

Digital Imaging and Communications in Medicine (DICOM)

Supplement 39: Add Stored Print Media Storage - Retire Normalized Print Media Storage

DICOM Standards Committee, Working Group 6

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VERSION: ~~sup39_ib.doc~~sup39_ft.doc

~~June 11, 1998 - Letter Ballot~~September 1, 1998 - Final Text

Foreword

In 1983, the American College of Radiology (ACR) and the National Electrical Manufacturers Association (NEMA) formed the ACR-NEMA Standards Committee which developed a standard for Digital Imaging and Communications in Medicine (DICOM). This committee, now called the DICOM Standards Committee, has expanded its membership to include many other bio-medical professional societies, vendor companies, standards developing organizations, and government agencies.

DICOM is developed in liaison with other standardization organizations including CEN TC251 in Europe and JIRA in Japan, with review also by other organizations including IEEE, HL7 and ANSI in the USA.

This document is a Supplement to the DICOM Standard. It is an extension to the published DICOM Standard which consists of the following parts:

- PS: 3.1 - Introduction and Overview
- PS: 3.2 - Conformance
- PS: 3.3 - Information Object Definitions
- PS: 3.4 - Service Class Specifications
- PS: 3.5 - Data Structures and Encoding
- PS: 3.6 - Data Dictionary
- PS: 3.7 - Message Exchange
- PS: 3.8 - Network Communication Support for Message Exchange
- PS: 3.9 - Point-to-Point Communication Support for Message Exchange
- PS: 3.10 - Media Storage and File Format
- PS: 3.11 - Media Storage Application Profiles
- PS: 3.12 - Media Format and Physical Media for Media Interchange
- PS: 3.13 - Print Management Point-to-Point Communication Support
- [PS: 3.14 - Grayscale Standard Display Function](#)

These parts are related but independent documents.

This Supplement includes the definition of Stored Print Media Storage.

Scope and Field of Application

The scope of this Supplement is to define services to store Stored Print Storage SOP Class to media to provide Media Interchange.

DICOM currently defines a mechanism to store print information for Media Interchange. However, it is based on the "Normalized" Basic Print model, not on the "Composite" model as defined in Supplement 24. The intent is to retire the "Normalized" media interchange model and replace it with the Composite Stored Print Storage SOP Class.

This supplement is simple as the mechanism to exchange composite information objects is already in DICOM (i.e. Standalone Overlays, Curves, etc). This supplement would be a simple addition to that design.

A new Media Profile will not be required as the General Purpose CD-R profile would support this interchange.

This Supplement covers the following objectives :

- Storage of Stored Print SOP Class to DICOM media.
- Treat the Stored Print SOP Class as any other composite object when performing storage to DICOM media.
- Retire Normalized Print Media Storage
- Retire Normalized Print Queue

This Supplement is defined to cover the following set of applications (non-exhaustive list) :

- Store of the Stored Print SOP Class on media.

Since this document proposes changes to existing Parts of DICOM the reader should have a working understanding of the Standard.

