DICOM 3.0 Conformance Statement
Odyssey LX Modality Worklist/Performed Procedure Step

Rev 9.4, November 1, 2002
P/N 453567928161
DICOM Modality Worklist software V9.4

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Highland Heights, Ohio 44143

This Conformance Statement describes DICOM Modality Worklist and Modality Performed Procedure Step software release 9.4 for the Philips Odyssey LX Nuclear Medicine systems with Axis or Irix gantries.

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1   Introduction

Medical imaging devices claiming conformance to the DICOM 3.0 standard must indicate in sufficient detail the service classes and information objects, as defined by the standard, to which they conform. This document details the conformance of the Philips Medical Systems Odyssey series Nuclear Medicine products to the DICOM 3.0 standard. The Odyssey systems must have Odyssey Baseline 9 software as a minimum, as well as the DICOM 3.0 Basic Modality Worklist option. This document does not attempt to detail any other medical imaging devices manufactured by Philips Medical Systems.

The Odyssey DICOM Modality Worklist and Performed Procedure Step product is implemented in accordance with the IHE Technical Framework.

2   Implementation Models

2.1   Modality Worklist

This implementation provides for simple transfer of patient demographic and procedure information using the DICOM Basic Modality Worklist SOP Class as a Service Class User (SCU). It is designed in accordance with the IHE year 3 requirements for modalities.

2.1.1   Application Data Flow Diagram

Queries for information are generally initiated automatically by the Odyssey, but can also be initiated manually by the operator.

Figure 2.1-1. Implementation Model
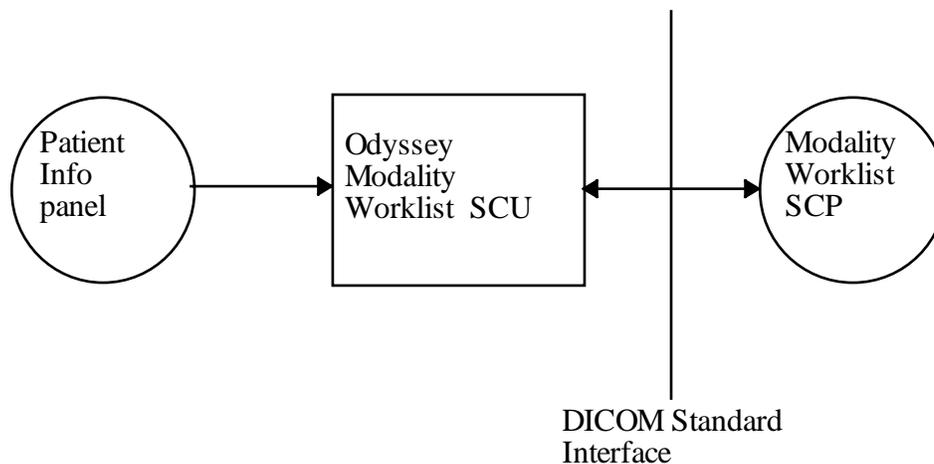
2.1.2   Functional Definitions of AE's

The DICOM Modality Worklist software is periodically started automatically by the Odyssey based on a configurable timing parameter. Each time it runs, it initiates a Query FIND request to obtain a list of all scheduled procedures from the Modality Worklist SCP. The received information is stored in a local schedule database, which can be accessed by the operator through the Acquisition Setup, Patient Information panel. The operator can also initiate the Worklist Query operation, for the purpose of getting an

immediate update of the patient schedule, by clicking on the <Update> button on the Patient List panel.

Entries are removed from the local schedule database as soon as the Modality Worklist SCP stops updating them. In other words, they are removed from the database as soon as the HIS stops reporting them as 'scheduled'.

2.1.3   Sequencing of Real-World Activities

The Modality Worklist SCU is started when the operator clicks on the <Update> button on the Patient List control panel, or automatically after a configurable time period has passed. At this time an association is established with the appropriate Worklist SCP, and a Query is generated for all NM procedures scheduled over the next N days (where N is configurable). All of the responses are recorded in a database on the Odyssey.

2.2   Performed Procedure Step

This implementation provides for simple transfer of procedure and image information using the DICOM Modality Performed Procedure Step SOP Class as a Service Class User (SCU). It is designed in accordance with the IHE year 3 requirements for modalities.

2.2.1   Application Data Flow Diagram

The Performed Procedure Step N-CREATE message is sent automatically after the acquisition protocol has been selected, and before the acquisition is begun. There is no operator intervention required.

