

again, such as troubleshooting the problem with the message, a manual change to the database is needed. Contact Acuo Technologies Support for further assistance.
        - The SkipHL7MessagesWithErrors parameter does not affect non-retryable errors. This setting is related only to retryable errors.
    - ARPS_RE_EVENT_PROCESSED >= 16
        - A value greater than or equal to 16 indicates a retryable error. Messages logged with these errors will generally be retried on their own periodically; The behavior is affected by the parameter SkipHL7MessagesWithErrors.
            - If set to **YES**, retryable messages in error will be skipped and retried automatically. This is the recommended setting for all current versions of AcuoSemantix.
            - If set to **NO** and a message is logged as a retryable error, processing of all subsequent messages is halted until the error is resolved. The same message will retry automatically on its own until it is successfully processed. All other subsequent messages received after the erred message will not be processed until the erred message is processed successfully. In cases where the erred message continues to fail after repeated retry attempts, a manual change to the database may be needed to allow processing to continue or troubleshoot the message in error. Contact Acuo Technologies Support for assistance.

21. **MasterDBServerName:** This is the name of the AcuoMed server where the HIS/RIS Patient and Event tables are updated with patient/study information, depending on the type of HL7 message received. This is also the AcuoMed server where a HIS/RIS feature key must be present.

Note In basic environments, the MasterDBServerName is typically the central long-term archive. But in more complex environments, multiple locations may exist in handling multiple RIS sources.

22. **HL7MessagePollingTimer (renamed in 5.3.1; formerly "RetryAcuoMedTimer")**: This is the amount of time AcuoSemantix checks for new messages that have been received and need processing. These are messages that have been inserted into the T_ARPS_HL7_TO_XML_REPRESENTATION table but are not yet processed by AcuoSemantix. This is also the interval, in seconds, AcuoSemantix will retry a message in error if the AcuoMed service is down, the HIS/RIS is not configured on the AcuoMed server, or the default prefetch rule of esdefault is not present on the AcuoMed server.
    - The default value for the **HL7MessagePollingTimer** setting is one second. It is recommended that the default value of one remain unchanged.

NOTE:	If the **HL7MessagePollingTimer** is set to something greater than the default of one second, there may be noticeable delays in message processing since this is the interval that AcuoSemantix checks for new messages.

23. **CleanUpDelayDays:** This is the number of days that must expire before messages are deleted from the T_ARPS_HL7_TO_XML_REPRESENTATION and T_ARPS_RIS_EVENTS tables in the AcuoSemantix database. The current system date is compared to the Acuo Insert Date of the events, and deletes events from both tables if the difference exceeds the number configured in this setting. The CleanUpDelayDays process runs once every time the AcuoSemantix Service is started or restarted, then once every day thereafter at that same time.
    - This value should be determined and set during site implementation and is dependent upon how long messages need to be kept in the database.

24. **EnableXMLFiles (new in 5.3.1):** This parameter can be used to enable writing of XML files to the configured Temp directory for the purposes of troubleshooting and viewing a snapshot of internal files at the time a single message is being processed. This parameter should be set to **YES** or **NO**.
    - If set to **NO**, XML files will not be written to the Temp directory. If no value is entered, it will default to **NO**. This is the same default behavior for releases prior to version 5.3.1. It is recommended this setting remain unchanged from the default of **NO** during normal operation.

- If set to **YES**, a set of XML files, which is approximately 6 files, will be written and saved into the directory configured in the TempFolderPath parameter. The directory only contains a set of XML files for the most recent message that has been processed. Each time a subsequent message is processed, the XML files are overwritten with those from the most recent message. Therefore, files should not accumulate in this directory.

25. **TempFolderPath (new in 5.3.1):** This is the location of the directory that AcuoSemantix uses to temporary write fixit messages. Files are temporarily written here for fixit processing, then immediately deleted.
    - If no value is listed, the default is to use the Temp subfolder in the directory where AcuoSemantix is installed. This is also the same behavior as in previous versions, however in previous versions the directory could not be changed. For example, the following directory is used by default on a 64 bit system:
        - C:\Program Files (x86)\Acuo Technologies\AcuoSemantix\Temp
    - The "Temp" sub-folder is created upon startup inside the directory configured in this parameter.
    - No files should accumulate or be found in this directory. Any leftover files that are unintentionally left behind will get deleted automatically when the AcuoSemantix service is started or restarted.
    - The AcuoSemantix service should be restarted after making a change to this parameter.

6-2 Modify ActivityList.xml

The **ActivityList.xml** file is located at *C:\Program Files (x86)\Acuo Technologies\AcuoSemantix*. This file is used to specify what activities or actions will be performed for each HL7 message type that is received. Changes to this file should not require a restart of the AcuoSemantix Service. See figure 6-2 below for a screenshot showing a sample **ActivityList.xml** file with notes on how this file can be edited follow below.

Figure 6-2: ActivityList.xml (Sample File)

```
<?xml version="1.0" encoding="utf-8" ?>
- <ActivityList Version="5.3.1">
  - <MESSAGE name="ADTA01">
      <ACTIVITY>UpdateAcuoHISRIS</ACTIVITY>
      <ACTIVITY>SendBatchMove</ACTIVITY>
    </MESSAGE>
  - <MESSAGE name="ADTA08">
      <ACTIVITY>UpdateAcuoHISRIS</ACTIVITY>
      <ACTIVITY>UpdatePatient</ACTIVITY>
      <ACTIVITY>SendBatchMove</ACTIVITY>
    </MESSAGE>
  - <MESSAGE name="ADTA18">
      <ACTIVITY>UpdateAcuoHISRIS</ACTIVITY>
      <ACTIVITY>PatientMerge</ACTIVITY>
      <ACTIVITY>UpdatePatient</ACTIVITY>
      <ACTIVITY>SendBatchMove</ACTIVITY>
    </MESSAGE>
  - <MESSAGE name="ORMO01">
      <ACTIVITY>UpdateAcuoHISRIS</ACTIVITY>
      <ACTIVITY>UpdatePatient</ACTIVITY>
      <ACTIVITY>UpdateStudy</ACTIVITY>
      <ACTIVITY>SendBatchMove</ACTIVITY>
    </MESSAGE>
  - <MESSAGE name="Activity Examples">
      <ACTIVITY>UpdateAcuoHISRIS</ACTIVITY>
      <ACTIVITY>PatientMerge</ACTIVITY>
      <ACTIVITY>UpdatePatient</ACTIVITY>
      <ACTIVITY>UpdateStudy</ACTIVITY>
      <ACTIVITY>SendBatchMove</ACTIVITY>
    </MESSAGE>
  </ActivityList>
```

Note The **ActivityList.xml** file is generally set up during initial implementation. Any changes to this file should be made by Acuo Support personnel. Changes made to this file may have significant workflow ramifications.

