Philips Medical Systems
DICOM Conformance Statement

Inturis DICOM Recorder

Release 1.2

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PHILIPS

1 Introduction

This chapter provides general information about the purpose, scope and contents of this Conformance Statement.

1.1 Scope and field of application

The scope of this DICOM Conformance Statement is to facilitate data exchange with equipment of Philips Medical Systems. This document specifies the compliance to the DICOM standard (formally called the NEMA PS 3.X standards). It contains a short description of the applications involved and provides technical information about the data exchange capabilities of the equipment. The main elements describing these capabilities are: the supported DICOM Service Object Pair (SOP) Classes, Roles, Information Object Definitions (IOD) and Transfer Syntaxes.

The field of application is the integration of the Philips Medical Systems equipment into an environment of medical devices.
This Conformance Statement should be read in conjunction with the DICOM standard and its addenda.

1.2 Intended 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.

1.3 Contents and structure

The DICOM Conformance Statement is contained in chapter 2 through 7 and follows the contents and structuring requirements of DICOM PS 3.2.

1.4 Used definitions, terms and abbreviations

DICOM definitions, terms and abbreviations are used throughout this Conformance Statement. For a description of these, see NEMA PS 3.3 and PS 3.4.
The word Philips in this document refers to Philips Medical Systems.

1.5 References

[DICOM]   The Digital Imaging and Communications in Medicine (DICOM) standard:
            NEMA PS 3.X.
            National Electrical Manufacturers Association (NEMA) Publication Sales
            1300 N. 17th Street, Suite 1847
            Rosslyn, Va. 22209, United States of America

1.6 Important note to the reader

This 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 a networked 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 analyse 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).

1.7 Acronyms and Abbreviations.

The following acronyms and abbreviations are used in the document.

- AE   Application Entity
- ACR   American College of Radiology
- ANSI   American National Standard Institute
- CD-R   Compact Disk Recorder
- DICOM   Digital Imaging and Communication in Medicine
- DICOMDIR   DICOM File containing the Media Storage Directory SOP Class
- EBE   Explicit Big Endian Transfer Syntax
- ELE   Explicit Little Endian Transfer Syntax
- FSC   File Set Creator
- FSU   File Set Updater
- ILE   Implicit Little Endian Transfer Syntax
- IOD   Image Object Definition
- JPEGLossless   JPEG Lossless, Non-Hierarchical First Order Prediction (Process 14, Selection Value 1) Transfer Syntax
- NEMA   National Electric Manufacturers Association
- PDU   Protocol Data Unit
- 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

