



KONICA MINOLTA

PRINT MANAGEMENT SYSTEM

Printlink5-ID_IV

DICOM 3.0 Conformance Statement

CODE NO. 1118

Manufacturer:

KONICA MINOLTA MEDICAL & GRAPHIC, INC.

2970 Ishikawa-machi, Hachioji-shi Tokyo 192-8505 Japan

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INTRODUCTION

This document describes the compatibility of the DICOM interface for Print Management System Printlink5-IC with DICOM 3.0.

Abbreviations

AE	DICOM Application Entity
IOD	DICOM Information Object Definition
PDU	Protocol Data Unit
SCU	DICOM Service Class User (client using this DICOM service)
SCP	DICOM Service Class Provider (server providing this service)
SOP	Service/Object Pair
UID	Unique Identifier

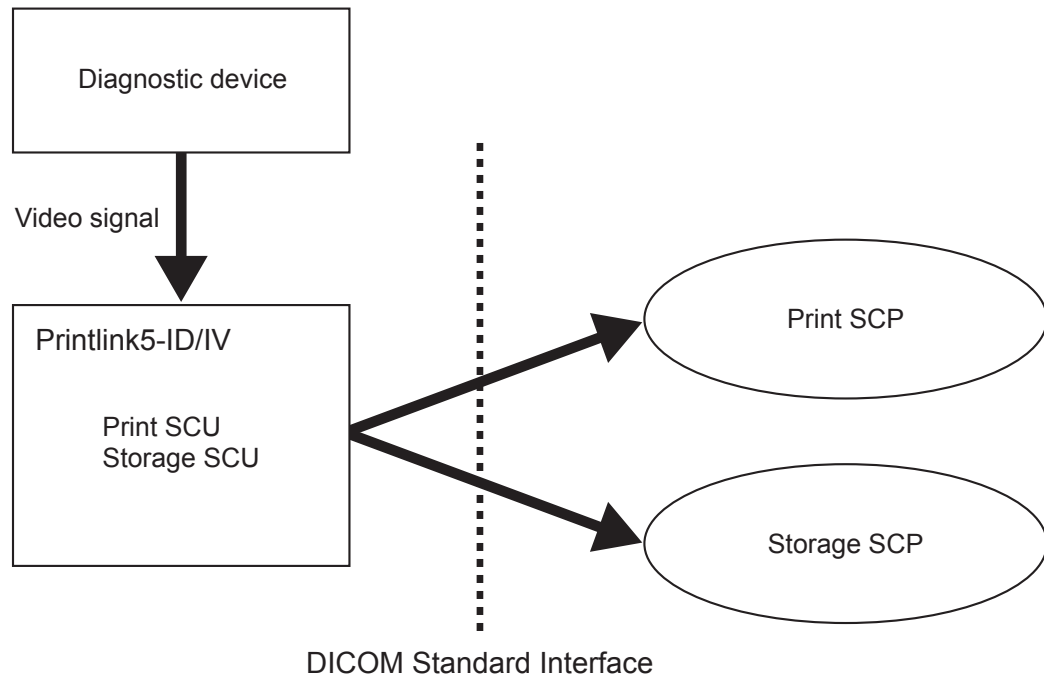
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1. IMPLEMENTATION MODEL

The DICOM interface for Print Management System Printlink5-ID/IV operates as a DICOM Print Service Class SCU and DICOM Storage Service Class SCU.

1.1 Application Data Flow Diagram



1.2 Functional Definitions of AEs

1.2.1 Print SCU

The Print Management Service Class SCU for Printlink5-ID/IV operates as a communication process and starts to send hard copies in response to an N-Create-RQ after a request to establish an association sent to an external AE is accepted.

1.2.2 Storage SCU

The Storage Service Class SCU for Printlink5-ID/IV starts to transfer images in response to a C-Store-RQ after a request to establish an association sent to an external AE is accepted.

1.3 Sequencing of Real World Activities

This model is not applicable to the Sequencing of Real-World Activities.

2. AE SPECIFICATION

2.1 Printlink5-ID/IV Print Management Service Class Specification

Printlink5-ID/IV sends print request associations and operates as an application entity.