Figure 2.2.1-1. Implementation Model (MPPS Create)
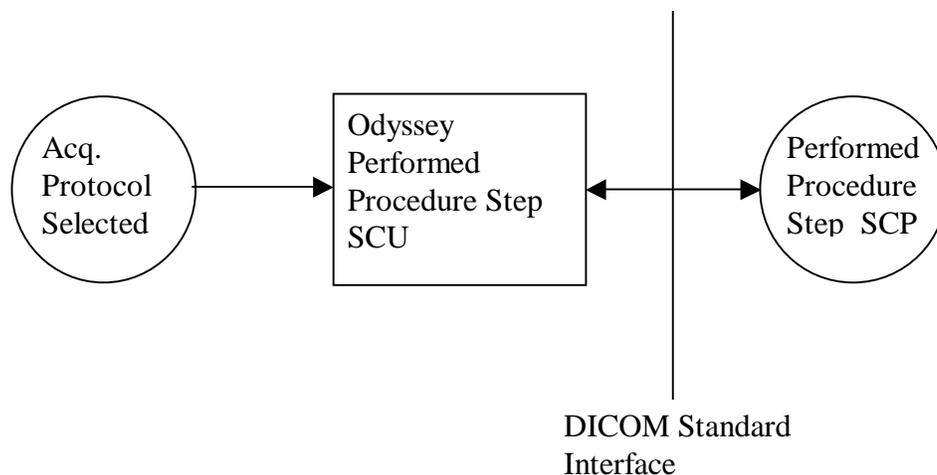
The Performed Procedure Step N-SET message is sent immediately after the acquisition has completed. If the operator aborted the acquisition, a DISCONTINUED status is sent, and no intervention by the operator is needed. In all other cases, the status that is sent is COMPLETED.

In cases where the acquisition was set up using information from the Worklist schedule, and no changes were made to the acquisition protocol, the N-SET message (with status = CPOMPLETED) is sent without any operator intervention. If the operator modified the acquisition protocol, or if the acquisition was not set up using Worklist schedule information, the operator is prompted to select protocol code information that should be returned to the information system in the N-SET message.

2.2.2   Functional Definition of AEs

When a Performed Procedure Step N-CREATE message is created and sent to the information system, information used to create the PPS message is stored in a file called MPPS.xxxx@ (where xxxx is a number created from a timestamp). A reference to this file is stored in the IIB field mpps, so that the information can be used later to send the MPPS completion message (N-SET). The same AE initiates both the N-CREATE and N-SET messages. It does not accept any associations or initiate any other DICOM messages.

2.2.3   Sequencing of Real World Activities

The Performed Procedure Step SCU is started automatically before an acquisition is started, and again after the acquisition is completed or aborted. The SCU is not started manually by the operator.

3   AE Specifications

The operational parameters for the DICOM Modality Worklist AE are derived from configuration files.

3.1   Worklist AE Specification

The Worklist Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes.

Table 3.1-1 Supported Meta SOP Classes

SOP Class Name	SOP Class UID	Role
Modality Worklist Query Find	1.2.840.10008.5.1.4.31	SCU

3.1.1   Association Establishment Policies (Worklist)

3.1.1.1   General (Worklist)

The Modality Worklist software will attempt to establish an association each time the List Patients function is invoked, or after a configurable time duration has elapsed. The association is maintained until all responses have been received and processed.

The maximum PDU (Protocol Data Unit) size allowed is 4096 bytes.

3.1.1.2   Number of Associations (Worklist)

Only one association at a time is attempted. However, it can be configured to query more than one Modality Worklist SCP.

3.1.1.3   Asynchronous Nature (Worklist)

There is no asynchronous activity in this implementation.

3.1.1.4   Implementation Identifying Information (Worklist)

The Implementation UID supplied for DICOM 3.0 associations is "2.16.840.1.113662.5".

3.1.2   Association Initiation By Real World Activity (Worklist)

The Modality Worklist software attempts to initiate an association once each time it is invoked. There is only one Real World Activity that can cause association establishment: Clicking on the <Update> button on the Patient List control panel.

3.1.2.1   Proposed Presentation Contexts (Worklist)

Table 3.1.2.1-1 Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Modality Worklist Query Find SOP Class	1.2.840.10008.5.1.4.31	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	None

3.1.2.2   SOP Specific Conformance (Worklist)

If the DICOM Modality Worklist software is unable to open an association with the selected destination AE, an error message is printed in the console window.