2 Implementation model Network and Media

2.1 Application Data Flow Diagram
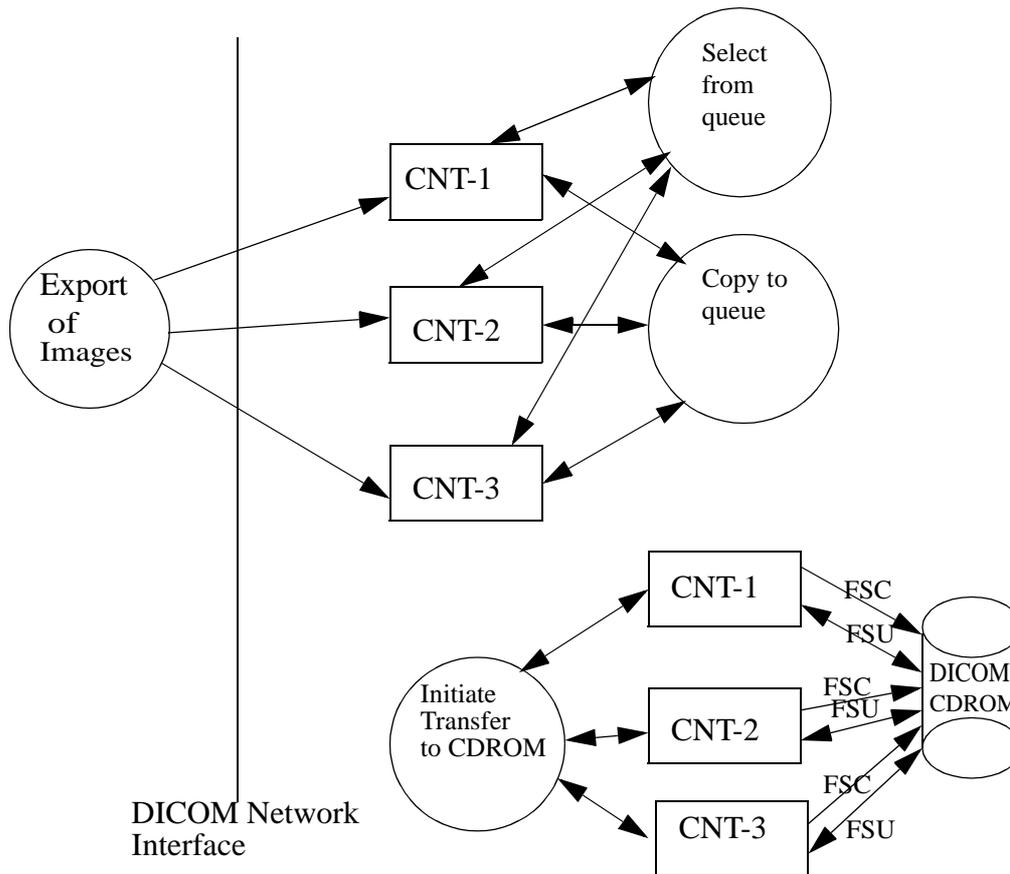
The Inturis DICOM Recorder can receive DICOM XA and SC images over the network. All images received in *one* DICOM association and belonging to the same patient are combined in *one* entry in the queue of the recording station. Afterwards, the operator can select the entries for inclusion on a DICOM CDROM.

Depending on the AE-title used for receipt of the cases, different types of CDROMs are produced by the Inturis DICOM Recorder. Three Classes of AE-titles are possible:

1. **CNT-1.** Received XA Image Storage Instances are written in accordance to STD-XABC-CD, while received SC Image Instances are written in accordance to STD-GEN-CD.
2. **CNT-2**. Received XA Image Storage Instances are written in accordance to STD-XA1K-CD and SC Image Instances still in accordance to STD-GEN-CD.
3. **CNT-3**. Received XA Image Storage Instances are written in accordance to STD-XA1K-CD or to STD-GEN-CD and SC Image Instances still in accordance to STD-GEN-CD.

2.2 Functional definition of Application Entities

The actual Application Entities are configurable. Each configured Application Entity supports the following functionality:
- Receipt of a number of Secondary Capture and X-Ray Angiographic images over the network and placing them in the queue.
- Initialization of the CD-R Media, writing a DICOM File-set onto the media. Or in case a DICOM File-set existed on the CD-R medium: updating the existing File-set.
- Copying of selected Secondary Capture and X-Ray Angiographic images from the queue to the CD-R device.
- Creation of a DICOMDIR file that represents the contents of the recorded data.

The Application Entities mainly differ in the support of transfer syntaxes and the Application Profiles used to write the CD-R contents.

2.3 Sequencing of Real World Activities

The operator selects entries from the queue and initiates the transfer to the CD-R medium.

3 AE Specifications

This chapter describes in more detail the DICOM network context for Application Entities. The actual Application Entities are configurable and behave as one of the following Application Entity templates.

3.1 Inturis DICOM Recorder Network AE

3.1.1 Association Establishment Policies

3.1.1.1 General

The Inturis DICOM Recorder always uses a PDU size of 16 kB.

3.1.1.2 Number of Associations

In total no more than licensed numbers of associations are supported, chapter 6.5 on page 25. This number is the total of all associations for the CNT-1, CNT-2 and CNT-3 AE titles.

3.1.1.3 Asynchronous Nature

None.

