



Patch 49
HL7 ADT Transmission to PACS
Patch Description

VistA Imaging
MAG*3.0*49
June 2011

Department of Veterans Affairs
Office of Enterprise Development
Health Provider Systems

MAG*3.0*49 Patch Description

June 2011

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VistA Imaging Office of Enterprise Development
Department of Veterans Affairs

Internet: <http://www.va.gov/imaging>

VA intranet: <http://vaww.va.gov/imaging>

Revision Table

| Rev | Date | Notes |
|------------|---------------|--|
| 0.1 | 08-Dec-2005 | Initial draft |
| 0.2 | 26-Jan-2006 | Added overview and a description of the software enhancement |
| 0.3 | 22-Jan-2007 | Merged content from patch 35 into patch 49 patch description |
| 0.4 | 02-Feb-2007 | Changing the table format in the Routines section. |
| 0.5 | 07-Mar-2008 | Updates to content for WPR preparation |
| 0.6 | 31-Mar-2008 | Resolving WPR issues |
| 0.7 | 01 Apr 2008 | DNC added info re: retirement of 2.1 and mandating of this interface to replace Class III interfaces. |
| 0.8 | 31-Mar-2009 | Updated for latest version of patch 49 development. |
| 0.9 | 13-May-2009 | Updated for Field Testing |
| 1.0 | 27-Oct-2009 | Updated for T20 release to Field Testing |
| 1.01 | 10-Jan-2010 | Updated configuration instructions to include subscribing to the HL7 PACS interface. M Henderson, L. Scorza. |
| 1.02 | 18-Jan-2010 | Updated installation instructions. P. Kuzmak, M Henderson, L. Scorza. |
| 1.03 | 09-Feb-2010 | Implemented comments from reviewers (B. Peterson, R. Blank, M. Henderson, P. Kuzmak, A. McFarren). |
| 1.04 | 12-Feb-2010 | Updated for T22; updated Remedy Call list (input from M. Henderson) |
| 1.05 | 12-Mar-2010 | Incorporated feedback from WPR (2/23/2010) and updated for T24. L. Scorza. |
| 1.06 | 30-April-2010 | Updated Imaging System Manager output. M.Henderson, L.Scorza |
| 1.07 | 19-Aug-2010 | Added remedy Ticket for UID checking, added information about 2 new fields (LOCATION STATION NUMBER in file 2006.563 and SITE-DFN in file 2006.55) and updated for T25. P.Kuzmak, L.Scorza. |
| 1.08 | 13-Sep-2010 | Updated for T26. L. Jenkins, L. Scorza. |
| 1.09 | 06-Oct-2010 | Updated for T26V2. L. Jenkins, P.Kuzmak, L. Scorza. |
| 1.10 | 04-Nov-2010 | Updated for T27. L. Jenkins, P.Kuzmak, L. Scorza. |
| 1.11 | 16-Dec-2010 | Updated for T28. L.Jenkins, P.Kuzmak, L.Scorza. |
| 1.12 | 22-Dec-2010 | Updated for T29. L.Jenkins, P.Kuzmak, L.Scorza. |
| 1.13 | 11-Jan-2011 | Updated for T30. L.Jenkins, K.Trombetta, L.Scorza. |
| 1.14 | 14-Feb-2011 | Updated for T31. L.Jenkins, P.Kuzmak, M.Henderson, L.Scorza. |
| 1.15 | 1-Apr-2011 | Updated for T32, added information about the interaction between image processing and Radiology exam editing. L.Jenkins, P. Kuzmak, L.Scorza. |
| 1.16 | 26-Apr-2011 | Added: (1) Note to install P49 on all Gateways; (2) Note not to install the JRE, if it is already installed; (3)Instructions about how to recover, in the event of an inadvertent attempt to install the JRE a second time, (4) a flowchart with patch installation and setup steps. L.Jenkins, P. Kuzmak, L.Scorza. |
| 1.17 | 29-Jun-2011 | Updated document date, Gateway build number and date. L.Jenkins, R. Blank, L.Scorza. |

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Patch 49 Overview

Commercial PACS have standardized on the use of HL7 for the transmission of patient demographics, patient movements, radiology orders, and radiology reports. Patch 49 defines HL7 standardized communications between VistA Imaging and a receiving PACS (Picture Archive and Communication System). The new HL7 interfaces implement the HL7 order and patient update transactions in the IHE Radiology Scheduled Workflow Profile¹.

Use of the VistA Imaging Patch 49 (MAG*3.0*49) and the corresponding Radiology Patch 47 (RA*5.0*47) will provide improved quality of information over the current Class III HL7 interfaces that transfer data from the VistA System. It is expected that the use of Patches 49/47 will allow all sites to retire Class III software that is now used to obtain information via HL7. The new HL7 messages will also replace the now obsolete DICOM messages sent to the PACS by the VistA Imaging DICOM Gateway.

Commercial vendors of HL7 interfaces (in particular, imaging, PACS, and voice recognition systems) are being requested to test and validate products currently sold to the VA with Patches 49/47. Testing will ensure that these products will continue to operate properly and that they make use of the new information available with the release of these patches. It is expected that the use of Patches 49/47 will be mandated to ensure better identification of patients and patient data, providing a significant improvement in safety, reliability, and interoperability. Vendors should be encouraged to participate in the testing and validation of HL7 interfaces with this software as soon as possible. Please direct any questions to the mail group: VHA VI DICOM Validation (VHA VI DICOM Validation@va.gov).

Patch 49 defines HL7 standardized patient registration communications between VistA Imaging and a receiving PACS system. Each of these messages will be triggered by a patient event in the VistA PIMS (Patient Information Management Service) Package.

The Patient Registration profile conveys the patient demographic and visit information that was captured at the point of encounter. This transaction is used both for inpatients and outpatients.

The Patient Update profile conveys changes to patient information, including demographics, patient identification, patient location/class changes, and patient merges. These changes may occur at any time for a patient record. This transaction is used both for inpatients and outpatients.

¹ http://www.ihe.net/Technical_Framework/index.cfm#radiology

It is expected that the site be familiar with the operation of the VistA HL7 Package and with the options that it makes available for defining and inspecting message queues. All messaging will be handled through the VistA HL7 Package and will occur entirely in the background without active user intervention.

The Accession Number has a new format, which includes a 3-digit site prefix (SSS). The old format was MMDDYY-NNNNN. It included only the date (MMDDYY) and the case number (NNNNN). The new format is: SSS-MMDDYY-NNNNN. The national Integration Control Number also is included in this interface. Additional patient information that describes the patient, for example, the Patient Height, Weight, and Confidentiality, is available to improve patient safety. To support of radiology coordination, technician comments, and a call back number is passed from VistA to PACS and Voice Recognition Systems.

The Study Instance UID is the attribute that labels all of the DICOM objects that are created during the course of a study. In order to uniquely identify studies between the HIS, RIS, and PACS, the Integrating the Healthcare Enterprise Radiology Technical Framework have specified an HL7 ZDS segment to convey the Study Instance UID². This segment is inserted into the HL7 ORM order message after the OBR segment. All DICOM systems that receive these HL7 messages should use the Study Instance UID in the new HL7 ZDS segment.

All sites running VistA Imaging 3.0 that have implemented DICOM Gateways must install both the KIDS portion on their VistA system and the client portions of this patch on all relevant client systems.

Distribution of Software

This patch can be downloaded from:

`ftp.i maging.med.va.gov/Software/Released_Software/Mag3_OP49`

Installation instructions are included in this document.

NOTE Any late-breaking news about this patch will be found in a readme file. If present, this file will also be located in the MAG3_OP49 directory.

² See Transaction RAD-4 Procedure Scheduled for details of the ZDS Segment and Study Instance UID in the IHE Radiology Technical Framework, vol. II: Transactions, http://www.ihe.net/Technical_Framework/upload/ihe_tf_rev8-2.pdf

Patch Contents

This patch includes the following files:

Software

- MAG3_0P49_DICOM_Setup.exe – Installation Program for DICOM Gateway.
- MAG3_0P49.KID – KIDS (Kernel Installation & Distribution System) package to be installed on the VistA hospital database.

Documentation

The following is the documentation available for this patch:

- MAG3_0P49_Patch_Description.pdf – This document.
- VistA_PACS_HL7_Profile_1_2.pdf – Profiles for HL7 Messages from VistA to Commercial PACS including Business and Functional Requirements, (available at <http://www.va.gov/IMAGING/HL7.asp>)
- MAG3_0P49_DICOM_Install_Guide_Change.pdf – Updates for the VistA Imaging DICOM Gateway Installation Guide.
- MAG3_0P49_DICOM_User_Manual_Change.pdf – Updates for the VistA Imaging DICOM Gateway User Manual.
- MAG3_0_P49_Security_Guide_Change.pdf – Updates for the VistA Imaging Security Guide.
- MAG3_0P49_Technical_Manual_Change.pdf – Updates for the VistA Imaging Technical Manual.