Printlink5-ID/IV supports the following SOP classes.

Description	Value
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
Printer SOP Class	1.2.840.10008.5.1.1.16

2.1.1 Association Establishment Policies

This section describes the conditions for establishing associations.

2.1.1.1 General

Print Management SCU and SCP utilize the DICOM upper layer to establish associations.

In doing so, the imager (SCP) receives an association started by Printlink5-ID/IV (SCU).

The maximum PDU size used is 64KB.

2.1.1.2 Number of Associations

The number of associations that Printlink5-ID/IV supports at the same time is 1.

2.1.1.3 Asynchronous Nature

Printlink5-ID/IV manages asynchronous N-EVENT messages.

However, a message is sent whenever necessary.

2.1.1.4 Implementation Identification Information

The Implementation Class UIDs are as follows:

Description	Value
Implementation Class UID	Printlink5-IV 1.2.392.200036.9107.500.523 Printlink5-ID 1.2.392.200036.9107.500.522
Implementation Version Name	KC_PLNK5_X.XXXXX "X.XXXXX" indicates the software version. e.g. KC_PLINK5_1.00R00

2.1.2 Associations in Real World Activities

Printlink5-ID/IV (SCU) starts associations to publish messages.

2.1.3 Association Acceptance Policy

Printlink5-ID/IV (SCU) establishes associations in response to a request to establish asynchronous N-EVENT message associations from the laser imager (SCP).

2.1.3.1 Real World Activities

2.1.3.1.1 Associated Real World Activity

Image data and various parameters are sent to the laser imager in order to print image data on films.

2.1.3.1.2 Presentation Context Table

Printlink5-ID/IV (SCU) publishes presentation contexts listed in the following table.

Abstract Syntax		Role
Name	UID	
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	SCU
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	
Printer SOP Class	1.2.840.10008.5.1.1.16	

Extended negotiations can be conformed to as required.

The following transmission syntax is valid against the individual SOP classes mentioned above.

Name	UID
Implicit VR Little Endian	1.2.840.10008.1.2

2.1.3.1.2.1 Basic Film Session SOP Class

Tag	Name	VR	VM	Permitted Value
(2000, 0010)	Copies	IS	1	Copy Count 1 to 99
(2000, 0020)	Print Priority	CS	1	Print Priority <ul style="list-style-type: none"> • LOW • HIGH • MED
(2000, 0030)	Medium Type	CS	1	Medium Type <ul style="list-style-type: none"> • CLEAR FILM = Clear Base • BLUE FILM = Blue Base • DR CLEAR FILM = DR Clear Base • DR BLUE FILM = DR Blue Base
(2000, 0040)	Film Destination	CS	1	Film Destination <ul style="list-style-type: none"> • MAGAZINE • PROCESSOR • BIN_1 to BIN_6 = Sorters 1 to 6

Tag	Name	VR	VM	Permitted Value
(2000, 0060)	Memory Allocation	LO	1	Memory Allocation Set the required memory contents. Indicate in KB.

Tags other than those listed above will not be checked. Furthermore, this model will conform to non-conforming header data as required.

2.1.3.1.2.2 Basic Film Box SOP Class

Tag	Name	VR	VM	Permitted Value
(0010, 0010)	Patient's Name	PN	1	Patient Name
(0010, 0020)	Patient ID	LO	1	Patient ID
(2010, 0010)	Image Display Format	ST	1	STANDARD, R ROWR1, R2, ... SLIDE
(2010, 0030)	Annotation Display Format ID	CS	1	Annotation Display Format ID <ul style="list-style-type: none"> • P1 = PORTRAIT • L1 = LANDSCAPE • TM = TIME • CC = Copy Count • ID = Modality ID • MS = Message
(2010, 0040)	Film Orientation	CS	1	Film Orientation <ul style="list-style-type: none"> • PORTRAIT • LANDSCAPE
(2010, 0050)	Film Size ID	CS	1	Film Size 8IN x 10IN, 10IN x 12IN, 11IN x 14IN, 14IN x 14IN, and 14IN x 17IN
(2010, 0060)	Magnification Type	CS	1	Magnification Type <ul style="list-style-type: none"> • REPLICATE= Replicate interpolation • CUBIC= Cubic B-Spline interpolation
(2010, 0080)	Smoothing Type	CS	1	Smoothing Type ... 1 to 7
(2010, 0100)	Borders	CS	1	Border Density ... BLACK/WHITE
(2010, 0140)	Trim	US	1	Trim Frame ... YES = Used, NO = Not used
(2010, 0150)	Configuration Information	ST	1	Imager LUT (described as follows) KC_LUT=1 to 7