3.1.1.4 Implementation Identifying Information

Implementation Class UID = "1.3.46.670589.7.10.1.1".
Implementation Version Name = "1_2_1_N", where N is a string that identifies the software build version.

3.1.2 Association Initiated by Real-World Activity

The Inturis DICOM Recorder doesn't initiate associations.

3.1.3 Association Acceptance Policy

3.1.3.1 Inturis DICOM Recorder AE Template Specification: CNT-1

3.1.3.1.1   Associated Real-World Activity

The Inturis DICOM Recorder receives a Store request form an remote AE.

3.1.3.1.2   Presentation Context Table

Table 3-1 : Acceptable Presentation Contexts for CNT-1

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Verification SOP Class	1.2.840.10008.1.1	ILE	1.2.840.10008.1.2	SCP	None
Verification SOP Class	1.2.840.10008.1.1	ELE	1.2.840.10008.1.2.1	SCP	None

Table 3-1 : Acceptable Presentation Contexts for CNT-1

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Verification SOP Class	1.2.840.10008.1.1	EBE	1.2.840.10008.1.2.2	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	ILE	1.2.840.10008.1.2	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	ELE	1.2.840.10008.1.2.1	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	EBE	1.2.840.10008.1.2.2	SCP	None
X-Ray Angio-graphic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossless	1.2.840.10008.1.2.4.70	SCP	None

3.1.3.1.2.1　SOP Specific Conformance for Secondary Capture Image Storage

CNT-1 provides Level 2 (Full) conformance for the Secondary Capture Image Storage SOP Class.

Only images that meet the criteria stated in STD-GEN-CD Application Profile can be written onto CD. See chapter 8 on page 27 bullets 1 and 2.

3.1.3.1.2.2　SOP Specific Conformance for X-Ray Angiographic Image Storage

CNT-1 provides Level 2 (Full) conformance for the X-Ray Angiographic Image Storage SOP Class.

Only images that meet the criteria stated in STD-XABC-CD Application Profile can be written onto CD. See chapter 8 on page 27 bullets 1 and 2.

3.1.3.1.3　Presentation Context Acceptance Criteria

CNT-1 always accepts any presentation context from the list defined in Table 3-1 on page 10.

3.1.3.1.4　Transfer Syntax Selection Policies

The Inturis DICOM Recorder uses the JPEG Lossless transfer syntax for the XA images. When given a choice during association negotiation, it prefers ELE over EBE over the ILE transfer syntax for the Secondary Capture images.

3.1.3.2　Inturis DICOM Recorder AE Template Specification: CNT-2

3.1.3.2.1　Associated Real-World Activity

See "Associated Real-World Activity" on page 10.

3.1.3.2.2　Presentation Context Table

See "Associated Real-World Activity" on page 10.

3.1.3.2.2.1   SOP Specific Conformance for Secondary Capture Image Storage

CNT-2 provides Level 2 (Full) conformance for the Secondary Capture Image Storage SOP Class.

Only images that meet the criteria stated in STD-GEN-CD Application Profile can be written onto CD. See chapter 8 on page 27 bullets 1 and 2.

3.1.3.2.2.2   SOP Specific Conformance for X-Ray Angiographic Image Storage

CNT-2 provides Level 2 (Full) conformance for the X-Ray Angiographic Image Storage SOP Class.

Only images that meet the criteria stated in STD-XA1K-CD Application Profile can be written onto CD. See chapter 8 on page 27 bullets 1 and 2.

3.1.3.2.3   Presentation Context Acceptance Criteria

See "Presentation Context Acceptance Criteria" on page 11.

3.1.3.2.4   Transfer Syntax Selection Policies

See "Transfer Syntax Selection Policies" on page 11.

3.1.3.3 Inturis DICOM Recorder AE Template Specification: CNT-3

3.1.3.3.1   Associated Real-World Activity

See "Associated Real-World Activity" on page 10.