- Refer to Figure 6-2 above. Notes on editing the **ActivityList.xml** file, which open in Notepad or in an XML editor to modify:
    - New message names may be added, along with corresponding activities depending on the requirements determined from site assessment and implementation.
    - To add a new message name, copy the text from an existing message from the "<MESSAGE name…" all the way to the end tag "</MESSAGE" including the activities in between, and paste it just after the end of another message. Change the text inside the quotes to the new message name, and add or remove any associated activities as needed.
    - The activities that can be configured for each message name are the following:
        - **UpdateAcuoHISRIS**
            - This activity should always be listed first if present.
            - If this activity is configured, patient information will be logged into the HIS/RIS Patient table T_HISRISPATIENTINFO_HRP and event information is logged into the HIS/RIS Event table T_HISRISEVENTINFO_RIS. This information is logged to the AcuoMed Server Database found in the **MasterDBServerName** parameter in the **AcuoSemantixConfig.xml** file. The information logged may depend on the message type and contents received. Further details by message type:
                - ORM-O01 Order Messages: Information is logged into the HIS/RIS Patient and HIS/RIS Event tables.

- ADT Messages, such as ADT-A08 and ADT-A18: Information is logged into the HIS/RIS Patient and HIS/RIS Event tables. However the entry into the Event table is generally a dummy record that does not contain any relevant information since ADT messages do not generally contain Study/Event information.

Notes

- If a patient is being reconciled from the Reconciliation Event Manager, REM, in AcuoMed, the records that will be returned during the HIS/RIS search are those with a patient and event entry. In addition, the event entry must contain a valid Study Date, Scheduled Procedure Start Date. The RIS_SCHEDPROCSTARTDATE column in the table T_HISRISEVENTINFO_RIS cannot be null and should contain a valid date. The mapping of this field from an HL7 message is normally configured during initial site implementation and testing.
- The above functionality is effective in 5.3.1 HF1 and beyond. In the base 5.3.1 release, a record was not inserted into the HIS/RIS Event table for ADT messages.

    - **PatientMerge (new in 5.3.1)**
        - This activity will generate a Patient Level Merge Fixit Message on the AcuoMed server. Previously in 5.2.1, the UpdatePatient activity queued the merge fixit message. In 5.3.1, the PatientMerge activity queues the merge fixit, and the UpdatePatient activity only queues a Patient Update fixit.
        - This activity should be configured for any merge message type such as ADT-A18, ADT-A34, ADT-A40.
        - The recommended order of activities for a merge message in 5.3.1 is PatientMerge, followed by UpdatePatient. For example, the listing of all activities for an ADT-A18 in 5.3.1 is as follows:
            - UpdateAcuoHISRIS (always first)
            - **PatientMerge (listed before UpdatePatient)**
            - **UpdatePatient (listed after PatientMerge)**
            - SendBatchMove (last, if needed)
        - The parameters in the **AcuoSemantixConfig.xml** file that affect Merge fixits are the following:
            - HostName, ListeningPort, AETitle_AcuoMed, AETitle, ImplementationUID, ImplementationName, where the fixits will go
            - UpdateDelayInMinutes
            - EnableDefaultFixitForDomain, FixItDests
            - The UseHisRisAsFilter and EnableFixitStudyStatus parameters are not applicable for merge messages.

    - **UpdatePatient**
        - This activity will generate a Patient Level Update Fixit Message on the AcuoMed server.
        - The other parameters in the **AcuoSemantixConfig.xml** file that affect Patient fixits are the following:
            - HostName, ListeningPort, AETitle_AcuoMed, AETitle, ImplementationUID, ImplementationName, where the fixits will go
            - UpdateDelayInMinutes
            - UseHisRisAsFilter
            - EnableFixitStudyStatus
            - EnableDefaultFixitForDomain, FixItDests
        - The UpdatePatient activity should be listed after the PatientMerge activity.

    - **UpdateStudy**
        - This activity will generate a Study Level Update Fixit Message on the AcuoMed server.
        - The parameters in the **AcuoSemantixConfig.xml** file that affect fixits are the same as Patient Level.

- **SendBatchMove**
  - This will queue a Batch Move job to the server specified in the AcuoBatchMoveServer parameter.
  - The other parameters in the **AcuoSemantixConfig.xml** file that affect Batch Moves are the following:
    - PrefetchStationMapping
    - EnableBatchMoveDBFilter
    - EnableBatchMoveStudyStatus
    - DisablePIDOnMove
    - ExpediteBatchMoveServer, ExpediteBatchMoveDaysAhead, ExpediteBatchMovePriority
    - SendBatchMoveStudy
    - SendBatchMovePatient
- **SendBatchMoveStudy**
  - This will queue a Study Level Batch Move job to the server specified in the AcuoBatchMoveServer parameter. This Batch Move job would typically include the Study UID if provided in the HL7 mesasge.
  - The other parameters in the **AcuoSemantixConfig.xml** file that affect Batch Moves are the following:
    - PrefetchStationMapping
    - EnableBatchMoveDBFilter
    - EnableBatchMoveStudyStatus
    - DisablePIDOnMove
    - ExpediteBatchMoveServer, ExpediteBatchMoveDaysAhead, ExpediteBatchMovePriority
    - SendBatchMove
    - SendBatchMovePatient
- **SendBatchMovePatient**
  - This will queue a Patient Level Batch Move job to the server specified in the AcuoBatchMoveServer parameter. This functions the same as the SendBatchMove activity, and was added at the time SendBatchMoveStudy was created to differentiate patient from study level.
  - The other parameters in the **AcuoSemantixConfig.xml** file that affect Batch Moves are the following:
    - PrefetchStationMapping
    - EnableBatchMoveDBFilter
    - EnableBatchMoveStudyStatus
    - DisablePIDOnMove
    - ExpediteBatchMoveServer, ExpediteBatchMoveDaysAhead, ExpediteBatchMovePriority
    - SendBatchMove
    - SendBatchMoveStudy

Note Queuing Batch Moves is also commonly referred to as Prefetching.

6-3 Modify/Replace Other XML Files

Other XML and mapping files are present with the install of AcuoSemantix found at *C:\Program Files\Acuo Technologies (x86)\AcuoSemantix*. These may need to be modified or replaced accordingly to compensate for differences in the version of HL7 messages being received or varying differences in message components from each HL7 feed. Sorting through these differences is generally part of the site assessment and implementation process where a sampling of site messages is

generated and analyzed by Acuo Technologies. Any modified files that are needed will be provided by Acuo when AcuoSemantix is configured and installed, after site assessment and implementation. Contact Perceptive Software for more information about setting up or modifying mapping fields.

Some XML files installed in the above AcuoSemantix directory are suffixed with _Template at the end of the file name. These are generally the XML files that may be site-specific and therefore require changes or different mappings from site to site. The template files are designated to help serve as a baseline showing general content format in these files, but they need to be modified accordingly.

- All files designated as template files need to be present in the AcuoSemantix directory in order for AcuoSemantix to function. They need to be renamed and saved without the _Template text, or files with the correct names need to be copied into the AcuoSemantix directory.
    - For example, the **HL7TagMap.xml** file needs to be present in the AcuoSemantix directory for AcuoSemantix to function properly, not the **HL7TagMap_Template.xml** file).

