



# Technical Publications

Direction: 2317751

Revision: 4

## Connect Pro Plus DICOM CONFORMANCE STATEMENT for DICOM v3.0 (ID/Net v3.0)

### Supported Products:

- Signa Infinity (9.1)
- Signa TwinSpeed (9.1)
- Signa Infinity with EXCITE (10.0)
- Signa OpenSpeed (HFO3)
- Signa Ovation (MFO3)
- Signa 3T (VH3)

*Addendum for :*

***Signa Horizon Lx DICOM Conformance Statement***

## Operating Documentation

**Revisions**

<b>Revision #</b>	<b>Date</b>	<b>Comments</b>
0	9/13/2001	Baseline version for ConnectPro Plus based on 225359 rev 1
1	10/4/2001	Added Signa 3T (VH3) product
2	5/16/2002	Added Signa Infinity with EXCITE (10.0) product Corrected table numbering in section 2
3	11/21/2002	Misc. corrections, added MFO3 product Updated PPS implUID
4	08/11/2003	Corrected DICOM tag in Table 3-1

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# 1. Introduction

## 1.1. OVERVIEW

This DICOM Conformance Statement is divided into Sections as described below:

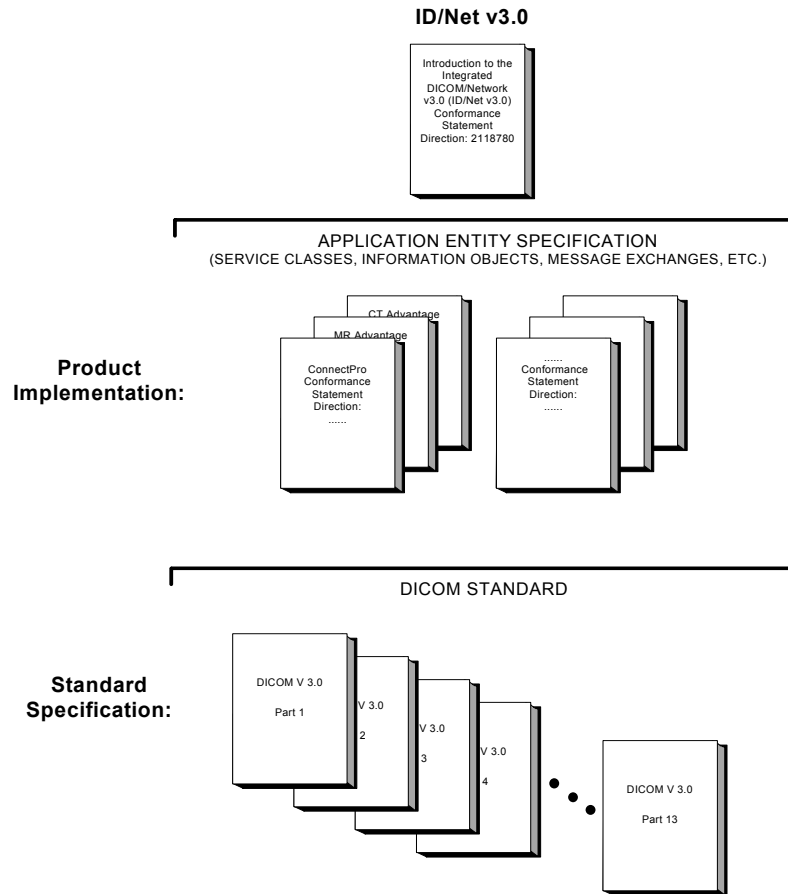
**Section 1 (Introduction)**, which describes the overall structure, intent, and references for this Conformance Statement

**Section 2 (Modality Worklist Information Model Definition)**, which specifies the GEMS equipment compliance to the DICOM requirements for the implementation of Basic Worklist Management Service capabilities.

**Section 3 (Modality Performed Procedure Step Conformance Statement)**, which specifies the GE Medical Systems (GEMS) equipment compliance to the DICOM requirements for the implementation of MPPS.

## 1.2. OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GEMS Conformance Statements and their relationship with the DICOM v3.0 Conformance Statements is shown in the Illustration below.



This document specifies the DICOM v3.0 implementation for the *PPS SOP and the enhanced MWL SOP*. It is entitled:

*Connect Pro Plus DICOM Conformance Statement  
Addendum for Signa Horizon Lx DICOM Conformance Statement  
for DICOM v3.0*

Please see the appropriate DICOM conformance Statement(s) for Implementation information on other DICOM services provided by the GE Medical Systems products.

This DICOM Conformance Statement documents the DICOM v3.0 Conformance Statement and Technical Specification required to interoperate with the GEMS network interface. Introductory information, which is applicable to all GEMS Conformance Statements, is described in the document:

*Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0)  
Conformance Statement  
Direction: 2118780.*

This Introduction familiarizes the reader with DICOM terminology and general concepts. It should be read prior to reading the individual products' GEMS Conformance Statements.

The GEMS Conformance Statement, contained in this document, also specifies the Lower Layer communications which it supports (e.g., TCP/IP). However, the Technical Specifications are defined in the DICOM v3.0 Part 8 standard. For more information including Network Architecture and basic DICOM concepts, please refer to the Introduction.

For more information regarding DICOM v3.0, copies of the Standard may be obtained by written request or phone by contacting:

NEMA Publication  
1300 North 17th Street  
Suite 1847  
Rosslyn, VA 22209  
USA  
Phone: (703) 841-3200  
Dat\_Wall@nema.org

### 1.3. INTENDED AUDIENCE

The reader of this document is concerned with software design and/or system integration issues. It is assumed that the reader of this document is familiar with the DICOM v3.0 Standards and with the terminology and concepts, which are used in those Standards.

If readers are unfamiliar with DICOM v3.0 terminology they should first refer to the document listed below, then read the DICOM v3.0 Standard itself, prior to reading this DICOM Conformance Statement document.

*Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0)  
Conformance Statement  
Direction: 2118780*

### 1.4. SCOPE AND FIELD OF APPLICATION

It is the intent of this document, in conjunction with the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*, to provide an unambiguous specification for GEMS implementations. This specification, called a Conformance Statement, includes a DICOM v3.0 Conformance Statement and is necessary to ensure proper processing and interpretation of GEMS medical data exchanged using DICOM v3.0. The GEMS Conformance Statements are available to the public.

The reader of this DICOM Conformance Statement should be aware that different GEMS devices are capable of using different Information Object Definitions. For example, a GEMS CT Scanner may send images using the CT Information Object, MR Information Object, Secondary Capture Object, etc.

Included in this DICOM Conformance Statement are the Module Definitions, which define all data elements, used by this GEMS implementation. If the user encounters unspecified private data elements while parsing a GEMS Data Set, the user is well advised to ignore those data elements (per the DICOM v3.0 standard). Unspecified private data element information is subject to change without notice. If, however, the device is acting as a "full fidelity storage device", it should retain and re-transmit all of the private data elements which are sent by GEMS devices.

### 1.5. IMPORTANT REMARKS

The use of these DICOM Conformance Statements, in conjunction with the DICOM v3.0 Standards, is intended to facilitate communication with GE imaging equipment. However, **by itself, it is not sufficient to ensure that inter-operation will be successful.** The **user (or user's agent)** needs to proceed with caution and address at least four issues:

- **Integration** - The integration of any device into an overall system of interconnected devices goes beyond the scope of standards (DICOM v3.0), and of this introduction and associated DICOM Conformance Statements when interoperability with non-GE equipment is desired. The responsibility to analyze the applications requirements and to design a solution that integrates GE imaging equipment with non-GE systems is the **user's** responsibility and should not be underestimated. The **user** is strongly advised to ensure that such an integration analysis is correctly performed.
- **Validation** - Testing the complete range of possible interactions between any GE device and non-GE devices, before the connection is declared operational, should not be overlooked. Therefore, the **user** should ensure that any non-GE provider accepts full responsibility for all validation required for their connection with GE devices. This includes the accuracy of the image data once it has crossed the interface between the GE imaging equipment and the non-GE device and the stability of the image data for the intended applications.