Associated Patches

This patch works in conjunction with RA*5.0*47, which must be loaded immediately before this patch.

All released Vista Imaging patches are required, including MAG*3.0.53 and MAG*3.0*66, before MAG*3.0*49 can be installed.

Test Sites

The following sites are test sites for this patch:

- Columbus, OH (Medium)
- Pittsburgh, PA (Integrated – Large)
- San Antonio, TX (Integrated – Large)
- Seattle, WA (Integrated – Large)
- White River Junction, VT (Medium)

Remedy Calls

The following Remedy help desk calls are addressed in this patch:

- 68131 Worklist to Provide Patient Location, Clinical History, and Callback Phone Numbers to Modalities.
- 89379 Commercial PACS as MWL provider.
- 116948 Worklist to Provide Patient Height and Weight to Modalities.
- 163841 HL7 Warning message in Text gateway for the 1_1 process.
- 361589 Can VistA send ADT HL7 messages to commercial PACS?
- 411686 Study UID does not contain station number.
- 427608 Importer Menu option showing DICOM images that were already imported/completed
- 474108 Gateway creating extra abstracts that don't exist

NSR Entries

There are no NSR (new service request) entries addressed in this patch.

Patch 49 Enhancements

Specific Enhancements

The VistA DICOM/Text Gateway is modified to use the Study Instance UID in the new HL7 ZDS segment that is specified by the HIMSS/RSNA Integrating the Healthcare Enterprise Radiology Technical Framework.

Patch 49 will provide VistA Imaging with an HL7 interface that is conformant with the IHE Radiology Scheduled Workflow Profile. The HL7 interface will replace the current use of the DICOM Text Gateway to send patient and order information from VistA to commercial PACS. (The VistA Imaging DICOM Text Gateway may still be used as a Modality Worklist Provider.) The goal is to improve interoperability between VistA and PACS.

- 1 The new HL7 interfaces implement the HL7 order and patient update transactions as described in the IHE Radiology Scheduled Workflow Integration Profile.
- 2 The national Integration Control Number is included in this interface. The issuer of this patient ID is the USVHA.
- 3 The Accession Number has a new format, which includes a 3-digit site prefix (SSS). The old format was MMDDYY-NNNNN. It included only the date (MMDDYY) and the case number (NNNNN). The new format is: SSS-MMDDYY-NNNNN. There are corresponding changes throughout VistA Imaging to support the new Accession Number format.

Note RA*5.0*47 must be configured to generate the new accession number format.

Note The new accession number format should be used only with HL7 v.2.4 interfaces.

When the new site-specific accession number is enabled, the accession number formats for version 2.1 and version 2.4 interfaces are different:

- MMDDYY- NNNNN for HL7 v. 2.1
- SSS-MMDDYY- NNNNN for HL7 v. 2.4

If the site-specific accession number is enabled for HL7 v. 2.1 interfaces, some subscriber systems will get the old MMDDYY- NNNNN format while others will get the SSS-MMDDYY- NNNNN format for the same study, and they will not match.

- 4 There are changes on the VistA Imaging DICOM Gateway to process the new HL7 messages from Radiology and handle the new patient information fields for Modality Worklist.

Additional patient description information will be available to improve patient safety.

Following is an example of the patient and order data exchanged between systems.

```
Patient Name: EIGHTFIVETWO, PATIENT
Race: <unknown>
Patient Sex: M
Pregnancy Status: Not Pregnant
Patient Identifier: 000-00-0852
ICN/MPI: 9801199661V407268
Admission ID: 49
Issuer of Patient ID: USVHA
Patient Height: 1.65
Patient Weight: 77
Date of Birth: 1 January 1940
Location: <unknown>
Address: PO BOX 14, SALT LAKE CITY, UT 32544
Confidentiality: <unknown>
Institution: SALT LAKE CITY
Accession Number: 660-020807-284
Requested Proc ID: 284
VA Procedure Code: 58
Name: CHEST 2 VIEWS PA&LAT
CPT Code: 71020 Name: CHEST X-RAY
Scheduled: 8 February 2008 at 15:30:27 in RAD
Status: SCHEDULED
Requesting Physician: ONETWOTWOONE, PROVIDER
Priority: ROUTINE
Call Back Number: (301)734-0100
Requesting Service: CARDIOLOGY
Attention: REG TEST
Referring Physician: ONETWOTWOONE, PROVIDER
Study UID: 1.2.840.113754.1.40.660.6929791.8465.1.660.20807.284
Reason for Study: NEW TESTING
```

```
----- Medical History -----
NEW TESTING
-----
```

VistA Host Changes

VistA Routines

New and modified routines for the VistA System are listed below. For each routine, the second line will contain the following information.

```
;3.0;IMAGING;*[Patch List]**; Mar 19, 2002; Build 2033; Apr 07, 2011
```

Please note that the “before” checksum may differ if any test software has been installed.

Checksum details:

| Routine Name | Checksum Before | Checksum After | Patch List |
|--------------|-----------------|----------------|--------------------------|
| MAG7UCFG | New | 21073435 | **49** |
| MAG7UD | New | 4685901 | **49** |
| MAGDHLE | 9902651 | 10197843 | **54,49** |
| MAGDHLI | New | 5220582 | **49** |
| MAGDHLL | New | 7511757 | **49** |
| MAGDHLS | New | 67817009 | **49** |
| MAGDHLSO | New | 9961335 | **49** |
| MAGDHLSV | New | 49332835 | **49** |
| MAGDHLT | New | 5153872 | **49** |
| MAGDHLTA | New | 23848932 | **49** |
| MAGDHLTC | New | 20360006 | **49** |
| MAGDHPS | New | 35750729 | **49** |
| MAGDHRC0 | 7715030 | 7768511 | **46, 54, 49** |
| MAGDHW0 | 9603861 | 9185901 | **10,86,49** |
| MAGDHW A | 58838393 | 45705303 | **10,51,50,49** |
| MAGDHW R | New | 7473279 | **49** |
| MAGDIR8A | 36949369 | 35665323 | **11,51,49** |
| MAGDIR8R | 53835298 | 55950540 | **53,49** |
| MAGDIR9A | 52130794 | 60148803 | **11,30,51,46,54,53,49** |
| MAGDRA2 | 25170126 | 28718021 | **10,11,51,54,49** |
| MAGDRA3 | 6023529 | 6846608 | **49** |
| MAGDRAHL | New | 8520421 | **49** |
| MAGDRPC1 | 45275966 | 46610398 | **11,30,51,50,54,49** |
| MAGDRPC3 | 64771366 | 57242503 | **11,30,51,50,85,54,49** |
| MAGDRPC4 | 79966759 | 61111180 | **11,30,51,50,54,49** |
| MAGDRPC9 | 56624389 | 55355495 | **50,54,53,49** |
| MAGDRUID | 4073143 | 4073143 | **54,49** |
| MAGENV49 | New | 6706010 | **49** |
| MAGIPS49 | New | 10146824 | **49** |

Routines MAGIPS49 and MAGENV49 are installation routines that will be automatically deleted after the KIDS installation.

- IMAGING SITE PARAMETERS (#2006.1)
 - Added IHE PACS HL7 INTERFACE ACTIVE Field (#3.01)

- The purpose of this file is to specify the UID Root. The UID Root is the left-most portion of every UID that is generated by an organization. The UID Root is assigned to the organization by an ISO Member body (ANSI in the US). The VA's DICOM UID Root of the Department of Veterans Affairs is 1.2.840.113754 .

- OWNER (#01) – The organization to which the UID root code is assigned.
- UID ROOT (#12) – The UID root code of the organization.

- Added SITE-DFN Field (#15). The field contains the three-digit station number, concatenated with the patient DFN, separated by a dash
Example: *660-13235*
 where *660* is the station number and
 13235 is the patient DFN.

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- DICOM WORKLIST STUDY (#2006.56)
 - Added new data items that populate the same extensible fields as the file DICOM WORKLIST PATIENT (#2006.55).
 - Added new field CPT CODING SCHEME (#14). The field incorporates the Current Procedural Terminology (CPT) Coding Scheme as defined in the DICOM Standard. The Current Procedural Terminology is a collection of codes. It is the most widely accepted medical nomenclature used for reporting and billing medical services and procedures. The field is a free text field.
- DICOM GATEWAY PARAMETER file (#2006.563)
 - Added LOCATION STATION NUMBER Field (#130). This is the three-digit station number and any modifiers that may be present. The value of this field is the same as the STATION NUMBER field (#99) of the INSTITUTION file (#4), as pointed to by the LOCATION (#17) field of this file.

Security Keys

There are no new or modified security keys included in this patch.