Note After inserting the customized XML mapping files, the file **DicomTagInit.xml** must have write permissions in order for AcuoSemantix to function properly.

Install and configure Intelligo Enterprise Manager

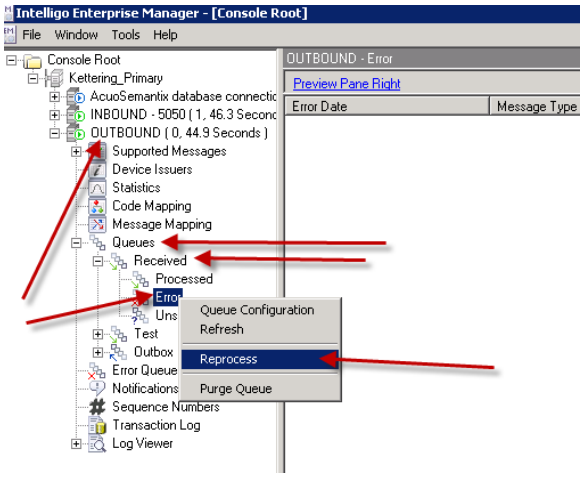
Intelligo should be installed on the same machine where AcuoSemantix is installed.
Contact Acuo Technologies for assistance installing and configuring Intelligo Enterprise Manager.

Working With Intelligo Enterprise Manager

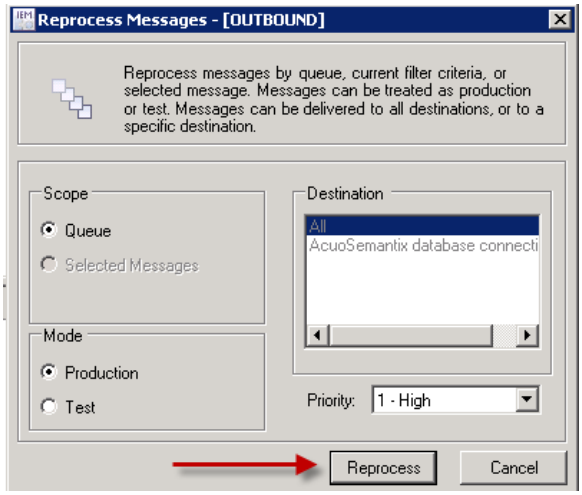
There are some common tasks which can be performed inside Intelligo Enterprise Manager for managing messages.

8-1 Reprocessing messages in Error

If there are messages present in the Error queue, the following steps can be followed to resend those messages:



1. Select OUTBOUND > Queues > Received
2. Right click on Error.
3. Select Reprocess.
4. The default selections should be as shown below:
    a. Scope is set to: Queue
    b. Mode is set to: Production
    c. Destination is set to: All
5. Click Reprocess.



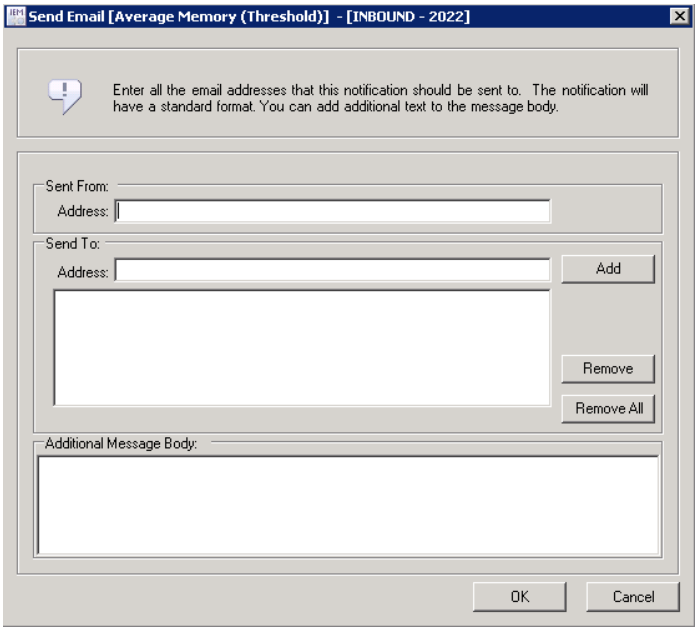
Note In the event the database goes down or is restarted, the Medicalis IIE Service should be restarted prior to reprocessing messages in the Error queue.

8-2 Intelligo Alerts

Alerts can be configured inside Intelligo Enterprise Manager through the Notifications node inside an Intelligo device. To set up Alerts, the following steps can be performed:

1. Inside Intelligo Enterprise Manager, expand an individual device, right-click the Notifications node and select Configure Notifications.
2. Configure the trigger events and desired notification actions for the device.

Recommended configuration example:



- Sent From: <CUSTOMER>_HL7@acuotech.com
- Send To: archive@acuotech.com
- Additional Message Body:

  Customer: <CUSTOMER_NAME>
  Location: Primary Data Center
  Alert: HL7
  Type: ACTIONABLE | NON-ACTIONABLE
  Port:
  Server: <HOSTNAME> - <IP ADDRESS>
  Message: A connection was lost from the customer's interface engine.

- Resolution:
  1) Verify Intelligo port is listening using netstat -an | find ":<PORT>
  2) If port is listening and no connection is established, contact customer to restart the interface on their side.

To change the Intelligo mail server for alerts, perform the following:

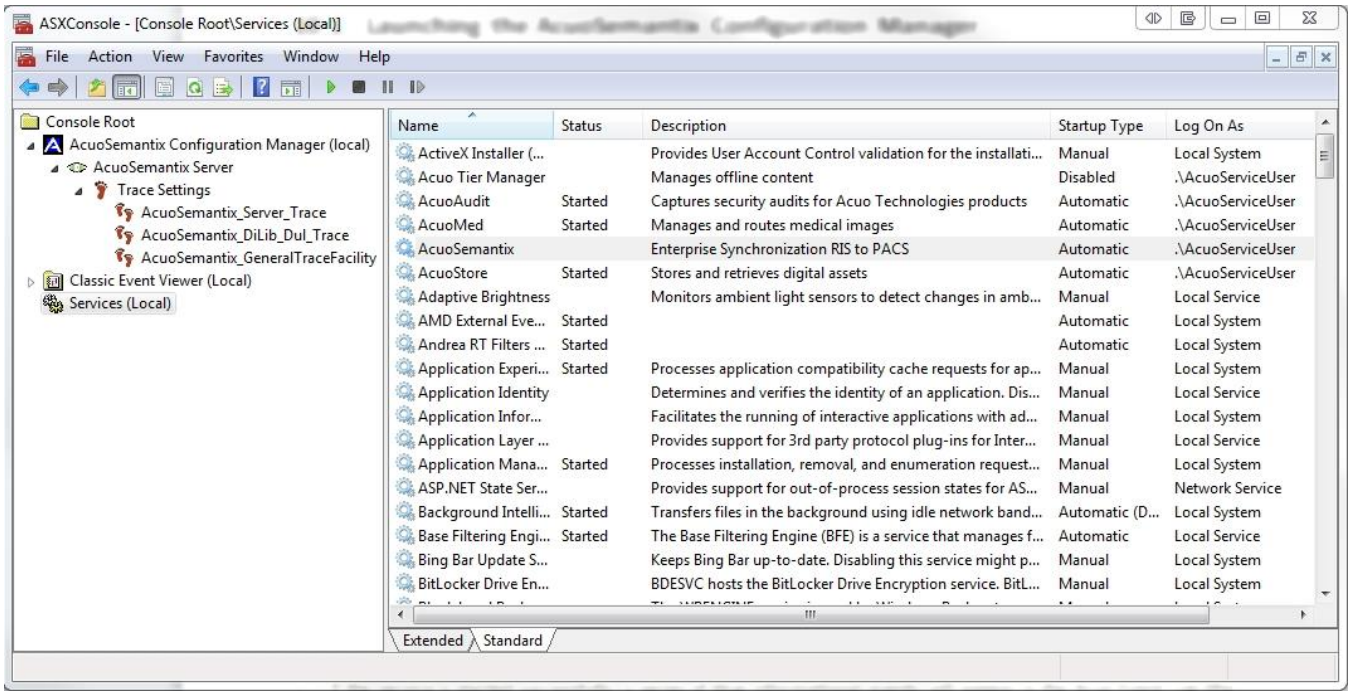
a. Stop the Medicalis IIE Service.
b. Update the mail server. This is either configured during the initial install or through the database post install.
    i. Update IIEConfig.dbo.PlatformConfiguration set mailServer = 'mail.acuotech.com'
c. Verify the mail server:
    i. Select mailServer from PlatformConfiguration
d. Start the Medicalis IIE Service.

AcuoSemantix - Service startup and message processing

After all installation and configuration steps are completed, the service may be started and messages may be received.

9-1 Launching the AcuoSemantix Configuration Manager

1. To start or restart the AcuoSemantix Service, open the Acuo Technologies folder on the desktop, click the AcuoSemantix folder, then launch the shortcut for the AcuoSemantix MMC. Go to the Services node and select the AcuoSemantix service. From there, click the buttons at the top of the screen or use the right click options available to stop, start, or restart the service.

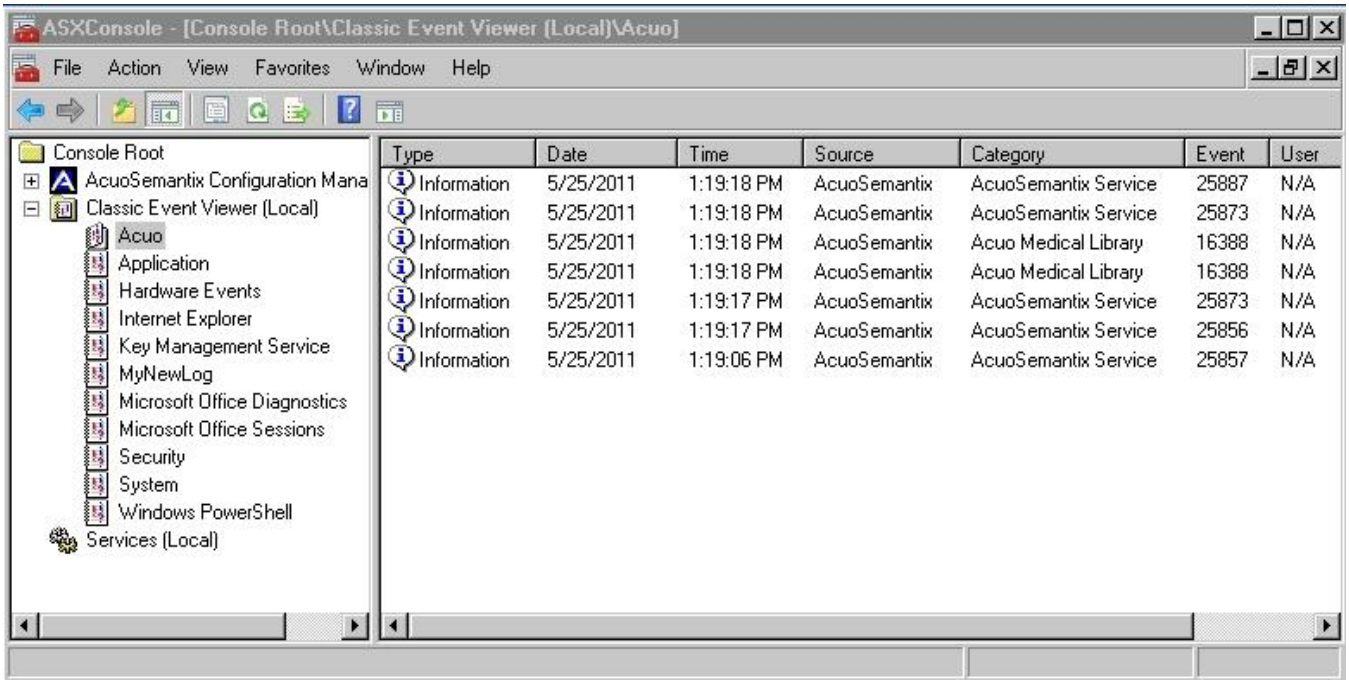


Notes

- The step above describes how to launch the standalone AcuoSemantix MMC, AcuoSemantix Configuration Manager that is present in the Acuo Technologies folder after running the installer. The Services node and the Event View nodes are also included as part of the default Acuo Technologies MMC that is present in the Acuo Technologies desktop folder. Therefore, the primary items of significance in the AcuoSemantix Configuration Manager snap-in are the Database Connection Parameters, which can be found by right clicking AcuoSemantix Server, select Change Database Connection, and access to the Trace Settings.

- Rather than opening up a separate MMC specifically for the AcuoSemantix Configuration Manager, the AcuoSemantix Configuration Manager node can simply be added to any other existing MMC. To do this, open up any existing MMC, such as one which may already contain AcuoMed/AcuoStore, go to the File menu, select Add/Remove Snap-in, then add the AcuoSemantix Configuration Manager snap-in.

2. If the service is started successfully, a series of blue informational events will appear in the Acuo Event Log. The screenshot below is after a complete restart of the service that was already running prior to the restart. There is an event output when the service is stopped, when the service starts, some initialization messages, and a final initialization message when the service is ready.