2.1.3.1.2.3 Basic Grayscale Image Box SOP Class

Tag	Name	VR	VM	Permitted Value
(0028, 0004)	Photometric Interpretation	CS	1	Photometric Interpretation <ul style="list-style-type: none"> • MONOCHROME1: Min. VOI pixel = White • MONOCHROME2: Min. VOI pixel = Black
(0028, 0010)	Rows	US	1	Pixels in image Y orientation
(0028, 0011)	Columns	US	1	Pixels in image X orientation

Tag	Name	VR	VM	Permitted Value
(0028, 0034)	Pixel Aspect Ratio	IS	2	Pixel Aspect Ratio
(0028, 0100)	Bits Allocated	US	1	Bits allocated in pixel. Non-used bits are included. <ul style="list-style-type: none"> • 0008 : 8 (8 bits) • 0010 : 16 (12 bits) Those other than the above result in an error.
(0028, 0101)	Bits Stored	US	1	Bits in 1 pixel <ul style="list-style-type: none"> • 0008 : 8 bits • 000C : 12 bits
(0028, 0102)	High Bit	US	1	High Bit Pixel data MBS (Most significant bit) <ul style="list-style-type: none"> • 0007 : (Bits Stored = 8) • 000B : (Bits Stored = 12)
(0028, 0103)	Pixel Representation	US	1	Pixel data representation <ul style="list-style-type: none"> • 0000 = Integer with no marks
(2020, 0010)	Image Position	US	1	Image Position Image position that structures a page.
(2020, 0020)	Polarity	CS	1	Polarity <ul style="list-style-type: none"> • NORMAL • REVERSE
(7fe0, 0010)	Pixel Data	OW OB	1	Pixel Data

2.1.3.1.2.4 Printer SOP Class

Tag	Name	VR	VM	Permitted Value
(0008, 1070)	Manufacture	LO	1	Manufacturer
(0008, 1090)	Manufacture's Model Name	LO	1	Manufacture's Model Name
(0008, 1000)	Device Serial Number	LO	1	Serial Number
(0008, 1020)	Software Version	LO	1	Software Version
(2110, 0010)	Printer Status	CS	1	Printer Status <ul style="list-style-type: none"> • NORMAL • WARNING • FAILURE
(2110, 0020)	Printer Status Information	CS	1	Printer Status Information
(2110, 0030)	Printer Name	LO	1	Printer Name

2.2 Printlink5-ID/IV Storage Service Class Specification

Printlink5-ID/IV supports the following SOP classes as a Storage Service Class SCU.

SOP Class Name	SOP Class UID
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7

2.2.1 Association Establishment Policies

2.2.1.1 General

Printlink5-ID/IV utilizes the Storage Service Class SCP and DICOM upper layer to establish associations.

The Storage Service Class SCP receives the associations started each time SC images are stored.

The maximum PDU size used is 64KB.

2.2.1.2 Number of Associations

A request to establish a single association is generated.

2.2.1.3 Asynchronous Nature

One or more images are managed in an association.

Asynchronous processing is not supported.

2.2.1.4 Implementation Identification Information

The Implementation Class UIDs are as follows:

Description	Value
Implementation Class UID	Printlink5-IV 1.2.392.200036.9107.500.523 Printlink5-ID 1.2.392.200036.9107.500.522
Implementation Version Name	KC_PLNK5_X.XXXXX "X.XXXXX" indicates the software version. e.g. KC_PLINK5_1.00R00

2.2.2 Relationships among Associations in Real World Activities

Associations are established in response to an association establishment request to the Storage Service Class SCP.