Remote Procedures

The following remote procedures are included in this patch:

- MAG DICOM GET PATIENT VITALS

Menu Options

The following new menu options are included in this patch.

- Imaging HL7 Messaging Maintenance [MAG HL7 MAINT] option.
- Maintain Subscriptions to Radiology HL7 Drivers [MAGD MAINT RAD HL7 SUBS] option.
- Configure IHE-Based HL7 Interface to PACS [MAG CONFIGURE IHE PACS HL7 I/F] option.

These options are added to the existing menu: Imaging System Manager Menu [MAG SYS MENU] menu.

Templates

There are no new or modified templates included in this patch.

Protocols

The following new protocols are included in this patch.

- MAG CPACS A01
- MAG CPACS A01 SUBS
- MAG CPACS A02
- MAG CPACS A02 SUBS
- MAG CPACS A03
- MAG CPACS A03 SUBS
- MAG CPACS A11
- MAG CPACS A11 SUBS
- MAG CPACS A12
- MAG CPACS A12 SUBS
- MAG CPACS A13
- MAG CPACS A13 SUBS

HL7 Application Parameters

The following new HL7 parameters are included in this patch.

- MAG COMRCL PACS
- MAG VISTA IMGNG

HL Logical Link

The following new HL logical link is included in this patch.

- MAG CPACS

DICOM Gateway Changes

Interaction Between Image Processing and Radiology Exam Editing

This patch fixes an issue related to editing a study in Radiology while the DICOM Gateway is still processing the images associated with the study. This resulted in images being associated with different reports for the same study.

The issue occurs when a radiology technologist opens the study for editing in the Radiology package before the DICOM Gateway has processed all images associated with the study.

In Radiology Patch RA*5.0*101 a change was introduced that involved incorporating a LOCK of the radiology exam record during image processing. When image editing continued for a long time, the DICOM Gateway would pause processing, terminate the existing TCP/IP connection, establish a new TCP/IP connection, and try to resume image processing. This resulted in creating “orphan” abstracts.

In this patch, the remote procedure first checks if the study is being edited and if it is, the DICOM Gateway stops processing the images of the study. It generates a message in the Image Processing session indicating that the study is locked and that processing is temporarily blocked.

The following is an example of such a message.

```
VistA DICOM Image Gateway --
  1 (Receive PACS Exam Complete Messages)
  2 (Send PACS Request Image Transfer Messages)
  3 Process DICOM Images
  4 Increment DICOM Image Input Pointer
  5 Display Real-Time Storage Server Statistics
  6 Display Cumulative Storage Server Statistics
  7 Display Daily Image Processing Statistics
  8 Send DICOM Images to Another Storage Server
  9 Display a DICOM Image Header
 10 Re-Transmit Images from PACS
 11 Purge Incomplete Image Information
 12 Import DICOM Objects
 13 Validate Failed Image Table
 14 TELEREADER

OPTION:  3

Fetching UID Table from VistA ... 6272 nodes

Ready to process DICOM Images and send them to VistA? y// Yes
Connecting to M-to-M RPC Broker Server "LOCALHOST" on Port 4800 - SUCCESS!
ISW-DICOM_0000022.DCM -- PATIENT^FOURZERONE^^^ -- 000-00-0401 -- 040111-362
Waiting (radiology exam locked)... 0:00:54
```

Once the record is locked, if the editing continues for more than five (5) minutes, the DICOM Gateway sends an email message to the mailgroup defined in its configuration.

The following is an example of such an email message:

NON-FATAL WARNING: IMAGE PROCESSING IS BLOCKED Someone in the Radiology Department is editing study 040111-362 whose images are being processed by the DICOM gateway.
Image processing is temporarily stopped and will resume upon completion of the editing.

Message generated at 1-Apr-2011, 07:58:54

Routine: MAGDIR6
DICOM Gateway "Main Radiology Gateway (ISW-DICOM)".

Important: Do not open a study in the Radiology package before the DICOM Gateway has processed all images related to the study. If you do so, image processing will stop while the study is edited. We highly recommend that images be viewed in VistA Imaging Display for quality, quantity, and accuracy before performing a case edit or updating the exam status in the radiology package.

DICOM Gateway Routines

New and modified routines for the Imaging DICOM Gateway are listed below. For each routine, the second line will contain the following information.

```
;3.0;IMAGING;**[Patch List]**; Mar 19, 2002; Build 2201; Jun 29, 2011
```

Please note the before checksum may differ if an Imaging Field Unit Test has been installed.

| Routine Name | Checksum Before | Checksum After | Patch List |
|--------------|-----------------|----------------|----------------------------|
| MAGDAIR1 | 173909266 | 174066539 | **53,49** |
| MAGDAIR3 | 110514648 | 110325747 | **53,49** |
| MAGDAIR5 | 177242390 | 176403451 | **53,49** |
| MAGDDW1 | 33149904 | 33395508 | **10,49** |
| MAGDFCNS | 73892007 | 77913878 | **9,10,11,30,50,49** |
| MAGDFND2 | 82916429 | 84247727 | **1,10,30,51,50,54,53,49** |
| MAGDFND3 | 63710119 | 87561723 | **10,30,51,54,53,49** |
| MAGDFND4 | 23741315 | 31058834 | **10,11,30,50,54,49** |
| MAGDFND5 | 10032385 | 11262447 | **10,30,54,49** |
| MAGDHR9 | 7638917 | 7550129 | **10,49** |
| MAGDHRC | 79419990 | 82233547 | **11,30,51,49** |

| Routine Name | Checksum Before | Checksum After | Patch List |
|--------------|-----------------|----------------|--|
| MAGDHRC0 | 7715030 | 7768511 | **11,51,54,49** |
| MAGDHRC2 | 22449295 | 20185184 | **11,49** |
| MAGDHRC3 | 40850743 | 113328494 | **11,30,102,49** |
| MAGDHRC4 | 71401987 | 137481394 | **11,51,102,49** |
| MAGDHRC5 | 64340735 | 63082234 | **11,30,51,49** |
| MAGDHRC6 | 30040803 | 28767993 | **11,51,49** |
| MAGDHRC7 | 15893574 | 14399552 | **11,51,49** |
| MAGDHRCP | 33544282 | 40374302 | **11,54,49** |
| MAGDIR6 | 68854843 | 87229193 | **11,30,51,54,53,49** |
| MAGDIR7C | 70785160 | 70768786 | ** 11,30,51,54,49** |
| MAGDMFBB | 51792993 | 52340245 | **9,21,11,51,69,54,53,49** |
| MAGDQRU0 | 5452504 | 5735145 | **51,49** |
| MAGDQUE2 | 21951411 | 21951411 | **11,30,49** |
| MAGDRPC0 | 4176279 | 4265561 | **11,51,50,49** |
| MAGDUID1 | 17581821 | 19789188 | **21,10,11,50,54,49** |
| MAGDVRSN | 21494160 | 21494340 | **1,7,9,26,21,10,36,3,11,30,5,51,50,52,69,75,102,103,54,53,66,49** |
| MAGDWLPA | 54804968 | 76434838 | **11,51,49** |
| MAGDWLPB | 26022767 | 54570103 | **11,30,51,102,49** |
| MAGDWLPC | 51913684 | 53817899 | **11,51,102,49** |
| MAGDWLU | 16135727 | 16190289 | **21,11,30,51,53,49** |
| MAGDWLU0 | 4288023 | 4339594 | **49** |
| MAGDWLU3 | 73811680 | 96198773 | **21,10,11,30,53,49** |