3.1.3.3.2   Presentation Context Table

Table 3-2 : Acceptable Presentation Contexts for CNT-3

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Verification SOP Class	1.2.840.10008.1.1	ILE	1.2.840.10008.1.2	SCP	None
Verification SOP Class	1.2.840.10008.1.1	ELE	1.2.840.10008.1.2.1	SCP	None
Verification SOP Class	1.2.840.10008.1.1	EBE	1.2.840.10008.1.2.2	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	ILE	1.2.840.10008.1.2	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	ELE	1.2.840.10008.1.2.1	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	EBE	1.2.840.10008.1.2.2	SCP	None

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	ILE	1.1.2.840.10008.1.2	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	ELE	1.2.840.10008.1.2.1	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	EBE	1.2.840.10008.1.2.2	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossless	1.2.840.10008.1.2.4.70	SCP	None

3.1.3.3.2.1   SOP Specific Conformance for Secondary Capture Image Storage

CNT-3 provides Level 2 (Full) conformance for the Secondary Capture Image Storage SOP Class.

Only images that meet the criteria stated in STD-GEN-CD Application Profile can be written onto CD. See chapter 8 on page 27 bullets 1 and 2.

3.1.3.3.2.2   SOP Specific Conformance for X-Ray Angiographic Image Storage

CNT-3 provides Level 2 (Full) conformance for the X-Ray Angiographic Image Storage SOP Class.

Only images that meet the criteria stated in the STD-GEN-CD, the STD-XABC-CD or the STD-XA1K-CD Application Profile can be written onto CD. See chapter 8 on page 27 bullets 1 and 2. Images received with uncompressed transfer syntax are validated according STD-GEN-CD application Profile. Images received with another transfer syntax are only written to CD when they meet the criteria of the STD-XABC-CD or the STD-XA1K-CD Application profile.

3.1.3.3.3   Presentation Context Acceptance Criteria

See "Presentation Context Acceptance Criteria" on page 11.

3.1.3.3.4   Transfer Syntax Selection Policies

When given a choice during association negotiation, the Inturis DICOM Recorder prefers ELE over EBE over the ILE transfer syntax for the received SC images. When given a choice during association negotiation, the Inturis DICOM Recorder prefers JPEG lossless over ELE over EBE over the ILE transfer syntax for the received XA images.

3.2 Inturis DICOM Recorder Media AE

3.2.1 File Meta Information

The attribute "Source AE Title" has the value "CNT-1" for all DICOM files that have been written or updated by AE template CNT-1.

The attribute "Source AE Title" has the value "CNT-2" for all DICOM files that have been written or updated by AE template CNT-2.

The attribute "Source AE Title" has the value "CNT-3" for all DICOM files that have been written or updated by AE template CNT-3.

The attribute "File Meta Information Version" has the values "0,1".

The attributes "Implementation Class UID" and "Implementation Version Name" have the values as specified in "Implementation Identifying Information" on page 10.

3.2.2 DICOMDIR Record Identifying Information

The DICOMDIR PATIENT, STUDY, SERIES and IMAGE records are identified by respectively the attributes "Patient ID", "Study Instance UID", "Series Instance UID" and "SOP Instance UID" from first XA Image Storage SOP Instance of the entries from the queue. In case only Secondary Capture Image Storage SOP Instances are available: use the values from first Secondary Capture Image Storage SOP Class Instance instead.

3.2.3 Real-World Activities

3.2.3.1 Real-World Activities for AE Template CNT-1

The real world activities and invoked Application Profiles are listed in following table.

Table 3-3 : Application Profiles, RWAs and Roles

Supported AP	RWA	Roles	SC option
STD-XABC-CD	Transfer to CDROM	FSC/FSU	Interchange
STD-GEN-CD	Transfer to CDROM	FSC/FSU	Interchange

Image instances for SC images are written to CD-ROM in according to the STD-GEN-CD Application Profile. Image instances for XA images are written to CD-ROM in according to the STD-XABC-CD Application Profile.

