



Print-in

DICOM Conformance Statement

Product Version: **1.04**
Revision: **1.1**
Date: **November 2010**

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1. Conformance Statement Overview

Print-in is a Windows XP/Vista/Seven application that convert any printable document into DICOM Part 10 compliant files and sends them or prints them to remote equipment using the DICOM protocol.

Print-in for PRI is a simplified application derived from Print-in, used to integrate printable documents into imaging studies for printing through PRI software program.

Print-in implements the necessary services to:

- Supports the Echo (Verification) service as SCU
- Supports Image Storage as SCU
- Support Basic Printing Service as SCU
- Supports Modality Worklist Service as SCU
- Support Query and Retrieve Service as SCU

This document is intended to describe Print-in's conformance to DICOM.

Table 1-1: Network Services for Print-in

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Communication		
Verification (ECHO)	Yes*	No
Transfer		
Secondary Capture Image Storage	Yes*	No
Secondary Capture Multi-Frame Storage (Grayscale Byte)	Yes	No
Secondary Capture Multi-Frame Storage (Grayscale Word)	Yes	No
Secondary Capture Multi-Frame Storage (True Color)	Yes	No
Encapsulated PDF Storage	Yes	No
Query/Retrieve		
Study Root Query & Retrieve (C-FIND)	Yes	No
Workflow Management		
Modality Worklist (C-FIND)	Yes*	No
Print Management		
Basic Grayscale Print Management	Yes	No
Basic Color Print Management	Yes	No

* Network Services used by Print-in for PRI application

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3. Introduction

3.1 Revision History

Document Version	Date	Author	Description
1.0	12/05/2009	Nicolas Le Meur	Creation
1.1	04/11/2010	Nicolas Le Meur	Update

3.2 Audience

This document is intended for:

- Potential users
- System integrators of medical equipment
- Software designers implementing DICOM interfaces

It is assumed that the reader has a working understanding of DICOM.

Experience and familiarity with DICOM Conformance Statements is helpful but not required.

3.3 Remarks

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication between Print-in and other DICOM systems. The Conformance Statement should be read and understood in conjunction with the DICOM Standard (DICOM). However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

- The comparison of different Conformance Statements is the first step towards assessing interconnectivity between Print-in and other DICOM conformant equipment.
- Test procedures should be defined to validate the desired level of connectivity.
- The DICOM standard will evolve to meet the users' future requirements. ETIAM is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue its delivery.

3.4 Definitions, Terms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard.

Abbreviations and terms are as follows:

AE	Application Entity
AET	Application Entity Title
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DICOM Message Service Element-Composite
DIMSE-N	DICOM Message Service Element-Normalized
HIS/RIS	Hospital Information System / Radiology Information System.
IOD	Information Object Definition
ISO	International Standard Organization
NEMA	National Electrical Manufacturers Association
PACS	Picture Archiving and Communication System
PDU	Protocol Data Unit
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier

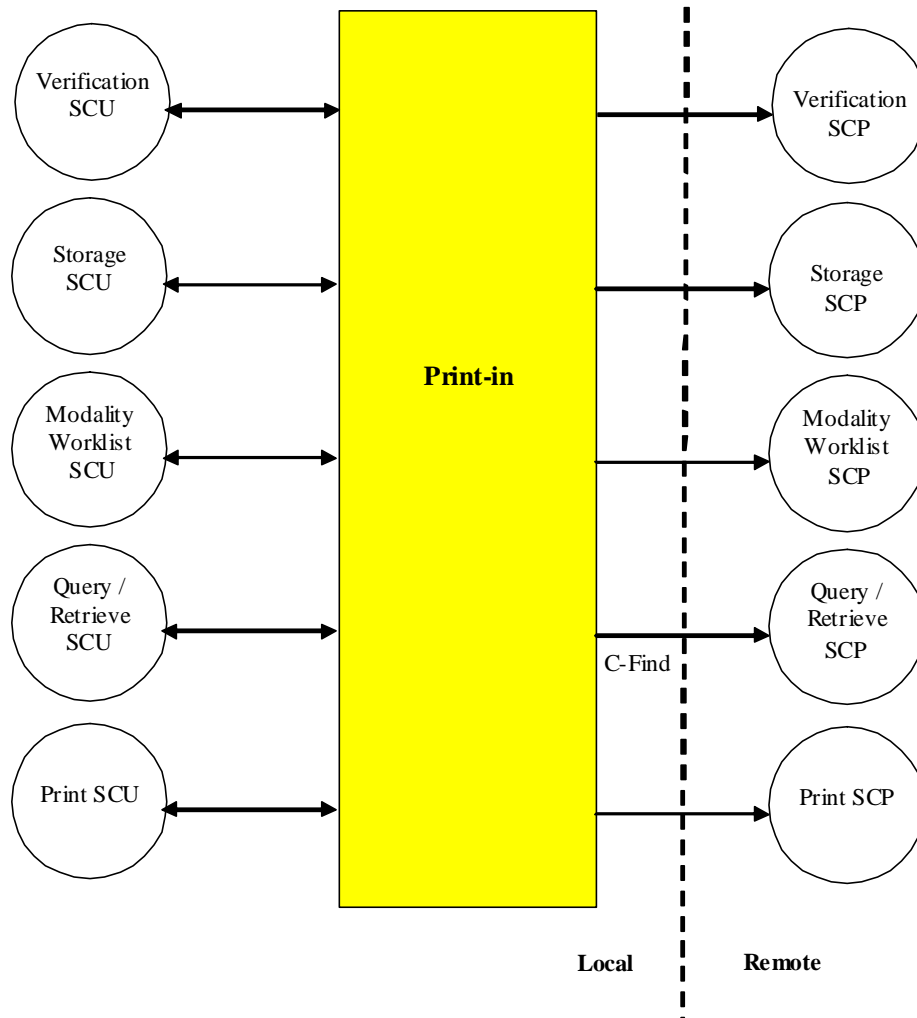
4. Networking

4.1 Implementation Model

Each installed Print-in-in acts as a single Application Entity, maintaining at most one association per connected remote DICOM SCP.

4.1.1 Application Data flow

Figure 4.1.1-1: Application Data Flow



After installing the Print-in, the software administrator will use Print-in settings window to declare the DICOM peers that Print-in will communicate with. These peers may include a DICOM Worklist provider, a DICOM Printer and PACS (DICOM Store and Query & Retrieve). At installation or whenever a problem occurs, the network communication between Print-in and other DICOM peers can be checked within the Verification service from the Print-in.

In order to create a new series with the document, the user may send a request to a Worklist Provider in order to get the medical information, use a Query & Retrieve provider (C_FIND request only) or possibly enter it manually.

Once ready, the new DICOM series can be sent to a remote DICOM peer that offers DICOM Store service as SCP such as a PACS, or sent to a DICOM printer.

4.1.2 Functional Definitions of Application Entities

As a SCU, Print-in connects to other DICOM applications

4.1.2.1 Verification Service as SCU

On user demand, Print-in can initiate an association with Presentation Contexts for the Verification service SOP class. It will send a C-ECHO request to another DICOM application and wait for a response to complete the verification.

4.1.2.2 Basic Modality Worklist Management Service as SCU

Print-in uses the Basic Worklist Management service to get required information to build its DICOM datasets.

It establishes one association with the remote Worklist SCP, performs a Find request, waits for responses, and then releases the association.

4.1.2.3 Query & Retrieve Service as SCU

Print-in uses the Query and Retrieve service to get required information to build its DICOM datasets.

It establishes one association with the remote Query and Retrieve SCP, performs a Find request, waits for responses, and then releases the association. It does not and cannot be used to request any move operation.

4.1.2.4 Image Storage Service as SCU

To store images, Print-in establishes an association with a remote Storage SCP, negotiates its presentation contexts, and sends the images according to their related Image Storage SOP Class. It then releases the association.

4.1.2.5 Basic Printing Service as SCU

Print-in establishes an association with a remote Print SCP, gets printer information, create a film session, film boxes, fills in images boxes, and asks for printing. It then releases the association.