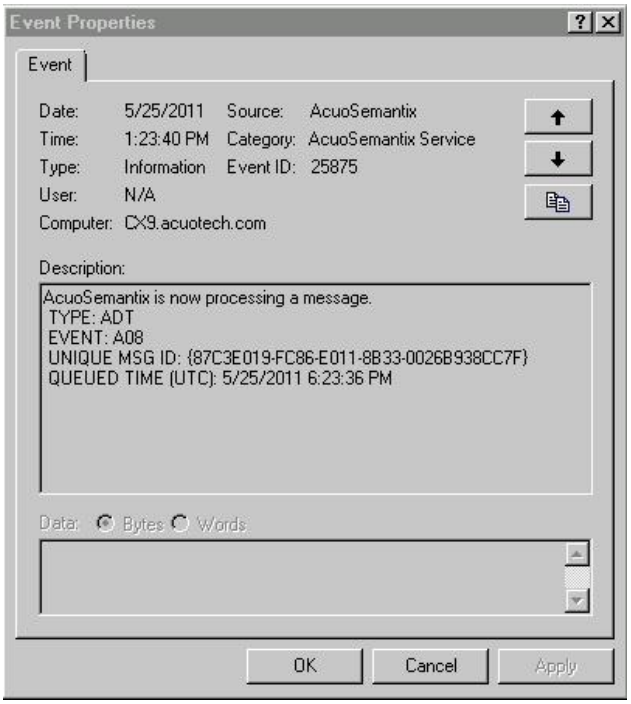


3. If the AcuoSemantix Service starts up normally and is now ready to receive messages, the last informational event output is the following: The AcuoSemantix service has been initialized and is ready to process Events.

9-2 Message processing and verification

After the service is started up successfully, AcuoSemantix is ready to receive messages. Once messages are being sent from the HL7 source into Intelligo, there are a few options available to verify messages are being processed correctly or that an issue exists with message processing. The following options are available:

1. Check the Acuo Event Viewer (available from the AcuoSemantix Configuration Manager):
   - Every time a new message is received, a blue informational event will be output indicating AcuoSemantix is now processing a message. The event also lists the message type, event type, a unique message ID, and the queued UTC time. See the following example:



- If the message above is followed by other informational events, yellow warning events, or red error events, additional investigation and troubleshooting may be necessary.

2. Look at the following two tables in the AcuoSemantix database:
   - **T_ARPS_HL7_TO_XML_REPRESENTATION**
   - **T_ARPS_RIS_EVENTS**
     - If these two tables contain a different amount of rows, that may suggest that Intelligo converted the message to XML and inserted it into the DB, however AcuoSemantix has trouble processing it. This scenario would not be unusual if messages are being sent in with unexpected or atypical characteristics.
     - Check the insert times of the entries in both tables to see if it coincides with the time that messages were sent in.
     - In the T_ARPS_RIS_EVENTS table, check the columns that end in PROCESSED, VALIDATED, and RESULT. These columns may indicate a problem with message processing or the inability to properly validate the message against required message components.
       i. The …PROCESSED column should generally display the number 1, which indicates it was processed.
          - Also reference the parameter SkipHL7MessagesWithErrors under the section above Modify **AcuoSemantixConfig.xml** for other values which may be logged when messages are in error.
       ii. The …VALIDATED column should generally indicate True, which means the message was properly validated.
       iii. The …RESULT column should generally indicate, HL7 Message processed, if it was processed successfully.

3. Review the expected behavior on the connected AcuoMed system. The **ActivityList.xml** configuration file will show the expected activities for each message type:
   - If UpdateAcuoHISRIS is configured as an activity for the message that was received, check the HIS/RIS Patient and Event tables in the AcuoMed Database to see if new patients/events are getting logged.

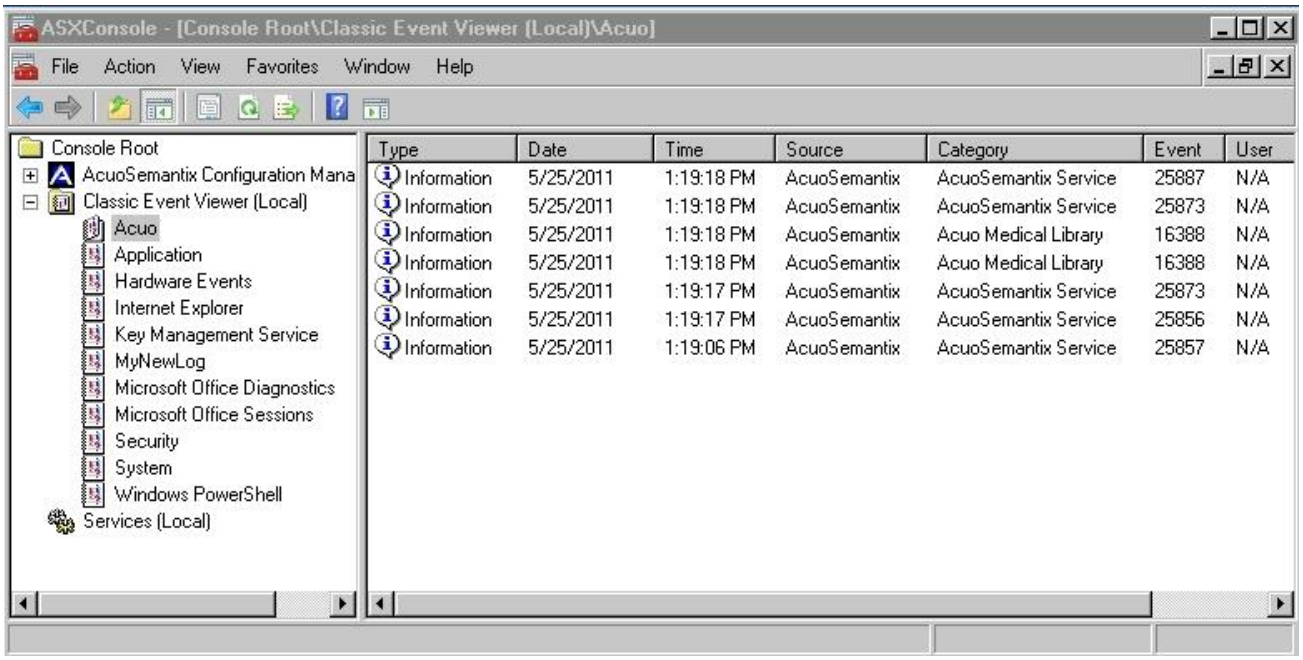
        - On a related note, if an unusually high amount of patients are going into the Reconciliation Event Manager, REM, this may also indicate a problem that not all messages are being processed and new messages are not properly updating the HIS/RIS tables.
- If SendBatchMove is configured as an activity for the message that was received, check the Batch Move Manager queue on the AcuoMed system.
- If fixit activities are configured, such as PatientMerge, UpdatePatient, UpdateStudy, check the Batch Patient Update Queue on the AcuoMed system and verify jobs are getting logged and are completing.

Appendix A: Troubleshooting

This appendix describes the various steps that you can take when you encounter problems using Acuo products.

Event Viewer

- The Event Viewer within Windows lets you view multiple event logs. Each of these logs runs constantly and, when you encounter a problem, you can open the Event Viewer and select from one of the four event logs to obtain more information. To open the Event Viewer, from the **Start** menu, select **Programs > Administrative Tools > Event Viewer**. Note the same Event Viewer is also visible in the AcuoSemantix Configuration Manager. The screenshot below shows the Event Viewer inside the AcuoSemantix Configuration Manager.

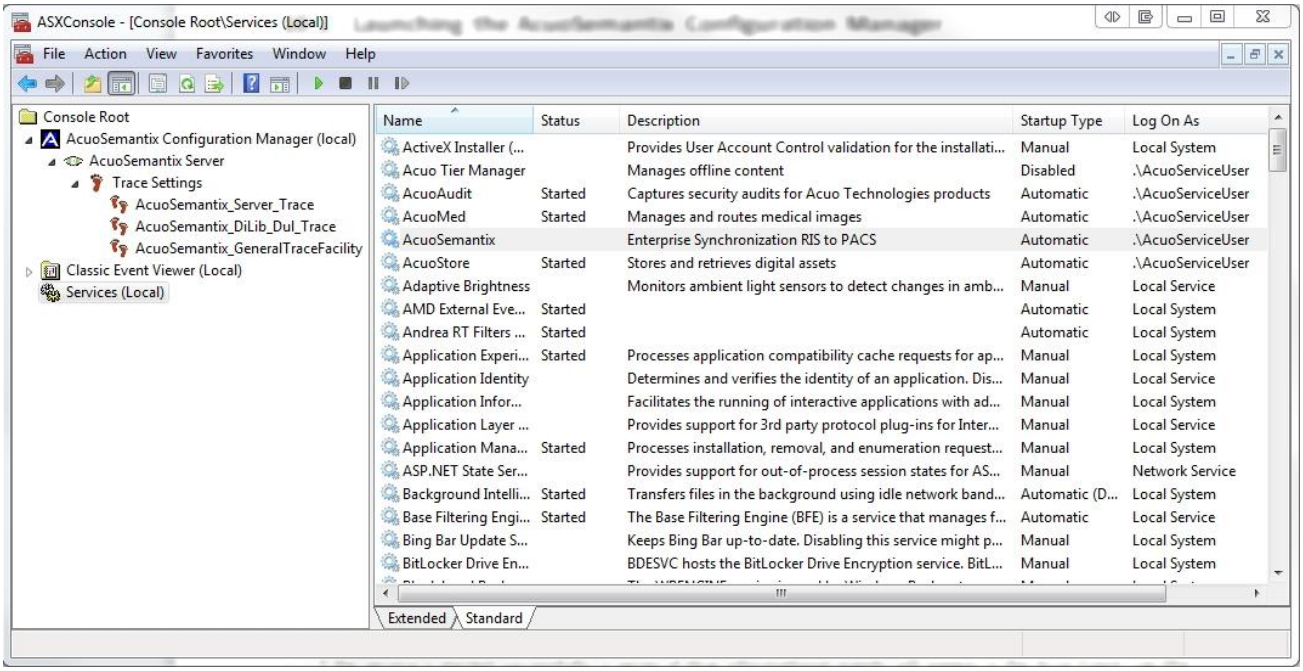


- The “Acuo” subnode inside the Event Viewer is the log that will contain information specific to AcuoSemantix.

Note When using the Information, Warning, and Error messages to diagnose a problem, you should review several messages around a particular timeframe to gain a more comprehensive picture of what is happening.

AcuoSemantix Traces

- As with all Acuo products, AcuoSemantix has the capability to output tracing information to help troubleshoot and debug specific problems. To access the traces and trace settings, launch the AcuoSemantix Configuration Manager and navigate to the AcuoSemantix Server > Trace Settings node. The individual traces and trace settings become visible.



Note By clicking the Trace Settings node, you can see a summary of which traces are On.

- The following 3 traces are available for AcuoSemantix:
  - AcuoSemantix_GeneralTraceFacility
  - AcuoSemantix_DiLib_Dul_Trace
  - AcuoSemantix_Server_Trace

- To change various properties for the individual traces, right-click one of the traces and select **Modify Trace Settings** from the pop-up menu. For further assistance, contact an Acuo Support Engineer.

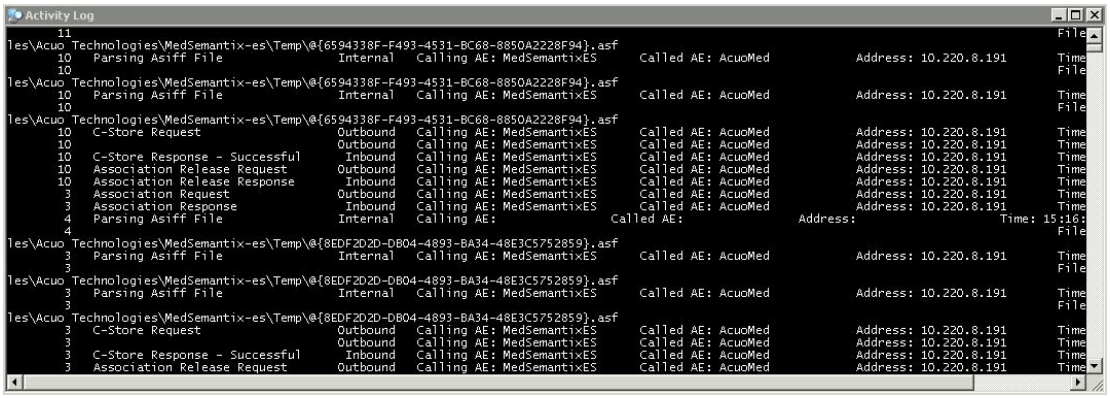
Manual Delivery of Error Trace Data

There may be cases when the Acuo Support staff will want you to manually collect and send trace information, either through email or by FTP. You need to locate, zip, and send the trace contents for AcuoSemantix. To do this, follow these steps:

1. To collect traces, navigate to the Windows directory, then the Tracing folder. This is typically *C:\WINDOWS\Tracing*.
2. Select and copy all of the trace files into a newly created folder.
3. Create a zip file with the contents of the folder and email it to an Acuo Support Engineer or copy it to the Acuo Technologies FTP Server. Contact an Acuo Support Engineer for the preferred method.

Activity Log

- The Activity Log is launched by opening the Acuo Technologies > AcuoMed Utilities folder on the desktop, then clicking the shortcut for the AcuoMed Activity Log.



- The Activity Log displays DICOM related command activities that are occurring. For AcuoSemantix, the Activity Log will generally show communication to a connected AcuoMed when Acuo Fixit update and merge messages are being sent. This will appear in the form of a DICOM C-Store request from AcuoSemantix outbound to AcuoMed. The activity log is always accumulating activity regardless of whether it is open.
- Reference the AcuoMed Installation and Operations Manual for further details on the Activity Log.

