# SISWeb-RIS
# YASI-RIS
# DICOM
# Conformance Statement

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# DICOM Conformance Statement

## Sommario

# 1. INTRODUCTION

## 1.1. OVERVIEW

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

- **Section 0 (Introduction)** describes the overall structure, in-tent, and references for this Conformance Statement
- **Section 2 (Summary)** gives a summary of all DICOM services that SISWeb-RIS/YASI-RIS supports and the references to the Chapters where the conformance statement of these services are present.
- **Section 3 (SISWeb_YASI_RIS_DICOM Server)** specifies the SISWeb-RIS/YASI-RIS compliance to DICOM requirements for Basic Modality Worklist SOP Class and Basic Study Content Notification SOP Class.
- **Section 4 (SISWeb_YASI_RIS_DICOM Image Query / Retrieve)** specifies the SISWeb-RIS/YASI-RIS compliance to DICOM requirements for Image Query / Retrieve SOP Classes.
- **Section 5 (SISWeb_YASI_RIS_DICOM Image Storage for Key Images)** specifies the SISWeb-RIS/YASI-RIS compliance to DICOM requirements for Image Storage SOP Classes.
- **Section 6 (SISWeb_YASI_RIS_DICOM PPS Manager)** specifies the SISWeb-RIS/YASI-RIS compliance to DICOM requirements for Modality Performed Procedure Step SOP Classes.
- **Section 7 (SISWEB-SR Information Object Implementation)** specifies the use of the SISWeb-RIS/YASI-RIS DICOM Comprehensive SR IOD to represent the information included in SC images produced by this implementation.
- **Section 8 - 109** give the general information applied to all of the services described in sections 3 - 6, like network interface, configuration, character set support, etc.

## 1.2. 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.

## 1.3. SCOPE AND FIELD OF APPLICATION

This specification, called a Conformance Statement, includes a DICOM v3.0 Conformance Statement and is necessary to ensure proper processing and interpretation of IASI medical data exchanged using DICOM v3.0.

The IASI Conformance Statements are available to the public.

## 1.4. IMPORTANT REMARKS

The use of these DICOM Conformance Statements, in conjunction with the DICOM v3.0 Standards, is intended to facilitate communication with IASI products. However, **by itself, it is not sufficient to ensure that interoperation 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-IASI equipment is desired. The responsibility to analyse the applications requirements and to design a solution that integrates IASI imaging equipment with non–IASI 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 IASI device and non–IASI devices, be-fore the connection is declared operational, should not be overlooked. Therefore, the **user** should ensure that any non–IASI provider accepts full responsibility for all validation required for their connection with IASI products. This includes the accuracy of the image data once it has crossed the interface between the IASI software products and the non–IASI 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 IASI imaging equipment are processed/displayed on a non-IASI device, as well as when images acquired on non-IASI equipment is proc-essed/displayed on a IASI console or workstation.

- **Future Evolution** - IASI understands that the DICOM Standard will evolve to meet the user's growing requirements. IASI is actively involved in the development of the DICOM v3.0 Standard. DICOM v3.0 will incorporate new features and technologies and IASI may follow the evolution of the Standard. The IASI protocol is based on DICOM v3.0 as specified in each DICOM Conformance Statement. Evolution of the Standard may require changes to devices, which have implemented DICOM v3.0. **In addition, IASI reserves the right to discontinue or make changes to the support of communications features (on its products) reflected on by these DICOM**

**Conformance Statement**s. The **user** should ensure that any non–IASI provider, which connects with IASI software products, 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 IASI Products are enhanced to support these changes.

- **Interaction** - It is the sole responsibility of the **non–IASI provider** to ensure that communication with the interfaced equipment does not cause degradation of IASI imaging equipment performance and/or function.

### *1.5. SYMBOLS AND ABBREVIATIONS*

There are the following abbreviations used in this document:

- SWRDSRV **SISWeb_YASI_RIS_D**ICOM **S**e**RV**er
- SWRDWLP **SISWeb_YASI_RIS_D**ICOM **W**ork**L**ist **P**rovider
- SWRDSCNP **SISWeb_YASI_RIS_D**ICOM **S**tudy **C**ontent **N**otification **P**rovider
- SWRDQRS **SISWeb_YASI_RIS_D**ICOM **Q**uery/**R**etrieve **S**ervices
- SWRDKIS **SISWeb_YASI_RIS_D**ICOM **K**ey **I**mage **S**tore
- SWRDPPS **SISWeb_YASI_RIS_D**ICOM **PPS** Manager

## 2. SUMMARY

This document is the DICOM Conformance Statement for SISWeb_YASI_RIS_DICOM. SISWeb_YASI_RIS_DICOM is DICOM 3.0 conformant DICOM connectivity package for SISWeb-RIS/YASI-RIS.

In summary SISWeb_YASI_RIS_DICOM supports the following DICOM functions for the demographic data exchange, work flow management and image communication:

- Service Class Provider (SCP) of the DICOM Verification Service Class
- Service Class User (SCU) of the DICOM Verification Service Class
- Service Class Provider (SCP) of the DICOM Basic Modality Worklist Service Class
- Service Class Provider (SCP) of the DICOM Basic Study Content Notification Service Class

- Service Class Provider (SCP) of the DICOM Storage Service Class
- Service Class User (SCU) of the DICOM Query / Retrieve Service Class
- Service Class User (SCU) of the DICOM Modality Performed Procedure Step Service Class
- Service Class Provider (SCP) of the DICOM Modality Performed Procedure Step Service Class

These DICOM services have been implemented in a number of applications, which can be configured, to share the same DICOM Application Entity Title or use their own DICOM Application Entity Titles. In SISWeb_YASI_RIS_DICOM, all DICOM applications are configured to support the same DICOM Application Entity. In this text, we use the term ***SISWeb_YASI_RIS_DICOM Application Entity*** to refer to this global Application Entity. All SISWeb_YASI_RIS_DICOM DICOM applications share the same ***SISWeb_YASI_RIS_DICOM DICOM Application Entity Title.***

This text presents the DICOM Conformance Statement information of these applications in several chapters organised logically according to their functionality. In the following, a brief road map to these chapters is given to facilitate the reading of this document:

**SISWeb_YASI_RIS_DICOM Server**

This chapter includes the SCP of the following service classes:

- **Basic Modality Worklist** This chapter includes the SCP of the DICOM Basic Modality Worklist Service Class for modality worklist sending after having received a request from a remote DICOM applica-tion entity.
- **Basic Study Content Notification** This chapter includes the SCP of the DICOM Basic Study Content Notification Service Class for study content notification receiving from a remote DICOM node.
- **Image Query & Retrieve** This chapter includes the SCU of the DICOM Query & Retrieve Service Class for either SISWeb-RIS/YASI-RIS users or internal server processes to query/retrieve image information/images from a remote DICOM Query & Retrieve Service Class Provider.
- **Image Storage** This chapter includes the SCP of the DICOM Storage Service Class for image receiving from a remote DICOM node. The DICOM Storage Service Class is only supported by the Windows NT edition of SISWeb_YASI_RIS_DICOM. This component has been implemented to receive key images, which are specified as

significant images.

- **Modality Performed Procedure Step (MPPS)** This chapter includes the SCP and the SCU of the DICOM Modality Performed Procedure Step Service Class. The Modality Performed Procedure Step MPPS Service Class is only supported by the Windows NT edition of SISWeb_YASI_RIS_DICOM. This component has been implemented to provide reception of information related to a performed procedure step from medical modalities or other systems that are acting as an SCU of the Modality Performed Procedure Step Service Class. Furthermore the SISWeb_YASI_RIS_DICOM PPS manager is able to for-ward the received information to a third system in order to fulfil the requirements to a PPS manager in terms of IHE.

# 3. SISWEB_YASI_RIS_DICOM SERVER

This chapter gives the technical specification of the SISWeb_YASI_RIS_DICOM Server (SWRDSRV) - a part of the DICOM communication interface of IASI SISWeb-RIS/YASI-RIS.

As SWRDSRV is not a stand-alone process on the respective system environment, it is part of the so called “SISWeb_YASI_RIS_DICOM Server” process.

SWRDSRV provides access to a worklist database maintained in SISWeb-RIS/YASI-RIS using DICOM protocols and messages. More specifically, it implements the Modality Worklist Management SOP Class as an SCP. As a second functionality SWRDSRV provides access to a RIS database maintained in SISWeb-RIS/YASI-RIS using DICOM protocols and messages. More specifically, it also implements the Study Content Notification SOP Class as an SCP.

SWRDSRV supports a single application entity (AE).

## 3.1 IMPLEMENTATION MODEL

SISWeb_YASI_RIS_DICOM is implemented as a collection of one or several components and each of these compo-nents provide the support of one or several DICOM Service Classes - SOPs. With this component architecture, SISWeb_YASI_RIS_DICOM can be configured as really demanded in a concrete installation site. The components can be configured as separate DICOM Application Entities, or they can share one same AE Title. In the first case, SISWeb_YASI_RIS_DICOM supports multiple AE Titles and in the later case SISWeb_YASI_RIS_DICOM supports one AE Title.

Usually, all components of SISWeb_YASI_RIS_DICOM share one same AE Title and SISWeb_YASI_RIS_DICOM appears as one DICOM application. The installation manual of SISWeb_YASI_RIS_DICOM provides the configuration information of a concrete installation.

The component SWRDSRV has been implemented to act as a Service Class Provider (SCP) of the DICOM Standard Basic Worklist Management Service Class and the Basic Study Content Notification SOP Class. In a client-server-environment, a DICOM SCP acts as a server. In the SISWeb_YASI_RIS_DICOM documents, therefore, SWRDSRV may be also called SISWeb_YASI_RIS_DICOM Server. The application is either a UNIX application and can run on most UNIX platforms or a Windows NT process to run on a Windows NT system.