4.1.3 Sequencing of Real-Word Activities

Real-World Activity for Verification operation is independent of other operations.

Real-World Activity for Storage operation is independent of other operations.

Real-World Activity for Printing operation is independent of other operations.

Real-World Activity for Basic Worklist Management query is independent of other operations.

Real-World Activity for Query and Retrieve operation is independent of other operations.

4.2 Application Entity Specifications

4.2.1 SOP Classes

The Print-in AE provides Standard Conformance to the following DICOM V3.0 SOP Classes:

Table 4.2.1-1: SOP Classes for Print-in AE

SOP Class Name	SOP Class UID	SCU	SCP
Supported SOP Classes for Verification SCU			
Verification	1.2.840.10008.1.1	Yes	No
Supported SOP Classes for Storage SCU			
Secondary Capture Image Storage [SCI]	1.2.840.10008.5.1.4.1.1.7	Yes	No
Secondary Capture Multi-Frame Storage (Grayscale Bit) [SCMF]	1.2.840.10008.5.1.4.1.1.7.1	Yes	No
Secondary Capture Multi-Frame Storage (Grayscale Byte) [SCMF]	1.2.840.10008.5.1.4.1.1.7.2	Yes	No
Secondary Capture Multi-Frame Storage (Grayscale Word) [SCMF]	1.2.840.10008.5.1.4.1.1.7.3	Yes	No
Secondary Capture Multi-Frame Storage (True Color) [SCMF]	1.2.840.10008.5.1.4.1.1.7.4	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	No
Supported SOP Class For Modality Worklist SCU			
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Yes	No
Supported SOP Class For Query and Retrieve SCU			

SOP Class Name	SOP Class UID	SCU	SCP
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Supported Meta SOP Class for Basic Print SCU			
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9	Yes	No
Basic Color Print Management	1.2.840.10008.5.1.1.18	Yes	No
Supported Meta SOP Class for Basic Grayscale Print SCU			
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Supported Meta SOP Class for Basic Color Print SCU			
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Yes	No
Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No

4.2.2 Association Policies

4.2.2.1 General

Before any SOP classes can be exchanged between Print-in (SCU) and a SCP Application Entity, an association stage takes place to negotiate and exchange the capabilities of the SCU and SCP.

Only Print-in shall release an association. Print-in or SCP may however abort the association.

The calling AE Title of Print-in is configurable in its user interface.

Print-in contains the following limitations for PDU size:

Minimum PDU size	8,192 bytes
Maximum PDU size	16,384 bytes

4.2.2.2 Number of Associations

Table 4.2.2.2-1: Number of Associations as an Association Initiator SCU for Print-in AE

Maximum number of simultaneous Associations	1
---	---

4.2.2.3 Asynchronous Nature

Print-in does not support asynchronous communication.

4.2.2.4 Implementation Identifying Information

The implementation information for the Application Entity is:

Table 4.2.2.4-1: DICOM Implementation Class and Version for Print-in AE

Implementation class UID	1.2.250.1.59.3.0.3.5.3
Implementation version name	ETIAM_DCMTK_353

4.2.2.5 Association Initiation Policy

Print-in AE initiates an association for implementing the following services as SCUs:

- Verification
- Basic Worklist Management
- Query and Retrieve
- Storage
- Basic Print Management

4.2.2.6 Association Acceptance Policy

Print-in will not accept any associations when acting as a SCU only for the following services:

- Verification
- Basic Worklist Management
- Query and Retrieve

4.2.2.7 Storage

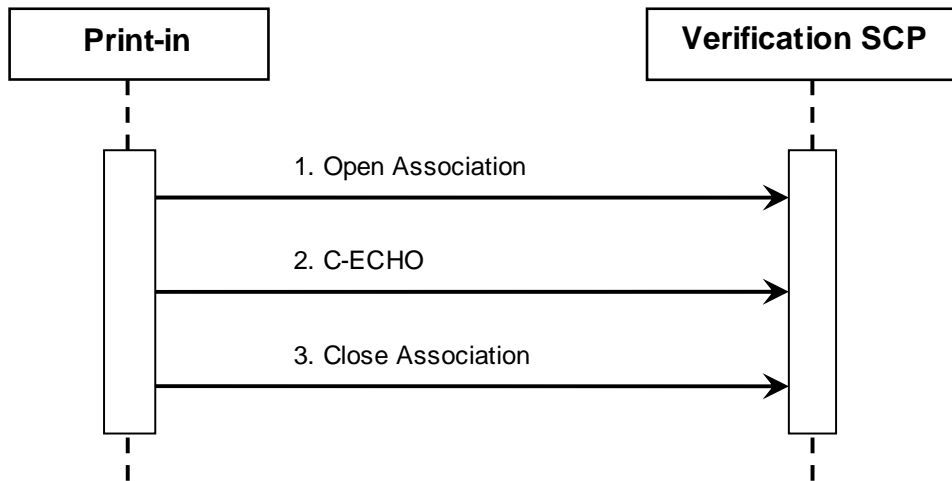
- Basic Print Management.

4.2.2.7.1 Activity – Verification SCU

4.2.2.7.1.1 Description and Sequencing of Activities

Print-in will initiate an association with a Verification SCP within the Configuration panel to check SCP availability. Association is then opened, negotiated and closed synchronously.

Figure 4.2.2.7.1.1-1: Sequencing of Activity – Verification



4.2.2.7.1.2 Proposed Presentation Contexts

Table 4.2.2.7.1.1-1: Proposed Presentation Contexts for Print-in AE and Verification Activity

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

4.2.2.7.1.3 SOP Specific Conformance to the Verification SOP Class

Print-in provides standard conformance to the DICOM Verification Service Class as a SCU. The status code for the C-ECHO is shown in the following table:

Table 4.2.2.7.1.3-1: C-ECHO Response Status Handling Behaviour

Code	Status	Meaning
0000	Success	The C-ECHO request is accepted.

Table 4.2.2.7.1.3-2: C-ECHO Communication Failure Behaviour

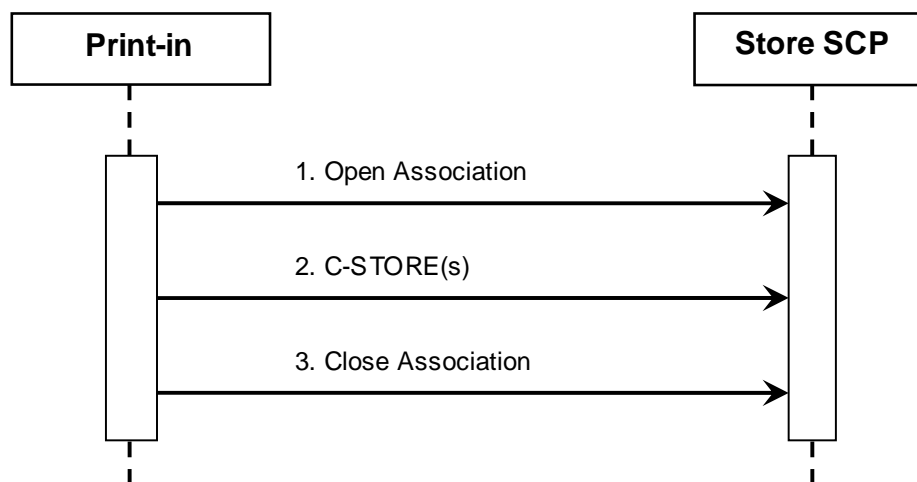
Exception	Behaviour
Timeout	The Association is aborted using A-ABORT.

4.2.2.7.2 Activity – Storage SCU

4.2.2.7.2.1 Description and Sequencing of Activities

Print-in will initiate an association with a Storage SCP to store all images. All images will be stored on an association.

Figure 4.2.2.7.2.1-1: Sequencing of Activity – Storage



4.2.2.7.2.2 Proposed Presentation Contexts

Table 4.2.2.7.2.2-1: Proposed Presentation Contexts for Print-in AE and Storage Activity

Presentation Context Table				
Abstract Syntax	Transfer Syntax		Role	Extended Negotiation
See note below	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
	JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCU	None
	JPEG Extended (Process 2 & 4): Default Transfer Syntax for Lossy JPEG 12 Bit Image Compression	1.2.840.10008.1.2.4.51	SCU	None
	JPEG Lossless, Non-Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCU	None

Note: Transfer syntaxes referenced in the above table applies to a very large number of Storage Abstract Syntax. The abstract syntaxes names and UIDs are listed in Table 4.2.1-1.