For conformance to the different application profiles see "Conformance of Media AE" on page 15.

3.2.3.2 Real-World Activities for AE Template CNT-2

The real world activities and invoked Application Profiles are listed in following table.

Table 3-4 : Application Profiles, RWAs and Roles

Supported AP	RWA	Roles	SC option
STD-XA1K-CD	Transfer to CDROM	FSC/FSU	Interchange
STD-GEN-CD	Transfer to CDROM	FSC/FSU	Interchange

Image instances for SC images are written to CD-ROM in according to the STD-GEN-CD Application Profile. Image instances for XA images are written to CD-ROM in according to the STD-XA1K-CD Application Profile.

For conformance to the different application profiles see "Conformance of Media AE" on page 15.

3.2.3.3 Real-World Activities for AE Template CNT-3

The real world activities and invoked Application Profiles are listed in following table.

Table 3-5 : Application Profiles, RWAs and Roles

Supported AP	RWA	Roles	SC option
STD-XA1K-CD	Transfer to CDROM	FSC/FSU	Interchange
STD-XACB-CD	Transfer to CDROM	FSC/FSU	Interchange
STD-GEN-CD	Transfer to CDROM	FSC/FSU	Interchange

Image instances for SC images are written to CD-ROM in according to the STD-GEN-CD Application Profile. Image instances for XA images are written to CD-ROM as follows:
- in accordance to the STD-XACB-CD Application Profile when the image instances meet the requirements of that Application Profile.
- in accordance to the STD-XA1K-CD Application Profile when the image instances meet the requirements of that Application Profile.
- in accordance to the STD-GEN-CD Application Profile when the image instances are received via an uncompressed transfer syntax.

For conformance to the different application profiles see "Conformance of Media AE" on page 15.

3.2.4 Conformance of Media AE

While adding entries to a CDROM, the Inturis DICOM Recorder will merge added entries in the PATIENT/STUDY/SERIES hierarchy of the DICOMDIR when the higher level identifying information of the added entries equals the information as present on the CDROM.

The attribute "Patient ID" is treated as the only identifying attribute on PATIENT level. When it has either no value or the value "?" for a particular selected entry from the queue, a possible merge with one of the other "available" patients is proposed. Available means any of the other selected entries and any of the patients that are already present on the CDROM. When merging is possible and selected, the UI displays the values for both "patient ID" values and lets the operator select one of them. Likewise, the operator can select the value to use for "Patient's Name", "Patient's Birth Date" and "Patient's Sex" from any of the two merge candidates. The resulting PATIENT Record contains the selected values.

Notes:
- in case the "Patient ID" attribute had a value, a merge is proposed with any of the "availa-

ble" entries with the same value for "Patient ID".

• When merging was prohibited: build the new PATIENT record from the selected queue entry only.

3.2.4.1 Conformance STD-XABC-CD Application Profile

3.2.4.1.1   Basic Directory SOP Class

The following paragraphs describe how a value for the record keys from the various DICOM-DIR records is derived.

3.2.4.1.1.1   PATIENT Record Keys

Table 3-6 : Directory Record Keys for PATIENT Records

Attribute Name	Tag	Type	Value taken from
Specific Character Set	(0008,0005)	1C	As in first Image Instance, see "" on page 26.
Patient's Name	(0008,0010)	2	See "Conformance of Media AE" on page 15.
Patient ID	(0008,0020)	1	See "Conformance of Media AE" on page 15. When it still has no value: use two blanks.
Patient Birth Date	(0008,0030)	2	See "Conformance of Media AE" on page 15.
Patient's Name	(0008,0010)	2	See "Conformance of Media AE" on page 15.