Appendix B: FAQs

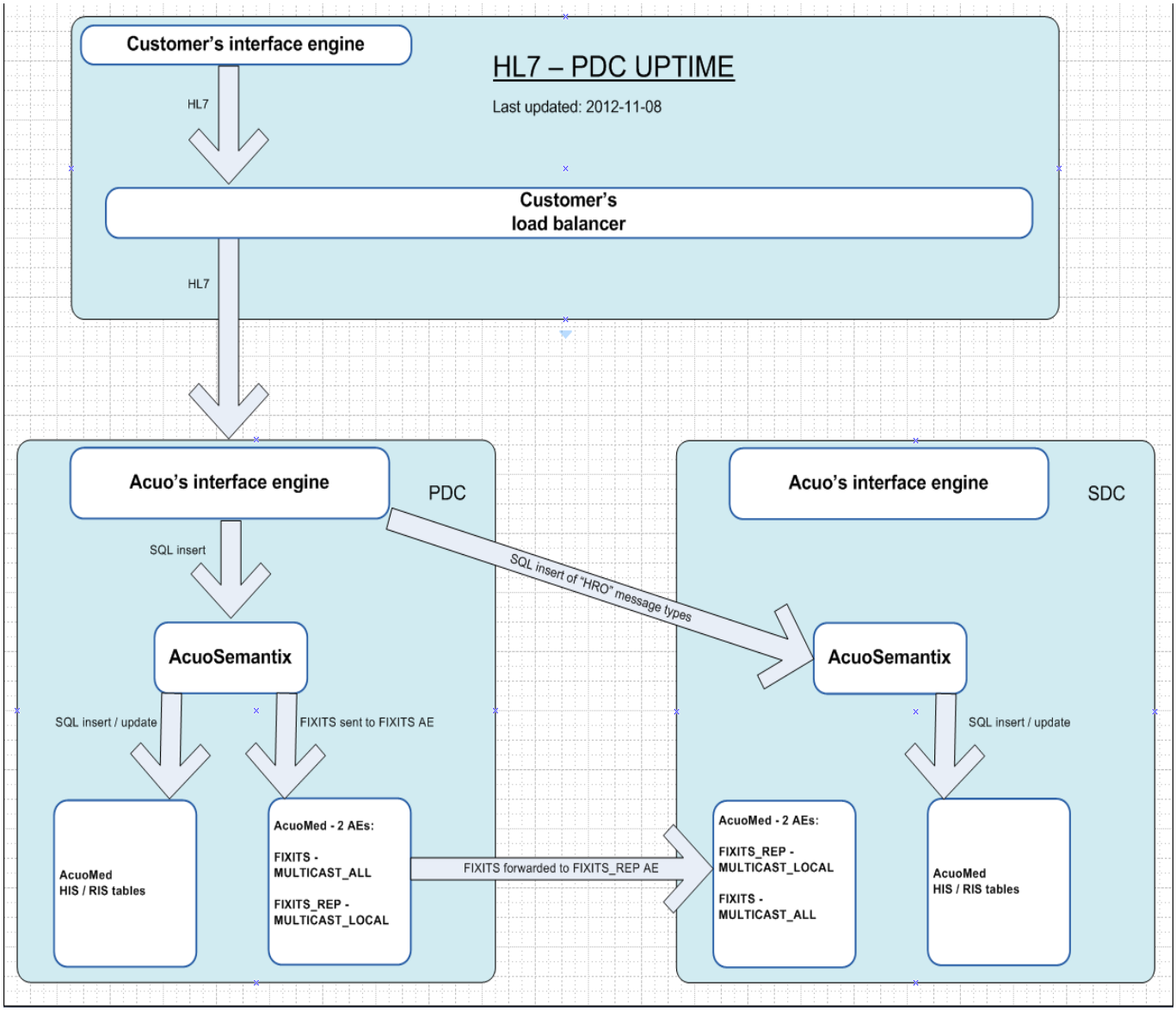
Question: How does assigned patient location, where the exam will occur, information inside an HL7 message get used by AcuoSemantix and the connected AcuoMed system?

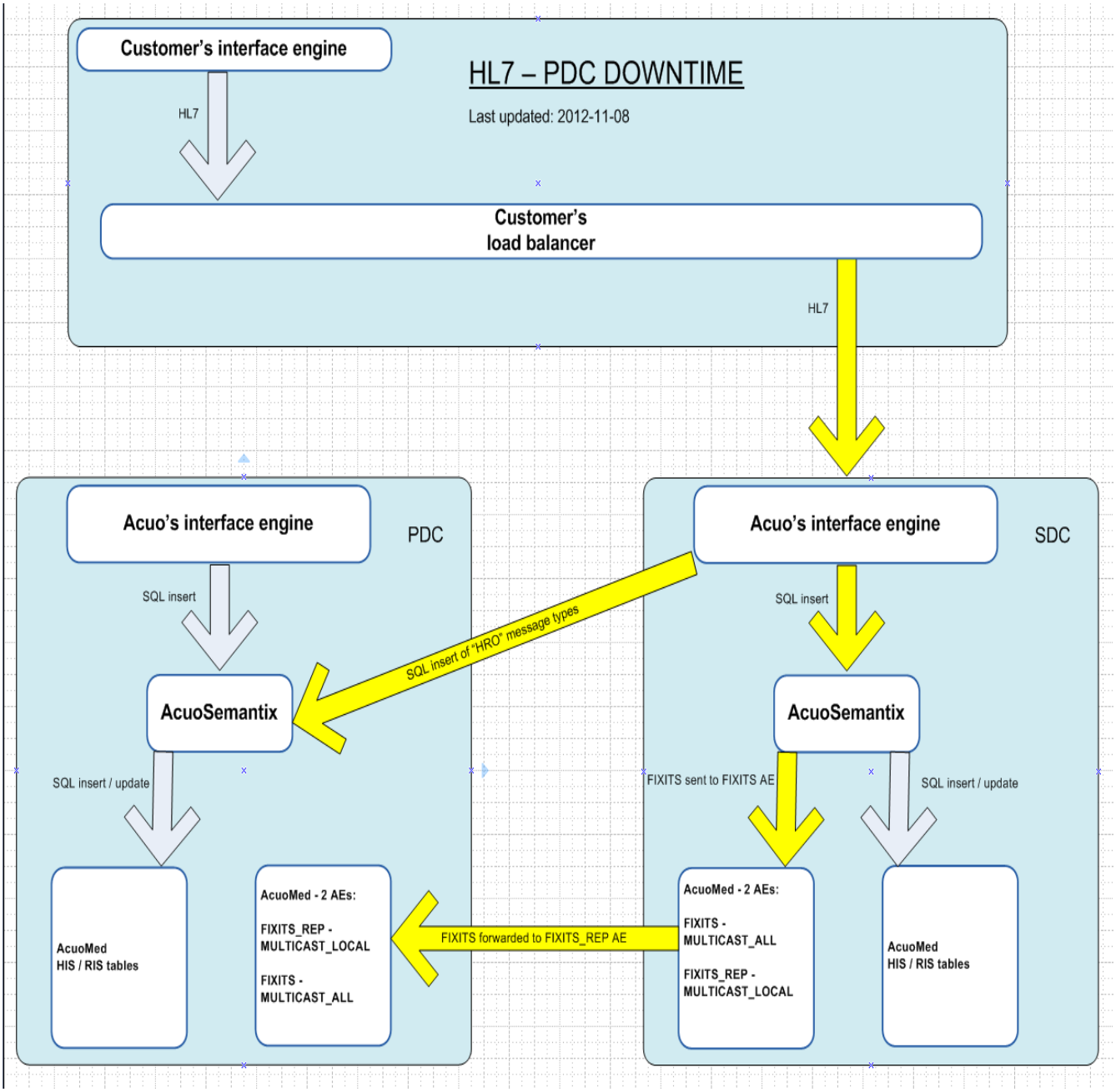
If a new HL7 message is received and data is present in the Assigned Patient Location segment, typically the PV1-3 segment, it will automatically get added to the (FFFF,0007) AcuoSemantix Prefetch Location tag of the Dicom Tag Customization node on the AcuoMed machine. The contents of the AcuoSemantix Prefetch Location tag are therefore available as a pre-populated list when configuring prefetch rules on the AcuoMed server. This can increase the speed and efficiency in setting up prefetch rules driven by inbound HL7 messages. If a prefetch rule is set up and the assigned patient location from the HL7 message matches a prefetch rule, that prefetch rule and its parameters will be used to generate a Batch Move job on the AcuoMed system.

