

DICOM Conformance Statement

DoseWise Portal R2.2.4



Issued by:

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Document Number: ICAP-PF.0033356
Date: 06-December-2017

1. DICOM Conformance Statement Overview

DoseWise Portal is a radiation dose management solution which simplifies the collection, analysis and interpretation of patient & staff radiation dose metrics and acquisition parameters across x-ray medical imaging devices. DoseWise Portal captures, tracks, alerts and reports on patient & staff radiation dose to support users in performing statistical analysis of imaging equipment radiation output & staff dose. This allows quantitative trends and statistics that users may use as input in planning and tracking dose management improvement activities. In addition DWP offers the capability to communicate data with PACS systems. This to support users to synchronize radiation exposure data for planning and tracking of dose management improvement activities.

Table 1: Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)	Viewable
Name	UID			
Other				
Verification SOP Class	1.2.840.10008.1.1	No	Yes	No
Transfer				
Digital Mammography X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes	No
Digital Mammography X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes	No
Digital X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes	No
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	No	Yes	No
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	No	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes	No
Workflow Management				
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	No	Yes	No

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3. Introduction

3.1. Revision History

Table 2: Revision History

Document Version	Date of Issue	Status	Description
00	06-December-2017	Authorized	Final Version

3.2. Audience

This Conformance Statement is intended for:

- (Potential) customers
- System integrators of medical equipment
- Marketing staff interested in system functionality
- Software designers implementing DICOM interfaces

It is assumed that the reader is familiar with the DICOM standard.

3.3. Remarks

The DICOM Conformance Statement is contained in chapter 4 through 8 and follows the contents and structuring requirements of DICOM PS 3.2. This DICOM Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

- **Interoperability**
Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.
It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.
- **Validation**
Philips equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.
Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.
- **New versions of the DICOM Standard**
The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery. The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

3.4. Definitions, Terms and Abbreviations

Table 3: Definitions, Terms and Abbreviations

Abbreviation/Term	Explanation
AE	Application Entity
ANSI	American National Standard Institute
DCA	Data Collector Agent
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DIMSE-Composite
DIMSE-N	DIMSE-Normalized
DWP	DoseWise Portal
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
IHE	Integrating the Healthcare Enterprise
ILE	Implicit VR Little Endian
IOD	Information Object Definition
ISO	International Organization for Standards
MG	Mammography (X-ray)
NEMA	National Electrical Manufacturers Association
PACS	Picture Archiving and Communication System
PDU	Protocol Data Unit
RDSR	Radiation Dose Structured Report
RWA	Real-World Activity
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier
VR	Value Representation

3.5. References

[DICOM] Digital Imaging and Communications in Medicine, Parts 1 - 20 (NEMA PS 3.1- PS 3.20),
 National Electrical Manufacturers Association (NEMA)
 Publication Sales 1300 N. 17th Street, Suite 1752 Rosslyn, Virginia. 22209, United States of America
 Internet: <http://medical.nema.org/>

4. Networking

4.1. Implementation model

The implementation model consists of three sections:

- The application data flow diagram, specifying the relationship between the Application Entities and the "external world" or Real-World Activities.
- A functional description of each Application Entity, and
- The sequencing constraints among them.

4.1.1. Application Data Flow

The DoseWise Portal (DWP) implements one network application entity: the DWP.

The following figure shows the networking application data flow as a functional overview of the application entity with Real-World Activities.