3.2.4.1.1.2   STUDY Record Keys

Table 3-7 : Directory Record Keys for STUDY Records

Attribute Name	Tag	Type	Value taken from
Specific Character Set	(0008,0005)	1C	As in first Image Instance, see "" on page 26.
Study Date	(0008,0020)	1	As in first Image Instance. When absent: insert current date.
Study Time	(0008,0030)	1	As in first Image Instance. When absent: insert current time.
Accession Number	(0008,0050)	2	As in first Image Instance. When absent: insert zero length value.
Study Description	(0008,1030)	2	As in first Image Instance. When absent: insert zero length value.
Study Instance UID	(0020,000D)	1C	As in first Image Instance.
Study ID	(0020,0010)	1	As in first Image Instance. When absent: do *not* record the queue entry.

3.2.4.1.1.3   SERIES Record Keys

Table 3-8 : Directory Record Keys for SERIES Records

Attribute Name	Tag	Type	Value taken from
Specific Character Set	(0008,0005)	1C	As in first Image Instance, see "" on page 26.
Modality	(0008,0060)	1	As in first Image Instance. When absent: insert zero length value.
Series Instance UID	(0020,000E)	1	As in first Image Instance. When absent: do *not* record the queue entry.
Series Number	(0020,0011)	1	As in first Image Instance. When absent: do *not* record the queue entry.
Institution Name	(0008,0080)	2	As in first Image Instance. When absent: insert zero length value.
Institution Address	(0008,0081)	2	As in first Image Instance. When absent: insert zero length value.
Performing Physician	(0008,1050)	2	As in first Image Instance. When absent: insert zero length value.

3.2.4.1.1.4   IMAGE Record Keys

Table 3-9 : Directory Record Keys for IMAGE Records

Attribute Name	Tag	Type	Value taken from
Specific Character Set	(0008,0005)	1C	As in the related Image Instance.
Image Type	(0008,0008)	1	As in the related Image Instance.
Referenced Image Sequence	(0008,1140)	1C	As in the related Image Instance when third value of "Image Type" equals "BIPLANE A" or "BIPLANE B".
Image Number	(0020,0013)	1	As in the related Image Instance. When absent: do *not* record the queue entry.
Calibration Image	(0050,0004)	2	As in the related Image Instance. When absent: insert zero length value.
Icon Image Sequence	(0088,0200)	1	Always generated . In case "Representative Frame Number" (0028,6010) has a value: use that frame. Otherwise if "Number of Frames" has a value: use the frame (number of frames)/3. In all other cases use the first frame.

3.2.4.1.2   Standard X-Ray Angiographic Image Storage SOP Class

The following points are of particular interest for the recording of XA Image Instances:
the attributes from the selected entries from the queue are copied *as is* to the CDROM. No checks on legality on attribute values like Dates etc. are performed. In case the process

described in "Conformance of Media AE" on page 15 results in updates of the patient demographics, these updates do *not* appear in the Image Instances on the CDROM.

4. Instances, which violate the restrictions on pixel data as described in the Application Profile, are *not* recorded.

5. The presence of a biplane acquisition is indicated by the presence of the "Referenced Image Sequence" attribute.The Inturis DICOM Recorder searches for that referenced image instance in the same queue entry. When that referenced Image Instance does not occur in that queue entry, the referring instance is *not* recorded.

6. It might happen that a particular selection no longer fits on a CDROM, so a split over more CDROMs is necessary. The recorder tries to keep the two planes of biplane acquisitions on one CDROM. The recorder will insist on *blank* CDROMs for the second and further CDROMs.

7. Basic Offset Table is always present for JPEG lossless instances.

3.2.4.2 Conformance STD-XA1K-CD Application Profile

3.2.4.2.1 Basic Directory SOP Class

The following paragraphs describe how a value for the record keys from the various DICOM-DIR records is derived.

3.2.4.2.1.1 PATIENT Record Keys

Table 3-10 : Directory Record Keys for PATIENT Records

Attribute Name	

3.2.4.2.1.2 STUDY Record Keys

Table 3-11 : Directory Record Keys for STUDY Records

Attribute Name	Tag	Type	Value taken from
Study Description	(0008,1030)	2	As in first Image Instance. When absent: insert zero length value.
Study Instance UID	(0020,000D)	1C	As in first Image Instance.
Study ID	(0020,0010)	1	As in first Image Instance. When absent: do *not* record the queue entry.