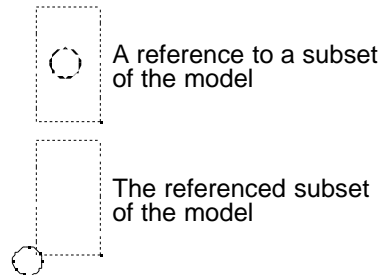
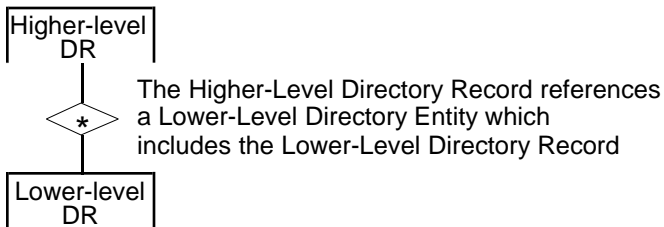
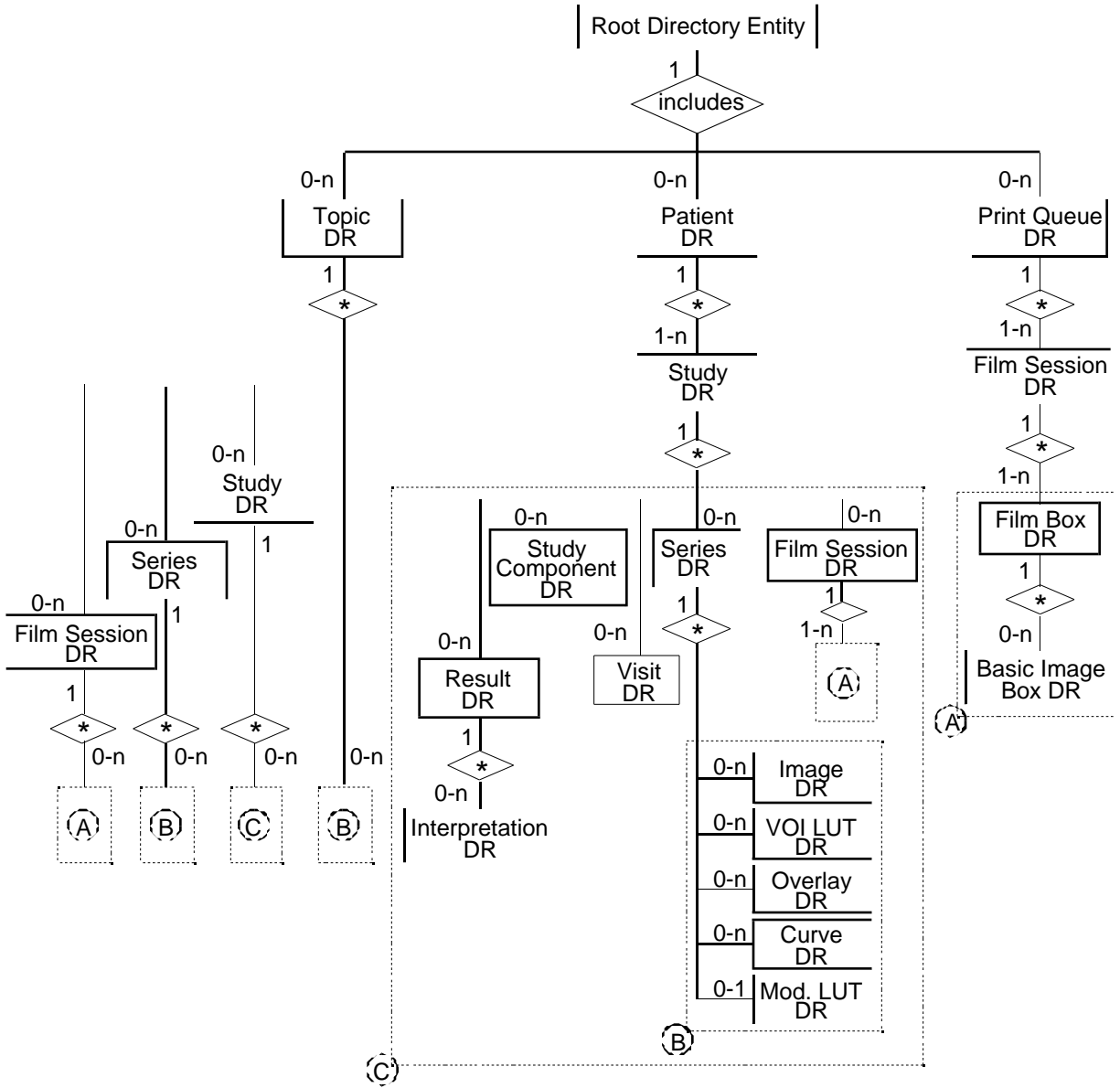
This Supplement includes a number of Addenda to existing Parts of DICOM :

- PS 3.3 Addendum : Basic Directory Information Object Definition
- PS 3.4 Addendum : Service Class Specifications (Annex I)
- PS 3.10 Addendum : Media Storage and File Format (Annex A.2)

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Part 3 Addendum: Annex F - Basic Directory Information Object Definition

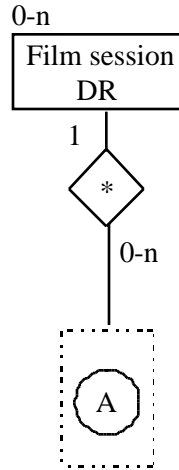
Modify Figure F.4.1 to include Stored Print, remove elements of Normalized Print and add note to identify retiring Normalized Print.

Figure F.4.1 is shown as drawn in DICOM-1998 for clarity. Changes are shown by the following items.

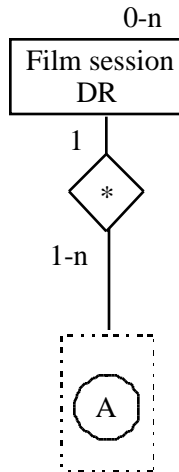


Note: Normalized Print media storage was previously defined in DICOM. It is now retired. See PS3.3 -1998.