2.2.2.1 Associated Real World Activity

The Storage SCU for Printlink5-ID/IV sends a C-STORE request to the Remote Storage SCP and sends image data in a real world where associations are established.

2.2.2.2 Proposed Presentation Context

Printlink5-ID/IV accepts the following presentation context as a Storage Service Class SCU.

Presentation Context Table			
Abstract Syntax Name			
Name	UID	Role	Expansion Negotiation
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	SCU	None

Transfer Syntax Name	
Name	UID
Implicit VR Little Endian	1.2.840.10008.1.2

2.2.3 SOP Class

2.2.3.1 SC Image Storage SOP Class

Printlink5-ID/IV provides adaptability to the SC Image Storage SOP Class.

2.2.3.2 C-STORE

Printlink5-ID/IV utilizes C-STORE to request the Storage Service Class SOP to store image data.

2.2.3.3 Behavior of SCU

Printlink5-ID/IV executes the C-STORE DIMSE service of the SOP instance appropriate for the request from the SC Image IOD.

Printlink5-ID/IV recognizes the C-STORE response status and takes proper actions against normal/abnormal service termination.

2.2.3.4 Behavior of SCP

The Storage Service Class SOP acts the same as the DIMSE service user for the C-STORE service. By ensuring normal operation of this service, the Storage Service Class SOP indicates that the SOP instance has been recognized successfully.

2.2.3.5 SC Image IOD

List of SC Image IOD

IE	Module	Usage
Patient	Patient	M
Study	General Study	M
	Patient Study	U
Series	General Series	M
Equipment	General Equipment	U
	SC Equipment	M
Image	General Image	M
	Image Pixel	M
	SC Image	M
	Overlay Plane	U
	Modality LUT	U
	VOILUT	U
	SOP Common	M

Options for SC Image IOD are "Overlay Surface", "Modality LUT", and "VOI LUT".

However, they are sent whenever necessary.

List of SC Image IOD details

((M) in the Digit column means the maximum length.)

Tag	Item Length	VR	VM	Digit	Type
ID Information					
0008 0000	Group Length	UL	1	4	1
0008 0005	Specific Character Set	CS	2	16(M)	1C
0008 0008	Image Type	CS	2	16(M)	3
0008 0016	SOP Class UID	UI	1	64(M)	1
0008 0018	SOP Instance UID	DA	1	64(M)	1
0008 0020	Study Date	DA	1	10	2
0008 0021	Series Date	DA	1	10	3
0008 0023	Image Date	TM	1	10	2C
0008 0030	Study Time	TM	1	16(M)	2
0008 0031	Series Time	TM	1	16(M)	3
0008 0033	Image Time	CS	1	16(M)	2C
0008 0060	Modality	CS	1	16(M)	1
0008 0064	Conversion Type	CS	1	16(M)	3
0008 0070	Manufacture	LO	1	64(M)	2
0008 0080	Institution Name	LO	1	64(M)	3
0008 0081	Institution Address	ST	1	1024(M)	3

Tag	Item Length	VR	VM	Digit	Type
Patient Information					
0010 0000	Group Length	UL	1	4	1
0010 0010	Patient's Name	PN	1	64(M)	2
0010 0020	Patient ID	LO	1	64(M)	2
Acquisition Information					
0018 0000	Group Length	UL	1	4	1
0018 1010	Secondary Capture Device ID	CS	1	16(M)	3
0018 1012	Date of Secondary Capture	DA	1	10	3
0018 1014	Time of Secondary Capture	TM	1	16(M)	3
0018 1016	Secondary Capture Device Manufacture	LO	1	64(M)	3
0018 1018	Secondary Capture Device Manufacture's Model Name	LO	1	64(M)	3
0018 1019	Secondary Capture Device Software Version	LO	1-n	64(M)	3
Related Information					
0020 0000	Group Length	UL	1	4	1
0020 000D	Study Instance UID	UI	1	64(M)	1
0020 000E	Series Instance UID	UI	1	64(M)	1
0020 0013	Image Number	IS	1	12(M)	2
Image Display Information					
0028 0000	Group Length	UL	1	4	1
0028 0002	Samples per Pixel	US	1	2	1
0028 0004	photometric Interpretation	CS	1	16(M)	1
0028 0010	Rows	US	1	2	1
0028 0011	Columns	US	1	2	1
0028 0100	Bits Allocated	US	1	2	1
0028 0101	Bits Stored	US	1	2	1
0028 0102	High Bit	US	1	2	1
0028 0103	Pixel Representation	US	1	2	1
0028 3010	VOI LUT Sequence	SQ	1	2	1C
>0028 3002	LUT Descriptor	US	3	2	1C
>0028 3003	LUT Explanation	LO	1	64(M)	3
>0028 3006	LUT Data	US	4096	2	1C
Image Pixel Information					
7FE0 0000	Group Length	UL	1	4	1
7FE0 0010	Pixel Data	OW	1	65536(M)	1

3. COMMUNICATION PROFILES

3.1 Supported Communication Stack

DICOM TCP/IP Network Communication Support defined in DICOM PS3.8 is provided.

3.2 TCP/IP Stack

The TCP/IP stack is succeeded from the Windows XP system.

3.2.1 Support of Physical Media

The following physical media are supported as standard.

- 10 BaseT and 100baseTX

4. EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

The following attributes are reserved in the Basic Film Box SOP Class.

- (0010, 0010) Patient's Name
- (0010, 0020) Patient ID

The following attributes are reserved in the Basic Film Box SOP Class.

- (2011,0010)
- (2011,1011)
- (2011,1021)
- (2011,1030)
- (2011,1031)
- (2011,1040)
- (2011,1050)
- (2011,1060)
- (2011,1070)
- (2011,1080)
- (2011,1090)

The following attributes are reserved in the Printer SOP Class.

- (2011,0010)
- (2011,10A0)
- (2011,10A1)
- (2011,10B0)
- (2011,10B1)
- (2011,10B2)
- (2011,10C0)
- (2011,10C1)
- (2011,10D0)
- (2011,10D1)
- (2011,10E0)
- (2011,10F0)

The following attributes are reserved in SC Image IOD.

- (2010 0010)
- (2010 0040)
- (2010 0050)
- (2010 0060)
- (2010 0080)
- (2010 0100)
- (2010 0110)
- (2010 0140)
- (2010 0150)
- (2011 0010)
- (2011 1011)
- (2011 1021)
- (2011 1040)
- (2011 1080)
- (2020 0010)
- (2020 0020)

5. CONFIGURATIONS

5.1 AE Title / Presentation Address Mapping

The conformance from a Printlink5-ID/IV AE title to a presentation address is performed by making indications to a configuration file.

5.2 Configurable Parameters

The following items are specified in the environment information file.

- AE title
- Printlink5-ID/IV AE name (KC_PLINK5_SCU default)
- IP address
- TCP port numbers 100 to 9999 (for transmission)
- TCP port numbers 100 to 9999 (for N-EVENT reception)

6. SUPPORT OF EXTENDED CHARACTER SETS

For elements in which the VR is SH (short column), LO (long column), ST (short text), LT (long text), or PN (person's name), extended characters can be used by specifying an extended character repertoire in the attribute specific character group (0008,0005) for SC Image IOD.

The extended character repertoire uses ISO 2022 IR87, ISO 2022 IR13, or ISO 2022 IR87.



KONICA MINOLTA

1118YA220 A

Konica Minolta Medical Imaging U.S.A., Inc.
411 Newark Pompton Turnpike, Wayne, NJ 07470, U.S.A.
TEL. 973-633-1500

Konica Minolta Business Solutions (Canada) Ltd.
369 Britannia Road East, Mississauga, Ontario, L4Z 2H5, Canada
TEL. 905-890-6600

Konica Minolta Medical & Graphic Imaging Europe B.V.
Frankfurtstraat 40, 1175 RH Lijnden, The Netherlands
TEL. 31-20659-0260

KONICA MINOLTA MEDICAL & GRAPHIC (SHANGHAI) Co., LTD.
11F-C1 Junyao International Plaza, No.789 ZhaojiabangRoad, Shanghai, China Postcode 200032
TEL. 021-6422-2626

071217JD