The Modality Worklist software does not attempt any extended negotiation.

The following optional attributes are included in the Query Find message:

**Table 3.1.2.2-1 Optional Matching Key Attributes for
Basic Modality Worklist SOP Class**

Tag	Name
[0008,0050]	Accession Number
[0008,0090]	Referring Physician's Name
[0008,1110]	Referenced Study Sequence
> [0008,1150]	Referenced SOP Class UID
> [0008,1155]	Referenced SOP Instance UID
[0010,0010]	Patient's Name
[0010,0020]	Patient ID
[0010,0030]	Patient's Birth Date
[0010,0040]	Patient Sex
[0010,1000]	Other Patient Ids
[0010,1030]	Patient's Weight
[0010,2000]	Medical Alerts
[0010,2160]	Ethnic Group
[0010,21b0]	Additional Patient History
[0010,21c0]	Pregnancy Status
[0010,4000]	Patient Comments
[0020,000d]	Study Instance UID
[0032,1032]	Requesting Physician
[0032,1033]	Requesting Service
[0032,1060]	Requested Procedure Description
[0032,1064]	Requested Procedure Code Sequence
> [0008,0100]	Code Value
> [0008,0102]	Coding Scheme Designator
> [0008,0104]	Code Meaning
[0038,0010]	Admission ID
[0038,0300]	Current Patient Location
[0040,0100]	Scheduled Procedure Step Sequence
> [0008,0060]	Modality
> [0032,1070]	Requested Contrast Agent
> [0040,0001]	Scheduled Station AE Title
> [0040,0002]	Scheduled Procedure Step Start Date
> [0040,0003]	Scheduled Procedure Step Start Time
> [0040,0006]	Scheduled Performing Physician
> [0040,0007]	Scheduled Procedure Step Description
> [0040,0008]	Scheduled Action Item Code Sequence
>> [0008,0100]	Code Value
>> [0008,0102]	Coding Scheme Designator
>> [0008,0104]	Code Meaning

> [0040,0009]	Scheduled Procedure Step ID
> [0040,0010]	Scheduled Station Name
> [0040,0011]	Scheduled Procedure Step Location
> [0040,0012]	Pre-Medication
> [0040,0020]	Scheduled Procedure Step Status
> [0040,0400]	Comments on the Scheduled Procedure Step
[0040,1001]	Requested Procedure ID
[0040,1002]	Reason for the Requested Procedure
[0040,1003]	Requested Procedure Priority
[0040,1004]	Patient Transport Arrangements
[0040,1010]	Names of Intended Recipients of Results
[0040,1400]	Requested Procedure Comments
[0040,2400]	Imaging Service Request Comments
[0040,3001]	Patient Data Confidentiality Constraints

Table 3.1.2.2-2 Optional Return Key Attributes for
Basic Modality Worklist SOP Class

Tag	Name
[0008,0090]	Referring Physician's Name
[0008,1110]	Referenced Study Sequence
> [0008,1150]	Referenced SOP Class
> [0008,1155]	Referenced SOP Instance UID
[0010,0030]	Patient's Birth Date
[0010,0040]	Patient's Sex
[0010,1000]	Other Patient Ids
[0010,1030]	Patient's Weight
[0010,2000]	Medical Alerts
[0010,2160]	Ethnic Group
[0010,21b0]	Additional Patient History
[0010,21c0]	Pregnancy Status
[0010,4000]	Patient Comments
[0032,1032]	Requesting Physician
[0032,1033]	Requesting Service
[0032,1060]	Requested Procedure Description
[0032,1064]	Requested Procedure Code Sequence
[0038,0010]	Admission ID
[0038,0300]	Current Patient Location
[0040,0100]	Scheduled Procedure Step Sequence
>[0032,1070]	Requested Contrast Agent
>[0040,0006]	Scheduled Performing Physician
>[0040,0007]	Scheduled Procedure Step Description
>[0040,0008]	Scheduled Action Item Code Sequence
>[0040,0010]	Scheduled Station Name
>[0040,0011]	Scheduled Procedure Step Location
>[0040,0012]	Pre-Medication
>[0040,0020]	Scheduled Procedure Step Status
>[0040,0400]	Comments on the Scheduled Procedure Step
[0040,1001]	Requested Procedure ID
[0040,1002]	Reason for the Requested Procedure
[0040,1003]	Requested Procedure Priority
[0040,1004]	Patient Transport Arrangements
[0040,1010]	Names of Intended Recipients of Results
[0040,1400]	Requested Procedure Comments
[0040,2400]	Imaging Service Request Comments
[0040,3001]	Confidentiality Constraint on Patient Data Description