3.2.4.2.1.3   SERIES Record Keys

Table 3-12 : Directory Record Keys for SERIES Records

Attribute Name	Tag	Type	Value taken from
Specific Character Set	(0008,0005)	1C	As in first Image Instance, see "" on page 26.
Modality	(0008,0060)	1	As in first Image Instance. When absent: insert zero length value.
Series Instance UID	(0020,000E)	1	As in first Image Instance. When absent: do *not* record the queue entry.
Series Number	(0020,0011)	1	As in first Image Instance. When absent: do *not* record the queue entry.
Institution Name	(0008,0080)	2	As in first Image Instance. When absent: insert zero length value.
Institution Address	(0008,0081)	2	As in first Image Instance. When absent: insert zero length value.
Performing Physician	(0008,1050)	2	As in first Image Instance. When absent: insert zero length value.

3.2.4.2.1.4   IMAGE Record Keys

Table 3-13 : Directory Record Keys for IMAGE Records

Attribute Name	Tag	Type	Value taken from
Specific Character Set	(0008,0005)	1C	As in the related Image Instance.
Image Type	(0008,0008)	1C	As in the related Image Instance.
Referenced Image Sequence	(0008,1140)	1C	As in the related Image Instance, when third value of "Image Type" equals "BIPLANE A" or "BIPLANE B".
Image Number	(0020,0013)	1	As in the related Image Instance. When absent: do *not* record the queue entry.
Calibration Image	(0050,0004)	2	As in the related Image Instance. When absent: insert zero length value.

3.2.4.2.2   Standard X-Ray Angiographic Image Storage SOP Class

See the remarks under "Standard X-Ray Angiographic Image Storage SOP Class" on page 17.

3.2.4.3 Conformance STD-GEN-CD Application Profile

3.2.4.3.1   Basic Directory SOP Class

The following paragraphs describe how a value for the record keys from the various DICOM-DIR records is derived.

3.2.4.3.1.1   PATIENT Record Keys

3.2.4.3.1.2   STUDY Record Keys

Table 3-15 : Directory Record Keys for STUDY Records

Attribute Name	Tag	Type	Value taken from
Study Instance UID	(0020,000D)	1C	As in first Image Instance. When absent: do *not* record the queue entry.
Study ID	(0020,0010)	1	As in first Image Instance. When absent: do *not* record the queue entry.

3.2.4.3.1.3 SERIES Record Keys

Table 3-16 : Directory Record Keys for SERIES Records

Attribute Name	Tag	Type	Value taken from
Specific Character Set	(0008,0005)	1C	As in first Image Instance, see "" on page 26.
Modality	(0008,0060)	1	As in first Image Instance. When absent: insert zero length value.
Series Instance UID	(0020,000E)	1	As in first Image Instance. When absent: do *not* record the queue entry.
Series Number	(0020,0011)	1	As in first Image Instance. When absent: do *not* record the queue entry.
Institution Name	(0008,0080)	3	As in first Image Instance.
Institution Address	(0008,0081)	3	As in first Image Instance.
Performing Physician	(0008,1050)	3	As in first Image Instance.

3.2.4.3.1.4 IMAGE Record Keys

Table 3-17 : Directory Record Keys for IMAGE Records

Attribute Name	Tag	Type	Value taken from
Specific Character Set	(0008,0005)	1C	As in the related Image Instance.
Image Type	(0008,0008)	1C	As in the related Image Instance.
Referenced Image Sequence	(0008,1140)	1C	As in the related Image Instance, when third value of "Image Type" equals "BIPLANE A" or "BIPLANE B".
Image Number	(0020,0013)	1	As in the related Image Instance. When absent: do *not* record the queue entry.
Calibration Image	(0050,0004)	3	As in the related Image Instance.
Icon Image Sequence	(0088,0200)	1	Always generated . In case "Representative Frame Number" (0028,6010) has a value: use that frame. Otherwise if "Number of Frames" has a value: use the frame (number of frames)/3. In all other cases use the first frame.