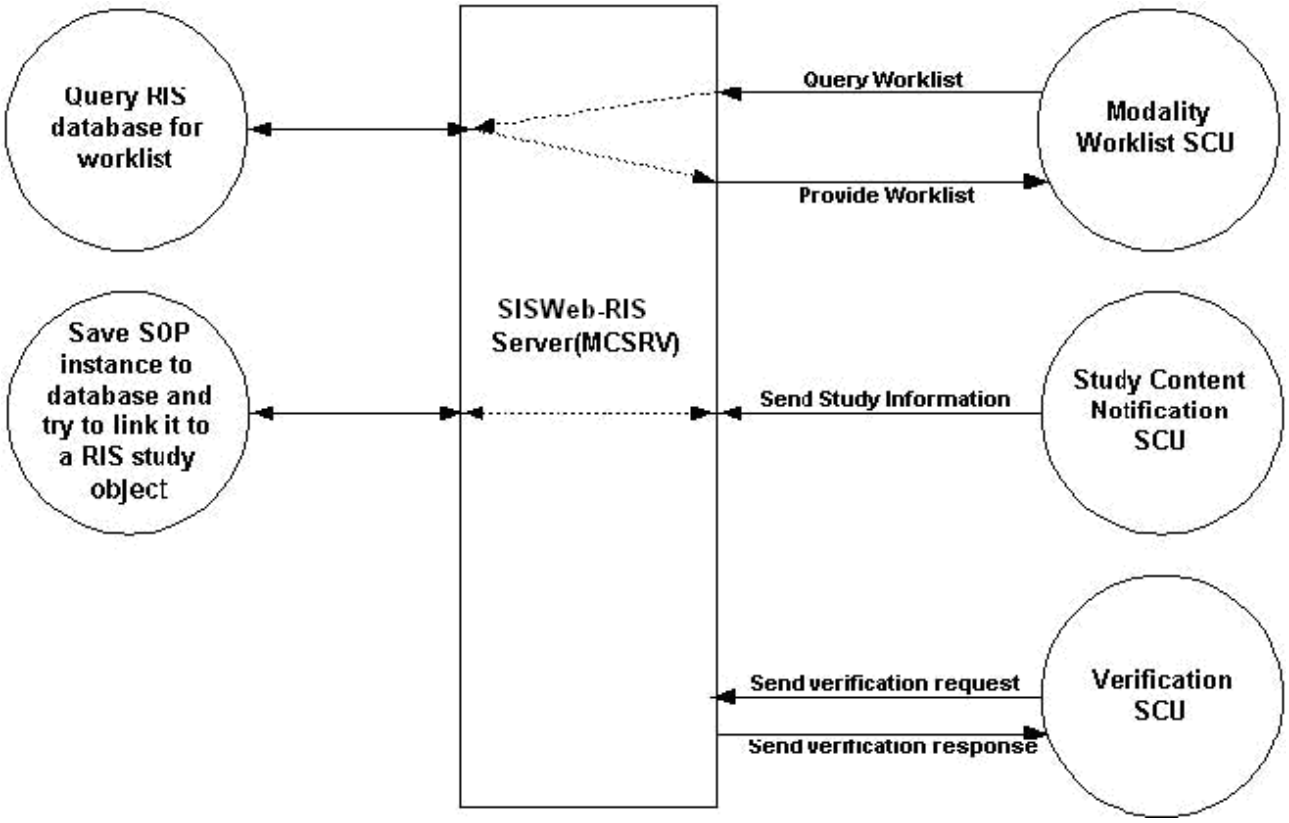
The SISWeb_YASI_RIS_DICOM Server supports one AE Title. The AE Title can be the same AE Title that other components of SISWeb_YASI_RIS_DICOM support, or another specialised AE Title.

### 3.1.1. Application Data Flow Diagram

SISWeb_YASI_RIS_DICOM Server is either a WIN 32 process controlled by the RIS-PACS Communication Manager service able to run on a Microsoft Windows NT machine. SISWeb_YASI_RIS_DICOM Server may be automatically started when the machine is booted or it may be started when the SISWeb-RIS/YASI-RIS server processes are launched what means that no user login is required.

A remote DICOM Application Entity initiates an association for DICOM Modality Worklist Service Class to SISWeb_YASI_RIS_DICOM. When SWRDSRV accepts the association, the remote AE transmits the DICOM information objects within the worklist request to SWRDSRV. Using these attributes SWRDSRV queries the SISWeb-RIS/YASI-RIS database for worklist according to the matching keys given in the worklist request. Afterwards SWRDWLP transmits the worklist item(s) within the worklist response back to the remote DICOM node.

A remote DICOM Application Entity initiates an association for DICOM Study Content Notification to SISWeb_YASI_RIS_DICOM. When SWRDSRV accepts the association, the remote AE transmits the study information to SWRDSRV. If an SOP instance is successfully received on the association, SWRDSRV saves the study information in the SISWeb-RIS/YASI-RIS database and tries to build a link between the received data and the corresponding study object in the RIS.




### 3.1.2. Functional Definition of AE

After being started, SWRDSRV is always waiting for an association request from a remote DICOM application entity. SWRDSRV will accept an association with the supported SOP classes only for those remote DICOM applications, which are specified in the configuration of SISWeb_YASI_RIS_DICOM. This means that not all remote DICOM application entities are permitted for example to query a modality worklist from SISWeb_YASI_RIS_DICOM.

### 3.1.3. Sequencing of Real-World Activities

#### 3.1.3.1. Basic Modality Worklist

With the SISWeb-RIS/YASI-RIS application a radiological examination can be scheduled either by user interaction or by receiving the data by the HIS interface. Based on these actions a study object is created in the RIS and stored in the RIS database. Based on the configuration of the basic data “workplace” and “medical device” and the dependence between these data also a worklist item is created in the RIS database. In the configuration of the medical device also the DICOM application entity title of the remote modality worklist SCU has to be specified.

Note: SISWeb-RIS/YASI-RIS and SISWeb_YASI_RIS_DICOM support multiple scheduled AE titles per study object. Therefore a single RIS study object can be available as a worklist item in the responses of different modality worklist SCUs. This option may be very useful for scenarios in which the user is not able to decide on what imaging equipment the examination shall take place at the time the study is scheduled.

From the time on the patient is admitted the study will appear in every worklist message, which is transmitted if the given matching keys of a worklist request match the study parameters. After the status of the RIS study object has changed to completed, the study will be no longer included as an item in the worklist message.

#### 3.1.3.2. Basic Study Content Notification

If SWRDSRV receives a valid Study Content Notification SOP instance, the related tables of the database will be updated to keep the track of the images archived in the client's data. Using the information in the database tables, SISWeb-RIS/YASI-RIS users can retrieve these images at any later time.

## *3.2. APPLICATION ENTITY SPECIFICATION*

SWRDSRV is one functional component of SISWeb_YASI_RIS_DICOM and supports the DICOM Basic Worklist Service Class and the DICOM Study Content Notification SOP Class. All operational parameters (such as AE titles, port numbers) can be accessed and changed by using the SISWeb_YASI_RIS_DICOM Monitor application on a Windows NT based system.

SWRDSRV provides Standard Conformance to the following DICOM 3.0 SOP Class as an SCP:

| SOP Class Name | SOP Class UID | Role |
|---|---|---|
| Modality Worklist Management | 1.2.840.10008.5.1.4.31 | SCP |
| Basic Study Content Notification | 1.2.840.10008. 1.9 | SCP |
| Verification | 1.2.840.10008.1.1 | SCP |

### 3.2.1. Association Establishment Policies

#### 3.2.1.1. General

SWRDSRV accepts associations for the purposes of Modality Worklist Management - query and the Study Content Notification - store. SWRDSRV accepts association requests from a

remote DICOM AE only when it is registered in the configuration of SWRDSRV (including AE Title (mandatory), optional TCP Port Number and Network Address) but SWRDSRV does not initiate any association to a remote DICOM application entity.

The maximal PDU size, which SWRDSRV supports, is configurable while the default value is 16 KB.

In general, SWRDSRV obeys the association establishment policies of SISWeb_YASI_RIS_DICOM.

#### 3.2.1.2. Number of Associations

SWRDSRV does not support simultaneous association handling.

#### 3.2.1.3. Asynchronous Nature

SWRDSRV will not perform asynchronous operations window negotiation.

#### 3.2.1.4. Implementation Identifying Information

SWRDSRV will provide a single Implementation Class UID of ”1.2.840.113619.6.95.31.0.3.4.1” and an implementation version name of ”SISWEB_YASI_RIS_DICOM11”

### 3.2.2. Association Acceptance Policy

SWRDSRV accepts associations for the purposes of retrieving worklist information, saving study, series and image information. SWRDSRV accepts an association request only from remote DICOM application entities, which are known in the configuration of SISWeb_YASI_RIS_DICOM.

For SWRDSRV running on UNIX the limitations on processing multiple associations simultaneously are adjustable.

#### 3.2.2.1. Real-World Activities for Basic Modality Worklist

##### *3.2.2.1.1 Associated Real-World Activities*

SWRDSRV supports a client to query the modality worklist database of the SISWeb-RIS/YASI-RIS. The client is usually an imaging modality or a system, which is delegated by imaging modalities. Each worklist item (organised as a Scheduled Procedure Step defined in the DICOM Standard) represents a scheduled imaging examination for a particular

patient. To achieve a minimum of user interaction for assignments of PACS study objects to RIS study objects within a complete RIS-PACS workflow, it is recommended that all returned key attributes will be encoded in the generated images. Currently SWRDSRV does not support more than one scheduled procedure step per requested procedure.

#### *3.2.2.1.2 Presentation Context Table*

For Basic Modality Worklist SWRDSRV will accept the presentation contexts shown in the following table.

**Table 3-2 Acceptable Presentation Contexts**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended |
| Name | UID | Name | UID | | Negotiation |
| Modality Worklist Information Model – FIND | 1.2.840.10008.5.1.4.31 | DICOM Implicit VR Little Endian<br>DICOM Explicit VR Little Endian DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |

##### *3.2.2.1.2.1 SOP Specific Conformance to the Modality Worklist Management SOP Class*

SWRDSRV supports the attributes listed in the following tables for matching and returning, respectively. SWRDSRV does not support the attribute Specific Character Set (0008,0005) as matching key. The return value for this attribute is always ISO_IR 100.

The SISWeb-RIS/YASI-RIS Modality Worklist Server supports matching on the Matching Key Attributes listed in the following table.

| Description / Module | Tag | Matching Key Type |
|---|---|---|
| **Scheduled Procedure Step** | | |
| Scheduled Procedure Step Sequence | (0040,0100) | R |
| >Scheduled Station AE Title | (0040,0001) | R |
| >Scheduled Procedure Step Start Date | (0040,0002) | R |

| Description / Module | Tag | Matching Key Type |
|---|---|---|
| >Scheduled Procedure Step Start Time | (0040,0003) | R |
| >Modality | (0008,0060) | R |
| >Scheduled Station Name | (0040,0010) | O |
| >Scheduled Procedure Step Location | (0040,0011) | O |
| >Scheduled Performing Physician's Name | (0040,0006) | R |
| **Patient Identification** | | |
| Patient's Name | (0010,0010) | R |
| Patient ID | (0010,0020) | R |
| **Imaging Service Request** | | |
| Accession Number | (0008,0050) | O |
| **Patient Demographic** | | |
| Patients Birth Date | (0010,0030) | O |
| Patient Sex | (0010,0040) | O |

The SISWeb-RIS/YASI-RIS Modality Worklist Server supports the Return Key Attributes listed in the following table.

| Description / Module | Tag | Matching Key Type |
|---|---|---|
| **SOP Common** | | |
| Specific Character Set | (0008,0005) | 1C |
| **Scheduled Procedure Step** | | |
| Scheduled Procedure Step Sequence | (0040,0100) | 1 |
| >Scheduled Station AE Title | (0040,0001) | 1 |
| >Scheduled Procedure Step Start Date | (0040,0002) | 1 |
| >Scheduled Procedure Step Start Time | (0040,0003) | 1 |
| >Modality | (0008,0060) | 1 |
| >Scheduled Performing Physician's Name | (0040,0006) | 2 |
| >Scheduled Procedure Step Description | (0040,0007) | 1C |
| >Scheduled Action Item Code Sequence | (0040,0008) | 1C |
| >>Code Value | (0008,0100) | 1C |
| >>Coding Scheme Designator | (0008,0102) | 1C |
| >>Code Meaning | (0008,0104) | 3 |

| | | |
|---|---|---|
| >Scheduled Station Name | (0040,0010) | 2 |
| >Scheduled Procedure Step Location | (0040,0011) | 2 |
| >Pre-Medication | (0040,0012) | 2C |
| >Scheduled Procedure Step ID | (0040,0009) | 1 |
| >Requested Contrast Agent | (0032,1070) | 2C |
| >Comments on the Scheduled Procedure Step | (0040,0400) | 3 |
| Referenced Study Sequence | (0008,1110) | 2 |
| >Referenced SOP Class UID | (0008,1150) | 1C |
| >Referenced SOP Instance UID | (0008,1155) | 1C |
| **Requested Procedure** | | |
| Requested Procedure ID | (0040,1001) | 1 |
| Requested Procedure Code Sequence | (0032,1064) | 1C |
| >Code Value | (0008,0100) | 1C |
| >Coding Scheme Designator | (0008,0102) | 1C |
| >Code Meaning | (0008,0104) | 3 |
| Requested Procedure Description | (0032,1060) | 1C |
| Study Instance UID | (0020,000D) | 1 |
| Requested Procedure Priority | (0040,1003) | 2 |
| Patient Transport Arrangements | (0040,1004) | 2 |
| **Imaging Service Request** | | |
| Accession Number | (0008,0050) | 2 |
| Requesting Physician | (0032,1032) | 2 |
| Referring Physician’s Name | (0008,0090) | 2 |
| **Visit Identification** | | |
| Admission ID | (0038,0010) | 2 |
| **Visit Status** | | |
| Current Patient Location | (0038,0300) | 2 |
| **Visit Relationship** | | |
| Referenced Patient Sequence | (0008,1120) | 2 |
| >Referenced SOP Class UID | (0008,1150) | 1C |
| >Referenced SOP Instance UID | (0008,1155) | 1C |
| **Patient Identification** | | |
| Patient's Name | (0010,0010) | 1 |

| | | |
|---|---|---|
| Patient ID | (0010,0020) | 1 |
| **Patient Demographic** | | |
| Patients Birth Date | (0010,0030) | 2 |
| Patient's Sex | (0010,0040) | 2 |
| Patient's Weight | (0010,1030) | 2 |
| Confidentiality constraint on patient data | (0040,3001) | 2 |
| **Patient Medical** | | |
| Patient State | (0038,0500) | 2 |
| Pregnancy Status | (0010,21C0) | 2 |
| Medical Alerts | (0010,2000) | 2 |
| Contrast Allergies | (0010,2110) | 2 |
| Special Needs | (0038,0050) | 2 |

### 3.2.2.2. Real-World Activities for Basic Study Content Notification

#### *3.2.2.2.1 Associated Real-World Activities*

The associated Real-World Activity is to notify the RIS on the content of an imaging study.

#### *3.2.2.2.2 Presentation Context Table*

#### *ble*

For Basic Study Content Notification SWRDSRV will accept any of the presentation contexts shown in the following table.

| **Presentation Context Table** | | | | | |
|---|---|---|---|---|---|
| **Abstract Syntax** | | **Transfer Syntax** | | **Role** | **Extended** |
| **Name** | **UID** | **Name** | **UID** | | **Negotiation** |
| Basic Study Content Notification SOP Classes | 1.2.840.10008.1.9 | DICOM Implicit VR Little Endian<br>DICOM Explicit VR Little Endian DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>2.840.10008.1.2.2 | SCP | None |

***SOP Specific Conformance to the Study Content Notification SOP Class***

SWRDSRV provides the Standard Conformance to the DICOM Study Content Notification Service Class.

In the event of a successful C-STORE operation, SWRDSRV saves all UIDs identifying the notified imaging study in the RIS and uses the Study Instance UID and the patient information for trying to build a link between the study and a study object in the RIS. The RIS may use these UIDs to move the images at a later time.

In order to facilitate to link the notified imaging study appropriately to a study object in the RIS, this implementation of SWRDSRV prefers that the remote DICOM application should submit a Basic Study Content Notification IOD instance with some extension, which is listed in the next chapter. In general, SWRDSCNP can handle any additional attributes included in the SOP instance. Those attributes not listed in Table 3-7 Additional Attributes in the Basic Study Content Notification IOD Supported by SWRDSRV will be simply ignored.

The SCP behaviour as a result of receiving the Study Content Notification information consists of storing study, series and image identification data in the RIS database to provide the ability studies, series and/or images to be retrieved by the RIS. Therefore the SCP support the 2C attribute Retrieve AE title (0008,0054).

SWRDSRV returns one of the following status codes to indicate an unsuccessful the C-STORE:

| Response Code | Status | Further Meaning |
|---|---|---|
| 0000 | Success | Complete Study Content exists on RIS |
| A700 | Out of Resources | Indicates that there was not enough disk space to store the information included in the SOP instance. Recovery from this condition is left to the administrator of Me-doraCOM. |
| A800 | SOP Class Not Sup-ported | Indicates that the SOP Class of the instance dataset in the C-STORE operation did not match the Abstract Syntax negotiated for the Presentation Context. This indicates a problem with the SCU of the Service Class. |
| A900 | Data Set does not match SOP Class | Indicates that the Data Set does not encode an instance of the SOP Class specified. This indicates a problem with SCU of the Service Class. |
| C000 | Cannot understand | Indicates that the Data Set cannot be parsed into ele-ments by SWRDSCN. This indicates a problem with the SCU. |

***Extension of the Basic Study Content Notification IOD***

SWRDSRV supports the following additional data attributes in a DICOM Standard Extended Basic Study Content Notification IOD instances:

| ***Study Level*** | |
|---|---|
| Accession Number | (0008,0050) |
| Study Date | (0008,0020) |
| Study Time | (0008,0030) |
| Study Description | (0008,1030) |
| ***Series Level*** | |
| Modality | (0008,0060) |
| Series Date | (0008,0021) |
| Series Time | (0008,0031) |
| Series Description | (0008,103E) |

SWRDSRV will make use of these additional data attributes to facilitate the link between the notified imaging study and a study object in the RIS.

### 3.2.2.3. Real-World Activities for Verification

#### *3.2.2.3.1 Associated Real-World Activities*

SWRDSRV allows another DICOM application to verify whether a DICOM association can be estab-lished between SWRDSRV and the application.

#### *3.2.2.3.2 Presentation Context Table*

For Verification SWRDSRV will accept the presentation contexts shown in the following table.

**Table 3-8 Acceptable Presentation Contexts**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended |
| Name | UID | Name | UID | | Negotiation |

| | | | | | |
|---|---|---|---|---|---|
| Verification | 1.2.840.10008.1.1 | DICOM Implicit VR Little Endian DICOM Explicit VR Little Endian DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |

***SOP Specific Conformance to the Verification SOP Class***

SWRDSRV provides standard conformance.

#### *3.2.2.3.3 Presentation Context Acceptance Criterion*

SWRDSRV will always accept a Presentation Context for the Modality Worklist SOP Class, the Study Content Notification SOP Class and the Verification SOP Class with the DICOM Default Transfer Syntax.

SWRDSRV will accept any number of presentation contexts specified in previous table. SWRDSRV will examine proposed Presentation contexts in the order proposed. For the presentation contexts of the same abstract syntax but different transfer syntaxes, only one of these presentation contexts will be accepted with the most preferred transfer syntax chosen by SWRDSRV. The policy of making this choice is described in the next section.

#### *3.2.2.3.4 Transfer Syntax Selection Policy*

SWRDSRV selects the transfer syntax to accept for the worklist query, receiving study information or retrieving a diagnostic report with the following general rules: First of all, it prefers a transfer syntax, which provides the explicit VR representation. After the VR choice has been made, SWRDSRV tries to select the transfer syntax using following preference in descending order:

1. Explicit VR Little Endian
2. Explicit VR Big Endian
3. Implicit VR Little Endian

Different Transfer Syntaxes will not be selected.

# 4. SISWEB_YASI_RIS_DICOM IMAGE QUERY/RETRIEVE SERVICES

## *4.1. IMPLEMENTATION MODEL*

The SISWeb-RIS/YASI-RIS application provides a user interface for defining pre-fetching and auto-routing rules and initiating image retrieval on demand. The user-defined rules are stored in several tables of the RIS database. The detailed specification is already available within the SISWeb-RIS/YASI-RIS user man-ual. Therefore only main issues shall be discussed within this document. Using the study, series and image information received either by the study content notification or by a query using C-FIND the RIS is able to control the image workflow by supporting mechanisms to automatically autoroute and pre-fetch of images as well as transfer images on demand. Therefore the DIMSE service C-FIND is used to gain the study, series and image information and the C-MOVE is used to request sending the images to any DICOM node known by the RIS.

### 4.1.1. Application Data Flow Diagram

SISWeb_YASI_RIS_DICOM Query/Retrieve Services (SWRDQRS) are WIN 32 processes that are controlled by RIS-PACS Communication Manager service able to run on a Microsoft Windows NT machine.

SWRDQRS initiates an association to a remote DICOM Application Entity (PACS or other IS). If the association is accepted by the remote AE, SWRDQRS sends either image query request or an image retrieve request based on one of the supported DICOM Retrieve Information Model by specifying the move destination.

### 4.1.2. Functional Definition of AE

SISWeb_YASI_RIS_DICOM Query/Retrieve Services may be automatically started when the machine is booted or it may be started when the SISWeb-RIS/YASI-RIS server processes are launched. Upon a service request coming from the SISWeb-RIS/YASI-RIS System, SWRDQRS is triggered to perform the DIMSE service operation.

Having been triggered, SWRDQRS initiates an association to the remote DICOM AE (PACS or other IS) which parameters are defined during the installation of SISWeb_YASI_RIS_DICOM. If there are more than one remote DICOM AEs to which the SISWeb-RIS/YASI-RIS System wants to communicate through SISWeb_YASI_RIS_DICOM, a concrete remote AE shall be specified with the trigger event. If the association is successfully ac-cepted by the remote AE, SWRDQRS then performs the concrete job specified in the request.

### 4.1.3. Sequencing of Real-World Activities

SISWeb_YASI_RIS_DICOM can be set up to perform a image query to a remote DICOM AE for getting study, series and image information similar to the DICOM study contents notification. SISWeb_YASI_RIS_DICOM can be configured to initiate a query after the RIS study status has been changed to

- Patient arrived
- Study started
- Study completed
- Report transcribed and
- Report approved.

SWRDQRS also performs image retrieve requests. In case of unsuccessful completion SISWeb_YASI_RIS_DICOM will retry the operation certain times or for a certain time depending on the configuration of SISWeb_YASI_RIS_DICOM.

## *4.2. APPLICATION ENTITY SPECIFICATION*

As stated previously, SWRDQRS is a component of SISWeb_YASI_RIS_DICOM and can be configured to operate as one DICOM AE or separate AEs, according to the demand of the user. Usually, all SISWeb_YASI_RIS_DICOM com-ponents run under one AE Title.

All operational parameters (such as AE titles, port numbers) of SWRDQRS are saved in the configuration data files or the Windows NT registry database of SISWeb_YASI_RIS_DICOM.

### 4.2.1. Association Establishment Policies

SWRDQRS provides Standard Conformance to the following DICOM 3.0 SOP Class as an SCU:

| SOP Class Name | SOP Class UID | Role |
|---|---|---|
| Study Root Query / Retrieve Information Model - FIND | 1.2.840.10008.5.1.4.1.2.2.1 | SCU |
| Study Root Query / Retrieve Information Model - MOVE | 1.2.840.10008. 5.1.4.1.2.2.2 | SCU |

#### 4.2.1.1. General

SWRDQRS will attempt to establish an association whenever a request is coming from the SISWeb-RIS/YASI-RIS System with all valid parameters, including the AE title, TCP port number, host name and net-work address. It will only attempt to establish associations if it determines that the request / retrieve parameters are valid with respect to this Conformance Statement.

The maximum PDU size that SWRDQRS will use is configurable.

#### 4.2.1.2. Number of Associations

SISWeb_YASI_RIS_DICOM keeps at most four instances of SWRDQRS running - one for querying a remote AE, one for image auto-routing, one for image pre-fetching and one for image transfer on demand - simultaneously. If a new request comes when such an association is still in process, the new request is queued and will be processed later.

#### 4.2.1.3. Asynchronous Nature

(SWRDQRS) will not perform asynchronous operations.

#### 4.2.1.4. Implementation Identifying Information

(SWRDDMS) will provide a single Implementation Class UID of ”1.2.840.113619.6.95.31.0.3.4.1” and an implementation version name of ”SISWEB_YASI_RIS_DICOM11”

### 4.2.2. Association Initiation Policy

SISWeb_YASI_RIS_DICOM Query/Retrieve Services (SWRDQRS) attempt to initiate a new association each time it is requested by the internal event management of SISWeb-RIS/YASI-RIS.

#### 4.2.2.1. Real-World Activities for Query Request (C-FIND)

##### *4.2.2.1.1 Associated Real-World Activities*

The associated Real-World Activity is to gain study, series and/or image information from remote using DIMSE-C-FIND applications. If the information is successfully received, SWRDQRS saves the study information in the SISWeb-RIS/YASI-RIS database and tries to build a link between the received study to the corresponding study object in the RIS.

### 4.2.2.1.2 Proposed Presentation Contexts

SWRDQRS-FIND will propose the Presentation Contexts shown in Table 4-2 Proposed Presentation Con-text of SWRDQRS for a C-FIND.

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| **Abstract Syntax** | | **Transfer Syntax** | | **Role** | **Extended** |
| **Name** | **UID** | **Name List** | **UID List** | | **Negotiation** |
| Study Root Query / Re-trieve Informa-tion Model - FIND | 1.2.840.10008.5.1.4.1.2.2.1 | DICOM Explicit VR Little Endian<br>DICOM Explicit VR Big Endian<br>DICOM Implicit VR Little Endian | 1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2<br>1.2.840.10008.1.2 | SCU | None |

***SOP Specific Conformance***

SWRDQRS provides standard conformance to the DICOM Query / Retrieve Service Class.

SWRDQRS does not provide extended negotiation and does not use relational retrieve. It uses only hier-archical query/retrieve on study, series or image levels.

| **Key** | **Tag** | **Level** | **Matching Key** | **Return Key** | **Type of Matching** |
|---|---|---|---|---|---|
| Study Instance UID | (0020,000D) | STUDY<br>SERIES | ✔<br>✔ | ✔<br>✔ | Single Value |
| Study ID | (0020,0010) | STUDY | ✔ | ✔ | Single Value |
| Study Date | (0008,0020) | STUDY | | ✔ | Universal |
| Accession Number | (0008,0050) | STUDY | ✔ | ✔ | Single Value |
| Series Instance UID | (0020,000E) | SERIES<br>IMAGE | ✔ | ✔ ✔ | Single Value |
| Series Number | (0020,0011) | SERIES | | ✔ | Universal |
| Modality | (0008,0060) | SERIES | ✔ | | Universal |
| Instance Number | (0020,0013) | IMAGE | | ✔ | Universal |
| Overlay Number | (0020,0022) | IMAGE | | ✔ | Universal |
| Curve Number | (0020,0024) | IMAGE | | ✔ | Universal |

| | | | | | |
|---|---|---|---|---|---|
| Lookup Table Num-ber | (0020,0026) | IMAGE | | ✔ | Universal |
| SOP Instance UID | (0008,0018) | IMAGE | | ✔ | Universal |

#### 4.2.2.2. Real-World Activities for Image Retrieve Request

##### *4.2.2.2.1 Associated Real-World Activities*

The associated Real-World Activity is the attempt to perform the service operation DIMSE-C-MOVE issued by SISWeb_YASI_RIS_DICOM. If SWRDQRS successfully establishes an association to a remote AE, it will re-quest it to move images to the specified destination.

SISWeb_YASI_RIS_DICOM will be informed about the move results.

##### *4.2.2.2.2 Proposed Presentation Contexts*

SWRDQRS-MOVE will propose the Presentation Contexts shown in next Table Proposed Presentation Context of SWRDQRS for a C-MOVE.

| **Presentation Context Table** | | | | | |
|---|---|---|---|---|---|
| **Abstract Syntax** | | **Transfer Syntax** | | **Role** | **Extended** |
| **Name** | **UID** | **Name List** | **UID List** | | **Negotiation** |
| Study Root Query / Re-trieve Informa-tion Model - FIND | 1.2.840.10008.5.1.4.1.2.2.1 | DICOM Explicit VR Little Endian<br>DICOM Explicit VR Big Endian<br>DICOM Implicit VR Little Endian | 1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2<br>1.2.840.10008.1.2 | SCU | None |

***SOP Specific Conformance***

SWRDQRS provides standard conformance to the DICOM Query / Retrieve Service Class.

SWRDQRS does not provide extended negotiation and does not use relational retrieve. It uses only hier-archical query/retrieve on study, series or image levels.

# 5. SISWEB_YASI_RIS_DICOM IMAGE STORAGE FOR KEY IMAGES

SISWeb_YASI_RIS_DICOM implemented an application SWRDKIS for receiving so called key images or significant images to set the key image status in the image table of SISWeb-RIS/YASI-RIS as well as to convert them into bitmaps to be displayed as thumbnails in the RIS application. The DICOM image itself is not stored in the RIS. The SISWeb_YASI_RIS_DICOM Key Image Store SCP is only available on Windows NT.

## *5.1. IMPLEMENTATION MODEL*

SISWeb_YASI_RIS_DICOM implemented an application SWRDKIS for receiving so called key images or significant images to set the key image status in the image table of SISWeb-RIS/YASI-RIS as well as to convert them into bitmaps to be displayed as thumbnails in the RIS application. The DICOM image itself is not stored in the RIS.

### 5.1.1. Application Data Flow Diagram

SWRDKIS is a WIN 32 process controlled by the RIS-PACS Communication Manager service able to run on any Microsoft® Windows NT™ machine.

SISWeb_YASI_RIS_DICOM Key Image Store may be automatically started when the machine is booted or it may be started when the SISWeb-RIS/YASI-RIS server processes are launched.

A remote DICOM Application Entity initiates an association for DICOM Storage Service Class to SISWeb_YASI_RIS_DICOM Key Image Store. When SWRDKIS accepts the association, the remote AE transmits the DICOM Image Information Objects to SWRDKIS. SWRDKIS sets the key image status in the RIS database and saves the bitmap images as described above.

### 5.1.2. Functional Definitions

After being started, SWRDKIS is always waiting for an association request from a remote DICOM Application Entity. SWRDKIS will accept an association with the supported SOP classes for all remote DICOM applications.

### 5.1.3. Sequencing of Real-World Activities

After receiving images from a remote application, SWRDKIS sets the key image status and stores the reduced and converted images in a specified folder on the hard disk. SWRDKIS

neither defines, nor re-quires any consequence event of the remote DICOM Application Entity after it receives the images over an association originated by SWRDKIS. Details about the usage and further handling of key images are beyond the scope of this document.

## 5.2. APPLICATION ENTITY SPECIFICATIONS

SWRDKIS provides the Standard Conformance to the following DICOM V3.0 SOP Classes as an SCP:

| SOP Class Name | SOP Class UID | Role |
|---|---|---|
| Computed Radiography Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.1 | SCP |
| CT Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.2 | SCP |
| MR Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.4 | SCP |
| Nuclear Medicine Image Infor-mation Object Storage | 1.2.840.10008.5.1.4.1.1.20 | SCP |
| Retired Nuclear Medicine Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.5 | SCP |
| Ultrasound Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.6.1 | SCP |
| Retired Ultrasound Image Infor-mation Object Storage | 1.2.840.10008.5.1.4.1.1.6 | SCP |
| Ultrasound Multiple Frame Im-age Information Object Storage | 1.2.840.10008.5.1.4.1.1.3.1 | SCP |
| Retired Multiple Frame Ultra-sound Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.3 | SCP |
| Secondary Capture Image Infor-mation Object Storage | 1.2.840.10008.5.1.4.1.1.7 | SCP |
| X-Ray Angiographic Image In-formation Object Storage | 1.2.840.10008.5.1.4.1.1.12.1 | SCP |
| X-Ray Fluoroscopy Image In-formation Object Storage | 1.2.840.10008.5.1.4.1.1.12.2 | SCP |
| Verification | 1.2.840.10008.1.1 | SCP |

### 5.2.1. Association Establishment Policies

#### 5.2.1.1. General

SWRDKIS accepts associations for the purposes of image storage. SWRDKIS accepts

association requests from a remote DICOM AE but SWRDKIS does not initiate any association to a remote DICOM applica-tion entity.

The maximal PDU size which SWRDKIS supports is configurable while the default value is 16 KB.

In general, SWRDKIS obeys the association establishment policies of SISWeb_YASI_RIS_DICOM.

#### 5.2.1.2. Number of Associations

SWRDKIS can accept and process multiple associations simultaneously. Maximally there can be five associations running concurrently. SWRDKIS will create a new thread for each connection request it re-ceives. There can be a maximum of five.

#### 5.2.1.3. Asynchronous Nature

SWRDKIS will not perform asynchronous operations window negotiation.

#### 5.2.1.4. Implementation Identifying Information

SWRDKIS will provide a single Implementation Class UID of "1.2.840.113619.6.95.31.0.3.4.1" and an implementation version name of "SISWEB_YASI_RIS_DICOM11"

### 5.2.2. Association Acceptance Policy

SWRDKIS accepts associations for the purpose of Image Storage. SWRDKIS accepts an association request from all remote DICOM Application Entity without checking if it is listed in its configuration data-base. When SWRDKIS accepts an association, it will receive any number of images transmitted on that association.

#### 5.2.2.1. Real-World Activities Key Image Storage

##### *5.2.2.1.1 Associated Real-World Activities*

The associated Real-World Activity of SWRDKIS is to receive one or several so called key images or significant images. Details about the usage and further handling of key images are beyond the scope of this document.

##### *5.2.2.1.2 Presentation Context Table*

SWRDKIS will accept the Presentation Contexts shown in the following table, depending on which SOP Instances should be received.

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| **Abstract Syntax** | | **Transfer Syntax** | | **Role** | **Extended** |
| **Name** | **UID** | **Name** | **UID** | | **Negotiation** |
| Computed Radiog-raphy Image Infor-mation Object Stor-age | 1.2.840.10008.5.1.4.1.1.1 | DICOM Implicit VR Little Endian<br>DICOM Implicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |
| CT Image Informa-tion Object Storage | 1.2.840.10008.5.1.4.1.1.2 | DICOM Implicit VR Little Endian<br>DICOM Implicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |
| MR Image Information Object Stora | 1.2.840.10008.5.1.4.1.1.4 | DICOM Implicit VR Little Endian<br>DICOM Implicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |
| Nuclear Medicine Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.20 | DICOM Implicit VR Little Endian<br>DICOM Implicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |
| Retired Nuclear Medicine Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.5 | DICOM Implicit VR Little Endian<br>DICOM Implicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |
| Ultrasound Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.6. | DICOM Implicit VR Little Endian<br>DICOM Implicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |
| Retired Ultrasound Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.6 | DICOM Implicit VR Little Endian<br>DICOM Implicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended |
| Name | UID | Name | UID | | Negotiation |
| Ultrasound Multiple Frame Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.3. | DICOM Implicit VR Little Endian<br>DICOM Implicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |
| Retired Multiple Frame Ultrasound Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.3 | DICOM Implicit VR Little Endian<br>DICOM Implicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |
| Secondary Capture Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.7 | DICOM Implicit VR Little Endian<br>DICOM Implicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |
| X-Ray Angiographic Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.12.1 | DICOM Implicit VR Little Endian<br>DICOM Implicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |
| X-Ray Fluoroscopy Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.12.2 | DICOM Implicit VR Little Endian<br>DICOM Implicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |
| X-Ray Angiographic Biplane Image Information Object Storage | 1.2.840.10008.5.1.4.1.1.12.3 | DICOM Implicit VR Little Endian<br>DICOM Implicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |

***SOP Specific Conformance***

SWRDKIS conforms to the SOPs' of the Storage Service Class at Level 0 (Local). All attributes are discarded, only a reduced pixel image is saved. In the event of a successful C-STORE operation, the key image status is set and the converted and reduced images are saved. A successful C-STORE response ensures that SWRDKIS has handled a valid DICOM Composite Information Object.

SWRDKIS returns one of the following status codes, when the C-STORE was unsuccessful:

| Response Code | Status | Further Meaning |
|---|---|---|
| A700 | Out of Resources | Indicates that there was not enough disk space to store the image. Recovery from this condition is left to the user of SISWeb_YASI_RIS_DICOM. |
| A800 | SOP Class Not Sup-ported | Indicates that the SOP Class of the image in the C-STORE operation did not match the Abstract Syntax negotiated for the Presentation Context. This indicates a problem with the SCU of the Service Class. |
| A900 | Data Set does not match SOP Class | Indicates that the Data Set does not encode an instance of the SOP Class specified. This indicates a problem with SCU of the Service Class. |
| C000 | Cannot understand | Indicates that the Data Set cannot be parsed into ele-ments by SWRDKIS. This indicates a problem with the SCU. |

SWRDKIS supports minimum image data set that only includes Type 1 data attributes filled with valid values. SISWeb_YASI_RIS_DICOM Key Image Store supports an image matrix of any size and any depth.

SWRDKIS supports palette coded colour images.

SWRDKIS supports RGB and YBR_FULL coded colour images.

SWRDKIS supports the overlays embedded in the image pixel matrix.

SWRDKIS does not support YBR_FULL_442 or YBR_PARTIAL_422 or other format coded colour images.

SWRDKIS supports neither stand-alone overlays nor any curves.

### 5.2.2.2. Real-World Activities for Verification

#### *5.2.2.2.1 Associated Real-World Activities*

SWRDKIS allows another DICOM application to verify whether a DICOM association can be established between SWRDKIS and the application.

#### *5.2.2.2.2 Presentation Context Table*

For Verification SWRDKIS will accept the presentation contexts shown in the following table.

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended |
| Name | UID | Name | UID | | Negotiation |
| Verification | 1.2.840.10008.1.1 | DICOM Implicit VR Little Endian<br>DICOM Explicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |

***SOP Specific Conformance to the Verification SOP Class***

SWRDKIS provides standard conformance.

#### *5.2.2.2.3 Presentation Context Acceptance Criterion*

SWRDKIS will accept any number of Presentation Contexts specified in Table Supported Presentation Contexts for the SISWeb-RIS/YASI-RIS Key Image Store. SWRDKIS will examine proposed Presentation Contexts in the order in which they are proposed. For the Presentation Contexts of the same Abstract Syntax but different Transfer Syntaxes, only one of these Presentation Contexts will be accepted with the most preferred Transfer Syntax chosen by SWRDKIS. The policy of making this choice is described in the next section. SWRDKIS can accept more than one Abstract Syntax in one association.

In the case that a SISWeb_YASI_RIS_DICOM runs out of resources, SWRDKIS will reject the association request.

#### *5.2.2.2.4 Transfer Syntax Selection Policies*

SWRDKIS selects the transfer syntax to accept for the image transmission with the following general rules: First of all, it prefers a transfer syntax, which provides the explicit VR representation. After the VR choice has been made, SWRDKIS tries to select the transfer syntax of the same byte-coding scheme of multiple byte data element as the one used on the platform it is running on.

As SWRDKIS runs on the Microsoft Windows NT Intel platforms, the concrete selection order of SWRDKIS is listed as follows:

Little Endian Transfer Syntax with Explicit VR

Big Endian Transfer Syntax with Explicit VR

Little Endian Transfer Syntax with Implicit VR

# 6. SISWEB_YASI_RIS_DICOM PPS MANAGER

This chapter gives the technical specification of the SISWeb_YASI_RIS_DICOM PPS Manager (SWRDPPS) - a part of the DICOM communication interface of IASI's Radiology Information System SISWeb-RIS/YASI-RIS.

SWRDPPS implements a PPS Manager as defined in the IHE Technical Framework 5.5. It consists of two processes one provides a DICOM Modality Performed Procedure Step SCP listening on a TCP port waiting for DICOM associations requested by SCUs. If configured this process tries to act also as an SCU in order to forward the received messages to a third system. The second process provides a DICOM Modality Performed Procedure Step SCU in order to send PPS messages to a third system in case the first attempt which is carried out by the PPS Manager process directly after reception has failed.

Usually SWRDPPS supports a single application entity titles (AET) but SWRDPPS SCP and SWRDPPS SCU may also be configured to support two different application entity titles.

## *6.1. IMPLEMENTATION MODEL*

The component SWRDPPS has been implemented to act as a Service Class Provider (SCP) and a Service Class User of the DICOM MPPS Service Class. The SISWeb_YASI_RIS_DICOM PPS Manager is only available on Windows NT.

The SISWeb_YASI_RIS_DICOM PPS Manager supports one AE Title. The AE Title can be the same AE Title that other components of SISWeb_YASI_RIS_DICOM support, or another specialised AE Title.

### 6.1.1. Application Data Flow Diagram

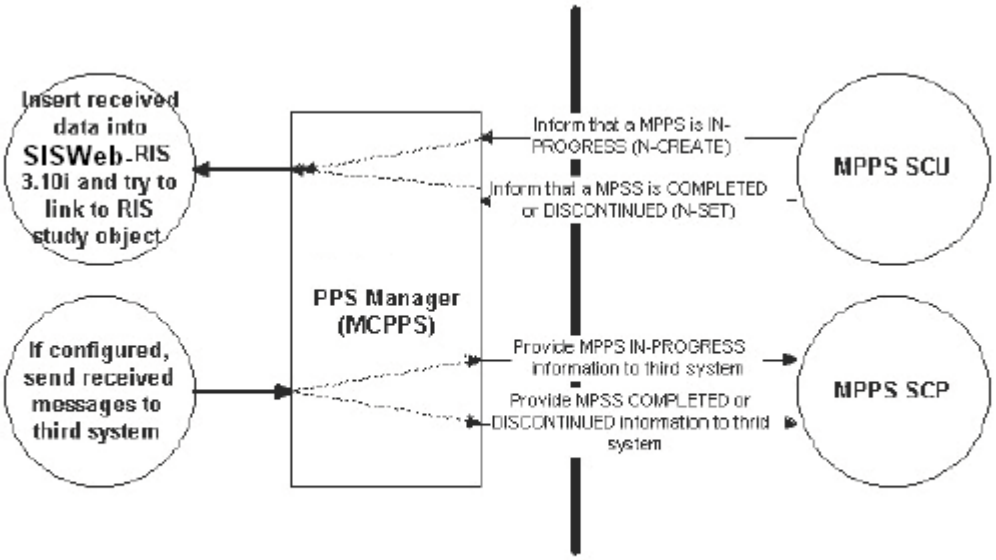
SWRDPPS consists of two WIN 32 processes controlled by the RIS-PACS Communication Manager service, which are able to run on any Microsoft Windows NT machine.

SISWeb_YASI_RIS_DICOM PPS Manager may be automatically started when the machine is booted or it may be started when the SISWeb-RIS/YASI-RIS server processes are launched what means that no user login is required.

A remote DICOM Application Entity initiates an association for a DICOM Modality Performed Pro-cedure Step Service Class.

When SWRDPPS accepts the association, the remote AE transmits the MPPS message to SWRDPPS. If con-figured SWRDPPS is acting as DICOM Modality Performed Procedure Step SCU sending the PPS mes-sages to a third system. The received data is stored in the RIS database and if possible automatically assigned to a patient/procedure in SISWeb-

RIS/YASI-RIS.




### 6.1.2. Functional Definition of AE

After being started, SWRDPPS is always waiting for an association request from a remote DICOM appli-cation entity. SWRDPPS will accept an association with the supported SOP class only for those remote DICOM applications, which are specified in the configuration of SISWeb_YASI_RIS_DICOM. This means that not all remote DICOM application entities are permitted to transmit PPS messages to SISWeb_YASI_RIS_DICOM.

### 6.1.3. Sequencing of Real-World Activities

Normally the medical modality (MPPS SCU) indicates

- the beginning of the PPS by sending a N-CREATE message to the MPPS SCP
- and the end of the PPS by sending a N-SET message with the status “DISCONTINUED” or “COMPLETED”

If SWRDPPS receives a valid Modality Performed Procedure Step SOP instance the information is stored into a structure of several database tables directly depicting the structure of the DICOM Modality Per-formed Procedure Step SOP Class and - if configured - forwarded to a third device. If possible the received MPPS SOP instance is assigned to a previously scheduled procedure step in the database of SISWeb-RIS/YASI-RIS.

## 6.2. APPLICATION ENTITY SPECIFICATION

SWRDPPS is one functional component of SISWeb_YASI_RIS_DICOM and supports the DICOM Modality Performed Procedure Step Service Class.

All operational parameters (such as AE titles, port numbers) can be accessed and changed by using the SISWeb_YASI_RIS_DICOM Monitor application on a Windows NT based system.

### 6.2.1. Association Establishment Policies

SWRDPPS provides Standard Conformance to the following DICOM 3.0 SOP Class as an SCP and SCU:

| SOP Class Name | SOP Class UID | Role |
|---|---|---|
| Modality Performed Procedure Step | 1.2.840.10008.3.1.2.3.3 | SCP |
| Modality Performed Procedure Step | 1.2.840.10008.3.1.2.3.3 | SCU |

#### 6.2.1.1. General

SWRDPPS accepts associations for the purposes of Modality Performed Procedure Step SOP Class. SWRDPPS accepts association requests from a remote DICOM AE only when it is registered in the con-figuration of SWRDPPS (including AE Title (mandatory), optional TCP Port Number and Network Ad-dress).

If configured, SWRDPPS also will attempt to establish an association to the configured peer SCP when-ever a valid N-CREATE or N-SET message is received from the PPS Manager SCP.

The maximal PDU size, which SWRDPPS supports, is configurable while the default value is 16 KB.

In general, SWRDPPS obeys the association establishment policies of SISWeb_YASI_RIS_DICOM.

#### 6.2.1.2. Number of Associations

SWRDPPS can accept and process multiple associations simultaneously. The maximum number of simul-taneous associations is configurable. SISWeb_YASI_RIS_DICOM PPS Manager will create a new process for each connection request it receives.

#### 6.2.1.3. Asynchronous Nature

SWRDPPS will not perform asynchronous operations window negotiation.

#### 6.2.1.4. Implementation Identifying Information

SWRDPPS will provide a single Implementation Class UID of ”1.2.840.113619.6.95.31.0.3.4.1” and an implementation version name of ”SISWEB_YASI_RIS_DICOM11”

### 6.2.2. Association Acceptance Policy

SWRDPPS accepts associations for the purposes of receiving modality performed procedure step information. SWRDPPS accepts an association request only from remote DICOM application entities, which are known in the configuration of SISWeb_YASI_RIS_DICOM.

#### 6.2.2.1. Real-World Activity MPPS SCP

##### *6.2.2.1.1 Associated Real-World Activity*

After an imaging modality has started the performance of a Procedure Step it should inform the IS by sending an N-CREATE service request to SWRDPPS (SCP). At the end of the Performed Procedure Step the imaging modality shall send a N-SET command with all other mandatory attributes to SWRDPPS (SCP).

If SWRDPPS (SCP) receives a valid Modality Performed Procedure Step SOP instance the information is stored into a structure of several database tables directly depicting the structure of the DICOM Modal-ity Performed Procedure Step SOP Class. If possible the received MPPS SOP instance is assigned to a previously scheduled procedure step in the database of SISWeb-RIS/YASI-RIS.

##### *6.2.2.1.2 Presentation Context Table*

SWRDPPS (SCP) will accept of the presentation contexts shown in the following table.

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended |
| Name | UID | Name | UID | | Negotiation |

| | | | | | |
|---|---|---|---|---|---|
| Modality Performed Procedure Step SOP Class | 1.2.840.10008.3.1.2.3.3 | DICOM Implicit VR Little Endian<br>DICOM Explicit VR Little Endian DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCP | None |

***SOP Specific Conformance***

SWRDPPS provides the Standard Conformance to the DICOM Modality Performed Procedure Step Ser-vice Class as an SCP.

| **Description / Module** | **Tag** | **Type N-CREATE SCU/SCP** | **Type N-SET SCU/SCP** | **Require ment Type Final State**[2] |
|---|---|---|---|---|
| **SOP Common Module** | | | | |
| SOP Class UID | (0008,0016) | 3/3 | 3/3 | |
| SOP Instance UID | (0008,0018) | 3/3 | 3/3 | |
| Specific Character Set | (0008,0005) | 1C/1C (Required if an extended or replacement character set is used) | Not allowed | |
| Instance Creation Date | (0008,0012) | 3/3 | 3/3 | |
| Instance Creation Time | (0008,0013) | 3/3 | 3/3 | |
| Instance Creator UID | (0008,0014) | 3/3 | 3/3 | |
| **Performed Procedure Step Relationship Module** | | | | |
| Patient´s Name | (0010,0010) | 3/3[3] | Not allowed | |
| Patient ID | (0010,0020) | 3/3[3] | Not allowed | |
| Patient´s Birth Date | (0010,0030) | 3/3[3] | Not allowed | |
| Patient´s Sex | (0010,0040) | 3/3[3] | Not allowed | |
| Referenced Patient Sequence | (0008,1120) | 3/3[3] | Not allowed | |

| | | | | |
|---|---|---|---|---|
| >Referenced SOP Class UID | (0008,1150) | 1C/1C | Not allowed | |
| >Referenced SOP Instance UID | (0008,1155) | 1C/1C | Not allowed | |
| Scheduled Step Attribute Sequence | (0040,0270) | 1/1 | Not allowed | |
| >Study Instance UID | (0020,000D) | 1/1 | Not allowed | |
| >Referenced Study Sequence | (0008,1110) | 3/3[3] | Not allowed | |
| >>Referenced SOP Class UID | (0008,1150) | 1C/1C | Not allowed | |
| >>Referenced SOP Instance UID | (0008,1155) | 1C/1C | Not allowed | |
| >Accession Number | (0008,0050) | 3/3 | Not allowed | |
| >Placer Order Number/ Imaging Service Request | (0040,2006) | 3/3 | Not allowed | |
| >Filler Order Number/ Imaging Service Request | (0040,2007) | 3/3 | Not allowed | |
| >Requested Procedure ID | (0040,1001) | 3/3[3] | Not allowed | |
| >Requested Procedure Description | (0032,1060) | 3/3[3] | Not allowed | |
| >Placer Order Number/ Procedure | (0040,1006) | 3/3 | Not allowed | |
| >Filler Order Number/ Procedure | (0040,1007) | 3/3 | Not allowed | |
| >Scheduled Procedure Step ID | (0040,0009) | 3/3[3] | Not allowed | |
| >Scheduled Procedure Step Description | (0040,0007) | 3/3[3] | Not allowed | |
| >Scheduled Action Item Code Sequence | (0040,0008) | 3/3[3] | Not allowed | |
| >>Code Value | (0008,0100) | 1C/1C | Not allowed | |

| | | | | |
|---|---|---|---|---|
| >>Coding Scheme designa-tor | (0008,0102) | 1C/1C | Not allowed | |
| >>Code Meaning | (0008,0104) | 3/3 | Not allowed | |
| **Performed Procedure Step Information** | | | | |
| Performed Procedure Step ID | (0040,0253) | 1/1 | Not allowed | |
| Performed Station AE Title | (0040,0241) | 1/1 | Not allowed | |
| Performed Station Name | (0040,0242) | 3/3[3] | Not allowed | |
| Performed Location | (0040,0243) | 3/3[3] | Not allowed | |
| Performed Procedure Step Start Date | (0040,0244) | 1/1 | Not allowed | |
| Performed Procedure Step Start Time | (0040,0245) | 1/1 | Not allowed | |
| Performed Procedure Step Status | (0040,0252) | 1/1 | 3/1 | |
| Performed Procedure Step Description | (0040,0254) | 3/3[3] | 3/2 | |
| Performed Procedure Type Description | (0040,0255) | 3/3[3] | 3/2 | |
| Procedure Code Sequence | (0008,1032) | 3/3[3] | 3/2 | |
| >Code Value | (0008,0100) | 1C/1<br><br>(Required if<br><br>Sequence Item is present) | 1C/1<br><br>(Required if Se-quence Item is present) | |
| >Coding Scheme Designator | (0008,0102) | 1C/1<br>(Required if Sequence Item is present) | 1C/1<br>(Required if Se-quence Item is present) | |
| >Code Meaning | (0008,0104) | 3/3 | 3/3 | |

| | | | | |
|---|---|---|---|---|
| Performed Procedure Step End Date | (0040,0250) | 3/3[3] | 3/1 | 1 |
| Performed Procedure Step End Time | (0040,0251) | 3/3[3] | 3/1 | 1 |
| **Image Acquisition Results** | | | | |
| Modality | (0008,0060) | 1/1 | Not allowed | |
| Study ID | (0020,0010) | 3/3[3] | Not allowed | |
| Performed Protocol Code Sequence | (0040,0260) | 3/3[3] | 3/2 | |
| >Code Value | (0008,0100) | 1C/1 (Required if Sequence Item is present) | 1C/1 (Required if Sequence Item is present) | |
| >Coding Scheme Designator | (0008,0102) | 1C/1 (Required if Sequence Item is present) | 1C/1 (Required if Sequence Item is present) | |
| >Code Meaning | (0008,0104) | 3/3 | 3/3 | |
| Performed Series Sequence | (0040,0340) | 3/3[3] | 3/1 | 1[4] |
| >Performing Physician's Name | (0008,1050) | 3/3[3] | 3/3[3] | 2 |
| >Protocol Name | (0018,1030) | 1C/1 (Required if Sequence Item is present) | 1C/1 (Required if Sequence Item is present) | 1 |
| >Operator's Name | (0008,1070) | 3/3[3] | 3/3[3] | 2 |

| | | | | |
|---|---|---|---|---|
| >Series Instance UID | (0020,000E) | 1C/1 (Required if Sequence Item is present) | 1C/1 (Required if Sequence Item is present) | 1 |
| >Series Description | (0008,103E) | 3/3[3] | 3/3[3] | 2 |
| >Retrieve AE Title | (0008,0054) | 3/3[3] | 3/3[3] | 2 |
| >Referenced Image Sequence | (0008,1140) | 3/3[3] | 3/3[3] | See F.7.2.2.2. (DICOM Standard) |
| >>Referenced SOP Class UID | (0008,1150) | 1C/1 (Required if Sequence Item is present) | 1C/1 (Required if Sequence Item is present) | |
| >>Referenced SOP Instance UID | (0008,1155) | 1C/1 (Required if Sequence Item is present) | 1C/1 (Required if Sequence Item is present) | |
| >Referenced Standalone SOP Instance Sequence | (0040,0220) | 3/3[3] | 3/3[3] | See F.7.2.2.2. (DICOM Standard) |
| >>Referenced SOP Class UID | (0008,1150) | 1C/1 (Required if Sequence Item is present) | 1C/1 (Required if Sequence Item is present) | |

| | | | | |
|---|---|---|---|---|
| >>Referenced SOP Instance UID | (0008,1155) | 1C/1 (Required if Sequence Item is present) | 1C/1 (Required if Sequence Item is present) | |
| >All other attributes from Performed Series Sequence | | 3/3 | 3/3 | |
| All other attributes from Radiation Dose Module and Billing and Material Code Module | | 3/3 | 3/3 | |

2 The requirement for the final state is that which applies at the time that the Performed Procedure Step Status (0040,0252) is N-SET to a value of COMPLETED or DISCONTINUED, as described in F.7.2.2.2. It is only described if it is different from the SCP requirement for the N-CREATE.

3 The original attribute type defined in the DICOM Standard is 2/2 or 2C/2. The PPS Manager SCP handles these attributes like type 3 attributes in case some tags are missing. **However** the PPS Manager SCU for-wards the message as it was received by the SCP, what means that the PPS Manager does not add any infor-mation that is missing.

4 The Performed Series Sequence (0040,0340) may not be empty (zero length) at the time that the Performed Procedure Step Status (0040,0252) is N-SET to a value of COMPLETED or DISCONTINUED. In other words a Series must exist for every Performed Procedure Step, though it may contain no Images or Stand-alone objects, if none were created, as described in F.7.2.2.2. (DICOM Standard).

In the event of an successful N-CREATE and N-SET operation, SWRDPPS saves all UIDs identifying the received performed procedure step in the RIS and uses the Study Instance UID and the patient infor-mation for trying to build a link between the performed procedure step and a scheduled procedure step/study object in the RIS. The RIS may use these UIDs to move the images at a later time.

The SCP behaviour as a result of receiving the Performed Procedure Step information consists of stor-ing the data assigned to the PPS SOP Instance in the RIS database. The PPS SOP Instance will remain in the RIS database – there is no deletion mechanism in place. After receiving a PPS SOP Instance with status COMPLETED or DISCONTINUED the corresponding SPS is flagged as completed or discontinued respectively.

SWRDPPS returns one of the following status codes to indicate an unsuccessful N-CREATE/N-SET:

| Response Code | Status | Further Meaning |
|---|---|---|
| 0000 | Success | Receiving and processing of PPS was successfully. |

| Response Code | Status | Further Meaning |
|---|---|---|
| 0111 | Duplicate SOP Instance | The new managed SOP Value supplied by the invoking DIMSE-service-user was already registered for a man-aged SOP Instance of the specified SOP Class. |
| 0106 | Invalid Attribute value | The Attribute Value specified was out of range or oth-erwise inappropriate. |
| B102 | Calling Error | Any other error during parsing message was encoun-tered. |
| B101 | Refused-Attribute empty | A required Attribute Value was empty (Type 1). |
| B100 | Refused-Attribute miss-ing | A required Attribute was missing (Type 1 and 2). |
| B200 | Refused-Attribute not allowed | An Attribute was included in the message, which is not defined within Table F.7.2-1 of the DICOM Standard. |
| 0110 | Processing Failure | A general failure in processing the operation was en-countered. |
| 0112 | No such SOP Instance | The SOP Instance was not recognized. |

### Presentation Context Acceptance Criterion

SWRDPPS (SCP) will always accept a Presentation Context for the Modality Performed Procedure SOP Class with the DICOM Default Transfer Syntax.

SWRDPPS (SCP) will accept any number of presentation contexts specified in Table 6-2 Acceptable Presentation Contexts for SWRDPPS. SWRDPPS will examine proposed Presentation contexts in the order proposed. For the presentation contexts of the same abstract syntax but different transfer syntaxes, only one of these presentation contexts will be accepted with the most preferred transfer syntax chosen by SWRDPPS. The policy of making this choice is described in the next section.

### Transfer Syntax Selection Policy

SWRDPPS (SCP) selects the transfer syntax to accept for receiving a Performed Procedure Step with the following general rules: First of all, it prefers a transfer syntax which provides the explicit VR repre-sentation. After the VR choice has been made, SWRDPPS (SCP) tries to select the transfer syntax using following preference in descending order:

1. Explicit VR Little Endian

2. Explicit VR Big Endian

3. Implicit VR Little Endian

Different Transfer Syntaxes will not be selected.

### 6.2.3. Association Initiation Policy

SWRDPPS attempts to initiate a new association to a peer PPS SCP each time it receives a valid N-CREATE/N-SET message.

#### 6.2.3.1. Real-World Activity MPPS SCU

##### *6.2.3.1.1 Associated Real-World Activity*

If SWRDPPS (SCP) receives a valid Modality Performed Procedure Step SOP instance SWRDPPS (SCU) forwards the information - if configured - to a third device.

##### *6.2.3.1.2 Presentation Context Table*

SWRDPPS (SCU) will propose the Presentation Contexts shown in following Table

.

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| **Abstract Syntax** | | **Transfer Syntax** | | **Role** | **Extended** |
| **Name** | **UID** | **Name** | **UID** | | **Negotiation** |
| Modality Per-formed Procedure Step SOP Class | 1.2.840.10008.3.1.2.3.3 | DICOM Implicit VR Little Endian<br>DICOM Explicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCU | None |

**SOP Specific Conformance**

SWRDPPS provides the Standard Conformance to the DICOM Modality Performed Procedure Step Ser-vice Class as an SCU (see 6.2.2.1.2.1). SWRDPPS does not provide extended negotiation. The SCU be-haviour as a result of receiving the Performed Procedure Step information (by PPS-Manager SCP) consists of forwarding the data to a third device. In case the association could not be established or the response code from the third system is unequal Success (0000) the PPS information objects are queued and the PPS-Manager SCU attempts later to forward the information. This is repeated until the data could be forwarded successfully or the system administrator deletes the PPS object from the queue.

# 7. SISWEB-SR Information Object Implementation

## 7.1. Introduction

This section specifies the use of the DICOM Comprehensive SR IOD to represent the information included in SC images produced by this implementation. Corresponding attributes are conveyed using the module construct. The contents of this section are:

- IOD Implementation
- IOD Module Table
- IOD Module Definitions

## 7.2. Comprehensive SR IOD Implementation

This section defines the implementation of Comprehensive SR information object.

## 7.3. Comprehensive SR Entity-Relationship Model

### 7.3.1. Entity Description

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities contained within the Comprehensive SR Information Object.

### 7.3.2. Voluson i/e Mapping of DICOM Entities

| DICOM | Equipment |
|---|---|
| Patient | Patient |
| Study | Exam |
| Series | Exam |
| SR Document | Results |

Table Mapping of DICOM Entities to Equipment Entities

## 7.4. IOD Module Table

Within an entity of the DICOM Comprehensive SR IOD, attributes are grouped into related set of attributes. A set of related attributes is termed a module. A module facilitates the understanding of the semantics concerning the attributes and how the attributes are related with each other. A module grouping does not infer any encoding of information into data sets. The table below identifies the defined modules within the entities, which comprise the DICOM Comprehensive SR IOD. Modules are identified by Module Name. See DICOM Part 3 for a complete definition of the entities, modules, and attributes.

| Entity Name | Module Name | Reference |
|---|---|---|
| Patient | Patient | 3.5.1.1 |
| Patient | Specimen Identification | Not used |
| Study | General Study | 3.5.2.1 |
| Study | Patient Study | 3.5.2.2 |
| Series | SR Document Series | 6.5.1 |
| Equipment | General Equipment | 3.5.4.1 |
| Document | SR Document General | 6.5.2 |
| Document | SR Document Content | 6.5.3 |
| Document | SOP Common | 3.5.6.1 |

Table SR IOD Modules

## *7.5. Information Module Definitions*

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the Comprehensive SR Information Object. The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are obtained. It should be noted that they are the same ones as defined in the DICOM Standard Part 3 (Information Object Definitions).

### 7.5.1. SR Document Series Module

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Modality | 0008,0060 | 1 | Defined Term ”SR” used. |
| Series Instance UID | 0020,000E | 1 | Uniquely generated by the equipment. |
| Series Number | 0020,0011 | 2 | Internal number which is incremented for each new series. |
| Referenced Performed Procedure Step Sequence | 0008,1111 | 3 | Used if Modality Performed Procedure Step is enabled. |
| >Referenced SOP Class UID | 0008,1150 | 3 | Used if Modality Performed Procedure Step is enabled. |
| >Referenced SOP Instance UID | 0008,1155 | 3 | Used if Modality Performed Procedure Step is enabled. |

Table SR Document Series Module Attributes

### 7.5.2. SR Document General Module

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Instance Number | 0020,0013 | 1 | Internal number which is incremented for each new SR document |
| Completion Flag | 0040,A491 | 1 | Define Term ”PARTIAL” used |
| Completion Flag Description | 0040,A492 | 3 | Not used |
| Verification Flag | 0040,A493 | 1 | Define Term ”UNVERIFIED” used |
| Content Date | 0008,0023 | 1 | Used |
| Content Time | 0008.0032 | 1 | Used |
| Verifying Observer Sequence | 0040,A073 | 1C | Not used |
| >Verifying Observer Name | 0040,A075 | 1 | |
| >Verifying Observer Identification Code Sequence | 0040,A088 | 2 | |
| >>Include ’Code Sequence Maco’ | | | |
| >Verifying Organization | 0040,A027 | 1 | |
| >Verifying DateTime | 0040,A030 | 1 | |
| Predecessor Documents Sequence | 0040,A360 | 1C | Not used |
| >Include ’SOP Instance Reference Macro’ | | | |
| Identical Documents Sequence | 0040,A525 | 1C | Not used |
| >Include ’SOP Instance Reference Macro’ | | | |
| Referenced Request Sequence | 0040,A370 | 1C | Filled if the exam is based on a Worklist entry |
| >Study Instance UID | 0020,000D | 1 | Taken from Study Instance UID in General Study Module |
| >Referenced Study Sequence | 0008,1110 | 2 | Taken from Worklist if MPPS is being used |
| >>Referenced SOP Class UID | 0008,1150 | 1 | Not used |
| >>Referenced SOP | 0008,1155 | 1 | Not used |

| | | | |
|---|---|---|---|
| Instance UID | | | |
| >Accession Number | 0008,0050 | 2 | Taken from Study Instance UID in General Study Module |
| >Placer Order Number/Imaging Service Request | 0040,2016 | 2 | Not used |
| >Filler Order Number/Imaging Service Reques2 | 0040,2017 | | Not used |
| >Requested Procdure ID | 0040,1001 | 2 | Taken from Worklist if present |
| >Requested Procdure Description | 0032,1060 | 2 | Taken from Worklist if present |
| >Requested Procdure Code Sequence | 0032,1064 | 2 | Taken from Worklist if present |
| >Include 'Code Sequence Macro' | | | |
| Current Requested Procedure Evidence Sequence | 0040,A375 | 1C | Not used |
| >Study Instance UID | 0020,000D | 1 | |
| >Referenced Series Sequenece | 0008,1115 | 1 | |
| >>Series Instance UID | 0020,000E | 1 | |
| >>Retrieve AE Titls | 0008,0054 | 3 | |
| >>Storage Media File-Set ID | 0088,0130 | 3 | |
| >>Storage Media File-Set UID | 0088,0140 | 3 | |
| >>Referenced SOP Sequence | 0008,1199 | 1 | |
| >>>References SOP Class UID | 0008,1150 | 1 | |
| >>>References SOP Instance UID | 0008,1155 | 1 | |
| Pertinent Other Evidence Sequence | 0040,A385 | 1C | |
| >Include 'SOP Instance Reference Macro' | | | |

Table SR Document General Module Attributes

### 7.5.3. SR Document Content Module

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Observation DateTime | 0040,A032 | 1C | Not used |
| Content Template Sequence | 0040,A504 | 1C | Not used |
| >Include ”Template Identification Macro’ | | | |
| Value Type | 0040,A040 | 1 | CONTAINER |
| Continuity of Content | 0040,A050 | 1C | SEPARATE |
| Concept Name Code Sequence | 0040,A043 | 1C | |
| >Include ”Code SequenceMacro’ | | | |
| Concept Value Attribute(s) | | | Not used for CONTAINER |
| Content Sequence | 0040,A730 | 1C | See Template ”OB–GYN Ultrasound Procedure Report” (TID 5000) |
| >Relationship Type | 0040,A010 | 1 | See Template ”OB–GYN Ultrasound Procedure Report” (TID 5000) |
| >Referenced Content Item Identifier | 0040,DB73 | 1C | Not used |
| >SR Document Content Module | | | See Template ”OB–GYN Ultrasound Procedure Report” (TID 5000) |

Table 6.5–3: SR Document Content Module Attributes

#### 7.5.3.1. SR Document Content Descriptions

##### 7.5.3.1.1. Content Template

The equipment supports the following root Templates for SR SOP Instances created, processed, or displayed by the equipment.

| SOP Class | Template ID | Template Name | Use |
|---|---|---|---|
| Comprehensive SR | 5000 | ”OB–GYN Ultrasound Procedure Report” | Create |

Table 6.5–4: SR Root Templates

# 8. COMMUNICATION PROFILES

## *8.1. SUPPORTED COMMUNICATION STACKS*

SISWeb_YASI_RIS_DICOM provides DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3.8.

### 8.1.1. TCP/IP Stack

SISWeb_YASI_RIS_DICOM inherits its TCP/IP stack from the base operating system upon which it executes.

### 8.1.2. Physical Media Support

SISWeb_YASI_RIS_DICOM is indifferent to the physical medium over which TCP/IP executes. Support for the physical network medium is provided by the underlying base operating system.

# 9. CONFIGURATION

SISWeb_YASI_RIS_DICOM Server (SWRDSRV), SISWeb_YASI_RIS_DICOM Key Image Storage Sever (SWRDKIS) and SISWeb_YASI_RIS_DICOM PPSManager SCP (SWRDPPS) can be configured for the TCP/IP port number on which it will listen for incoming TCP/IP connections.

SISWeb_YASI_RIS_DICOM Image Query/Retrieve Server (SWRDQRS) and SISWeb_YASI_RIS_DICOM PPSManager SCU (SWRDPPS) can be configured for the TCP/IP port number on which it will try to connect to a remote AE.

# 10. SUPPORT OF EXTENDED CHARACTER SETS

SISWeb_YASI_RIS_DICOM supports the ISO-IR 100 character set in addition to the default character repertoire.

# 11. CODES AND CONTROLLED TERMINOLOGY

All code sequences in the MWL response are configurable for the specific institution. The user is able to add and change these values using the SISWeb-RIS/YASI-RIS application. Thus the value for Coding Scheme Designator (0008,0102) is always ‘L’.

# 12. SECURITY PROFILES

The product does not conform to any defined DICOM Security Profiles.

It is assumed that the product is used within a secured environment. It is assumed that a secured envi-ronment includes at a minimum:

1. Firewall or router protections to ensure that only approved external hosts have network access to the product.

2. Firewall or router protections to ensure that the product only has network access to approved external hosts and services.

3. Any communications with external hosts and services outside the locally secured environment use appropriate secure network channels (such as a Virtual Private Network (VPN))