Table 3.1.2.2-3 Extended Return Key Attributes for
Basic Modality Worklist SOP Class

Tag	Name
[0020,0010]	Study ID
[0008,1030]	Study Description
[0008,0020]	Study Date
[0008,0030]	Study Time

The DICOM Modality Worklist software provides Standard Extended conformance to the DICOM Basic Modality Worklist SOP Class.

3.1.3   Association Acceptance Policy (Worklist)

The DICOM Modality Worklist software does not accept associations.

3.2   Modality Performed Procedure Step (MPPS) AE Specifications

3.2.1   Association Establishment Policies (MPPS)

3.2.1.1   General (MPPS)

The Performed Procedure Step software will attempt to establish an association immediately after an acquisition protocol has been selected (before the acquisition is started) and again as soon as the acquisition has completed. Each association is maintained only until an acknowledgment is received, and then is immediately closed.

The maximum PDU (Protocol Data Unit) size allowed is 4096 bytes.

3.2.1.2   Number of Associations (MPPS)

Only one association at a time is attempted.

3.2.1.3   Asynchronous Nature (MPPS)

There is no asynchronous activity in this implementation.

3.2.1.4   Implementation Identifying Information (MPPS)

The Implementation UID supplied for DICOM 3.0 associations is "2.16.840.1.113662.5".

3.2.2   Association Initiation By Real World Activity (MPPS)

The Performed Procedure Step software attempts to initiate an association once each time it is invoked.   There is only one Real World Activity that can cause association establishment: initiating and completing an acquisition.

3.2.2.1   Proposed Presentation Contexts (MPPS)

Table 3.1.1.1-1 Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	None

3.2.2.2   SOP Specific Conformance (MPPS)

If the DICOM Performed Procedure Step software is unable to open an association with the selected destination AE, an error message is printed in the console window.

The Performed Procedure Step software does not attempt any extended negotiation.

The following attributes may be included in the MPPS N-CREATE message:

Table 3.2.2.2-1 N-CREATE Message Attributes

Tag	Name
[0000,0002]	Affected SOP Class UID
[0000,0100]	Command Field
[0000,0110]	Message ID
[0000,0800]	Data Set Type
[0000,1000]	Affected SOP Instance UID
[0008,0060]	Modality
[0008,1032]	Procedure Code Sequence
[0008,1120]	Referenced Patient Sequence
[0010,0010]	Patient's Name
[0010,0020]	Patient ID
[0010,0030]	Patient's Birth Date
[0010,0040]	Patient's Sex
[0020,0010]	Study ID
[0040,0241]	Performed Station AE Title
[0040,0242]	Performed Station Name
[0040,0243]	Performed Location
[0040,0244]	Performed Procedure Step Start Date
[0040,0245]	Performed Procedure Step Start Time
[0040,0250]	Performed Procedure Step End Date
[0040,0251]	Performed Procedure Step End Time
[0040,0252]	Performed Procedure Step Status
[0040,0253]	Performed Procedure Step ID
[0040,0254]	Performed Procedure Step Description
[0040,0255]	Performed Procedure Type Description
[0040,0260]	Performed Action Item Sequence
[0040,0270]	Scheduled Step Attributes Sequence
[0008,0050]	Accession Number
[0008,1110]	Referenced Study Sequence
[0020,000d]	Study Instance UID
[0032,1060]	Requested Procedure Description
[0040,0007]	Scheduled Procedure Step Description
[0040,0008]	Scheduled Action Item Code Sequence
[0040,0009]	Scheduled Procedure Step ID
[0040,1001]	Requested Procedure ID
[0040,1006]	Placer Order Number/Procedure
[0040,1007]	Filler Order Number/Procedure
[0040,2006]	Placer Order Number/Imaging Service Request
[0040,2007]	Filler Order Number/Imaging Service Request
[0040,0280]	Comments on the Performed Procedure
[0040,0340]	Performed Series Sequence

The following attributes may be included in the MPPS N-SET message:

Table 3.2.2.2-2 N-SET Message Attributes

Tag	Name
[0000,0003]	Requested SOP Class UID
[0000,0100]	Command Field
[0000,0110]	Message ID
[0000,0800]	Data Set Type
[0000,1001]	Requested SOP Instance UID
[0040,0250]	Performed Procedure Step End Date
[0040,0251]	Performed Procedure Step End Time
[0040,0252]	Performed Procedure Step Status
[0040,0254]	Performed Procedure Step Description
[0040,0280]	Comments on the Performed Procedure Step
[0040,0340]	Performed Series Sequence
[0008,0054]	Retrieve AE Title
[0008,103e]	Series Description
[0008,1050]	Attending Physician's Name
[0008,1070]	Operator's Name
[0008,1140]	Referenced Image Sequence
[0008,1150]	Referenced SOP Class UID
[0008,1155]	Referenced SOP Instance UID
[0018,1030]	Protocol Name
[0020,000e]	Series Instance UID
[0040,0220]	Referenced Standalone SOP Instance
[0018,1030]	Protocol Name
[0020,000e]	Series Instance UID
[0040,0220]	Referenced Standalone SOP Instance

The DICOM performed Procedure Step software provides Standard conformance to the DICOM Modality Performed Procedure Step SOP Class.

3.2.3   Association Acceptance Policy (MPPS)

The DICOM Performed Procedure Step software does not accept associations.

4   Communication Profiles

4.1   Supported Communications Stacks (Parts 8,9)

This software provides DICOM 3.0 TCP/IP Network Communications Support as defined in Part 8 of the DICOM Standard.

4.2   OSI Stack

No OSI stack communications are provided with this implementation.

4.3   TCP/IP Stack

The TCP/IP protocol stack is supported.

4.3.1   Physical media supported

The following media are supported:
   1) Twisted pair Ethernet
   2) Thinnet Ethernet
   3) Thicknet Ethernet

4.4   Point to Point Stack

No point to point stack communications are provided with this implementation.

5   Extensions/Specializations/Privatizations

The Worklist software provides Standard Extended Conformance, as described in section 3.1.2.2. There are no other extensions or specializations used in the Worklist product. The Performed Procedure Step software uses no extensions, specializations, or privatizations.

6   Configuration

6.1   AE Title/Presentation Address Mapping

The host name and AE title for each Worklist and Performed Procedure Step SCP is maintained in configuration files on the Odyssey.

6.2   Configurable Parameters

The following parameters are configurable:

Table 6.2-1 Configuration Parameters (Worklist)

Mode:	Determines the amount of diagnostic messages to be displayed.
Database Path:	The device name for the disk that contains the patient schedule database.
Database Node:	The host name for the Odyssey that maintains the patient schedule database. The device defined in the Database Path parameter, above, is connected to this host.
Lookahead:	Number of days worth of schedule information to be maintained in the database. 0 means show patients scheduled for 'today' only. 1 means show patients scheduled for 'tomorrow' as well, etc.
For each destination:	
Port Number:	Port number on which to communicate with destination AE (Worklist SCP). The standard DICOM port is 104.
Odyssey AE Title:	The Odyssey Application Entity Title to use when opening an association with the destination AE.
Remote AE Title:	Application Entity Title of destination AE.
Remote Node Name:	Host name of remote Worklist SCP.
Timeout	Maximum time (seconds) to wait for a response from the SCP before timing out.
Access Period:	Defines the amount of time to wait before querying this destination AE again.
Query Match Type:	Determines whether strings entered by the operator for qualifying the query search will be sent as is (exact match required), with an '*' appended (finds strings beginning with the entered text), or with an '*' pre-pended and appended (finds strings containing the entered text, i.e. wildcard match).

Table 6.2-1 Configuration Parameters (Performed Procedure Step)

Enable Performed Procedure Step:	Determines whether or not PPS is used.
Mode:	Determines the amount of diagnostic messages to be displayed.
Port Number:	Port number on which to communicate with destination AE (MPPS SCP). The standard DICOM port is 104.
Odyssey AE Title:	The Odyssey Application Entity Title to use when opening an association with the destination AE.
Remote AE Title:	Application Entity Title of destination AE.
Remote Host Name:	Host name of remote MPPS SCP.
Timeout Duration:	Maximum time (seconds) to wait for a response from the SCP before timing out.
Study Description Source:	Determines the source of the text that will be returned in the Study Description Source in the MPPS message. Choices are from the worklist entry, or from the acquisition protocol.

7   Support of Extended Character Sets

This implementation supports the ISO IR-100 character set.