3.2.4.3.2   Standard X-Ray Angiographic Image Storage SOP Class

See the remarks under "Standard X-Ray Angiographic Image Storage SOP Class" on page 17.

3.2.4.3.3   Secondary Capture Image Storage SOP Class

The following points are of particular interest for the recording of Secondary Capture Image Instances:

1. the attributes from the selected entries from the queue are copied *as is* to the CDROM. No checks on legality on attribute values like Dates etc. are performed.

In case the process described in "Conformance of Media AE" on page 15 results in updates of the patient demographics, these updates do *not* appear in the Image Instances on the CDROM.

It might happen that a particular selection no longer fits on a CDROM, so a split over more CDROMs is necessary. The recorder will insist on *blank* CDROMs for the second and further CDROMs.

4 Communication Profiles

4.1 Supported Communications Stacks

The Inturis DICOM Recorder provides the DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3.8.

4.2 TCP/IP Stack

Inturis DICOM Recorder uses the TCP/IP stack provided by Windows-NT/2000 platform. The minimal requirement is a Ethernet ISO.8802-3 Standard AUI, optional twisted pair 100-BaseT.

4.2.1 Physical Media

Not applicable as the recorder uses the network capabilities of the underlying Windows-NT platform.

5 Extensions/Specializations/Privatizations

Not applicable.

6 Configuration

6.1 IP Address

The Inturis DICOM Recorder inherits its IP address from the underlying Windows NT platform.

6.2 Inturis DICOM Recorder Listen Port

The Inturis DICOM Recorder listens on *one* (configurable) listen port for incoming DICOM network traffic.

6.3 Inturis DICOM Recorder AE-Titles

The Inturis DICOM Recorder allows the configuration of AE-Titles for the recorder *itself* up to a maximum of one hundred. Each of these AE-Titles should be made equivalent to one of the AE-Title templates CNT-1, CNT-2 or CNT-3. Such an AE-Title inherits the properties as described in "Inturis DICOM Recorder AE Template Specification: CNT-1" on page 10, "Inturis DICOM Recorder AE Template Specification: CNT-2" on page 11 and "Inturis DICOM Recorder AE Template Specification: CNT-3" on page 12 respectively. Afterwards, each configured AE-Title can be further restricted in the use of allowed SOP Classes.

6.4 Remote Node Names

Each remote node should be defined during configuration of the Inturis DICOM Recorder. For each entered node name, the configuration defines *one* recorder AE-Title, as defined in "Inturis DICOM Recorder AE-Titles" on page 25, to which it can connect. Furthermore, the configuration process requires the entry of the IP-address for each remote node.

6.5 Allowed Connections from Remote AE-Titles

The software licence of the Inturis DICOM Recorder defines a maximum number of connections, that can be open at any one time. That implies that only the first "maximum number" of remote nodes from the list configured during "Remote Node Names" on page 25 can connect.

7 Support of Extended Character Sets

The Inturis DICOM Recorder supports the Extended character set "ISO_IR_100", so the Latin alphabet ISO_IR No. 101 supplementary set.

8 Other Issues

Considering the system there are the following remarks.:

1. During an association, the recorder accepts transfer syntaxes that are useless when observed in the light of the intended Application Profile for Media recording. It accepts ELE, EBE and ILE for XA images for the AE's CNT-1 and CNT-2. Here JPEGLossless is expected. Received image instances, that are encoded in such a "useless" transfer syntax, are rejected in the C-STORE response.

2. Images, that violate either the pixel data constraints from the Application Profile or miss
ing th(C-ST)01.5(OREopher)-753ae3753atixn. Tr   h-953re   y-01.5, are arej   cte(a)-656(t)757(thr mmdn
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