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Installation

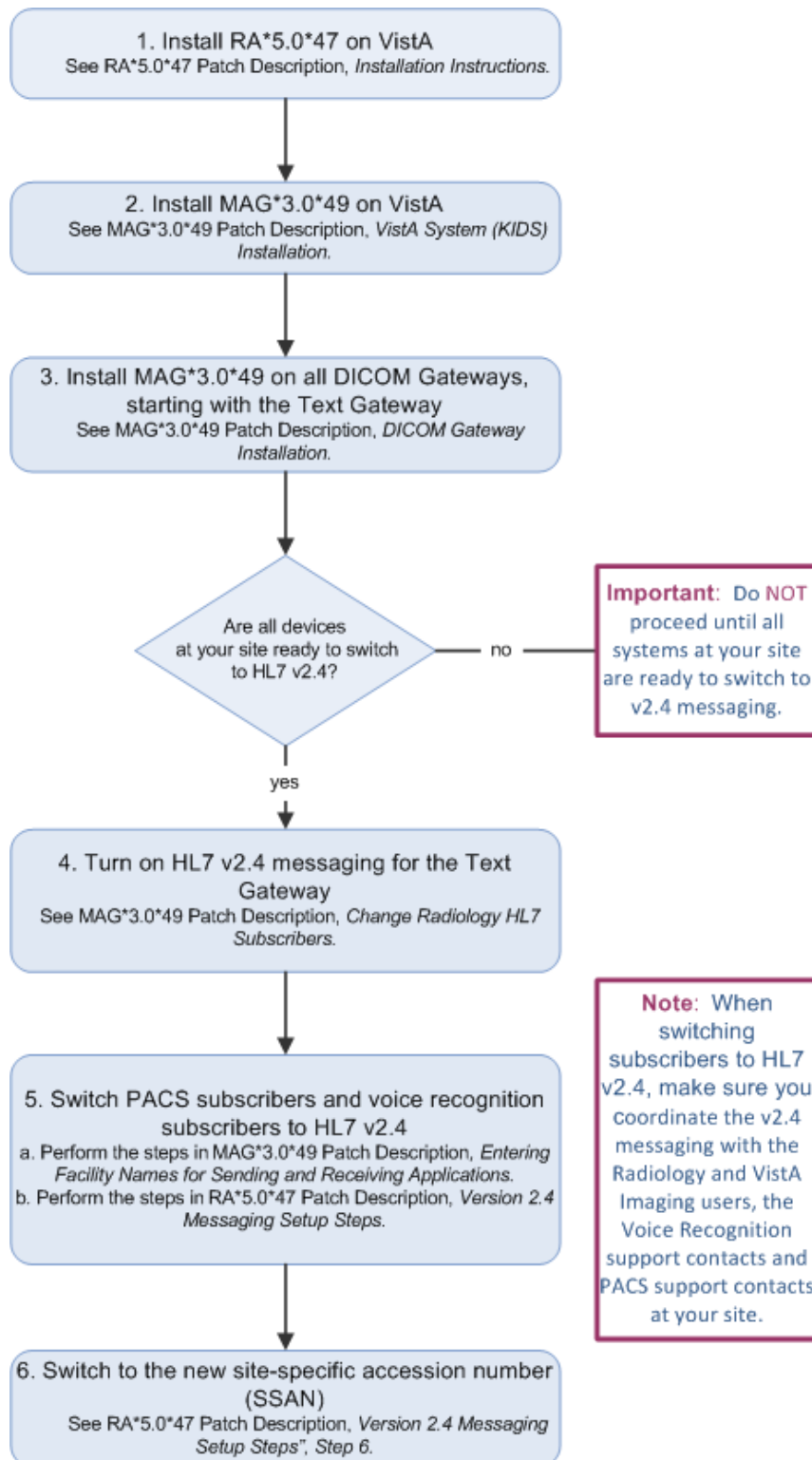
Before installing this patch, you will need to download the Patch 49 files from the Imaging FTP site to a local storage location. In general, it is a good idea to schedule the installation of a patch for a time when adequate support resources are available and when system load is expected to be low.

Before installing the client portion of Patch 49 on a DICOM Gateway, all activity on that DICOM Gateway being updated must be stopped. Other DICOM Gateways present can remain active. Client installation should take about 10 to 30 minutes per gateway.

It is required that all released VistA Imaging Patches be installed prior to the installation of VistA Imaging Patch 49.

RA*5.0*47 is required to be installed on VistA before MAG*3.0*49.

The following flowchart shows the basic steps to install RA*5.0*47 and MAG*3.0*49 and where to get the information for each step.



The following are a set of instructions to install Patch 49:

Obtain the software from the Imaging FTP folder; the files to be downloaded are itemized in an earlier section. The time needed to download these files is dependent on the WAN activity; normally it will take a couple of minutes.

The KIDS file can be installed with users on the system and will take less than 5 minutes.

NOTE In general, it is a good idea to schedule the installation of a patch for a time when

- Adequate support resources are available
- System load is expected to be low

NOTE This section describes the basic steps you need to install this patch on an existing DICOM Gateway installation. The instructions in this section assume familiarity with the *VistA DICOM Gateway Installation Guide*, which contains complete details about installing the VistA System and the DICOM Gateway.

NOTE The installation of the KIDS package typically takes less than a minute. The installation of the InstallShield package on the DICOM Gateways may vary, depending on the characteristics of the computer. During testing, “old and slow” computers took almost half an hour, and “new and fast” computers took less than five minutes.

NOTE Install Patch 49 on all DICOM Gateways immediately after the KIDS package is installed on VistA.

VistA System (KIDS) Installation

NOTE Please pay particular attention to the boxes labeled *PACS CONFIGURATION NOTES* in the following sections. They contain important information about values that you will need to make sure are configured within your commercial PACS product.

Installing the KIDS Package

- 1 Access the Kernel Installation and Distribution System Menu [XPD MAIN].
- 2 Run the Installation option [XPD INSTALLATION MENU].
- 3 Load the KIDS file by performing the following steps:
 - a Run the Load a Distribution [XPD LOAD DISTRIBUTION] option to load the KIDS distribution.
 - b When prompted, enter the path and file name (MAG3_OP49.KID) of the Patch 49 KIDS file that you downloaded from the Imaging FTP server.
 - c When prompted to continue with the load, enter YES.
 A Distribution OK! message will be displayed when the load is complete.
- 4 After you load the KIDS file, you may elect to use the following options:
 - a Verify Checksums in Transport Global [XPD PRINT CHECKSUM] – Run this option if you want to ensure the integrity of the routines in the patch.
 - b Compare Transport Global to Current System [XPD COMPARE TO SYSTEM] – Run this option if you want to view all changes that will be made when the patch is installed. All components (routines, options, and so on) in the patch will be compared.
 - c Backup a Transport Global [XPD BACKUP] – Run this option if you want to create a backup message of any routines exported with the patch. It will NOT back up any of the other changes.

5 After performing the load and any optional verification steps, install the KIDS file by performing the following steps:

- a Run the Install Package(s) [XPD INSTALL BUILD] option.
- b When prompted for the install name, enter MAG*3.0*49.
- c Answer **NO** to the following prompts:

```
Want KIDS to Rebuild Menu Trees Upon Completion of Install? NO//<Enter>
Want KIDS to INHIBIT LOGONs during the install? NO//<Enter>
Want to DISABLE Scheduled Options, Menu Options, and Protocols? NO//<Enter>
```

When installation completes, a message that the patch is installed will be displayed.

KIDS Installation Example

```
Select Installation Option: 6 Install Package(s)
Select INSTALL NAME: MAG*3.0*49          Loaded from Distribution
4/7/11@13: 19: 38      => VistA Imaging V3.0 - Patch 49 - 04/07/2011 13: 07PM
;Created o

This Distribution was loaded on Apr 07, 2011@13: 19: 38 with header of
VistA Imaging V3.0 - Patch 49
04/07/2011 13: 07PM ;Created on Apr 0
7, 2011@13: 07: 06
It consisted of the following Install(s):
MAG*3.0*49
Checking Install for Package MAG*3.0*49
Will first run the Environment Check Routine, MAGENV49

Install Questions for MAG*3.0*49

Incoming Files:

    2006.1    IMAGING SITE PARAMETERS (Partial Definition)
Note:  You already have the 'IMAGING SITE PARAMETERS' File.

    2006.15   DICOM UID ROOT
Note:  You already have the 'DICOM UID ROOT' File.

    2006.55   DICOM WORKLIST PATIENT
Note:  You already have the 'DICOM WORKLIST PATIENT' File.

    2006.56   DICOM WORKLIST STUDY
Note:  You already have the 'DICOM WORKLIST STUDY' File.

    2006.563  DICOM GATEWAY PARAMETER
Note:  You already have the 'DICOM GATEWAY PARAMETER' File.

Want KIDS to Rebuild Menu Trees Upon Completion of Install? NO//

Want KIDS to INHIBIT LOGONs during the install? NO//
Want to DISABLE Scheduled Options, Menu Options, and Protocols? NO//
```

Enter the Device you want to print the Install messages.
You can queue the install by enter a 'Q' at the device prompt.
Enter a '^' to abort the install.

DEVICE: HOME// HERE

Install Started for MAG*3.0*49 :
Apr 07, 2011@13:21:40

Build Distribution Date: Apr 07, 2011

Installing Routines:.....
Apr 07, 2011@13:21:40

Installing Data Dictionaries:
Apr 07, 2011@13:21:40

Installing PACKAGE COMPONENTS:

Installing HL LOGICAL LINK .

Installing HL7 APPLICATION PARAMETER...

Installing PROTOCOL.....
Located in the MAG (IMAGING) namespace..
Located in the MAG (IMAGING) namespace..
Located in the MAG (IMAGING) namespace..
Located in the MAG (IMAGING) namespace..
Located in the MAG (IMAGING) namespace..
Located in the MAG (IMAGING) namespace..
Located in the MAG (IMAGING) namespace..
Located in the MAG (IMAGING) namespace..
Located in the MAG (IMAGING) namespace..
Located in the MAG (IMAGING) namespace..
Located in the MAG (IMAGING) namespace..
Located in the MAG (IMAGING) namespace..
Located in the MAG (IMAGING) namespace..