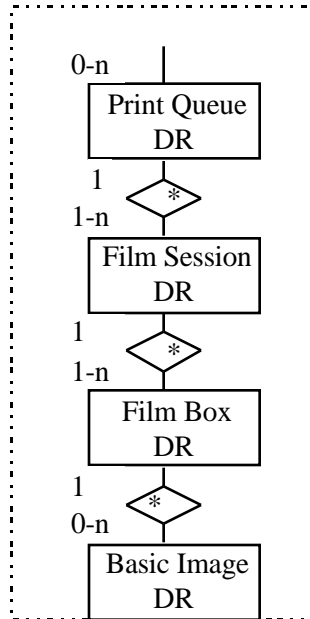
Retire the Normalized Film Session media storage features by deleting “Film Session DR” and its children under “Topic DR”.



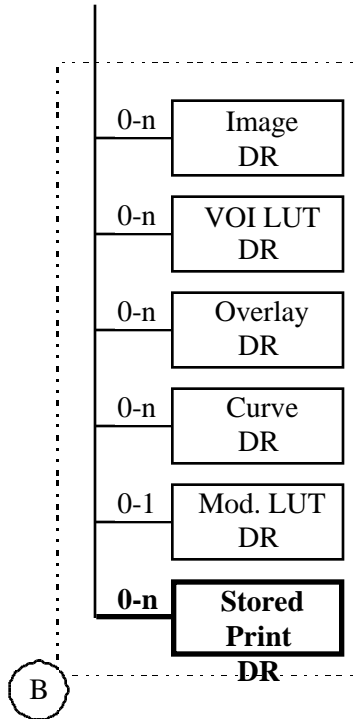
Retire the Normalized Film Session media storage features by deleting “Film Session DR” and its children under “Study DR”.



Retire the Print Queue media storage features by deleting “DR” and its children under “Root Directory Entity”.



Include the Composite Stored Print media storage feature by adding “Stored Print DR” under the Series DR.



Modify Table F.3-3 in section F.3.2.2 to include “STORED PRINT” in the Directory Record Type item of the Directory Record sequence. Also, retire the references to the Normalized Directory Record and add note to explain.

>Directory Record Type	(0004,1430)	1C	<p>Defines a specialized type of Directory Record by reference to its position in the Media Storage Directory Information Model (see Section F.4).</p> <p>Required if the Directory Record Sequence (0004,1220) is not zero length.</p> <p>Enumerated Values (see Section F.5): PATIENT STUDY SERIES IMAGE OVERLAY MODALITY LUT VOI LUT CURVE TOPIC VISIT RESULTS INTERPRETATION STUDY COMPONENT PRINT QUEUE FILM SESSION FILM BOX IMAGE BOX <u>STORED PRINT</u></p> <p>PRIVATE = Privately defined record hierarchy position. Type shall be defined by Private Record UID (0004,1432).</p> <p>MRDR = Special Directory Record which allows indirect reference to a File by multiple Directory Records. Instead of directly referencing a File by its Referenced File ID (0004,1500), a Directory Record of any of the Types define above (except MRDR) may reference a Multi-Referenced File Directory Record which in turn will reference the File by its File ID.</p> <p>Note: Enumerated Values <u>PRINT QUEUE</u>, <u>FILM SESSION</u>, <u>FILM BOX</u>, and <u>IMAGE BOX</u> were previously defined in DICOM for this Attribute. They are now retired. See PS3.3-1998.</p>
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Modify Table F.4-1 to include Stored Print, retire Normalized Print values and add note identify the retirement of Normalized Print.

**Table F.4-1
RELATIONSHIP BETWEEN DIRECTORY RECORDS**

Directory Record Type	Section	Directory Record Types which may be included in the next lower-level directory Entity
(Root Directory Entity)		PATIENT, TOPIC, PRINT QUEUE , PRIVATE
PATIENT	F.5.1	STUDY, PRIVATE
STUDY	F.5.2	SERIES, VISIT, RESULTS, STUDY COMPONENT FILM SESSION , PRIVATE
SERIES	F.5.3	IMAGE, OVERLAY, MODALITY LUT, VOI LUT, CURVE, <u>STORED PRINT</u> , PRIVATE
IMAGE	F.5.4	PRIVATE
OVERLAY	F.5.5	PRIVATE
MODALITY LUT	F.5.6	PRIVATE
VOI LUT	F.5.7	PRIVATE
CURVE	F.5.8	PRIVATE
<u>STORED PRINT</u>	<u>F.5.18</u>	<u>PRIVATE</u>
TOPIC	F.5.9	STUDY, SERIES, IMAGE, OVERLAY, MODALITY LUT, VOI