Note There is currently a limitation on new installs where this data is not getting added automatically to the Dicom Tag Customization node. To work around this issue, manually add a value to the Dicom Tag Customization node for the tag (FFFF,0007) MedSemantix-es Prefetch Location. After manually adding a value, all subsequent messages received will automatically have their values added.

Appendix C: HL7 Failover

The following diagram shows a generic HL7 failover scenario involving a Primary Data Center, PDC, and Secondary Data Center, SDC.




Customer's interface engine
HL7 – PDC DOWNTIME
Last updated: 2012-11-08
HL7
Customer's
load balancer
HL7
Acuo's interface engine
PDC
Acuo's interface engine
SDC
SQL insert
SQL insert
SQL insert of "HRO" message types
AcuoSemantix
AcuoSemantix
SQL insert / update
FIXITS sent to FIXITS AE
SQL insert / update
AcuoMed
HIS / RIS tables
AcuoMed - 2 AEs:
FIXITS_REP -
MULTICAST_LOCAL
FIXITS -
MULTICAST_ALL
FIXITS forwarded to FIXITS_REP AE
AcuoMed - 2 AEs:
FIXITS -
MULTICAST_ALL
FIXITS_REP -
MULTICAST_LOCAL
AcuoMed
HIS / RIS tables

Appendix D: Version 5.3.1 Changes & Recommendations

This section contains information specific to the 5.3.1 Release of AcuoSemantix. It lists changes between AcuoSemantix version 5.2.1 and 5.3.1, as well as general configuration recommendations.

1. Product Rename
   - The product was renamed from Acuo MedSemantix-es in 5.2.1 to AcuoSemantix" in 5.3.1. There may still be some areas in the GUI, MMC, or Database that reference the old product name. These will be less common for new installs of 5.3.1.

2. Installation Changes & Enhancements
   - In 5.3.1, user can now modify the service logon information, the service user name and password, or create a new user to run the service during install.
   - In 5.3.1, user can now modify the AcuoSemantix database name and login during install, or change the location of the database data and log files.
     - Previously in 5.2.1, the database name could not be changed and was always MedSemantix-es. In addition, the database data and log files were automatically placed in the default database location as defined in SQL Server.

3. **AcuoSemantixConfig.xml** (formerly **ARPSConfig.xml**)
   - The configuration file **ARPSConfig.xml** from 5.2.1 was renamed to **AcuoSemantixConfig.xml** in 5.3.1. In addition, there are numerous changes and additions for **AcuoSemantixConfig.xml** in 5.3.1.
     - There are new parameters for this file in 5.3.1.
     - Some existing parameters from the old configuration file have been renamed.
     - Reference the section in this manual titled Modify AcuoSemantixConfig.xml for details on these changes. All parameters that are new to 5.3.1 have the text "new in 5.3.1" listed at the title of the parameter in parenthesis. All parameters that have been renamed have the text "renamed in 5.3.1".

4. **ActivityList.xml**
   - A new activity called PatientMerge is present in 5.3.1. This activity will queue a Patient Merge Fixit message to the Batch Patient Update Manager.
   - Previously in 5.2.1, the UpdatePatient activity queued the merge fixit message. In 5.3.1, the PatientMerge activity queues the merge fixit, and the UpdatePatient activity only queues a Patient Update fixit.
   - This activity should generally be configured for any merge message. Reference the section in this manual titled Modify ActivityList.xml for further details.

5. Other XML files
   - There are some notes, recommendations and requirements that are applicable to other XML configuration files used by AcuoSemantix in 5.3.1. Although these files may vary from site to site and are generally created during initial implementation by Acuo Technologies, the information listed here may help in understanding further details on AcuoSemantix functionality.
   - **PatientUpdate.xml** (Required change in 5.3.1)
     - In the **PatientUpdate.xml** file, any merge message should have the Surviving PID listed as the Match tag. Previously in 5.2.1, the Match tag was the Non-Surviving PID.
       - This recommendation coincides with the change in 5.3.1 where the Patient Merge is now a separate activity.
     - In addition, the only Dest tags or Change tags that should be configured for any message type are the following: Patient Name, Patient Birth Date, Patient Sex
   - **HL7TagMap.xml** (Enforce Required Fields Recommendation)
     - The **HL7TagMap.xml** file defines which fields from an inbound HL7 message are marked as required. Required fields can be designated for each message type.

- If a required field is set for a particular message type, and that message is received without the required field present, no processing will occur and the message will be marked as a non-retryable error in the AcuoSemantix database. This is preferred, since it prevents potential unwanted behavior for a message that is not considered valid.
- Recommended required fields:
  - ORM Messages: Patient ID and Accession Number
  - ADT Merge Messages: Non-Surviving PID & Surviving PID
  - Other ADT Messages: Patient ID

- **PatientMerge.xml** (New File in 5.3.1)
  - This file is new in 5.3.1, and only lists merge type messages. It was not present in version 5.2.1.
  - This file contains two relevant tags for each merge message:
    - Match Tag: Non-Surviving PID
    - Dest (Change) Tag = Surviving PID

6. Error Processing
   - In previous releases, if an HL7 message could not be successfully processed, it was logged in the database as an error, however messages in error were never retried automatically.
   - In 5.3.1, the default behavior for AcuoSemantix is now to automatically retry or attempt to reprocess messages in error, assuming the message in error is classified as retryable. Messages in error classified as non-retryable will never be retried on their own, and thus behavior is the same as in 5.2.1.
     - Example of message logged with retryable error: A fixit could not be queued to AcuoMed because the AcuoMed service was being restarted at the time.
     - Example of message logged with non-retryable error: An HL7 message is received that is corrupted or has a missing Patient ID.
   - Reference the section in this manual titled "Modify AcuoSemantixConfig.xml", and go to the description for parameter **SkipHL7MessagesWithErrors** for further details.