Installing REMOTE PROCEDURE..

Installing OPTION.....
Apr 07, 2011@13:21:40

Running Post-Install Routine: POST^MAGIPS49.

Updating Routine file.....

Updating KIDS files.....

MAG*3.0*49 Installed.
Apr 07, 2011@13:21:41

Change Radiology HL7 Subscribers

- 1 The following steps will update the HL7 Radiology Subscriber Protocols for the VistA DICOM Text Gateway to version 2.4.
- 2 Use the Imaging System Manager (MAG SYS MENU) setup options. Type the responses in bold.

```

VA>D ^XUP

Setting up programmer environment
This is a TEST account.

Terminal Type set to: C-VT320 48 LINE

Select OPTION NAME: MAG SYS MENU           Imaging System Manager Menu

    HL7    Imaging HL7 Messaging Maintenance ...
    IX     Image Index Conversion Menu ...
    LS     Edit Network Location STATUS
    TR     Telereader Menu ...
           Ad hoc Enterprise Site Report
           Delete Image Group
           Enter/edit Reason
           Imaging Database Integrity Checker Menu ...
           Imaging Site Reports ...

Select Imaging System Manager Menu Option: HL7 Imaging HL7 Messaging
Maintenance

    RHL7    Maintain Subscriptions to Radiology HL7 Drivers
    IHE     Configure IHE-Based HL7 Interface to PACS

Select Imaging HL7 Messaging Maintenance Option: RHL7 Maintain
Subscriptions to
Radiology HL7 Drivers

MAGD SEND ORM protocol found...

MAGD SEND ORU protocol found...

RA CANCEL protocol found...
RA EXAMINED protocol found...
RA REG protocol found...
RA RPT protocol found...
RA CANCEL 2.4 protocol found...
RA EXAMINED 2.4 protocol found...
RA REG 2.4 protocol found...
RA RPT 2.4 protocol found...

Enter the desired version of HL7: 2.4 HL7 Version 2.4
Subscribing to HL7 version 2.4 protocols...
Protocol RA CANCEL has been unsubscribed from...
Protocol RA EXAMINED has been unsubscribed from...
Protocol RA REG has been unsubscribed from...
Protocol RA RPT has been unsubscribed from...
Protocol RA CANCEL 2.4 has been subscribed to...
Protocol RA EXAMINED 2.4 has been subscribed to...
Protocol RA REG 2.4 has been subscribed to...
Protocol RA RPT 2.4 has been subscribed to...

```

If you run option **RHL7** a second time, you will be informed that the **2.4** protocols have already been subscribed to and that no action is being taken.

- 3** The IHE option controls the transmission of HL7 version 2.4 ADT messages. Select option **IHE** to enter name and address information for the HL7 PACS interface (if you are using a commercial PACS), and to turn on HL7 version 2.4 ADT messaging to the VistA DICOM Gateway. (Radiology and Consult orders and results are always enabled. The protocol version is set by RHL7 above.)
 - a** You will be shown the sending application name and receiving application name. These are the names that will be sent in the MSH Segment of the HL7 messages that are transmitted to PACS (if used). (See also the *PACS CONFIGURATION NOTES* following.) The designated sending application name is also sent to the VistA DICOM Gateway in the MSH Segment of the HL7 messages. (The receiving application name in these messages is always **VISTA DICOM/TEXT GATEWAY**.)
 - Ordinarily, you will not wish to change either of these names and will enter NO when prompted to change them.
 - If you wish to change either of these names, enter YES when prompted.
 - b** You will then be asked to enter the TCP/IP address and port number for the logical link. This information defines where VistA HL7 will send the ADT messages to the commercial PACS. If you are not using a commercial PACS, leave the TCP/IP address and port number blank. If you need help finding the correct values to enter at these prompts, please consult your site's PACS Administrator or HL7 Specialist.
 - c** Finally, you will be asked whether you want to turn on the IHE-based interface. You must answer YES if you wish HL7 version 2.4 ADT messages to be sent from VistA to PACS (if used) and to the DICOM Gateway. If you do not wish HL7 version 2.4 ADT messages to be sent from VistA to PACS (if used) and to the DICOM Gateway, enter NO.
 - d** In addition, you will need to refer to the Radiology RA*5.0*47 Patch Description to setup the PACS subscribers and HL7 transmission parameters for the Radiology order and report HL7 messages.

The following is a sample of the prompts you will see when you select option **IHE**. The text in **bold** is what you need to type. Note that the IP address and port number are examples and you should enter the ones that apply to your PACS. If you are not using a commercial PACS, leave the IP address and port number blank.

```

RHL7    Maintain Subscriptions to Radiology HL7 Drivers
IHE      Configure IHE-Based HL7 Interface to PACS

Select Imaging HL7 Messaging Maintenance Option: IHE  Configure IHE-Based
HL7 Interface to PACS

HL7 PACS Interface Configuration

Sending application name:    MAG VISTA IMGNG
Receiving application name:  MAG COMRCL PACS

Do you wish to change either of these names? NO

Please enter the TCP/IP address and port number for the logical link.
TCP/IP ADDRESS: www.xxx.yyyy.zzz <enter the address that applies to your
PACS>
TCP/IP PORT: nnnnn          <enter the port number that applies to your
PACS>

Enter Y or YES below to turn the IHE-based HL7 PACS interface ON;
enter N or NO to turn the interface OFF.

IHE PACS HL7 INTERFACE ACTIVE: Y  YES

```

PACS CONFIGURATION NOTES

PACS must be configured to accept in field *MSH-3-Sending Application* the value of “Sending application name:” shown in the preceding sample, and to return this value in field *MSH-5-Receiving Application* when sending replies.

PACS must be configured to accept in field *MSH-5-Receiving Application* the value of “Receiving application name:” shown in the preceding sample, and to return this value in field *MSH-3-Sending Application* when sending replies.

For both these values, follow your PACS manufacturer’s configuration instructions.

Entering Facility Names for Sending and Receiving Applications

Within the VistA HL7 package, the correct facility names need to be associated with the MAG VISTA IMGNG sending application and with the MAG COMRCL PACS receiving application. Associating the facility names with the sending and receiving applications is done via the HL7 menu system by a user who has been granted access to the HL7 menus. This section provides the steps that the authorized user must perform to associate the facility names with the sending and the receiving applications.

- 1 Assign the correct facility name to the MAG VISTA IMGNG sending application as follows:
 - a From the main menu, select option **HL7 MAIN MENU** and enter the values in bold, which are illustrated in the following sample.

```

Event monitoring menu ...
  Systems Link Monitor
  Filer and Link Management Options ...
  Message Management Options ...
  Interface Developer Options ...
  Site Parameter Edit
HL0  HL7 (Optimized) MAIN MENU ...
Select HL7 Main Menu Option: INTERface Developer Options

EA  Application Edit
EP  Protocol Edit
EL  Link Edit
VI  Validate Interfaces
    Reports ...

Select Interface Developer Options Option: EA Application Edit

Select HL7 APPLICATION PARAMETER NAME: MAG VISTA IMGNG      ACTIVE

```

An entry screen like this one will appear:

```

                                HL7 APPLICATION EDIT
-----
NAME: MAG VISTA IMGNG          ACTIVE/INACTIVE: ACTIVE
FACILITY NAME: VA-WOIFO        COUNTRY CODE: USA
HL7 FIELD SEPARATOR:          HL7 ENCODING CHARACTERS:
MAIL GROUP:

```

- b Change the value of the **FACILITY NAME** field to indicate the facility in which VistA is installed. The value you specify will be transmitted to PACS in the field *MSH-4-Sending Facility*.

| | |
|---------------------------------|--|
| PACS CONFIGURATION NOTES | <p>PACS must be configured to accept the value specified for the FACILITY NAME field in field <i>MSH-4-Sending Facility</i> when receiving messages, and to return this value in field <i>MSH-6-Receiving Facility</i> when sending replies.</p> <p>Follow your PACS manufacturer's configuration instructions to configure your PACS in this manner.</p> |
|---------------------------------|--|

- c After changing the **FACILITY NAME** field, save your changes and exit the form.
- 2 Assign the correct facility name to the MAG COMRCL PACS receiving application as follows:
 - a From the HL7 APPLICATION PARAMETER NAME menu option, select **MAG COMRCL PACS**.

| |
|--|
| Select HL7 APPLICATION PARAMETER NAME: MAG COMRCL PACS ACTIVE |
|--|

An entry screen like this one will appear.

| HL7 APPLICATION EDIT | |
|-------------------------------|--------------------------|
| ----- | |
| NAME: MAG COMRCL PACS | ACTIVE/INACTIVE: ACTIVE |
| FACILITY NAME: CPACS FACILITY | COUNTRY CODE: USA |
| HL7 FIELD SEPARATOR: | HL7 ENCODING CHARACTERS: |
| MAIL GROUP: | |

- b Change the value of the **FACILITY NAME** field to indicate the facility in which PACS is installed. This value will be transmitted to PACS in field *MSH-6-Receiving Facility*.

| | |
|---------------------------------|--|
| PACS CONFIGURATION NOTES | <p>PACS will need to be configured to accept this value in field <i>MSH-6-Receiving Facility</i> when receiving messages, and to return this value in field <i>MSH-4-Sending Facility</i> when sending replies.</p> <p>Follow your PACS manufacturer's configuration instructions to configure your PACS in this manner.</p> |
|---------------------------------|--|


- c After changing the **FACILITY NAME** field, save your changes and exit the form.