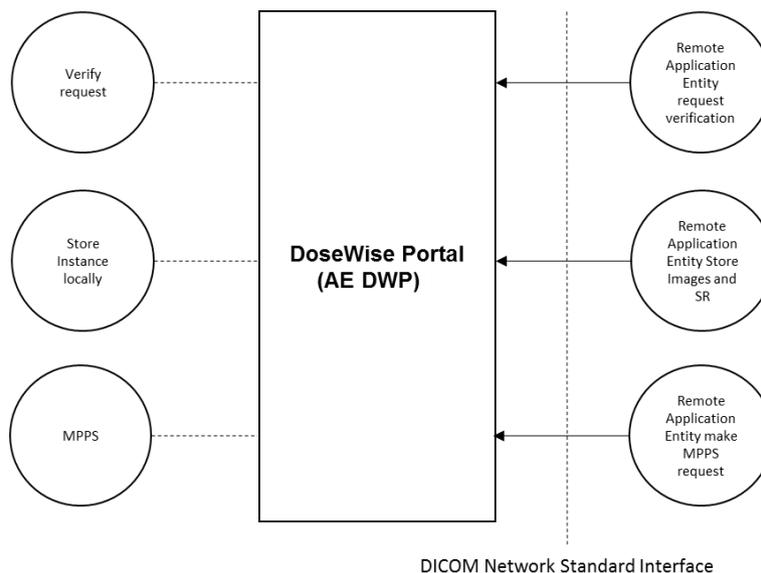


Figure 1: Application Data Flow Diagram

4.1.2. Functional Definition of AE's

This section contains a functional definition for each individual local Application Entity.

4.1.2.1. Functional Definition of DWP

DWP AE incorporates the following functionality:

- The DWP AE can verify application level communication by using the Verification service as SCP.
- The DWP AE can store images by using the Storage service as SCP.
- The DWP AE can store RDSR and Enhanced SR by using the Storage service as SCP.
- The DWP AE receive MPPS N-CREATE and MPPS N-SET messages using MPPS service as SCP.

4.1.3. Sequencing of Real World Activities

This section contains a description of specific sequencing as well as potential constraints of Real-World Activities, including any applicable user interactions, as performed by DWP AE.

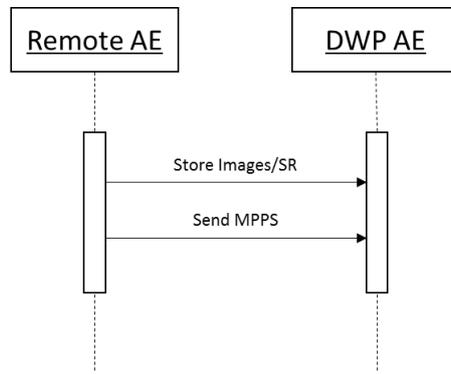


Figure 2: RWA Sequencing for Store Images.

4.2. AE Specifications

This section in the DICOM Conformance Statement is a set of Application Entity specifications.

4.2.1. DWP AE

4.2.1.1. SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes.

Table 4: SOP Classes for DWP

SOP Class		User of Service (SCU)	Provider of Service (SCP)	Display
Name	UID			
Transfer				
Verification SOP Class	1.2.840.10008.1.1	No	Yes	No
Digital Mammography X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes	No
Digital Mammography X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes	No
Digital X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes	No
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	No	Yes	No
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	No	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes	No
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	No	Yes	No

Note:

- The Application Entity (Modalities and PPS manager) can be configured with DWP SCP to communicate with one or more than one of the following: DICOM Images, SR objects or MPPS messages.
- Any SOP specific behavior is documented later in the applicable SOP specific conformance section of the conformance statement.

4.2.1.2. Association Policies

Each AE specification contains a description of the general association establishment and acceptance policies of the AE.

4.2.1.2.1. General

The DICOM standard application context is specified below.

Table 5: DICOM Application Context

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2. Number of Associations

The number of simultaneous associations that an Application Entity may support as an Initiator or Acceptor is specified here.

Table 6: Number of associations as an Association Acceptor for this AE

Description	Value
Maximum number of simultaneous associations	See the note below

Note:-the maximum number of simultaneous associations is set by integrator at the sites.

4.2.1.2.3. Implementation Identifying Information

The value supplied for Implementation Class UID and version name are documented here.

Table 7: DICOM Implementation Class and Version for DWP

Implementation Class UID	1.3.46.670589.60.1.2.2
Implementation Version Name	PHILIPSDCA224

4.2.1.2.4. Communication Failure Handling

The behavior of the AE during communication failure is summarized in the next table.