Print-in applies the following rules for its proposed presentation contexts;

- All uncompressed transfer syntaxes are proposed for Storage operations.
- If an image is encoded, its corresponding native transfer syntax is proposed also, and will be preferred by SCU if both compressed and uncompressed transfer syntaxes are accepted by SCP;
- If SCP does not accept encoded transfer syntaxes, Print-in will uncompress the related images on the fly.

4.2.2.7.3 Activity – Print SCU

4.2.2.7.3.1 Description and Sequencing of Activities

Print-in will initiate a separate association with a Print SCP for each print session.

After an association has been accepted and is established, Print-in will send a print job to the Print Server. Each print job includes the following steps:

- Print-in first performs a N-GET request to get Printer information.
- Print-in requests the server to a N-CREATE a film session SOP instance.

For each film to be printed:

- a N-CREATE request is performed to get a Film Box SOP instance
- N-SET requests are made to change some film box instance attributes and to fill image boxes with image pixel data.
- if no print collation is needed, an N-ACTION is requested for the Film Box instance. This causes the film to be printed.
- If print collation is requested, an N-ACTION is performed on the film session.

4.2.2.7.3.2 Proposed Presentation Contexts

Table 4.2.2.7.3.2-1: Proposed Presentation Contexts for Print-in AE and Verification Activity

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

4.2.2.7.3.3 SOP Specific Conformance to the Print SOP Class

If the DICOM Print software is unable to open an association with the selected destination AE, an error message displays in Print-in. No message is displayed when successful printing operation responses are received.

4.2.2.7.3.3.1 Basic Film Session SOP Class

Print-in can send the following DIMSE commands:

- N-CREATE
- N-SET
- N-ACTION

➤ **N-CREATE** is issued by Print-in to create a Film Session where film boxes will be created.

Attribute Name	Tag ID	Value / Comment
Number of copies	(2000, 0010)	Default is 1

☛ **N-SET** is issued by Print-in to change Film Session attributes.

Attribute Name	Tag ID	Value / Comment
Number of copies	(2000, 0010)	Default is 1
Print Priority	(2000, 0020)	HIGH, MED, LOW. Default is MED
Medium Type	(2000, 0030)	PAPER, BLUE FILM, CLEAR FILM, empty string
Film Destination	(2000, 0040)	PROCESSOR or MAGAZINE. Not set if default.
Film Session Label	(2000, 0050)	Default is Print-in

☛ **N-ACTION** is issued by Print-in to request printing of all Film Boxes in the Film Session.

4.2.2.7.3.3.2 Basic Film Box SOP Class

Print-in can send the following DIMSE commands:

- N-CREATE
- N-SET
- N-ACTION

☛ **N-CREATE** is issued by Print-in to create a Film Box in a Film Session.

Attribute Name	Tag ID	Value / Comment
Image Display Format	(2010, 0010)	STANDARD
Film Orientation	(2010, 0030)	PORTRAIT or LANDSCAPE. Not set if default.

☛ **N-SET** is issued Print-in to change Film Box attributes.

Attribute Name	Tag ID	Value / Comment
Image Display Format	(2010, 0010)	STANDARD
Film Orientation	(2010, 0030)	PORTRAIT or LANDSCAPE. Not set if default.
Film Size ID	(2010, 0060)	8INX10IN, 10INX12IN, 10INX14IN, 11INX14IN, , 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM, A4 or A3. Not set if default.
Magnification Type	(2010, 0060)	REPLICATE, BILINEAR or CUBIC Not set if default.
Smoothing Type	(2010, 0080)	Not set if default.
Border Density	(2010, 0100)	Not set if default
Empty Image Density	(2010, 0110)	Not set if default
Min Density	(2010, 0120)	Not set if default
Max Density	(2010, 0130)	Not set if default
Trim	(2010, 0140)	Not set if default
Referenced Film Session Sequence	(2010, 0500)	
>Referenced SOP Class UID	(0008, 1150)	
>Referenced SOP Instance UID	(0008, 1155)	

☛ **N-ACTION** is issued by Print-in to request printing.