DICOM Gateway Installation

NOTE Install Patch 49 on all DICOM Gateways immediately after the KIDS package is installed on VistA.

Pre-installation

Before installing Patch 49 on a DICOM Gateway, perform the following steps:

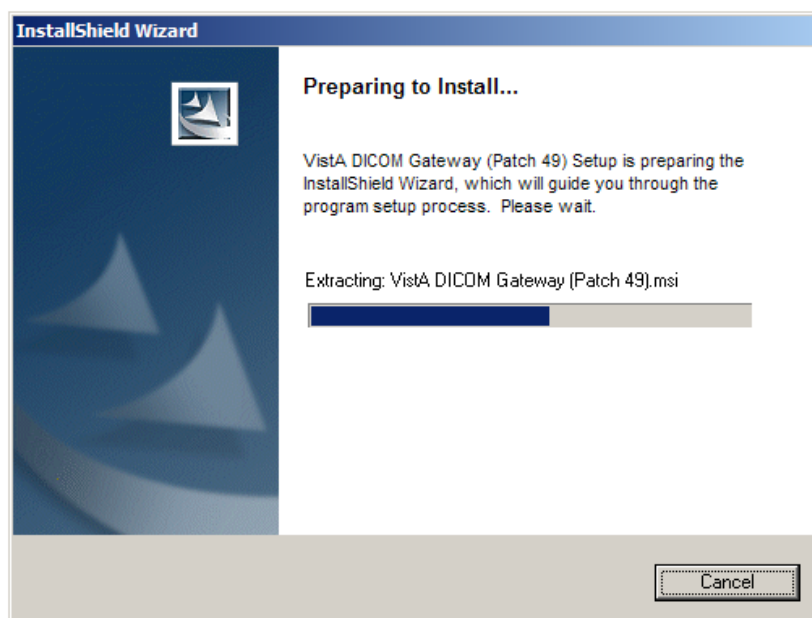
- 1 Log into the DICOM Gateway as a local administrator.
- 2 Review the general setup of the DICOM Gateway (number of text data directories, mapped drives for components such as dictionary files, etc.).
- 3 Ensure all processing on the DICOM Gateway is stopped.
- 4 Stop Caché from the blue cube .
- 5 Copy the **MAG3_OP49_DICOM_SetUp.exe** file to a location accessible to the gateway.

Installing the DICOM Gateway Software

This section includes instructions for installing the patch on a computer on which the DICOM Gateway is already installed.

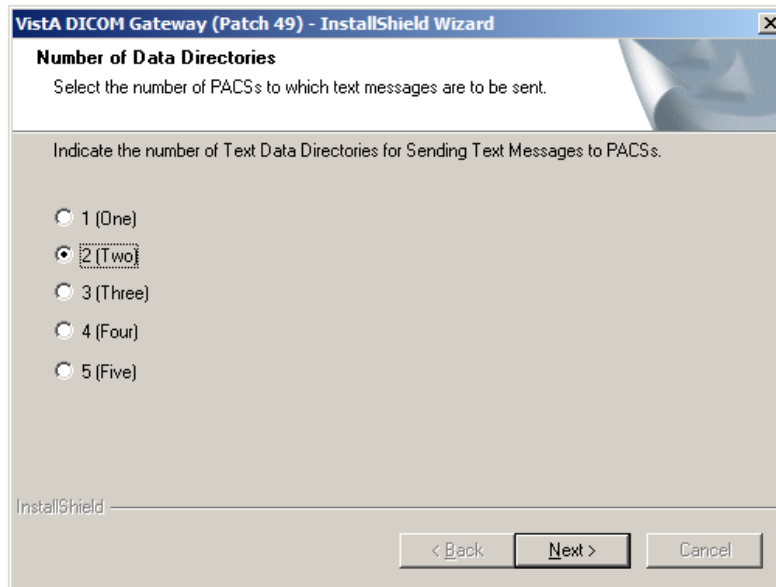
Note Make sure you run the installation procedure while logged on to the Gateway as a LOCAL Administrator.

- 1 Double-click **MAG3_OP49_DICOM_SetUp.exe** and wait while the installation procedure is extracted (this may take a few minutes).

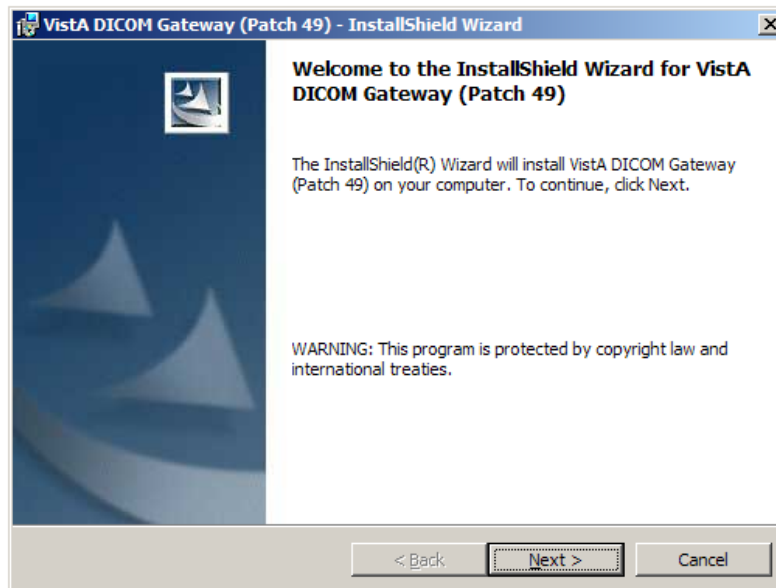


- 2 When the Number of Data Directories dialog box displays, choose the number of directories for sending text messages to PACS. Then, click **Next**.

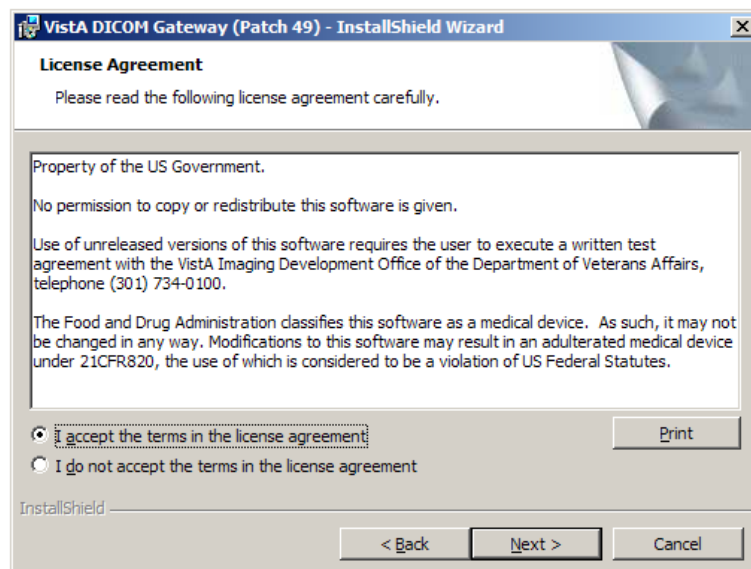
- 3 On systems that are already functioning as Text Gateways, the installation program automatically detects the proper number of directories. For all other systems, you can use the default value of **Two** with no impact on the system.



- 4 When the Welcome dialog box displays, click **Next**.