Table 8: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	The association setup fails; the reason is logged and reported to the user.

4.2.1.3. Association Acceptance Policy

The DWP accepts associations for the following purposes:

- To allow remote applications to verify application level communication.
- To allow remote applications to send images/SR to DWP.
- To allow remote application to send MPPS messages to DWP.

The DWP rejects association requests from unknown applications, i.e. applications that offer an unknown "calling AE title". An application is known if and only if it is defined per configuration of the DWP system. The DWP also rejects association requests from applications that do not address the DWP, i.e. that offer a wrong "called AE title". The DWP AE title is defined during configuration of DWP.

The Application Entity may reject Association attempts as shown in the table below.

Table 9: Association Reject Reasons

Result	Source	Reason/Diagnosis	Behavior
1 - rejected permanent	1 - DICOM UL service-user	1 - no-reason-given	Association is not established due to any problem other than that specified for DWP SCP in the rows below. (Example: Problem while decoding the DICOM stream).
		2 - application-context-name-not-supported	An application context name other than 1.2.840.10008.3.1.1.1 is requested by the SCU during association.
		3 - calling-AE-title-not-recognized	The configuration does not contain a repository having the Calling AE Title as per the association request; There is a problem in configuration (related to composing the configuration from the SCU and the SCP configuration).

Result	Source	Reason/Diagnosis	Behavior
2 - rejected-transient	2 - DICOM UL service provider (ACSE related function)	7 - called-AE-title-not-recognized	The called AE Title in the association request does not match the AE Title as per the configuration.
		1 - no-reason-given	Not used.
	3 - DICOM UL service provider (Presentation related function)	2 - protocol-version-not-supported	Not used.
		1 - temporary-congestion	Not used.
	1 - DICOM UL service-user	2 - local-limit-exceeded	Not used.
		1 - no-reason-given	Not used.
2 - rejected-transient	2 - DICOM UL service provider (ACSE related function)	2 - application-context-name-not-supported	Not used.
		3 - calling-AE-title-not-recognized	Not used.
	3 - DICOM UL service provider (Presentation related function)	7 - called-AE-title-not-recognized	Not used.
		1 - no-reason-given	Maximum number of associations is exceeded and an association request is received.
	2 - DICOM UL service provider (ACSE related function)	2 - protocol-version-not-supported	Not used.
		1 - temporary-congestion	Not used.
3 - DICOM UL service provider (Presentation related function)	2 - local-limit-exceeded	Not used.	

The behavior of the AE for sending an Association abort is summarized in next table.

Table 10: Association Abort Policies

Source	Reason/Diagnosis	Behavior when received	Sent when
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	When received, the DWP terminates the connection with the following log: Association ABORTED by peer 0: ABORT_SOURCE_dul_user, 0: ABORT_REASON_not_specified).	Association times out due to inactivity; Any other problem than ones specified for DWP SCP in the rows below. (Examples: Problem while decoding the DICOM stream, Invalid request, Echo/Find/Move/N-Action SCP was unable to send the Response to SCU, Error writing to SCU stream).
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	When received, the DWP terminates the connection with the following log: Association ABORTED by peer 2: ABORT_SOURCE_dul_provider, 0: ABORT_REASON_not_specified	Import fails (Import SCP Performer returns fail status)
	1 - unrecognized-PDU	When received, the DWP terminates the connection with the following log: Association ABORTED by peer 2: ABORT_SOURCE_dul_provider, 1: ABORT_REASON_unrecognized_pdu	An unrecognized PDU type is received ⁴ .
	2 - unexpected-PDU	When received, the DWP terminates the connection with the following log: Association ABORTED by peer 2: ABORT_SOURCE_dul_provider, 2: ABORT_REASON_unexpected_pdu	The received PDU type is not expected in the current state of connection ⁵ .
	4 - unrecognized-PDU parameter	When received, the DWP terminates the connection with the following log: Association ABORTED by peer 2: ABORT_SOURCE_dul_provider, 4: ABORT_REASON_unrecognized_pdu_parameter	An unrecognized Associate PDU item is received ¹ .

Source	Reason/Diagnosis	Behavior when received	Sent when
	5 - unexpected-PDU parameter	When received, the DWP terminates the connection with the following log: Association ABORTED by peer 2: ABORT_SOURCE_dul_provider, 5: ABORT_REASON_unexpected_pdu_parameter	One of the Associate PDU items is received more than once ² ; One of the Associate PDU items is received unexpectedly ² .
	6 - invalid-PDU-parameter value	When received, the DWP terminates the connection with the following log: Association ABORTED by peer 2: ABORT_SOURCE_dul_provider, 6: ABORT_REASON_invalid_pdu_parameter	One of the Associate PDU items is received more than once ³ ; One of the Associate PDU items is not received ³ ; Empty Called AE Title String (space-only) is received; Empty Calling AE Title String (space-only) is received; Unknown abstract syntax is received; The length or the format of the received PDU item is invalid.

Notes:

1. Associate PDU items that are recognized:

- 0x10 APPLICATION CONTEXT
- 0x20 PRESENTATION CONTEXT (RQ)
- 0x21 PRESENTATION CONTEXT (AC)
- 0x30 ABSTRACT SYNTAX
- 0x40 TRANSFER SYNTAX
- 0x50 USER INFO
- 0x51 MAXIMUM LENGTH
- 0x52 IMPLEMENTATION CLASS UID
- 0x54 SCP/SCU ROLE SELECTION
- 0x55 IMPLEMENTATION VERSION NAME

2. Associate PDU items for Unexpected-PDU parameter Received more than once:

- 0x10 APPLICATION CONTEXT (SCU, SCP)
- 0x30 ABSTRACT SYNTAX (SCU, SCP)
- 0x40 TRANSFER SYNTAX (SCU)

Received unexpectedly:

- 0x20 PRESENTATION CONTEXT (RQ) (SCU)

3. Associate PDU items for Invalid-PDU parameter value:

Received more than once (SCU, SCP):

- 0x50 USER INFO
- 0x51 MAXIMUM LENGTH
- 0x52 IMPLEMENTATION CLASS UID
- 0x55 IMPLEMENTATION VERSION NAME

Received illegally:

- 0x21 PRESENTATION CONTEXT (AC) (SCP)

PDU items not received:

- 0x10 APPLICATION CONTEXT (SCU, SCP)
- 0x20 PRESENTATION CONTEXT (RQ) (SCP)
- 0x21 PRESENTATION CONTEXT (AC) (SCU)
- 0x50 USER INFO (SCU, SCP)
- 0x30 ABSTRACT SYNTAX (SCU)
- 0x40 TRANSFER SYNTAX (SCU)
- 0x51 MAXIMUM LENGTH (SCU, SCP)
- 0x52 IMPLEMENTATION CLASS UID (SCU)

4. PDU types that are recognized:

- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF

- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
- 0x07 A-ABORT

5. Expected PDU's for following states:

STATE_IDLE:

- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP

STATE_ASSOCIATED:

- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x06 A-RELEASE-RP

STATE_ASSOCIATING (SCU):

- 0x01 A-ASSOCIATE-RQ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP

STATE_RELEASING:

- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ

STATE_WAIT_FOR_ASSOCIATE (SCP):

- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
- 0x07 A-ABORT

STATE_WAIT_FOR_FINISH:

- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP

STATE_WAIT_FOR_DISCONNECT:

- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ

STATE_TIMED_OUT:

- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
- 0x07 A-ABORT

Table 11: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Confirmation	Confirm the verification request.

4.2.1.3.1. (Real-World) Activity – Verification as SCP

4.2.1.3.1.1. Description and Sequencing of Activities

The DWP AE accepts Associations from configured systems that wish to verify application level communication using the C-ECHO command.

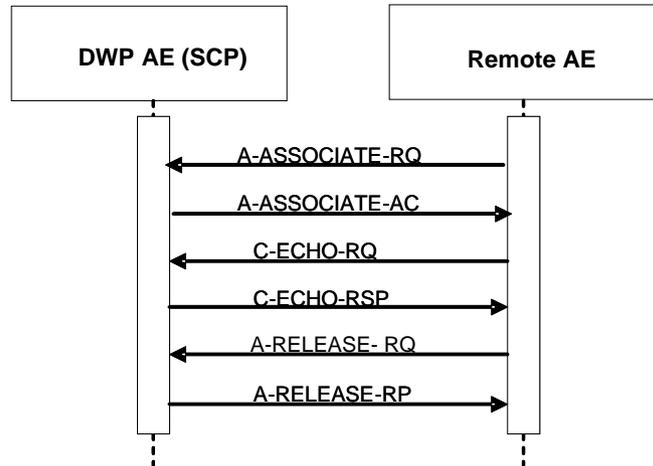


Figure 3: Data Flow Diagram Verification as SCP

4.2.1.3.1.2. Accepted Presentation Contexts

The presentation contexts are defined in the table 12.

Table 12: Acceptable Presentation Contexts for (Real-World) Activity – Verification as SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification SOP Class	1.2.840.10008.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

The DWP accepts all contexts in the intersection of the proposed and acceptable Presentation Contexts. This means that multiple proposed presentation contexts with the same SOP class but different transfer syntaxes are accepted by the DWP as far as those transfer syntaxes are part of the acceptable transfer syntaxes. There is no check for duplicate contexts and these are therefore accepted.

4.2.1.3.2. (Real World) Activity- Modality Performed Procedure Step as SCP

4.2.1.3.2.1. Description and Sequencing of Activities

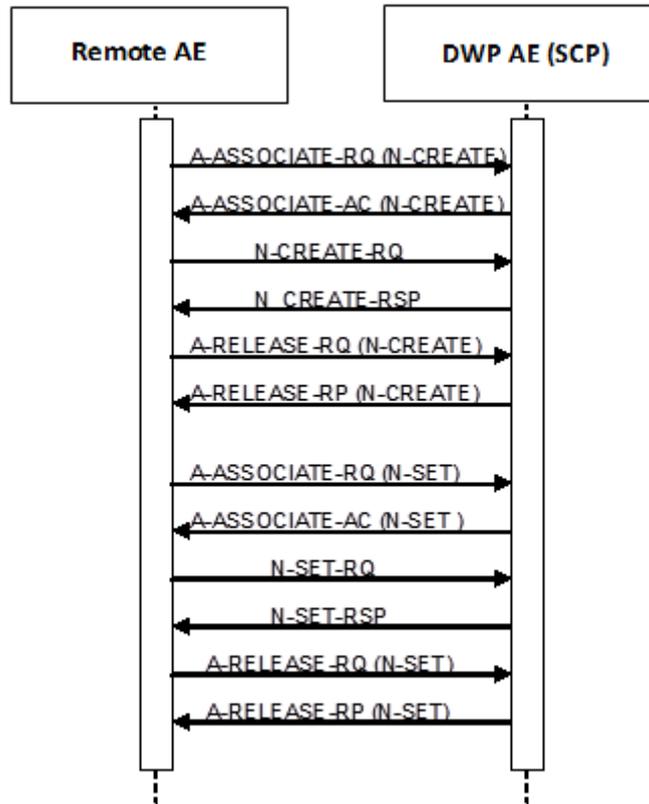


Figure 4 (Real World) Activity - Modality Performed Procedure Step as SCP

Radiology X-ray modalities sends MPPS messages to PPS manager and PPS manager can be configured to forward all the incoming MPPS messages using DICOM standard to DWP. DWP will then receive and process the MPPS messages from PPS manager to retrieve the dose information.

4.2.1.3.2.2. Accepted Presentation Contexts

The presentation contexts are defined in the next table.

Table 13: Proposed Presentation Contexts for (Real-World) Activity – Modality Performed Procedure Step As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

Note:

- Total DLP in DWP viewer will be displayed only when the private tag (00E1, 1021) is present in the MPPS files from CT modalities.

4.2.1.3.2.3. Activity – Receive N-CREATE Request

4.2.1.3.2.3.1.1. Description and Sequencing of Activities

When an N-CREATE request is received, in the local database the performance status of the procedure is created with the data from the message. An initial validation is performed internally for the presence of mandatory attributes in the message and for ensuring the absence of certain attributes as mentioned in the DICOM standards.

4.2.1.3.2.3.1.2. Extended Negotiation

No extended negotiation is performed.

4.2.1.3.2.3.1.3. SOP Specific Conformance

4.2.1.3.2.3.1.4. SOP Specific Conformance to N-CREATE SOP Classes

Below is the only attribute that DWP check for the presence, further validation of Attributes and use of the values will be dependent on the client system needs. This shall be taken care by the client.

Table 14: SUPPORTED ATTRIBUTES FOR THE MPPS-SCP

Attribute Name	Tag	VR	Comment
Affected SOP Class UID	0000,0002	UI	This command and dataset will be passed to client for further validation.

4.2.1.3.2.3.1.5. Presentation Context Acceptance Criterion

MPPS-SCP will always accept any Presentation Context for the supported SOP Classes with the supported Transfer Syntaxes. More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

4.2.1.3.2.3.1.6. Transfer Syntax Selection Policies

MPPS-SCP will always select the first Transfer Syntax proposed by the client that is supported by the SCP, per Presentation Context.

MPPS-SCP will accept duplicate Presentation Contexts; that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts, applying the same method for selecting a Transfer Syntax for each.

4.2.1.3.2.3.1.7. Response Status

MPPS-SCP will behave as described in next table when constructing the N-CREATE response command message.

Table 15 : RESPONSE STATUS FOR MPPS-SCP AND RECEIVE N-CREATE REQUEST

Service Status	Further Meaning	Status Codes	Behavior
Success	Processing Success	0000	N-CREATE message received successfully
Failure	Processing failure	0110	N-CREATE message transfer failed

4.2.1.3.2.4. Activity – Receive N-SET Request

4.2.1.3.2.4.1.1. Description and Sequencing of Activities

When an N-SET request is received, the local database is updated with the performed procedure step information from the message. An initial validation is performed internally for the presence of mandatory attributes in the message and for ensuring the absence of certain attributes as mentioned in the DICOM standards.

4.2.1.3.2.4.1.2. Extended Negotiation

No extended negotiation is performed.

4.2.1.3.2.4.1.3. SOP Specific Conformance

4.2.1.3.2.4.1.4. SOP Specific Conformance to N-SET SOP Classes

MPPS-SCP doesn't provide complete standard conformance to the supported Modality Performed Procedure Step SOP. Below is the only attribute that DWP check for the presence, further validation of Attributes and use of the values will be dependent on the client system needs. This shall be taken care by the client.

Table 16: SUPPORTED ATTRIBUTES FOR THE MPPS-SCP

Attribute Name	Tag	VR	Comment
Requested Sop Class UID	0000,0003	UI	The attributes list is not checked. The command and dataset will be passed to client for validation.
Requested Sop Instance UID	0000,1001	UI	The attributes list is not checked. The command and dataset will be passed to client for validation.

4.2.1.3.2.4.1.5. Presentation Context Acceptance Criterion

MPPS-SCP will always accept any Presentation Context for the supported SOP Classes with the supported Transfer Syntaxes. More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

4.2.1.3.2.4.1.6. Transfer Syntax Selection Policies

MPPS-SCP will always select the first Transfer Syntax proposed by the client that is supported by the SCP, per Presentation Context.