		LUT, CURVE, FILM SESSION , STORED PRINT, PRIVATE.
VISIT	F.5.10	PRIVATE
RESULTS	F.5.11	INTERPRETATION, PRIVATE
INTERPRETATION	F.5.12	PRIVATE
STUDY COMPONENT	F.5.13	PRIVATE
PRINT QUEUE	F.5.14	BASIC FILM SESSION, PRIVATE
BASIC FILM SESSION	F.5.15	BASIC FILM BOX, PRIVATE
BASIC FILM BOX	F.5.16	BASIC IMAGE BOX, PRIVATE
BASIC IMAGE BOX	F.5.17	PRIVATE
PRIVATE	F.6.1	PRIVATE, (any of the above as privately defined)
MRDR	F.6.2	(Not applicable)

Note: Directory Record Types PRINT QUEUE, FILM SESSION, FILM BOX, and IMAGE BOX were previously defined in DICOM. They have been retired. See PS 3.3-1998.

Retire the Normalized Print Directory Record Sections

F.5.14 Print Queue Directory Record Definition

This section was previously defined in DICOM. It is now retired. See PS 3.3-1998.

F.5.15 Print Film Session Directory Record Definition

This section was previously defined in DICOM. It is now retired. See PS 3.3-1998.

F.5.16 Print Film Box Directory Record Definition

This section was previously defined in DICOM. It is now retired. See PS 3.3-1998.

F.5.17 Print Image Box Directory Record Definition

This section was previously defined in DICOM. It is now retired. See PS 3.3-1998.

Add section F.5.18 : Stored Print Directory Record Definition

F.5.18 Stored Print Directory Record Definition

The Directory Record is based on the specification of Section F.3. It is identified by a Directory Record Type of Value "STORED PRINT". Table F.5-18 lists the set of keys with their associated Types for such a Directory Record Type. The description of these keys may be found in the Modules related to Stored Print IODs. This Directory Record shall be used to reference a Stored Print SOP Instance. This Type of Directory Record may reference a Lower-Level Directory Entity which includes one or more Directory Records as defined in Table F.4-2.

**Table F.5-18
STORED PRINT KEYS**

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	Required if an extended or replacement character set is used in one of the keys.
Instance Number	(0020,0013)	2	A number that identifies this film box.

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Icon Image Sequence	(0088,0200)	3	One or more Icons which represent the images (of the Film Box) which are referenced by the Stored Print SOP instance.
> Image Pixel Module			See Section F.7 of this Part.
Any other Attribute of the Image IE Modules		3	

Note: Because (0004,1511) Referenced SOP Instance UID in File may be used as a "pseudo" Directory Record Key (See Table F.3-3), it is not duplicated in this list of keys.

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Part 4 Addendum: Service Class Specification

Add the Stored Print Storage, Hardcopy Grayscale Image Storage, and Hardcopy Color Image Storage SOP Classes to the defined Media SOP Classes. Retire the Normalized SOP Classes.

**Table I.4.1
Media Storage Media SOP Classes**

SOP Class Name	SOP Class UID	IOD Specification
Basic Color Image Box Storage	1.2.840.10008.5.1.1.4.1	See N Set attributes Section H.4.3.2.2.1
Basic Film Box Storage	1.2.840.10008.5.1.1.2	See N Create attributes Section H.4.2.2.1
Basic Film Session Storage	1.2.840.10008.5.1.1.1	See N Create attributes Section H.4.1.2.1
Basic Grayscale Image Box Storage	1.2.840.10008.5.1.1.4	See N Set attributes Section H.4.3.1.2.1
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29 1.2.840.10008.1.4.1.1.29	IOD defined in PS3.3
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30 1.2.840.10008.1.4.1.1.30	IOD defined in PS3.3
Stored Print Storage	1.2.840.10008.5.1.1.27 1.2.840.10008.1.4.1.1.27	IOD defined in PS3.3
Other Media SOP Classes in table not shown		

Note: The storage of Normalized Print SOP Instances on media was previously defined in DICOM. They have been retired. See PS 3.4-1998.

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Part 10 Addendum: Annex F: Media Storage and File Format for Media Interchange

Retire Example for Print Queue

A.2 EXAMPLE OF DICOMDIR FILE CONTENT WITH MULTIPLE REFERENCED FILES

This section was previously defined in DICOM. It is now retired. See PS 3.3-1998.