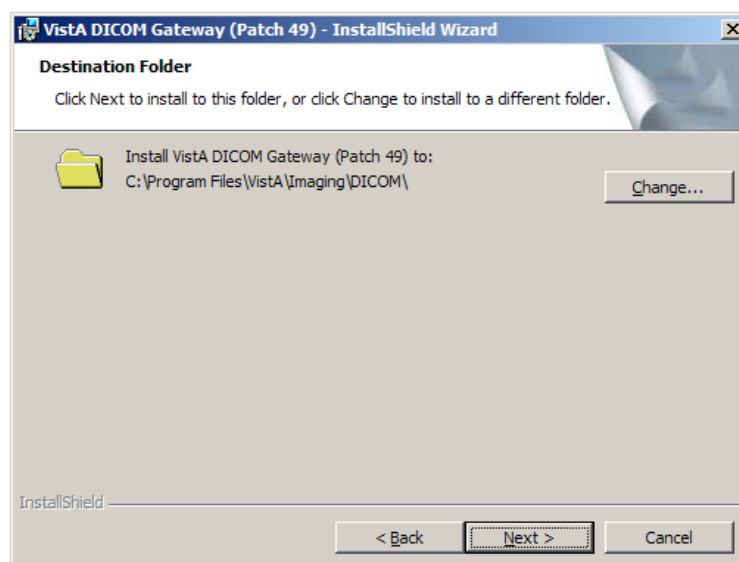


- 5 When the License Agreement dialog box displays, review the terms of the agreement, click the **I accept ...** option, and then click **Next**.



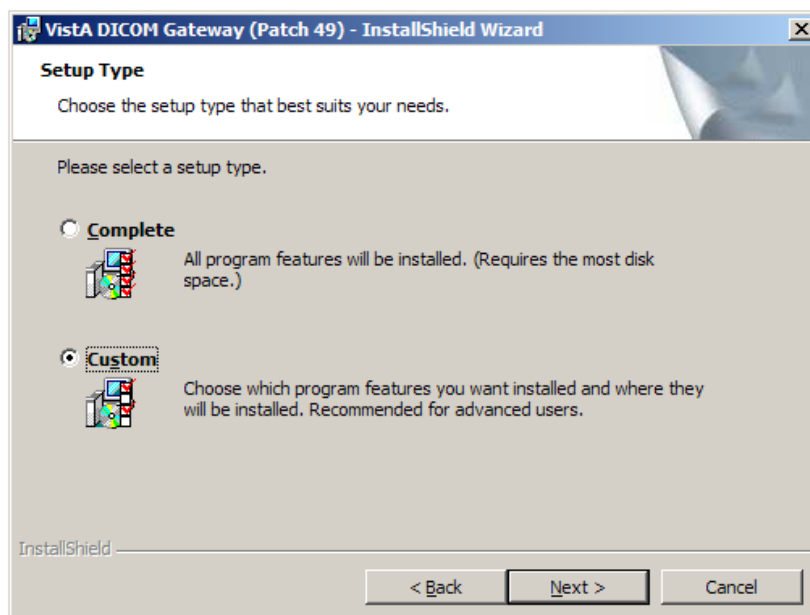
Note When the InstallShield presents the list of product-features, make sure each feature is installed on the appropriate disk drive.

- 6 When InstallShield prompts you to specify the destination folder (the folder in which the DICOM Gateway is installed), make sure that the installation program is pointing to the **C:** drive (local system drive). The installation will likely fail if you choose an alternate path.

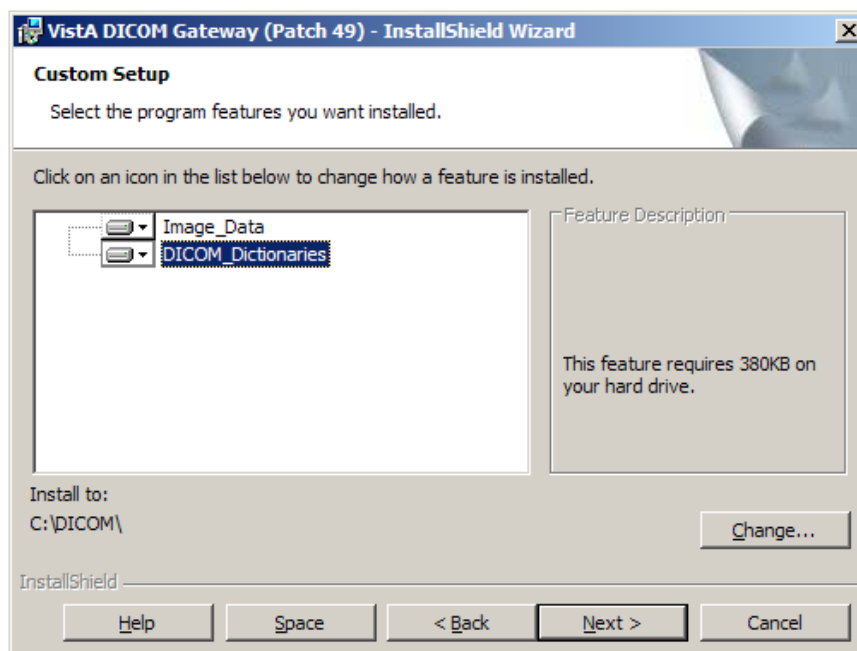


- 7 If you want to change the default location of the product-features, in the Setup Type dialog box that displays, make sure **Custom** is selected, then click **Next**.
- The Custom setup allows you to change the default location of the folders for the images (**Image_Data**) and the dictionary files (**DICOM_Dictionaries**). This is convenient if you want the images to be stored on a different drive (not the default, which is C). You must use the Custom option if you want the dictionary files to be installed on a network drive. If you choose Custom, continue with step 8 following.
 - If you choose the Complete setup, you will not be able to change the default location (**C:\DICOM**) for the folders for the images and the dictionary files. If you choose **Complete**, continue with step 10.

IMPORTANT: If the dictionary files reside on another drive (not in the default location C:\DICOM\), you must use the Custom setup and configure the dictionary files to be installed in the proper location. If you use the Complete setup, your dictionary files will be installed in the default location and the DICOM Gateway will not operate as expected.

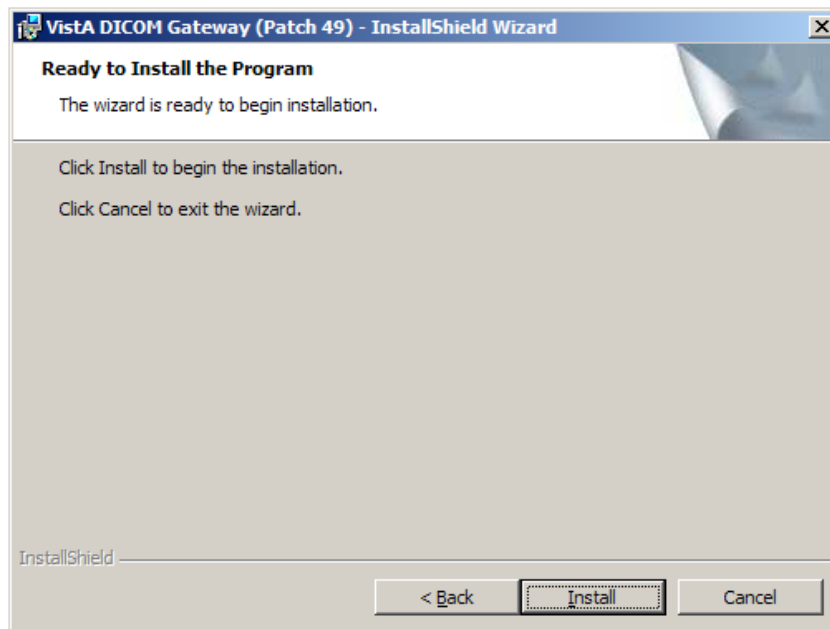


- 8 In the Custom Setup dialog, click each item (not the icon, but the actual item name) in the list and verify that the **Install To** area shows the correct folder for the installation. You must do this for both **Image_Data**, and **DICOM_Dictionaries**. If you need to change where an item (such as dictionary files) is installed, click **Change** and then use the dialog box that displays to select the appropriate location.

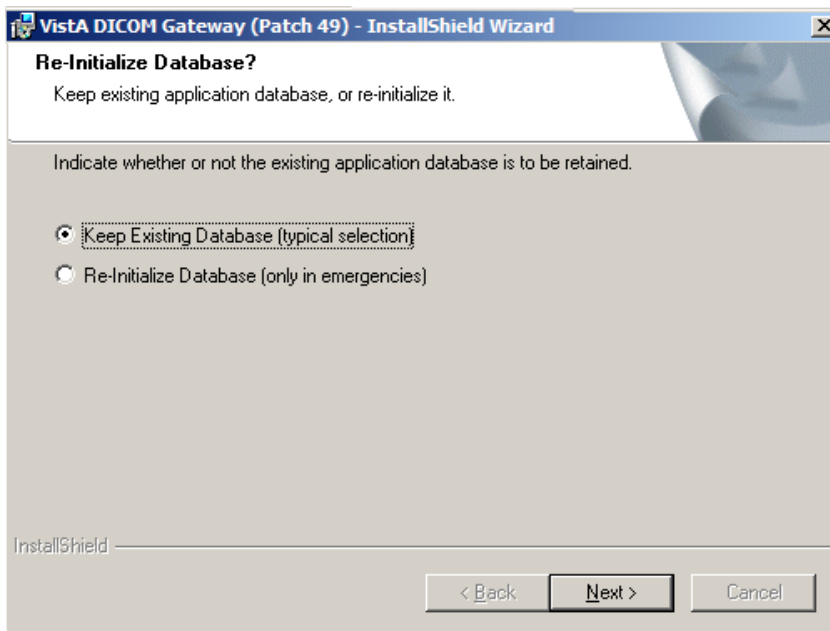


- 9 After verifying that all components are in their expected locations, click **Next**.

- 10 When the Ready To Install dialog box displays, click **Install**.



- 11 When prompted to select whether you want to keep the existing data in the database or re-initialize the database, it is strongly recommended that you do not re-initialize the database. Rather, use the default selection (**Keep Existing Database (typical selection)**) and click **Next**.



The installation process will copy the new files to the DICOM Gateway.

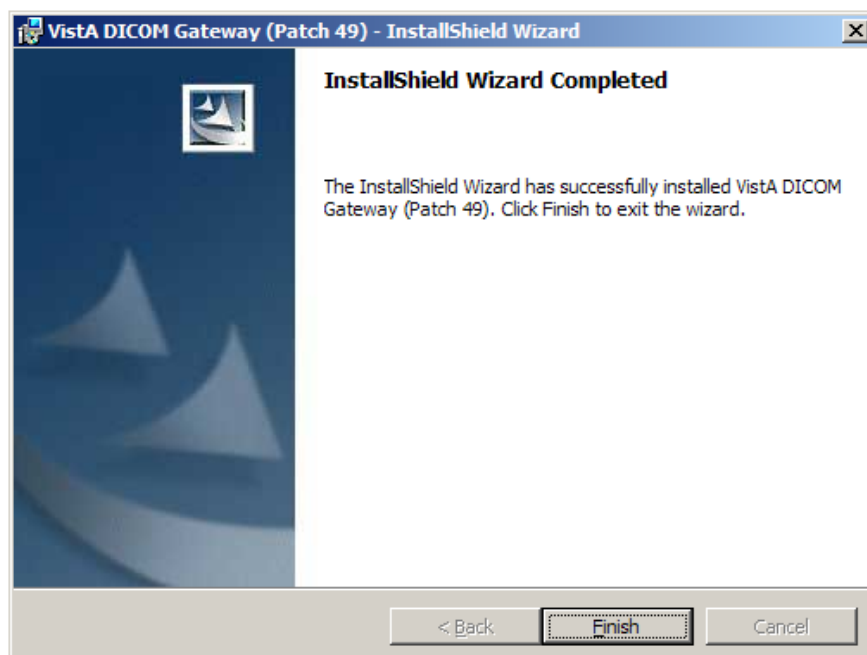
After the files have been copied, a reminder message displays.



12 Click **OK**.

Important: Do not run the Installer for the Java components, the file **JavaInstallEngine.bat**, if the Java components are already installed. See *Running the Java Installer*, following.

13 Click **Finish** to complete the installation of the new DICOM Gateway software.



- 14 To verify that the correct version has been installed, use the following menu option on the DICOM Gateway:

- 4 - System Maintenance,
 - 1 - System Operation,
 - 4 - Display the Version of the Software.

The correct display is as follows:

```
This is "IMAGING 3.0" created on Jun 29, 2011.
Active patch(es):
**1, 7, 9, 26, 21, 10, 36, 3, 11, 30, 5, 51, 50, 52, 69, 75, 102, 103, 54, 53, 66,
49**

Installed patches:
Patch 10: NOV 20, 2003
Patch 11: APR 14, 2004
Patch 30: NOV 5, 2004
Patch 49: Jun 29, 2011
Patch 50: JUL 13, 2006
Patch 51: JUN 16, 2006
Patch 53: Apr 22, 2010
Patch 54: OCT 28, 2009
Patch 69: NOV 7, 2007
Patch 102: SEP 08, 2008
Patch 103: MAR 03, 2009
```

Running the Java Installer

The DICOM Gateway installation program places a shortcut to the Java Installer (the file **JavaInstallEngine.bat**) on your desktop and prompts you to install the Java components. The Java components are not required for MAG*3.0*49. Additionally, running JavaInstallEngine.bat when the Java components are already installed can corrupt the Java Runtime Environment (JRE), which will prevent you from successfully installing the patch and the Query/Retrieve application from operating. The Java components are installed with MAG*3.0*53 and MAG*3.0*66. If any of these patches are installed on the DICOM Gateway on which you are installing MAG*3.0*49, the Java components most likely are already installed on that computer.

Important: Do not run the Installer for the Java components, the file **JavaInstallEngine.bat**, if the Java components are already installed.

- 1 To find out if the Java components are already installed, do the following: In **Control Panel**, double-click **Add or Remove Programs**.
- 2 Check if the following files are in the list of installed programs:
Java 6 Update <Version Number>
Java Advanced Imaging 1.1.3 ; and
Java Advanced Imaging Image I/O Tools 1.1.
- 3 If they are installed, do **not** run the Java installer.

If you tried to run the Java installer when the Java components were installed, do the following:

- 1** Uninstall the programs:
Java 6 Update <Version Number>;
Java Advanced Imaging 1.1.3; and
Java Advanced Imaging Image I/O Tools 1.1.
- 2** To do this, in Control Panel, double-click **Add or Remove Programs**.
- 3** Select each program one by one and click the **Remove** button.
- 4** Restart your computer.
- 5** Then, run the Installer for the Java components by clicking the shortcut on your desktop.

Sample Modality Worklist Illustrating New Patch 49 Fields

Patch 49 stores the new data elements supplied in the HL7 stream from Radiology Patch 47 in the in the Modality Worklist database. These elements can now be retrieved in the Modality Worklist Query and included in the results.

New data elements for Modality Worklist Queries:

- (0008,0050) New Accession Number format: SSS-MMDDYY-NNNNN³
- (0010,0021) Issuer of Patient ID
- (0010,1020) Height
- (0010,1030) Weight
- (0010,1000) Integration Control Number
- (0032,1033) Requesting Service
- (0032,4000) Tech Comment
- (0038,0010) Admission ID
- (0040,2010) Order Callback Phone Number
- (0040,3001) VIP Status and Patient Confidentiality

³ Sites may or may not use the SSS-MMDDYY-NNN format. If you enter this format, you must make sure that Radiology Patch 47 is configured to generate the SSS-MMDDYY-NNN format. Otherwise, the Modality Worklist Query will fail.

Use menu option 1-5 to perform a sample Modality Worklist Query and check results.

SELECT MODALITY WORKLIST ATTRIBUTE KEYS

```

PATIENT NAME (1) :
PATIENT ID (2) :
ACCESSION NUMBER (3) :
REQUESTED PROCEDURE ID (4) :
MODALITY (5) :
START DATE (6) :
START TIME (7) :

```

Enter 1-7 to change an item above, "R" to refresh, "Q" to query: q
 Performing Query...
 Sending the PDU to the SCP
 completed!

The following is an example Modality Worklist display with the new fields highlighted:

```

Patient Name: TWOONETWO, PATIENT          Race: WHITE, NOT HISP.
Patient Sex: M      Status: OUTPATIENT      Pregnancy Status: Not Pregnant
Patient Identifier: 000-00-0212            ICN/MPI: 9818820123V095770
Admission ID: 12345                        Issuer of Patient ID: USVHA
Patient Height: 1.65 meters                Patient Weight: 84 kilograms
Date of Birth: 1 January 1941              Location: 2B
Address: 11801 NW 18 CT, SALT LAKE CITY, UT 33323
Confidentiality: Patient is an EMPLOYEE with SENSITIVE data. Institution: SALT LAKE CITY

Accession Number: 660-021209-396           Requested Proc ID: 396
VA Procedure Code: 172   Name: ABDOMEN 1 VIEW - CONTRAST MEDIA USED
CPT Code: 74000-7       Name: X-RAY EXAM OF ABDOMEN - CONTRAST MEDIA USED
Scheduled: 12 February 2009 at 15:01:38 in RAD      Status: SCHEDULED
Requesting Physician: ONETWOSIX, PROVIDER           Priority: ROUTINE
Call Back Number: (301) 734-0100
Requesting Service: CARDIOLOGY                   Attention: <unknown>
Referring Physician: ONETWOSIX, PROVIDER
Study UID: 1. 2. 840. 113754. 1. 40. 660. 6919787. 8498. 1. 660. 21208. 396
Reason for Study: TEST

----- Medical History -----
Pt with claudication, diminished fem pulses. esp on L requesting aogram with
runoff and possible PTA/stending. Pt to be admitted as a lodger on 2-12 on 4B
and go post procedure to observation bed there. thanks
-----
Study Comments: If patient is uncooperative, cancel the examination.

```