MPPS-SCP will accept duplicate Presentation Contexts; that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts, applying the same method for selecting a Transfer Syntax for each.

4.2.1.3.2.4.1.7. Response Status

MPPS-SCP will behave as described in next table when constructing the N-SET response command message.

Table 17 : RESPONSE STATUS FOR MPPS-SCP AND RECEIVE N-SET REQUEST

Service Status	Further Meaning	Status Codes	Behavior
Failure	Processing failure	0110	N-SET message transfer failed
Failure	No Such SOP Instance	0112	N-SET message transfer failed
Success	Processing Success	0000	N- SET message received successfully

4.2.1.3.3. (Real-World) Activity – Image Import

4.2.1.3.3.1. Description and Sequencing of Activities

The DWP accepts associations from configured systems that wish to store images in the DWP database using the C-STORE command.

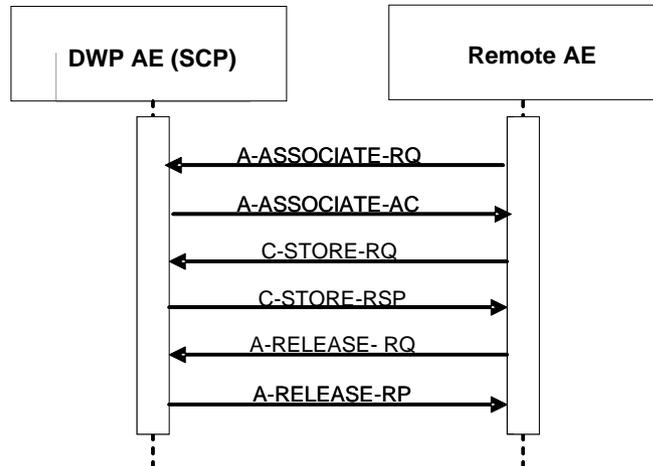


Figure 5: Data Flow Diagram Image Import.

4.2.1.3.3.2. Accepted Presentation Contexts

The presentation contexts are defined in the next table.

Table 18: Acceptable Presentation Contexts for (Real-World) Activity – Image Import

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Digital Mammography X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
Digital Mammography X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
Digital X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

Note:

- The DWP support the DICOM communication of Secondary Capture created from other system as well, but can only read the dose information from CT Secondary Capture images.
- Total DLP in DWP viewer will be displayed only when the private tag (00E1, 1021) is present in the SC images acquired from CT modalities.

4.2.1.3.3.3. SOP Specific Conformance for Storage SOP Classes

DWP receives the incoming DICOM messages from configured DICOM systems and store it in the local buffer.

4.2.1.3.3.3.1.1. Dataset Specific Conformance for C-STORE-RSP

Details regarding the Dataset Specific response behavior will be reported in this section.

This includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 19: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful command	Successful completion of the store request.
Failure	A700	Refused: out of resources	Not enough resources available to do a store.
	C000	Error: cannot understand	Any other exception generated during the store.

4.3. Network Interfaces

4.3.1. Physical Network Interfaces

The System provides only DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3.8 of the standard.

TCP/IP is the only protocol stack supported.

Supported physical medium include:

IEEE 802.3-1995, 10BASE-T

IEEE 802.3-1995, 100BASE-TX (Fast Ethernet)

IEEE 802.3, 1000BASE-X (Fiber Optic Gigabit Ethernet).

4.3.2. Additional Protocols

No additional protocols are used.

4.4. Configuration

Not applicable.

4.4.1. AE Title/Presentation Address Mapping

An important installation issue is the translation from AE title to presentation address. How this is to be performed is described here.

4.4.1.1. Local AE Titles

The Field Service User Interface only allows one AE to be configured.

The following AE specific information must be available to configure a local AE:

- AE title.
- Hostname or IP address (or both).
- Port number.

4.4.1.2. Remote AE Title/Presentation Address Mapping

One or more remote AEs may be configured.

The following AE specific information must be available to configure a remote AE:

- AE title.
- Hostname or IP address (or both).
- Port number.

4.4.2. Parameters

The specification of important operational parameters, their default value and description are specified here.

Table 20: Configuration Parameters Table

Parameter	Type	Description	Default Value
id	GUID		
Maximum PDU receive size	int	Maximum PDU size	0
hospitalId	GUID	Hospital unique ID	Configured manually during installation process
hospitalSecretKey	string	DICOM message encryption key for hospital	Is generated by installer
anonymizationEnabled	bool	Enable anonymization mechanism	false
maxFailedSendAttempts	int	Number of attempts to send	3
filterCtlImages	bool	Block CT image processing	false
blockDuplicates	bool	Block duplicate DICOM processing	true
scp/enabled	bool	Enable SCP service	true
scp/localAeTitle	string	AE Title for SCP mechanism	DWP_SCP
scp/localPort	int	TCP port for communication	1044
scp/queryInterval	time	Time interval for message queue checking mechanism to send data to the local / remote storage	1 Second
scp/batchSize	int	DICOM send batch	10
statistics/synchronizationInterval	time	Time interval to send statistics information to the DoseWise Portal	30 Seconds
storage/type	string	'Web' or 'FileSystem'	Web
storage/filesystem/path	string	Path for Local Storage folder	Configured manually during installation process
storage/web/path	string	Path to DoseWise Portal	https://localhost/dwp/
relay/localAETitle	string	Calling AE Title	DWP_SCU
relay/remoteAETitle	string	Called AE Title	DWP_SCU
relay/remoteHost	string	Endpoint IP address	127.0.0.1
relay/remotePort	int	Endpoint TCP port	104
relay/enabled	bool	Enable endpoint	false

5. Media Interchange

DWP does not have the Media Interchange capability.

6. Transformation of DICOM to CDA

DWP does not have the transformation of DICOM to CDA capability.

7. Support of Character Sets

Any support for character sets in Network and Media services is described here.

Table 21: Supported DICOM Character Sets

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Latin alphabet No. 1	ISO_IR 100	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 100	G1	Supplementary set of ISO 8859

When an unsupported character set is received it shall be tried and decoded according the preferred character set. Unsupported characters shall be displayed as “?”.

8. Security

8.1. Security Profiles

It is not supported in this release.

8.1.1. Security use Profiles

Not applicable

8.1.2. Security Transport Connection Profiles

Not applicable

8.1.3. Digital Signature Profiles

Not applicable

8.1.4. Media Storage Security Profiles

Not applicable

8.1.5. Attribute Confidentiality Profiles

Not applicable

8.1.6. Network Address Management Profiles

Not applicable

8.1.7. Time Synchronization Profiles

Not applicable

8.1.8. Application Configuration Management Profiles

Not applicable

8.1.9. Audit Trail Profiles

Not applicable

8.2. Association Level Security

Not applicable

8.3. Application Level Security

Not applicable

9. Annexes

9.1. IOD Contents

9.1.1. Created SOP Instance

DWP only receives DICOM IODs and it does not create any DICOM IODs.

9.1.2. Usage of Attributes from Received IOD

The DWP only accepts all valid DICOM IODs specified in this document. It is implicit that the receive IODs has the dose information necessary for DWP application.

9.1.3. Attribute Mapping

Not applicable.

9.1.4. Coerced/Modified fields

Not applicable.

9.2. Data Dictionary of Private Attributes

Not applicable.

9.3. Coded Terminology and Templates

DWP does not implement any specific support for coded terminology and templates.

9.3.1. Context Groups

Not applicable.

9.3.2. Template Specifications

Not applicable.

9.3.3. Private code definitions

Not applicable.

9.4. Grayscale Image consistency

Not applicable.

9.5. Standard Extended/Specialized/Private SOPs

Not Applicable.

9.6. Private Transfer Syntaxes

Not Applicable.