4.2.2.7.3.3.3 Basic Grayscale Image Box SOP Class

Basic Grayscale Image Box instances are created at the time the Basic Film Box SOP instance is created (N-CREATE). The Basic Image Box contains the presentation parameters and image pixel data that applies to a single image of a film sheet.

Print-in can send the following DIMSE command:

N-SET

☛ **N-SET** is issued by Print-in to set Image Box attributes.

Attribute Name	Tag ID	Value / Comment
Image Position	(2020, 0010)	1 to <number of images in film box>
Polarity	(2020, 0020)	NORMAL or REVERSE. Not set if default.
Basic Grayscale Image Sequence	(2020, 0110)	
>Samples Per Pixel	(0028, 0002)	3
>Photometric Interpretation	(0028, 0004)	MONOCHROME2
>Rows	(0028, 0010)	
>Columns	(0028, 0011)	
>Pixel Aspect Ratio	(0028, 0034)	1\1
>Bits Allocated	(0028, 0100)	8 or 16
>Bits Stored	(0028, 0101)	8 or 12
>High Bit	(0028, 0102)	7 or 11
>Pixel Representation	(0028, 0103)	0
>Pixel Data	(7FE0, 0010)	

4.2.2.7.3.3.4 Basic Color Image Box SOP Class

Basic Color Image Box instances are created at the time the Basic Film Box SOP instance is created (N-CREATE). The Basic Image Box contains the presentation parameters and image pixel data that apply to a single image of a film page.

Print-in can send the following DIMSE command:

N-SET

➤ **N-SET** is issued by Print-in to set Image Box attributes.

Attribute Name	Tag ID	Value / Comment
Image Position	(2020, 0010)	1 to <number of images in film box>
Polarity	(2020, 0020)	NORMAL or REVERSE. Not set if default.
Basic Color Image Sequence	(2020, 0110)	
>Samples Per Pixel	(0028, 0002)	3
>Photometric Interpretation	(0028, 0004)	RGB
>Planar Configuration	(0028, 0006)	0
>Rows	(0028, 0010)	
>Columns	(0028, 0011)	
>Pixel Aspect Ratio	(0028, 0034)	1\1
>Bits Allocated	(0028, 0100)	8
>Bits Stored	(0028, 0101)	8
>High Bit	(0028, 0102)	7
>Pixel Representation	(0028, 0103)	0
>Pixel Data	(7FE0, 0010)	

4.2.2.7.3.3.5 Basic Printer SOP Class

Print-in can send the following DIMSE command:

N-GET

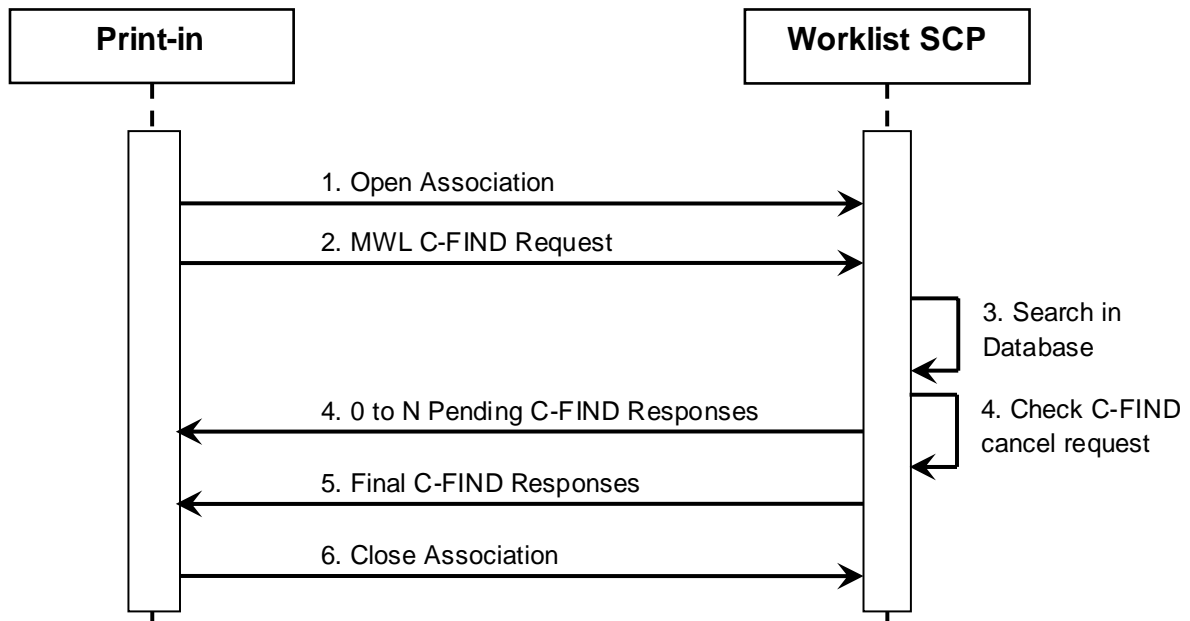
☛ **N-GET** is issued by Print-in to get Printer information. However, this information is not used.

4.2.2.7.4 Activity – Worklist Management SCU

4.2.2.7.4.1 Description and Sequencing of Activities

Print-in will initiate a separate association for each Find request.

Figure 4.2.2.7.4.1-1: Sequencing of Activity – Storage



4.2.2.7.4.2 Proposed Presentation Contexts

Table 4.2.2.7.4.2-1: Proposed Presentation Contexts for Print-in AE and Worklist Management Activity

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Information Model	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

4.2.2.7.4.3 SOP Specific Conformance to the Worklist Management SOP Class

Print-in provides standard conformance to the DICOM Basic Worklist Management Service Class. Print-in requests the following matching key types:

Table 4.2.2.7.4.3-1: Modality Worklist Matching Key Type

Key Type Matching	
SV	Single Value matching
WC	Wild Card matching
RM	Range matching
	No matching Returns value when available

Table 4.2.2.7.4.3-2: Modality Worklist Supported Attributes

Module	Attribute Name	Tag	Match
	Specific Character Set	(0008,0005)	
Scheduled Procedure Step	Scheduled Procedure Step Sequence	(0040,0100)	
	> Scheduled Station AETitle	(0040,0001)	SV
	> Scheduled Procedure Step Start Date	(0040,0002)	RM
	> Scheduled Procedure Step Start Time	(0040,0003)	
	> Modality	(0008,0060)	SV
	> Scheduled Performing Physician's Name	(0040,0006)	SV / WC
	> Scheduled Procedure Step Description	(0040,0070)	
	> Scheduled Protocol Code Sequence	(0040,0008)	
	>> Code Value	(0008,0100)	
	>> Coding Scheme Designator	(0008,0102)	
	>> Coding Scheme Version	(0008,0103)	
	>> Code Meaning	(0008,0104)	
	> Scheduled Station Name	(0040,0010)	
	> Scheduled Procedure Step Location	(0040,0011)	
	> Pre Medication	(0040,0012)	
> Scheduled Procedure Step ID	(0040,0009)		
> Requested Contrast Agent	(0032,1070)		
Requested Procedure	Requested Procedure ID	(0040,1001)	
	Requesting Service	(0032,1033)	
	Requested Procedure Description	(0032,1060)	
	Requested Procedure Code Sequence	(0032,1064)	
	> Code Value	(0008,0100)	
	> Coding Scheme Designator	(0008,0102)	
	> Coding Scheme Version	(0008,0103)	
	> Code Meaning	(0008,0104)	
	Study Instance UID	(0020,000D)	
	Requested Procedure Priority	(0040,1003)	
Patient Transport Arrangements	(0040,1004)		
Imaging Service Request	Accession Number	(0008,0050)	SV
	Requesting Physician	(0032,1032)	
	Referring Physician's Name	(0008,0090)	
Visit Identification	Admission ID	(0038,0010)	