Such a validation is required before any clinical use (diagnosis and/or treatment) is performed. It applies when images acquired on GE imaging equipment are processed/displayed on a non-GE device, as well as when images acquired on non-GE equipment is processed/displayed on a GE console or workstation.

- **Future Evolution** - GE understands that the DICOM Standard will evolve to meet the user's growing requirements. GE is actively involved in the development of the DICOM v3.0 Standard. DICOM v3.0 will incorporate new features and technologies and GE may follow the evolution of the Standard. The GEMS protocol is based on DICOM v3.0 as specified in each ID/Net DICOM Conformance Statement. Evolution of the Standard may require changes to devices, which have implemented DICOM v3.0. **In addition, GE reserves the right to discontinue or make changes to the support of communications features (on its products) reflected on by these ID/Net DICOM Conformance Statements.** The user should ensure that any non—GE provider, which connects with GE devices, also plans for the future evolution of the DICOM Standard. Failure to do so will likely result in the loss of function and/or connectivity as the DICOM Standard changes and GE Products are enhanced to support these changes.
- **Interaction** - It is the sole responsibility of the **non—GE provider** to ensure that communication with the interfaced equipment does not cause degradation of GE imaging equipment performance and/or function.

## **1.6. REFERENCES**

A list of references, which is applicable to all GEMS Conformance Statements, is included in the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780.*

The information object implementation refers to DICOM PS 3.3 (Information Object Definition).

## **1.7. DEFINITIONS**

A set of definitions, which is applicable to all GEMS Conformance Statements, is included in the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780.*

## **1.8. SYMBOLS AND ABBREVIATIONS**

A list of symbols and abbreviations, which is applicable to all GEMS Conformance Statements, is included in the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780.*

## 2. Enhanced Modality Worklist INFORMATION MODEL Definition

### 2.1. INTRODUCTION

This section specifies the use of the DICOM Modality Worklist Information Model used to organize data and against which a Modality Worklist Query will be performed. The overall content of this specification is an enhancement to the existing capability. The contents of this section are:

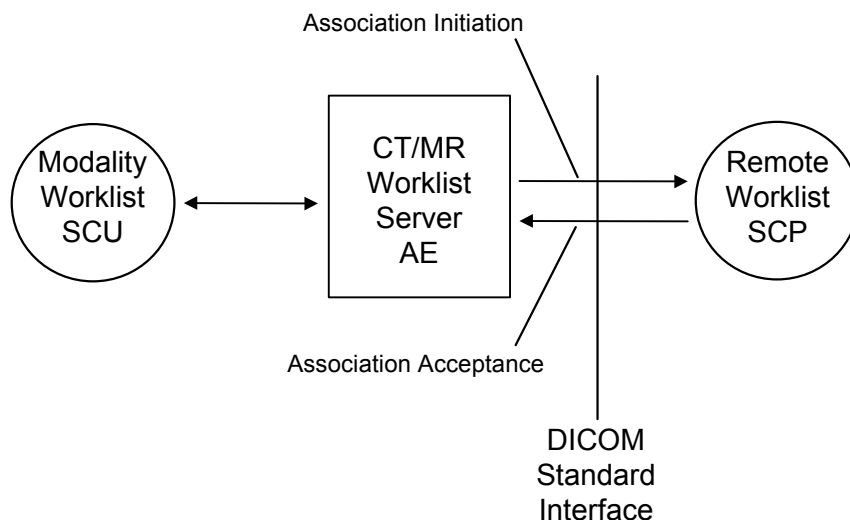
- 2.2IMPLEMENTATION MODEL
- 2.3AE SPECIFICATIONS
- 2.4MODALITY WORKLIST INFORMATION MODEL DESCRIPTION
- 2.5MODALITY WORKLIST INFORMATION MODEL ENTITY-RELATIONSHIP MODEL
- 2.6INFORMATION MODEL MODULE
- 2.7INFORMATION MODEL KEYS
- 2.8PRIVATE DATA DICTIONARY

### 2.2. IMPLEMENTATION MODEL

All Modality Worklist DICOM functionality provided by the GE Medical System *MRI System* is logically provided by the Worklist Server DICOM AE. The Worklist Server DICOM AE is commanded to perform DICOM modality worklist query services through the use of the Scanner's user interface.

#### 2.2.1. Application Data Flow Diagram

The Basic and Specific Application models for this device are shown in the following illustration:



### 2.2.2. Functional Definition of AE's

The Worklist Server AE is implemented as an application process on the scanner host computer. It runs as a daemon serving requests from the user interface to obtain modality worklist, query remote AE's and return the results to the user interface.

The Worklist Server AE initiates the following functions:

- *Query*: Initiates a DICOM association in order to query a remote AE. If the remote AE accepts a presentation context applicable to modality worklist, the Worklist Server AE will issue a modality worklist query request via the C-FIND service.

### 2.2.3. Sequencing of Real-World Activities

1. The user or the system initiates a modality worklist query (as a modality worklist SCU) to the modality worklist SCP with a given set of query parameters.
2. The modality worklist SCP returns responses, which match the query parameters.
3. Items from the returned worklist responses are presented to the user.
4. A subset of attributes corresponding to operator selected returned worklist responses will be included in the Modality Performed Procedure Step related to the responses.
5. A subset of attributes corresponding to operator selected returned worklist responses will be included in acquired DICOM images related to the responses.

## 2.3. AE SPECIFICATIONS

### 2.3.1. Worklist Server AE Specification

This Application Entity provides Standard Conformance to the following DICOM v3.0 SOP Classes as an SCU:

SOP Class Name	SOP Class UID
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31

#### 2.3.1.1. Association Establishment Policies

##### 2.3.1.1.1. General

The DICOM Application Context Name (ACN), which is always proposed, is:

Application Context Name	1.2.840.10008.3.1.1.1

The Maximum Length PDU negotiation is included in all association establishment requests. The maximum length PDU for an association initiated by the DICOM Worklist Server is:

Maximum Length PDU	50 Kbytes

The SOP Class Extended Negotiation is not supported.

The maximum number of Presentation Context Items that will be proposed is 1.

The user information Items sent by this product are:

- Maximum PDU Length
- Implementation UID

### 2.3.1.1.2. *Number of Associations*

The Worklist Server AE (SCU) will initiate only one DICOM association at a time to perform a modality worklist query of a single remote AE.

### 2.3.1.1.3. *Asynchronous Nature*

Asynchronous mode is not supported. All operations are performed synchronously.

### 2.3.1.1.4. *Implementation Identifying Information*

The Implementation UID allows unique identification of a set of products that share the same implementation.

The Implementation UID for this GEMS Implementation is:

Modality Worklist Implementation UID	1.2.840.113619.6.52
--------------------------------------	---------------------

### 2.3.1.2. **Association Initiation Policy**

The Worklist Server AE initiates a new association due to an update operation being initiated from the Signa Horizon Lx user interface. The association is closed upon receipt of the final query response from the remote AE. The association can also be closed by the Worklist Server AE upon receipt of error status from the remote AE or upon expiration of association or session timers (see section 2.3.1.2.1.2.1 for more information).

#### 2.3.1.2.1. *Real-World Activity: Worklist Query*

##### 2.3.1.2.1.1. **Associated Real-World Activity**

The operator of the system initiates a query for a modality worklist by either opening the Schedule screen or by opening the Schedule screen and pressing the Update button. The choice of which of these two behaviors occurs is user configurable. The Worklist Server will then initiate an association with the remote AE in order to query for the worklist.

A user can configure a number of parameters, which directly control the worklist query request. The user can request worklist items that are intended for the scanner the user is working at, all items that apply to the modality of the scanner the user is working at or all worklist items available. These selections and their affects on worklist query parameters are given below:

This Scanner:

- Modality, (0008,0060) - set to MR
- Scheduled Station AE Title, (0040,0001) - set to Station name AE title

This Modality:

- Modality, (0008,0060) - set to MR
- Scheduled Station AE Title, (0040,0001) - zero-length (universal matching)

All Scanners:

- Modality, (0008,0060) - zero-length (universal matching)
- Scheduled Station AE Title, (0040,0001) - zero-length (universal matching)

Note that the All Scanners query above can return worklist items for modalities other than MR if such items exist. The system will warn the operator and disallow selection if a dissimilar modality is selected from the worklist.

The scheduled dates of procedures of interest can be specified for query by selecting a specific date range. The date ranges available are Today, Days Before Today, Days After Today and All Days. These selections and their affects on worklist query parameters are given below:

Today:

Scheduled Procedure Step Start Date, (0040,0002) - set to YYYYMMDD, where this date is the current date.

Days Before Today and Days After Today:

Scheduled Procedure Step Start Date, (0040,0002) - set to YYYYMMDD-YYYYMMDD, where this date range represents the specified number of days before today and/or after today. Note that number of days both before and after can be specified in the same query and that each always includes today.

All Days:

Scheduled Procedure Step Start Date, (0040,0002) - zero-length (universal matching)

Note that selecting All Scanners and All Days with no worklist specific fields specified results in an unconstrained worklist query. The response to an unconstrained worklist query can differ between different modality worklist SCP implementations. Consult the modality worklist SCP manufacturer if difficulties occur when attempting unconstrained queries.

Worklist specific fields targeted to retrieve a single or very small set of related entries may also be specified. These fields may be used for a query combined with scanner and scheduled time to provide a very specific query to the worklist server. The specific fields are specified below:

Patient Name (0010,0010)

Matching with leading and trailing wildcards is allowed on either Patient Last Name or Patient First Name (user selectable), zero length matches all values.

Patient ID (0010,0020)

Zero length or single value matching only of value entered.

Requested Procedure Number (0040,1001)

Leading and trailing wildcard matching for value entered.

Assession Number (0008,0050)

Leading and trailing wildcard matching for value entered.

**2.3.1.2.1.2. Proposed Presentation Context**

Table 2-1 Proposed Presentation Context, shows the proposed presentation contexts for the Worklist Server AE after real-world activity “Worklist Query” has been initiated:

*Table 2-1 Proposed Presentation Context*

<b>Presentation Context Table – Proposed</b>
--

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

**2.3.1.2.1.2.1. SOP Specific DICOM Conformance Statement for the Worklist SOP Class**

If the remote AE does not support the proposed Presentation Context, an appropriate error is logged and the operator is notified.

This implementation can receive multiple C-FIND results over a single association. Only one association is opened at a time.

Each C-FIND response received from the remote AE is parsed to verify the length/type of the items in the response (see section 2.3.1.2.1.2.2 for more information). Upon detecting any error in the response data, the response is discarded and the next response (if any) is considered.

On receipt of any error from the remote AE, the Worklist Server will issue a C-FIND-CANCEL and, upon receipt of a C-FIND-RSP (or if an applicable timer expires), will abort the association. Any previously received worklist items are discarded. Warnings received from the remote AE are ignored.

Each C-FIND operation supports a configurable “Association Timer.” This timer starts when the association request is sent or received and stops when the association is established. The default time-out value is 30 seconds.

Each C-FIND operation supports a configurable “Session Timer.” This timer starts when an association is established and stops when the association is ended. The default time-out value is 3600 seconds.

If any of the above timers expires, the association is aborted (A-ABORT) and the operation in progress is considered to be failed. Any previously received worklist items are discarded.

All errors and failures detected by the Worklist Server AE are logged to the log file **/usr/g/hisris/wlsErrors**.

**2.3.1.2.1.2.2. Record Acceptance Policy**

The *Implementation* adheres to strict value checking of incoming query responses from the remote AE. Each response received is examined to verify that all Type 1 attributes are present with non-zero length and that the data for all attributes is consistent with respect to the attributes’ value representation (VR).

Any inconsistencies in the response data, with respect to the categories described above, are considered errors. Upon detecting any such errors in the response data, the Worklist Server AE will immediately discard the item containing the error (not including it in any resulting displayed worklist items.) Any received valid worklist items are retained.

Note that the absence of requested Type 2 or Type 3 attributes is not considered an error.

Attributes considered Type 1 by the Worklist Server AE include:

- (0010,0010), Patient’s Name
- (0010,0020), Patient ID
- (0020,000D), Study Instance UID
- (0040,0001), Scheduled Station AE Title
- (0040,0002), Scheduled Procedure Step Start Date
- (0040,0003), Scheduled Procedure Step Start Time
- (0040,0009), Scheduled Procedure Step ID

- (0040,1001), Requested Procedure ID
- (0008,0060), Modality

### **2.3.1.3. Association Acceptance Policy**

The Worklist Server AE does not respond to attempts by a remote AE to open an association.

## **2.4. MODALITY WORKLIST INFORMATION MODEL DESCRIPTION**

In order to serve as a Service Class Provider (SCP) of the Modality Worklist Service Class, a DICOM Application Entity (AE) possesses information about the attributes of a number of managed worklist items. These items are organized into Modality Worklist Information Modules. In this Service Class, the Information Model plays a role similar to an Information Object Definition of most other DICOM Service Classes.

## **2.5. MODALITY WORKLIST INFORMATION MODEL ENTITY-RELATIONSHIP MODEL**

The Entity-Relationship diagram for the Modality Worklist Information Model schema is shown in Figure 2-1

Modality Worklist Information Model E/R DIAGRAM. It represents the information that composes a Worklist Item. In this figure, the following diagrammatic convention is established to represent the information organization:

- each entity is represented by a rectangular box
- each relationship is represented by a diamond shaped box.
- the fact that a relationship exists between two entities is depicted by lines connecting the corresponding entity boxes to the relationship boxes.

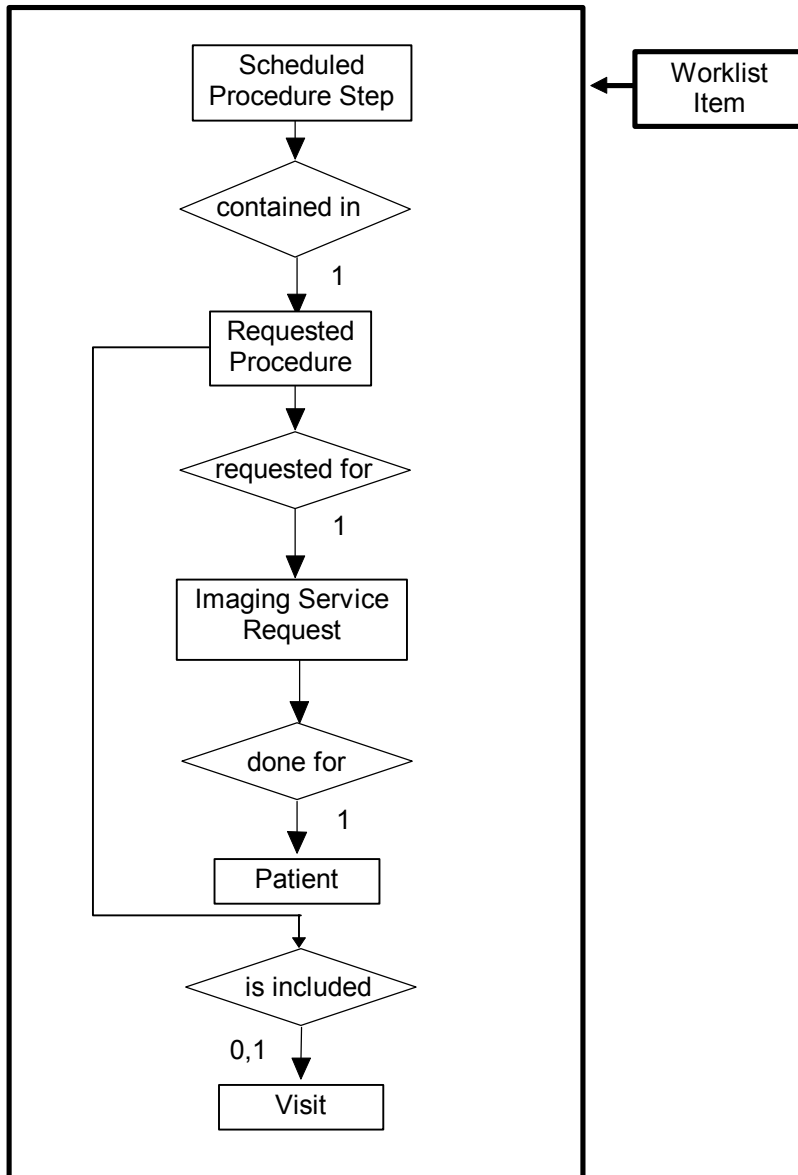


Figure 2-1  
Modality Worklist Information Model E/R DIAGRAM

## 2.5.1. ENTITY DESCRIPTIONS

Please refer to DICOM Standard PS 3.3. (Information Object Definitions) and PS 3.4 (Service Class Specifications) for a description of each of the Entities contained within the Modality Worklist Information Model.

### 2.5.1.1. Scheduled Procedure Step

A Scheduled Procedure Step is an arbitrarily defined scheduled unit of service that is specified by the Procedure Plan for a Requested Procedure. It specifies one or more Action Items (events)



involving equipment (i.e. imaging modality equipment), human resources, location and time (i.e. start time, stop time, duration).

**2.5.1.2. Requested Procedure Entity Description**

A Requested Procedure is an instance of a Procedure of a given Procedure Type. An instance of a Requested Procedure includes all of the items of information that are specified by an instance of a Procedure Plan that is selected for the Requested Procedure by the imaging service provider.

**2.5.1.3. Imaging Service Request Entity Description**

An Imaging Service Request is a set of one or more Requested Procedures selected from a list of Procedure Types. An Imaging Service Request is submitted by one authorized imaging service requester to one authorized imaging service provider in the context of one Service Episode.

**2.5.1.4. Visit Entity Description**

A Visit is the context in which the treatment or management of an arbitrary subset of a Patient’s medical conditions occurs. A Visit is limited to the description of a Patient’s activities at a single facility.

**2.5.1.5. Patient Entity Description**

A Patient is a person receiving, or registered to receive, healthcare services.

**2.5.2. MR Systems Mapping of DICOM Entities**

*Table 2-2  
Mapping of DICOM Entities to MR Systems Entities*

DICOM	MR Systems Entity
Scheduled Procedure Step	Exam
Requested Procedure	Exam
Imaging Service Request	Exam
Visit	Exam
Patient	Patient

**2.6. INFORMATION MODEL MODULE**

Within an entity of the DICOM v3.0 Modality Worklist Information Model, attributes are grouped together into related set of attributes called modules. A module facilitates the understanding of the semantics concerning the attributes and how the attributes relate to one another. A module grouping does not infer any encoding of information into datasets.

Table 2-3 identifies the defined modules within the entities which comprise the DICOM v3.0 Modality Worklist Information Model. Modules are identified by Module Name.

See DICOM v3.0 PS 3.3 and PS 3.4 for a complete definition of the entities, modules, and attributes.

*Table 2-3  
Modality Worklist Information Model Modules*

Entity Name	Module Name	Reference
Scheduled Procedure Step	SOP Common	2.7.2.1
	Scheduled Procedure Step	2.7.2.2
Requested Procedure	Requested Procedure	2.7.3.1
Imaging Service Request	Imaging Service Request	2.7.4.1
Visit	Visit Identification	2.7.5.1
	Visit Status	2.7.5.2
	Visit Relationship	2.7.5.3
	Visit Admission	2.7.5.4
Patient	Patient Relationship	2.7.6.1
	Patient Identification	2.7.6.2
	Patient Demographic	2.7.6.3
	Patient Medical	2.7.6.4

## 2.7. INFORMATION MODEL KEYS

Please refer to DICOM Standard PS 3.3. (Information Object Definitions) and PS 3.4 (Service Class Specifications) for a description of each of the Entities contained within the Modality Worklist Information Model.

The following Module descriptions contain the attributes, which are present in a C-FIND request message sent by the Worklist Server AE to a remote AE. It should be noted that they are the same as those defined in the DICOM v3.0 Standard, PS 3.4 (Service Class Specifications) and include:

- Name
- Tag group and element numbers
- Expected Matching Key Type: R-required, O-optional
- Expected Return Key Type:
  - 1 - non-zero value required
  - 1C - conditionally of type 1
  - 2 - required to be present, possibly with zero-length value
  - 3 - optional
- Mapped into The Image - whether this data is mapped into subsequently acquired images
- Notes - clarification of this implementation's use/treatment of this attribute

All data elements in the following Module descriptions are requested by the Worklist Server AE. Values of data elements that are not mapped into images, and are not otherwise dealt with (displayed on the user interface, etc.), are not used and are, thus, discarded upon receipt.

Data elements for which values can be sent for matching purposes are described as such. Data elements for which values are not sent are sent with zero length and universal matching will apply. This is the default case if no other description to the contrary is provided.

### 2.7.1. Supported Matching

The following are the types of matching that can be request by the implementation:

- Single Value matching
- Universal Matching
- Range of date/time

### 2.7.2. Scheduled Procedure Step Entity

#### 2.7.2.1. SOP Common Module

Table 2-4  
SOP Common Module Attributes

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Specific Character Set	(0008,0005)	O	1C	No	The value of "ISO_IR 100" is always sent in the query, however the returned value is ignored.

#### 2.7.2.2. Scheduled Procedure Step Module

Table 2-5  
Scheduled Procedure Step Module Attributes

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Scheduled Procedure Step Sequence	(0040,0100)	R	1	No	
>Scheduled Station AE Title	(0040,0001)	R	1	No	Matching is supported as follows: either no AE title is supplied (universal matching), or the scanner's Worklist Server Station Name is supplied for matching; this is user selectable. Displayed on "More Info" Screen.
>Scheduled Procedure Step Start Date	(0040,0002)	R	1	No	Matching is supported as one of the following; this is user selectable: <ul style="list-style-type: none"> <li>• all days,</li> <li>• today only,</li> <li>• today and a number of days before today,</li> <li>• today and a number of days after today,</li> <li>• today and a number of days before today and a number of days after today.</li> </ul> The number of days before/after is specified by the user. Displayed on "More Info" Screen.
>Scheduled Procedure Step Start Time	(0040,0003)	R	1	No	Displayed on "More Info" Screen.

>Modality	(0008,0060)	R	1	Yes	Matching is supported as follows: either no Modality is supplied (universal matching), or the scanner's Modality is supplied for matching; this is user selectable. Displayed on "More Info" Screen.
>Scheduled Performing Physician's Name	(0040,0006)	R	2	No	Displayed on "More Info" Screen.
>Scheduled Procedure Step Description	(0040,0007)	O	1C	Yes	Displayed on "More Info" Screen.
>Scheduled Station Name	(0040,0010)	O	2	No	not used
>Scheduled Procedure Step Location	(0040,0011)	O	2	No	Displayed on "More Info" Screen.
>Scheduled Action Item Code Sequence	(0040,0008)	O	1C	No	
>>Code Value	(0008,0100)	O	1C	No	For MR systems, when a procedure step is selected from the schedule, the returned value is used to automatically select and download a protocol for MR systems (if the appropriate mapping has been established). See the MR system documentation for further details Displayed on "More Info..." screen.
>>Coding Scheme Designator	(0008,0102)	O	1C	No	Displayed on "More Info..." screen.
>>Code Meaning	(0008,0104)	O	3	No	Displayed on "More Info..." screen.
>Pre-Medication	(0040,0012)	O	2C	No	
>Scheduled Procedure Step ID	(0040,0009)	O	1	Yes	Displayed on "More Info..." screen.
>Requested Contrast Agent	(0032,1070)	O	2C	No	Displayed on "More Info..." screen.

### 2.7.3. Requested Procedure Entity

#### 2.7.3.1. Requested Procedure Module

Table 2-6  
Requested Procedure Module Attributes

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Requested Procedure ID	(0040,1001)	O	1	Yes	Displayed on "More Info..." screen.
Requested Procedure Description	(0032,1060)	O	1C	Yes	MR truncates to 22 characters in image header, saved as exam description. Displayed Fully on "More Info..." screen.
Requested Procedure Code Sequence	(0032,1064)	O	1C	No	Displayed on "More Info..." screen.
>Code Value	(0008,0100)	O	1C	No	Displayed on "More Info..." screen.
>Coding Scheme Designator	(0008,0102)	O	1C	No	Displayed on "More Info..." screen.

>Code Meaning	(0008,0104)	O	3	No	Displayed on “More Info...” screen.
Study Instance UID	(0020,000D)	O	1	Yes	Displayed on “More Info...” screen.
Referenced Study Sequence	(0008,1110)	O	2	No	
>Referenced SOP Class UID	(0008,1150)	O	1C	No	not used
>Referenced SOP Instance UID	(0008,1155)	O	1C	No	not used
Requested Procedure Priority	(0040,1003)	O	2	No	not used
Requested Procedure Comments	(0040,1400)	O	3	No	Displayed on “More Info...” screen.
Name of Intended recipients of results	(0040,1010)	O	3	No	Displayed on “More Info...” screen.
Patient Transport Arrangements	(0040,1004)	O	2	No	not used
Requested Procedure Location	(0040,1005)	O	3	No	not used
Confidentiality Code	(0040,1008)	O	3	No	not used

## ***2.7.4. Imaging Service Request Entity***

### **2.7.4.1. Imaging Service Request Module**

*Table 2-7  
Imaging Service Request Module Attributes*

<b>Attribute Name</b>	<b>Tag</b>	<b>Expected Matching Key Type</b>	<b>Expected Returned Key Type</b>	<b>Mapped into the Image</b>	<b>Note</b>
Accession Number	(0008,0050)	O	2	Yes	Displayed on “More Info...” screen.
Requesting Physician	(0032,1032)	O	2	No	Displayed on “More Info...” screen.
Referring Physician's Name	(0008,0090)	O	2	Yes	MR Truncates to 32 characters in image header. Displayed on “More Info...” screen.
Imaging Service Request Comments	(0040,2400)	O	3	No	Displayed on “More Info...” screen.
Requesting Service	(0032,1033)	O	3	No	Displayed on “More Info...” screen.

## 2.7.5. Visit Entity

### 2.7.5.1. Visit Identification

Table 2-8  
Visit Identification Module Attributes

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Admission ID	(0038,0010)	O	2	No	not used
Institution Name	(0008.0080)	O	3	No	not used

### 2.7.5.2. Visit Status

Table 2-9  
Visit Status Module Attributes

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Current Patient Location	(0038,0300)	O	2	No	Displayed on “More Info...” screen.

### 2.7.5.3. Visit Relationship

Table 2-10  
Visit Relationship Module Attributes

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Referenced Patient Sequence	(0008,1120)	O	2	No	
>Referenced SOP Class UID	(0008,1150)	O	2	No	not used
>Referenced SOP Instance UID	(0008,1155)	O	2	No	not used

### 2.7.5.4. Visit Admission

No data elements are requested from the Visit Admission Module.

## 2.7.6. Patient Entity

### 2.7.6.1. Patient Relationship

No data elements are requested from the Patient Relationship Module.

### 2.7.6.2. Patient Identification

Table 2-11

Patient Identification Module Attributes

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Patient's Name	(0010,0010)	R	1	Yes	Matching is supported as follows: either no Patient's Name is supplied (universal matching), the patient's <u>last</u> (family) name specified on the scanner's Preferences screen is supplied, or the Patient's first name for matching; this is user selectable. Wild card matching is implemented for leading and trailing characters.  Patient Name is displayed on the "Patient Information" screen.
Patient ID	(0010,0020)	R	1	Yes	Matching is supported using single value matching from the scanner's Preferences page.  Patient ID is displayed on the "Patient Information" screen.
Other Patient ID's	(0010,1000)	O	3	No	Displayed on "More Info..." screen.

### 2.7.6.3. Patient Demographic

Table 2-12

Patient Demographic Module Attributes

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Patient's Birth Date	(0010,0030)	O	2	Yes	Displayed on the "Patient Information" screen.
Patient's Sex	(0010,0040)	O	2	Yes	Displayed on the "Patient Information" screen.
Patient's Weight	(0010,1030)	O	2	No	Limited to maximum value of 999 kg. Displayed on "More Info..." screen.  Weight is an operator entry requirement for MR on the "Patient Information" screen.
Confidentiality constraint on patient data	(0040,3001)	O	2	No	Not used
Patient's Size	(0010,1020)	O	3	No	Not used

Patient's Address	(0010,1040)	O	3	No	Not used
Patient's Telephone Numbers	(0010,2154)	O	3	No	Not used
Patient Comments	(0010,4000)	O	3	No	Displayed on "More Info..." screen.
Ethnic Group	(0010,2160)	O	3	No	Displayed on "More Info..." screen.

**2.7.6.4. Patient Medical**

Table 2-13  
Patient Medical Module Attributes

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Patient State	(0038,0500)	O	2	No	
Pregnancy Status	(0010,21C0)	O	2	No	Displayed on "More Info..." screen.
Medical Alerts	(0010,2000)	O	2	No	Displayed on "More Info..." screen.
Contrast Allergies	(0010,2110)	O	2	No	Displayed on "More Info..." screen.
Special Needs	(0038,0050)	O	2	No	Displayed on "More Info..." screen.
Additional Patient History	(0010,21B0)	O	3	Yes	Displayed on "More Info..." screen. MR truncates in image header to 60 characters

**2.8. PRIVATE DATA DICTIONARY**

The *MR Implementation* does not define any private attributes within the Modality Worklist Information Model. Private attributes received from a remote AE are discarded.



# 3.PERFORMED PROCEDURE STEP CONFORMANCE STATEMENT

## 3.1. INTRODUCTION

The PPS option for the MR *Implementation* allows a Modality Performed Procedure Step to be communicated to the Hospital/Radiology information system. The PPS feature is providing the DICOM Modality Performed Procedure Step service as a service class user (SCU).

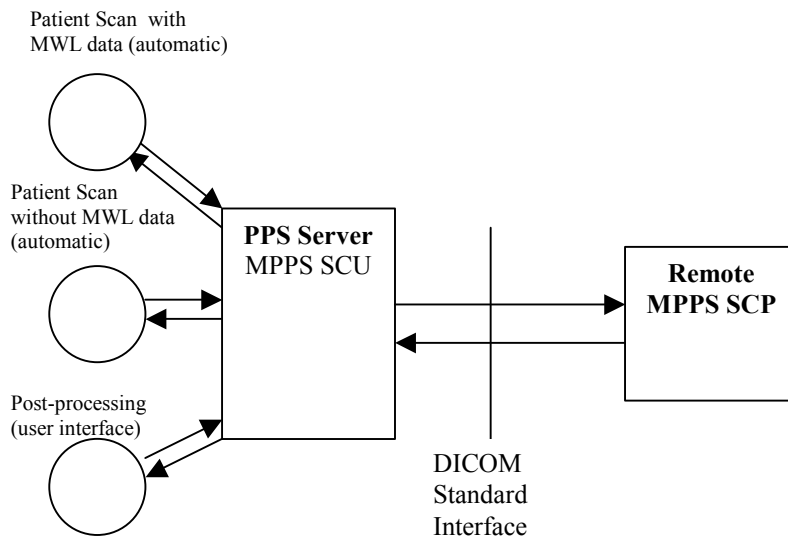
This capability works in conjunction with DICOM Modality Work-list feature. However the conformance of this capability is independent of Modality work-list feature. For information on conformance of Modality Work-List to DICOM standard please refer to the appropriate section of this document.

## 3.2. IMPLEMENTATION MODEL

The DICOM 'Performed Procedure Step' service is provided by the PPS Server DICOM AE. The PPS Server DICOM AE is commanded to perform Performed Procedure Step services either automatically or through the user interface.

### 3.2.1. APPLICATION DATA FLOW DIAGRAM

The basic Application models for the feature are shown in the following illustration:



### 3.2.2. Functional Definition of AEs

The PPS Server AE is implemented as an application process on the scanner host computer. It runs as a daemon serving requests from other applications to send the PPS information to the remote AE and return the results to the requesting application.

The PPS Server AE initiates the following functions.

*Start PPS:* Initiates a DICOM association in order to create a DICOM Modality Performed Procedure Step SOP instance in the remote AE. If the remote AE accepts a presentation context applicable to Modality performed Procedure Step, the PPS Server AE will issue a request to create the SOP instance in the remote AE via the N-CREATE service.

*Complete PPS:* Initiates a DICOM association in order to update a DICOM Modality Performed Step instance that is already created with the remote AE. If the remote AE accepts a presentation context applicable to Modality performed Procedure Step, the PPS Server AE will issue a request to update the SOP instance in the remote AE via the N-SET service. The PPS Status is set to 'COMPLETED'.

*Discontinue PPS:* Initiates a DICOM association in order to update a DICOM Modality Performed Step instance that is already created with the remote AE. If the remote AE accepts a presentation context applicable to Modality performed Procedure Step, the PPS Server AE will issue a request to update the SOP instance in the remote AE via the N-SET service. The PPS Status is set to 'DISCONTINUED'.

### 3.2.3. Sequencing of Real-World Activities

#### 3.2.3.1. PPS from acquisition system with MWL data

The system has a Modality Work-list Server AE installed. Work-List information is obtained from HIS/RIS system through the use of Basic Work-list Management Service. Use of the information retrieved in the creation of Image SOP instance is described in section 2 of this document. Use of the information retrieved in MPPS SOP instances is described later in this document.

- Once a worklist entry is selected for scanning, the system retrieves necessary information related to the Scheduled Procedure Step from the Modality Work-list Server as mapped in *Table 3-1 Use of Specific DICOM Data.*
- The system initiates a 'Start PPS' when starting a scan, i.e. when the scan button is selected. The PPS Server AE initiates a MPPS (Modality Performed Procedure Step) N-CREATE request to the remote AE (MPPS SCP), in-order to create a MPPS SOP instance at the remote AE with the status set to "in-progress".
- The MPPS SCP returns response indicating the success/failure of the request execution. The PPS state information is updated in the system based on the response data, and is presented to the user.
- Images created by the scanner will be marked as "INPR" on the browser if the N-CREATE message is successfully sent to the MPPS SCP.
- Images created by the scanner will not be marked on the browser if the N-Create message was not successfully sent. The N-CREATE message may be manually sent later by the operator in the browser.

At the end of image acquisition, system initiates an N-Set message based on the operator's choice on 'Complete PPS' or 'Discontinue PPS' based on the choice selected by the user using the user interface provided. The user is also given a choice 'Defer PPS'.

If the operator selects PPS complete from the end exam pop-up:

- The PPS Server AE initiates a MPPS N-SET request to the remote AE, in-order to update the MPPS SOP instance, that is already created. The message includes the necessary information related to the Performed procedure Step as specified in *Table 3-1 Use of Specific DICOM Data.*
- The remote AE returns response indicating the success/failure of the request execution. The PPS state information is updated in the system based on the response data, and is presented to the user. If the response indicates success, the PPS status on the browser will be set to complete. If the response indicates a failure, the PPS state in the browser will not be changed. The operator may manually re-send the message later for completion.

- System includes the necessary information related to Scheduled Procedure Steps and the Performed procedure Step in the image instances created as identified in *Table 3-1 Use of Specific DICOM Data*.

At the end of the exam, if the user chooses 'Defer PPS', no message is sent. The user may manually choose to send the N-Set message with either a "Complete" or a "discontinue" later from the image browser. The "Defer PPS" is to provide the operator with the option to manually add post processing images or remove acquisition images from the exam image list later.

If the operator chooses Discontinue at the end of the exam, then the PPS N-Set message sent to the PPS SCP will send a status of DISCONTINUE. The PPS state on the image browser will be updated with "DISC".

#### **3.2.3.2. PPS from acquisition system without MWL data**

The system either does not have a Modality Work-list Server AE installed or a Modality Work-list Server AE installed but no Work-List information is obtained from HIS/RIS system for the current procedure that is being performed. The information required for performing the procedure is supplied through the user interface of the system. The information is stored in a worklist entry. The information mapping is specified in *Table 3-1*

*Use of Specific DICOM Data* From this point on the sequencing of events are equivalent to the real-world activities for PPS from the acquisition system *with* MWL data. This is described in section 3.2.3.1.

#### **3.2.3.3. No PPS from acquisition system with/without MWL data**

The system does not have a Modality PPS Server AE connection available or is off-line for the current procedure that is being performed. The information required for performing the procedure is supplied either through the Modality Worklist Server or the user interface of the system.

- The system does not initiate a 'Start PPS' before starting a scan, i.e. when the image acquisition is started.
- System includes the necessary information related to Scheduled Procedure Steps and the Performed procedure Step in the image instances created.
- At the end of image acquisition, user may select, from the user interface, either a 'Complete PPS', 'Discontinue PPS' or 'Defer PPS'. If Discontinue is selected, then the images created will be marked as discontinued. No MPPS transaction will be allowed. If Defer PPS or Complete PPS is selected, then the images will not be marked. No transaction or event will occur.

#### **3.2.3.4. PPS for Images Created from post-processing system**

- The user initiates post-processing on the images generated through acquisition.
- The system creates a Modality performed Procedure Step instance locally in the system. If the source image instances has the Scheduled Procedure Step information, it is copied into the image instances created. Also the system includes the necessary information related to the Modality Performed Procedure Step into the image instance.
- At the end of (one or more) post-processing, the user initiates 'Complete PPS' or 'Discontinue PPS' through the user interface provided. PPS Server AE initiates a MPPS (Modality Performed Procedure Step) N-CREATE request to the remote AE (MPPS SCP), in-order to create a MPPS SOP instance at the remote AE (which is actually a replica of the locally created MPPS SOP instance).
- The remote AE returns response indicating the success/failure of the request execution. If the response indicates success, PPS Server AE initiates a MPPS N-SET request to the remote AE, in-order to update the MPPS SOP instance, that is already created, with the additional information.

- The remote AE returns response indicating the success/failure of the request execution. The PPS state information is updated in the system based on the response data, and is presented to the user.

### 3.3. AE SPECIFICATION

#### 3.3.1. PPS Server AE Specification

This Application Entity provides Standard Conformance to the following DICOM v3.0 SOP Classes as an SCU:

SOP Class Name	SOP Class UID
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3

##### 3.3.1.1. Association Establishment Policies

###### 3.3.1.1.1. General

The DICOM Application Context Name (ACN), which is always proposed, is:

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

The Maximum Length PDU negotiation is included in all association establishment requests. The maximum length PDU from an association initiated by the PPS Server AE is:

Maximum Length PDU	128 Kbytes
--------------------	------------

The SOP Class Extended negotiation is not supported.

The maximum number of presentation negotiation items that will be proposed is 1.

The user information items sent by this AE are

- Maximum PDU Length
- Implementation UID

###### 3.3.1.1.2. Number of Associations

The PPS Server will initiate only one DICOM association at any time to perform a PPS operation to the remote AE.

###### 3.3.1.1.3. Asynchronous Nature

Asynchronous mode is not supported. All operations are performed synchronously.

### 3.3.1.1.4. Implementation Identifying Information

The Implementation UID allows unique identification of a set of products that share the same implementation.

The Implementation UID for this GEMS Implementation is:

Modality Performed Procedure Step Implementation UID	1.2.840.113619.6.141
--	----------------------

### 3.3.1.2. Association Initiation Policy

The PPS Server AE initiates a new association for every PPS operation initiated.

#### 3.3.1.2.1. Real-World Activity: Performed Procedure Step creation and update

##### 3.3.1.2.1.1. Associated Real-World Activity

The real-world activities are mentioned in section 3.2.3 *Sequencing of Real-World Activities*. Each of the real world activity results in either creating a new Performed procedure Step SOP instance at the remote SCP or updating an already created Performed Procedure Step SOP instance as per the DICOM v3.0 standard.

##### 3.3.1.2.1.2. Proposed Presentation Context Table

The following table shows the proposed presentation contexts for the PPS Server AE after any of the real-world activity listed in section 3.2.3 *Sequencing of Real-World Activities*, is initiated.

Presentation Context Table – Proposed					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

##### 3.3.1.2.1.2.1. SOP Specific DICOM Conformance Statement for MPPS SOP class

If the remote AE does not support the proposed Presentation context, an appropriate error message logged. Only one association is opened at a time.

All the operations used by this SOP class support an association timer, which is configurable. The timer is started when a request (association request, N-CREATE request or N-SET request) is send and stopped when the respective response is received. The default time-out value is 300 seconds.

All the operations used by this SOP class support a “Session Timer”. This timer is started when the association is established and stopped when association is ended. The default time-out value is 3000 seconds.

If any of the above timers expires the association is aborted and the operation in-progress is considered FAILED.

In any case an operation (N-CREATE or N-SET) fails, system updates the state to enable operator to manually invoke the operation at any later time.

### **3.3.1.3. Association Acceptance Policy**

The PPS Server AE does not respond to attempts by remote AE to open an association.

## **3.4. COMMUNICATION PROFILES**

### **3.4.1. Supported Communication Stacks (PS 3.8)**

DICOM Upper Layer (PS 3.8) is supported using TCP/IP.

### **3.4.2. OSI Stack**

The OSI Communication stack is not supported by this Implementation.

### **3.4.3. TCP/IP Stack**

The TCP/IP stack is inherited from the IRIX operating system

#### **3.4.3.1. API**

Not Applicable to this product.

#### **3.4.3.2. Physical Media Support**

Ethernet 802.3 provides the physical network layer for this product.

### **3.4.4. Point-to-Point Stack**

The Point-to-Point Stack is not supported by this Implementation.

## **3.5. EXTENSIONS/SPECIALIZATION/PRIVATIZATION**

### **3.5.1. Standard Extended/Specialized/Private SOPs**

PPS for the *MR Implementation* does not implement any private SOP classes.

### **3.5.2. Private Transfer Syntaxes**

PPS for *MR Implementation* does not implement any private Transfer Syntaxes.

## **3.6. CONFIGURATION**

The PPS feature is configured by GEMS Field Service Engineers. The DICOM configuration items below are configurable or re-configurable by the Field Service Engineer and are not accessible by users through the scanner's user interface.

### **3.6.1. AE Title/Presentation address Mapping**

PPS allows for the configuration of the following parameters, which pertain to the remote AE.

Remote AE (HIS/RIS) IP Address (the remote AE's network address)

Remote AE (HIS/RIS) IP Port (the remote AE's listen port)

These parameters define where the MPPS requests will be directed. Configuration of these parameters is performed by GEMS Field Service engineers, using the installation facilities.

### 3.6.2. Configurable Parameters

The following are configurable for the PPS Server AE:

- Local (PPS Server AE)
- AE Title (The default is host name of the scanner appended with string “\_PPS”)
- Local IP Address
- Local IP net-mask
- Local IP gateway

The following parameters are configurable by changing their values in the configuration file `/usr/g/hisris/WLdcm.cfg`. Note that these parameters typically need not be changed. Furthermore, no support is provided for retaining changed settings: the values will require changing again after a system software upgrade:

- PDU size
- Association time-out period
- Session time-out period

### 3.7. SUPPORT OF EXTENDED CHARACTER SETS

PPS feature for the MR IMPLIMENTATION only supports the ISO\_IR 100 extended character set.

### 3.8. N-CREATE & NSET REQUEST MESSAGE

PPS Feature for THE MR Implementation supports all named attributes listed in Table F.7.2.1 in PS3.4 of DICOM standard. That is, attributes that are not explicitly referenced by name in the table are not supported. (Example is last row in the table reads “All other attributes from Radiation Dose Module and Billing and Material Code Module”. The attributes referenced here are not supported).

For the MPPS associated with an acquisition, the following attributes are copied from the Modality Work-list SCU into the MPPS request Message, if procedure performed corresponds to the SPS information retrieved through the Modality Work-list.

- Referenced Study Sequence - a maximum of three items are supported. This attribute will be present only if SPS information is available from Modality Work-list SCU.
- At the end of acquisition the user might choose to ‘Defer PPS’ and later choose to ‘Complete PPS’ or ‘Discontinue PPS’ from the user interface provided in the system. In this case, the date and time when user chooses to ‘Complete PPS’ or ‘Discontinue PPS’ is taken as the Performed Procedure Step End Date and Performed Procedure Step End Time respectively (Not the actual end date and end time of acquisition).

For the MPPS associated with images created from a post-processing the following restrictions apply on the attributes listed below.

- Referenced Study Sequence – Copied from the originating image
- Scheduled Step Attribute Sequence – a maximum of 3 items are supported. The attribute will be send only if SPS information is available in the image instance.
- Referenced Patient Sequence – This sequence is not added
- Scheduled action Item Code Sequence – Copied from the originating image.
- Performed Procedure Step Start date & Performed Procedure Step start time – The exam date and exam time that is the Start date and Start Time of the current Study Component (Exam) is

used if the current state of the PPS is in-progress. Otherwise it is when the PPS in-progress is set for the post-processing image creation.

- Performed Procedure Step end date & Performed Procedure Step end time - The date and time when user chooses to 'Complete PPS' or 'Discontinue PPS' is taken as the Performed Procedure Step End Date and Performed Procedure Step End Time respectively (Not the actual end date and end time of post-processing).
- Procedure Code Sequence – This sequence is sent with ZERO items in the MPPS message
- Performed Action Item Code Sequence – This sequence is sent with ZERO items in the MPPS message.
- Referenced Standalone SOP Instance Sequence – The sequence is sent with ZERO items in the MPPS message.

### **3.9. ERROR HANDLING AND RECOVERY**

PPS Server AE does not define any extended error codes. The standard error codes are handled. On a response with status 'success' for the N-CREATE or N-SET request, the system updates the state and indicates the same on the user interface. On a response with status other than 'success' the operation is deemed 'Failed' and the system updates the state and indicates the same on the user interface. If the request has failed or response is not received before the association timeout, the operation is deemed 'Failed' and the system updates the state and indicates the same on the user interface.

If the operation is 'Failed', detailed message is logged into system log-file and system provides an alternative mechanism to retry the failed operation through the user interface to ensure that transient failures do not affect the feature performance.



### 3.10. USE OF SPECIFIC DICOM DATA

The following table gives specific usage of some of attributes in the MPPS SOP instance created, with reference to each of the real-world scenarios mentioned in section 3.2.3 of this document. If the attribute is not supported by this implementation, but is a type 2, then the attribute will be sent with a zero length.

Table 3-1  
Use of Specific DICOM Data

Attribute Name	Tag	Usage in MPPS Instance			Image header/notes
		Acquisition with MWL data	Acquisition without MWL data	Secondary Capture with PPS Acquisition Images	
Performed Procedure Step Relationship Module Attributes					
Scheduled Step Attribute Sequence	(0040,0270)	MWL SCP data	Only one item	Copied from source image	MR maps only one per exam.
>Study Instance UID	(0020,000D)	MWL SCP data	Local Unique ID	Copied from source image	Yes
>Referenced Study Sequence	(0008,1110)	MWL SCP data	Not used	Copied from source image	ENCODED
>>Referenced SOP Class UID	(0008,1150)	MWL SCP data	Not used	Copied from source image	Yes
>>Referenced SOP Instance UID	(0008,1155)	MWL SCP data	Not used	MWL,HIS	Yes
>Accession Number	(0008,0050)	MWL SCP data	User Entered or 0, if not entered	Copied from source image	Yes
>Requested Procedure ID	(0040,1001)	MWL SCP data	0	Copied from source image	Yes
>Requested Procedure Description	(0032,1060)	MWL SCP data	0	Copied from source image	Yes
>Scheduled Procedure Step ID	(0040,0009)	MWL SCP data	0	Copied from source image	Yes
>Scheduled Procedure Step Description	(0040,0007)	MWL SCP data	0	Copied from source image	Yes
>Scheduled Action Item Code Sequence	(0040,0008)	Encoded	0	Not used	No
>>Code Value	(0008,0100)	MWL, HIS, New, to be supported for PPS.	Not used	Not used	No
>>Coding Scheme designator	(0008,0102)	MWL, HIS, New, to be supported for PPS.	Not used	Not used	No
>>Code Meaning	(0008,0104)	MWL, HIS, New, to be supported for PPS.	Not used	Not used	No
Patient's Name	(0010,0010)	MWL SCP data	User Entered or 0 length, if not entered	Copied from source image	Yes
Patient ID	(0010,0020)	MWL SCP data	User Entered or 0	Copied from	Yes

Attribute Name	Tag	Usage in MPPS Instance			Image header/notes
		Acquisition with MWL data	Acquisition without MWL data	Secondary Capture with PPS Acquisition Images	
			length, if not entered	source image	
Patient's Birth Date	(0010,0030)	MWL SCP data	User Entered or 0 length, if not entered	Copied from source image	Yes
Patient's Sex	(0010,0040)	MWL SCP data	User Entered or 0 length, if not entered	Copied from source image	Yes
Referenced Patient Sequence	(0008,1120)	MWL SCP data	Not used	Not used	No
>Referenced SOP Class UID	(0008,1150)	MWL SCP data	Not used	Not used	No
>Referenced Instance UID	(0008,1155)	MWL SCP data	Not used	Not used	No
<b>Performed Procedure Step Information Module</b>					
Performed Procedure Step ID	(0040,0253)	Same as Exam Number	Same as Exam Number	Copied from host if part of same procedure step or New generated, may not be unique	Yes
Performed Station AE Title	(0040,0241)	Local Station Name	Local Station Name	Should be the bi_aptitle or defaulted to <host_name>pps	Yes
Performed Station Name	(0040,0242)	Local Station Name	Local Station Name	Should be the bi_aptitle or defaulted to <host_name>pps	Yes
Performed Location	(0040,0243)	Suite ID	Suite ID	Not used	No
Performed Procedure Step Start Date	(0040,0244)	Exam Start Date	Exam Start Date	Same as exam date, if the procedure step current status is in progress. Otherwise the date for "IN PROGRESS" IS SET	Exam start date
Performed Procedure Step Start Time	(0040,0245)	Exam Start Time	Exam Start Time	Same as exam time, if the procedure step current status is in progress. otherwise the time "IN PROGRESS" IS SET"	Exam start time

Attribute Name	Tag	Usage in MPPS Instance			Image header/notes
		Acquisition with MWL data	Acquisition without MWL data	Secondary Capture with PPS Acquisition Images	
Performed Procedure Step Status	(0040,0252)	“In Progress” at start of exam “Discontinue” if selected by operator at end of exam “Complete” if selected at end of exam	“In Progress” at start of exam “Discontinue” if selected by operator at end of exam “Complete” if selected at end of exam	“In Progress” at end of image creation “Discontinue” if selected by operator with a previous InProgress status “Complete” if selected by operator with a previous InProgress status	Not used
Performed Procedure Step Description	(0040,0254)	Exam Description	Exam Description	filled in by application if new or copied from originating image	Exam description
Performed Procedure Type Description	(0040,0255)	Not Entered	Not Entered	Not entered	No
Procedure Code Sequence	(0008,1032)	Scheduled Procedure Code Sequence from MWL SOP	Not used	Not used	No
>Code Value	(0008,0100)	MWL SCP data	Not used	Not used	No
Code Meaning Designator	(0008,0102)	MWL SCP data	Not used	Not used	No
Performed Procedure Step End Date	(0040,0250)	The date “Complete PPS” or “Discontinue PPS” is set	The date “Complete PPS” or “Discontinue PPS” is set	The date “Complete PPS” or “Discontinue PPS” is invoked, not the actual end of post-processing	No
Performed Procedure Step End Time	(0040,0251)	The time “Complete PPS” or “Discontinue PPS” is set	The time “Complete PPS” or “Discontinue PPS” is set	The time “Complete PPS” or “Discontinue PPS” is invoked, not the actual end of post-processing	No
<b>Imaging Acquisition Results Module</b>					
Modality	(0008,0060)	MR	MR	Copied from source image	Yes
Study ID	(0020,0010)	Exam Number set by system	Exam Number set by system	Copied from source image	Yes
Performed Action Item Code Sequence	(0040,0260)	encoded	encoded	Encoded	Encoded
>Code Value	(0008,0100)	Protocol mapped AI Code value	Protocol mapped AI Code value	Copied from source image	Yes

Attribute Name	Tag	Usage in MPPS Instance			Image header/notes
		Acquisition with MWL data	Acquisition without MWL data	Secondary Capture with PPS Acquisition Images	
>Coding Scheme Designator	(0008,0102)	Protocol mapped AI Scheme Designator from MWL	Protocol mapped AI Scheme Designator from MWL	Copied from source image	Yes
>Code Meaning	(0008,0104)	Protocol mapped AI Scheme Designator from MWL	Not used	Not used	No
Performed Series Sequence	(0040,0340)	One item for each series created with Acquisition	One item for each series created with Acquisition	One item for each series created with post-processing	No
>Performing Physician's Name	(0008,1050)	Not used	Not used	Not used	No
>Operator's Name	(0008,1070)	Operator entry	Operator entry	Not used	No
>Series Instance UID	(0020,000E)	System generated UID	System generated UID	System generated UID	No
>Series Description	(0008,103E)	Operator entry or system generated	Operator entry or system generated	Operator entry or system generated	No
>Protocol Name	(0018,1030)	Protocol name that were used for acquisition and planned for post-processing	Protocol name that were used for acquisition	Copied from source image and Added by post processing application	No
>Retrieve AE Title	(0008,0054)	Archive AE title If auto-archive was set otherwise, null	Archive AE title If auto-archive was set otherwise, null	Not Used	No
>Referenced Image Sequence	(0008,1140)	One item for each image generated by Acquisition	One item for each image generated by Acquisition	One item for each image generated by post-processing	No
>>Referenced SOP Class UID	(0008,1150)	Image SOP Class UID	Image SOP Class UID	Image SOP Class UID	No
>>Referenced SOP Instance UID	(0008,1155)	Image SOP Instance UID	Image SOP Instance UID	Image SOP Instance UID	No
>Referenced Standalone SOP Instance Sequence	(0040,0220)	Not used	Not used	Not used	No



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