Module	Attribute Name	Tag	Match
	IssuerOfAdmissionID	(0038,0011)	
Visit Status	Current Patient Location	(0038,0300)	
Patient Identification	Patient's Name	(0010,0010)	SV / WC
	Patient ID	(0010,0020)	SV / WC
Patient Demographic	Patient's Birth Date	(0010,0030)	RM
	Patient's Sex	(0010,0040)	SV
	Patient's Size	(0010,1020)	
	Patient's Weight	(0010,1030)	
Patient Medical	Patient State	(0038,0500)	
	Medical Alerts	(0010,2000)	
	Contrast Allergies	(0010,2110)	
	Special Needs	(0038,0050)	

Note: Print-in for PRI application uses the DICOM Worklist SCU service to query for pending print jobs that are waiting for a report. Print-in for PRI can only query PRI software program. Some attributes are specified in queries to ensure that Print-in for PRI can interact with PRI only.

4.2.2.7.5 Activity – Query and Retrieve SCU

4.2.2.7.5.1 Description and Sequencing of Activities

The associated Real-World Activity for Print-in Query and Retrieve SCU is to get patient and possibly study items that will be presented to the user to populate its images attributes. Thus, only C_FIND requests are performed.

4.2.2.7.5.2 Proposed Presentation Contexts

Table 4.2.2.7.5.2-1: Proposed Presentation Contexts for Print-in AE and Query and Retrieve Activity

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Find	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

4.2.2.7.5.3 SOP Specific Conformance to the Query and Retrieve SOP Class

Print-in provides standard conformance to the DICOM Query and Retrieve Service Class. Print-in requests the following matching key types:

Key Type Matching	
SV	Single Value matching
WC	Wild Card matching
RM	Range matching

Table 4.2.2.7.5.3-1: Query and Retrieve matching key types

Attribute Name	Tag	Match
Study Date	(0008,0020)	RM
Accession number	(0008,0050)	SV
Patient's Name	(0010,0010)	SV
Patient ID	(0010,0020)	SV/WC

Print-in will query for the following attributes:

Table 4.2.2.7.5.3-1: Query Attributes

Attribute Name	Tag
PatientName	(0010,0010)
PatientID	(0010,0020)
PatientBirthDate	(0010,0030)
PatientSex	(0010,0020)
StudyInstanceUID	(0020,000D)
Study Date	(0008,0020)
Study Time	(0008, 0030)
Accession Number	(0008,0050)
Referring PhysiciansName	(0008,0050)
Study Description	(0008,1030)
StudyID	(0020,0010)
SeriesInstanceUID	(0020,000E)
Modality	(0008,0060)
SeriesNumber	(0020,0011)
SOPInstanceUID	(0008,0018)

4.3 Network Interfaces

4.3.1 Physical Network Interface

Print-in provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

Print-in inherits its TCP/IP stack from the Windows system where it runs. Default Windows TCP/IP stack is supported.

4.3.2 Additional Protocols

None.

4.4 Configuration

Print-in configuration is detailed in *Print-in Administrator's Guide*.

4.4.1 AE Titles / Presentation Address Mapping

AE Titles, host names and port numbers for remote applications are configured using the **Connectivity** tab of the Print-in settings panel. Multiple Worklists, Query and Retrieve, Print and Store SCPs can be defined.

4.4.2 Parameters

Print-in configurable parameters can be defined in the **Connectivity** and **Workstation** tab of the control panel. They are the following:

- AE Title: default is PRINTIN_SystemID, with SystemID, a random number consisting of 4 digits.
- The UID root of the institution or distributor
- Debug and Verbose modes: to get or not detailed information about connections.

5. Support of Extended Character Sets

Print-in supports the "ISO_IR 100" Latin Alphabet No. 1 Extended Character Set, supplementary set.

6. Security

Print-in does not support any specific security measures.

It is assumed that Print-in is used within a secured environment, including:

- Router protections to ensure that only approved external hosts have network access to Print-in.
- Router protections to ensure that Print-in only has network access to approved external hosts and services
- Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels