

# TruPlan v3.4

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## DICOM Conformance Statement

# 1 CONFORMANCE STATEMENT OVERVIEW

**TruPlan** is a software that enables visualization and measurement of structures of the heart and vessels for pre-procedural planning and sizing for the left atrial appendage closure (LAAC) procedure.

To facilitate the above, TruPlan provides general functionality such as:

- Segmentation of cardiovascular structures
- Visualization and image reconstruction techniques: 2D review, Volume Rendering, MPR
- Simulation of TEE views, ICE views, and fluoroscopic rendering
- Measurement and annotation tools
- Reporting tools

**TruPlan** supports several DICOM Service Classes, using the OFFIS DICOM Toolkit (DCMTK), to provide the following capabilities:

- Receive DICOM images and store them in the local system.
- Send DICOM images stored in the local system to a remote system.
- Query a PACS for particular studies and retrieve these studies for local storage.
- Read DICOM images from particular storage media and import them to the local system.
- Accept and process queries from remote DICOM applications for particular studies and send them to remote systems.

Table 1-1 provides an overview of the network services supported by **TruPlan**. Table 1-2 lists all supported media services.

Table 1-1  
NETWORK SERVICES

| Networking SOP Classes                       | User of Service (SCU) | Provider of Service (SCP) |
|----------------------------------------------|-----------------------|---------------------------|
| <b>Transfer</b>                              |                       |                           |
| Computed Radiography Image Storage           | Yes                   | Yes                       |
| CT Image Storage                             | Yes                   | Yes                       |
| Digital X-Ray Image Storage For Presentation | Yes                   | Yes                       |
| Digital X-Ray Image Storage For Processing   | Yes                   | Yes                       |
| Enhanced CT Image Storage                    | Yes                   | Yes                       |
| Enhanced MR Image Storage                    | Yes                   | Yes                       |
| MR Image Storage                             | Yes                   | Yes                       |
| Multi-frame Single Bit SC Image Storage      | Yes                   | Yes                       |
| Multi-frame Grayscale Byte SC Image Storage  | Yes                   | Yes                       |
| Multi-frame Grayscale Word SC Image Storage  | Yes                   | Yes                       |
| Multi-frame True Color SC Image Storage      | Yes                   | Yes                       |
| Nuclear Medicine Image Storage               | Yes                   | Yes                       |

|                                                    |     |     |
|----------------------------------------------------|-----|-----|
| Encapsulated PDF Storage                           | Yes | Yes |
| Positron Emission Tomography Image Storage         | Yes | Yes |
| Secondary Capture Image Storage                    | Yes | Yes |
| Surface Segmentation Storage                       | Yes | Yes |
| Ultrasound Image Storage                           | Yes | Yes |
| Ultrasound Multi-frame Image Storage               | Yes | Yes |
| X-Ray Angiographic Image Storage                   | Yes | Yes |
| <b>Query/Retrieve</b>                              |     |     |
| Study Root Query/Retrieve Information Model – FIND | Yes | Yes |
| Study Root Query/Retrieve Information Model – MOVE | Yes | Yes |
| Study Root Query/Retrieve Information Model – GET  | Yes | No  |
| <b>Workflow Management</b>                         |     |     |
| Storage Commitment Push Model SOP Class            | Yes | Yes |

Table 1-2  
MEDIA SERVICES

| Media Storage Application Profile                      | Write Files<br>(FSC or FSU) | Read Files<br>(FSR) |
|--------------------------------------------------------|-----------------------------|---------------------|
| <b>Compact Disc – Recordable</b>                       |                             |                     |
| Basic Cardiac X-Ray Angiographic Studies on CD-R Media | No                          | Yes                 |
| 1024 X-Ray Angiographic Studies on CD-R Media          | No                          | Yes                 |
| Ultrasound Single Frame for Image Display on CD-R      | No                          | Yes                 |
| Ultrasound Multi-Frame for Image Display on CD-R       | No                          | Yes                 |
| General Purpose CD-R Interchange                       | No                          | Yes                 |
| CT/MR Studies on CD-R                                  | No                          | Yes                 |
| <b>Digital Versatile Disc</b>                          |                             |                     |
| 1024 X-Ray Angiographic Studies on DVD Media           | No                          | Yes                 |
| CT/MR Studies on DVD Media                             | No                          | Yes                 |
| CT/MR Studies on DVD-RAM Media                         | No                          | Yes                 |

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## 3 Introduction

This DICOM Conformance Statement specifies the behavior and functionality of the **TruPlan** system, with regard to supported DICOM networking SOP Classes and Media Storage Application Profiles. **TruPlan** is a workstation for comprehensive evaluation of Cardiovascular CT images for pre-procedural planning and sizing for the left atrial appendage closure (LAAC) procedure.

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### 3.1 Revision History

| Document Version | Date of Issue | Author                                    | Description                                                                                              |
|------------------|---------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------|
| TruPlan v3.4     | 2023-05-28    | Mostafa Vahedi / Ben Park                 | Updated for TruPlan v3.4.0 and cvi42 6.3.0 server.                                                       |
| TruPlan v3.3     | 2025-01-31    | Alex Minifie                              | Updated contact address.                                                                                 |
| TruPlan v3.2     | 2023-08-24    | Luciano Favaro                            | Confirmed that the content of this document is applicable and acceptable for the TruPlan v3.2.0 release. |
| TruPlan v3.1     | 2023-02-09    | Luciano Favaro                            | Confirmed that the content of this document is applicable and acceptable for the TruPlan v3.1.0 release. |
| TruPlan v3.0     | 2022-07-26    | Ben Park / Luciano Fávaro / Johan de Boer | Initial release of this document                                                                         |

### 3.2 Audience

This document is written for the people that need to understand how **TruPlan** will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

### 3.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between **TruPlan** and other DICOM products. The Conformance Statement should be read and understood in

conjunction with the DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

### ***3.4 Terms and Definitions***

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard [DICOM] is the authoritative source for formal definitions of these terms.

*Abstract Syntax* – the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

*Application Entity (AE)* – an end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.

*Application Entity Title* – the externally known name of an Application Entity, used to identify a DICOM application to other DICOM applications on the network.

*Application Context* – the specification of the type of communication used between Application Entities. Example: DICOM network protocol.

*Association* – a network communication channel set up between Application Entities.

*Attribute* – a unit of information in an object definition; a data element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

*Information Object Definition (IOD)* – the specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.

*Joint Photographic Experts Group (JPEG)* – a set of standardized image compression techniques, available for use by DICOM applications.

*Media Application Profile* – the specification of DICOM information objects and encoding exchanged on removable media (e. g., CDs)

*Module* – a set of Attributes within an Information Object Definition that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

*Negotiation* – first phase of Association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data will be encoded.

*Portable Document Format (PDF)* – standardized file format to present documents

*Presentation Context* – the set of DICOM network services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.

*Protocol Data Unit (PDU)* – a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

*Service Class Provider (SCP)* – role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).

*Service Class User (SCU)* – role of an Application Entity that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)

*Service/Object Pair (SOP) Class* – the specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

*Service/Object Pair (SOP) Instance* – an information object; a specific occurrence of information exchanged in a SOP Class. Examples: a specific X-Ray image.

*Tag* – a 32-bit identifier for a data element, represented as a pair of four-digit hexadecimal numbers, the “group” and the “element”. If the “group” number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]

*Transfer Syntax* – the encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), little endian explicit value representation.

*Unique Identifier (UID)* – a globally unique “dotted decimal” string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

*Value Representation (VR)* – the format type of an individual DICOM data element, such as text, an integer, a person’s name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

### **3.5 Basics of DICOM Communication**

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statement are highlighted in italics below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two Application Entities (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network “handshake”. One of the two devices must initiate an Association (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (Negotiation).

DICOM specifies a number of network services and types of information objects, each of which is called an Abstract Syntax for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted Transfer Syntaxes. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called Presentation Contexts. The receiving Application Entity accepts the Presentation Contexts it supports.

For each Presentation Context, the Association Negotiation also allows the devices to agree on Roles – which one is the Service Class User (SCU - client) and which is the Service Class Provider (SCP - server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

The Association Negotiation finally enables exchange of maximum network packet (PDU) size, security information, and network service options (called Extended Negotiation information).

The Application Entities, having negotiated the Association parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate Information Object Definition and sent using the negotiated Transfer Syntax. There is a Default Transfer Syntax that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a Response Status indicating success, failure, or that query or retrieve operations are still in process.

Two Application Entities may also communicate with each other by exchanging media (such as a CD-R). Since there is no Association Negotiation possible, they both use a Media Application Profile that specifies “pre-negotiated” exchange media format, Abstract Syntax, and Transfer Syntax.

## 3.6 Abbreviations

The following list illustrates all abbreviations that are used in this document.

|       |                                                |
|-------|------------------------------------------------|
| ACSE  | Association Control Service Element            |
| AE    | Application Entity                             |
| CD-R  | Compact Disc – Recordable                      |
| CT    | Computed Tomography                            |
| DICOM | Digital Imaging and Communications in Medicine |
| DIMSE | DICOM Message Service Element                  |
| DVD   | Digital Versatile Disc                         |
| FSC   | File-Set Creator                               |
| FSR   | File-Set Reader                                |
| FSU   | File-Set Updater                               |
| IOD   | Information Object Definition                  |
| IPv4  | Internet Protocol version 4                    |
| IPv6  | Internet Protocol version 6                    |
| ISO   | International Standards Organization           |
| JPEG  | Joint Photographic Experts Group               |

|        |                                                   |
|--------|---------------------------------------------------|
| MPR    | Multiplanar Reconstruction                        |
| MWL    | Modality Worklist                                 |
| PACS   | Picture Archiving and Communication System        |
| PDF    | Portable Document Format                          |
| PDU    | Protocol Data Unit                                |
| SC     | Secondary Capture                                 |
| SCP    | Service Class Provider                            |
| SCU    | Service Class User                                |
| SOP    | Service Object Pair                               |
| TCP/IP | Transmission Control Protocol / Internet Protocol |
| UID    | Unique Identifier                                 |
| US     | Ultrasound                                        |
| VM     | Value Multiplicity                                |
| VR     | Value Representation                              |
| XA     | X-Ray Angiography                                 |

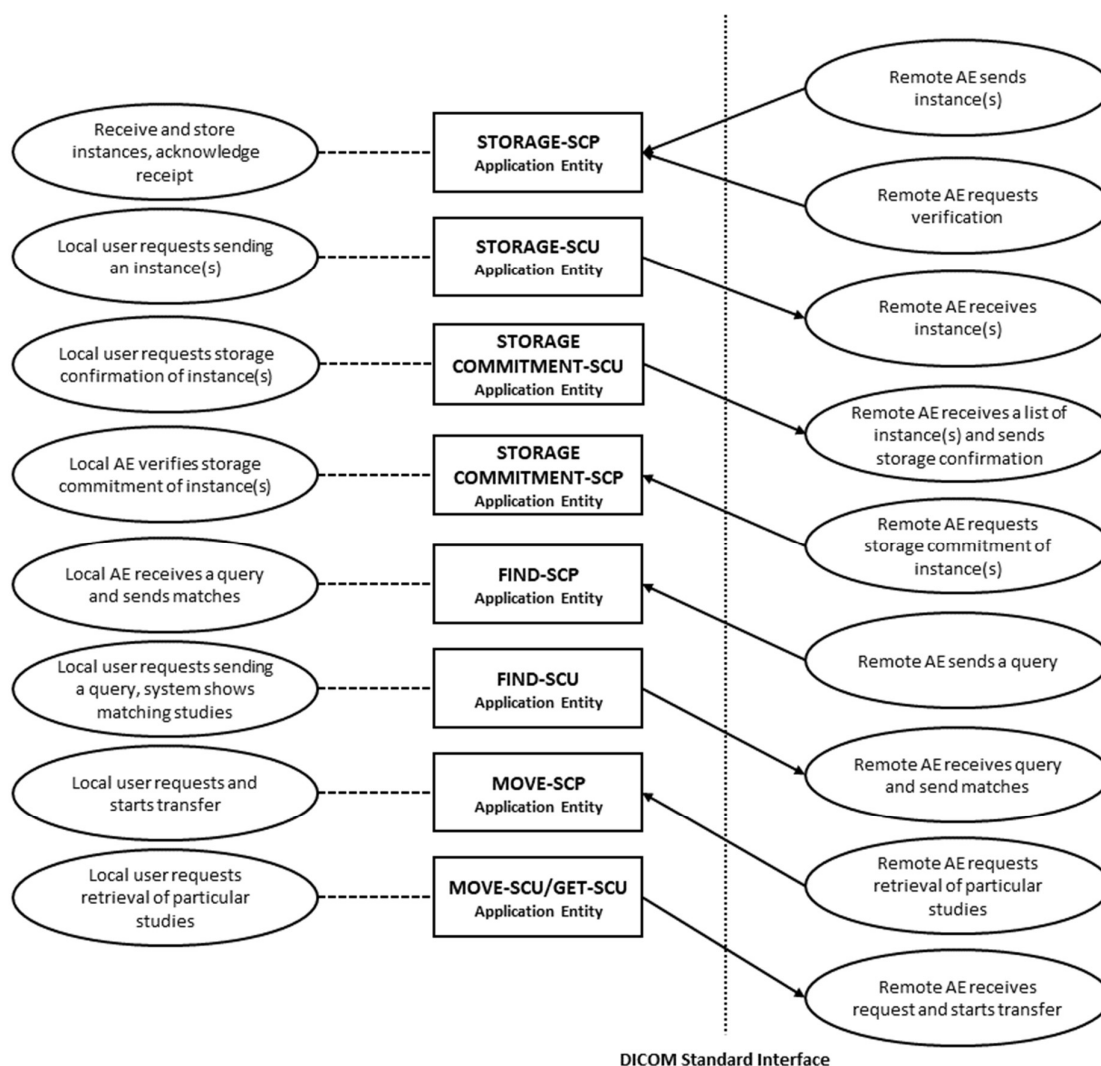
### ***3.7 References***

[DICOM] NEMA Standards Publication PS 3.1-22, Digital Imaging and Communications in Medicine (DICOM) 2022, available at <http://dicomstandard.org/>

## 4 Networking

### 4.1 Implementation Model

#### 4.1.1 Application Data Flow



**Figure 4-1. Application Data Flow Diagram**

Conceptually, the networking services which are implemented in the **TruPlan** system may be modeled as the following separate AEs.

## 4.1.2 Functional Definitions of AEs

### 4.1.2.0 STORAGE-SCP

STORAGE-SCP listens for connection requests at the port number configured for it. It will accept Presentation Contexts for Storage and Verification SOP Classes. Upon receipt of a Verification Request, STORAGE-SCP will respond with a successful Verification response. Upon receipt of a Storage Request, STORAGE-SCP will store the object that has been successfully received in the local system. The stored instances are subsequently listed and may be viewed through the user interface.

### 4.1.2.1 STORAGE-SCU

STORAGE-SCU is activated through the user interface when a user selects one or more instances from the local system and requests that they be sent to a remote AE. The remote AE is selected from a pre-configured list of communication partners.

### 4.1.2.2 STORAGE COMMITMENT-SCP

STORAGE COMMITMENT-SCP receives a list of instances from a remote AE and verifies the proper storage of all requested instances, creating a response message consisted of failed and succeeded instances. **TruPlan** can either send back N-EVENT-REPORT requests on the same association from the previous N-ACTION request or create a new association request.

### 4.1.2.3 STORAGE COMMITMENT-SCU

STORAGE COMMITMENT-SCU ensures that previously sent images are properly stored in the remote AE. In **TruPlan**, STORAGE COMMITMENT-SCU is triggered automatically after STORAGE-SCU finishes sending all images the remote AE. Users can adjust the number of retries and delay time between retries in the configuration.

### 4.1.2.4 FIND-SCP

**TruPlan** can act as a DICOM Q/R server. It answers Study Root Query/Retrieve Information Model queries from remote DICOM compatible applications.

### 4.1.2.5 FIND-SCU

FIND-SCU is activated through the user interface when a user selects a remote AE (from a preconfigured list) and initiates a query on study level. Subsequently, the matching studies are presented to the user as a list from which studies can be selected for retrieval.

### 4.1.2.6 MOVE-SCP

**TruPlan** can act as a DICOM server. It answers MOVE-SCP requests from remote DICOM compatible applications and sends requested images.

### 4.1.2.7 MOVE-SCU

MOVE-SCU is activated through the user interface when a user selects particular studies from a list for retrieval. A connection to the remote AE is established to initiate the retrieval. The STORAGE-SCP AE receives the retrieved instances and stores them in the local system.

### 4.1.2.8 GET-SCU

GET-SCU is activated through the user interface when a user selects particular studies from a list for retrieval, if the remote AE is configured for C-GET support.

### 4.1.3 Sequencing of Real-World Activities

All SCP activities are performed asynchronously in the background and are not dependent on any sequencing. The only limitation is that the STORAGE-SCP only accepts one association at a time if configured accordingly (which is the default behavior).

All SCU activities are initiated in the user interface. For each remote AE, a new background is started which allows for multiple associations at the same time.

## 4.2 AE Specifications

### 4.2.1 STORAGE-SCP

#### 4.2.1.0 SOP Classes

STORAGE-SCP provides standard conformance to the following DICOM SOP classes.

Table 4.2-1  
SOP CLASSES FOR AE STORAGE-SCP

| SOP Class Name                               | SOP Class UID                 | SCU | SCP |
|----------------------------------------------|-------------------------------|-----|-----|
| Verification SOP Class                       | 1.2.840.10008.1.1             | No  | Yes |
| Computed Radiography Image Storage           | 1.2.840.10008.5.1.4.1.1.1     | No  | Yes |
| CT Image Storage                             | 1.2.840.10008.5.1.4.1.1.2     | No  | Yes |
| Digital X-Ray Image Storage For Presentation | 1.2.840.10008.5.1.4.1.1.1.1   | No  | Yes |
| Digital X-Ray Image Storage For Processing   | 1.2.840.10008.5.1.4.1.1.1.1   | No  | Yes |
| Enhanced CT Image Storage                    | 1.2.840.10008.5.1.4.1.1.2.1   | No  | Yes |
| Enhanced MR Image Storage                    | 1.2.840.10008.5.1.4.1.1.4.1   | No  | Yes |
| MR Image Storage                             | 1.2.840.10008.5.1.4.1.1.4     | No  | Yes |
| Multi-frame Single Bit SC Image Storage      | 1.2.840.10008.5.1.4.1.1.7.1   | No  | Yes |
| Multi-frame Grayscale Byte SC Image Storage  | 1.2.840.10008.5.1.4.1.1.7.2   | No  | Yes |
| Multi-frame Grayscale Word SC Image Storage  | 1.2.840.10008.5.1.4.1.1.7.3   | No  | Yes |
| Multi-frame True Color SC Image Storage      | 1.2.840.10008.5.1.4.1.1.7.4   | No  | Yes |
| Nuclear Medicine Image Storage               | 1.2.840.10008.5.1.4.1.1.20    | No  | Yes |
| Encapsulated PDF Storage                     | 1.2.840.10008.5.1.4.1.1.104.1 | No  | Yes |
| Positron Emission Tomography Image Storage   | 1.2.840.10008.5.1.4.1.1.128   | No  | Yes |
| Secondary Capture Image Storage              | 1.2.840.10008.5.1.4.1.1.7     | No  | Yes |
| Surface Segmentation Storage                 | 1.2.840.10008.5.1.4.1.1.66.5  | No  | Yes |
| Ultrasound Image Storage                     | 1.2.840.10008.5.1.4.1.1.6.1   | No  | Yes |
| Ultrasound Multi-frame Image Storage         | 1.2.840.10008.5.1.4.1.1.3.1   | No  | Yes |
| X-Ray Angiographic Image Storage             | 1.2.840.10008.5.1.4.1.1.12.1  | No  | Yes |

## 4.2.1.1 Association Policies

### 4.2.1.1.1 General

STORAGE-SCP accepts but never initiates associations. The DICOM standard application context name, which is always proposed, is:

Table 4.2-2  
DICOM APPLICATION CONTEXT

|                          |                       |
|--------------------------|-----------------------|
| Application context name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

The PDU size is in the range 4096 to 131072 bytes. The default is 16384 bytes.

SOP Class extended negotiation is not supported.

### 4.2.1.1.2 Number of Associations

Table 4.2-3  
NUMBER OF ASSOCIATIONS AS AN ASSOCIATION ACCEPTOR FOR AE STORAGE-SCP

|                                             |                              |
|---------------------------------------------|------------------------------|
| Maximum number of simultaneous associations | Depends on the configuration |
|---------------------------------------------|------------------------------|

### 4.2.1.1.3 Asynchronous Nature

Asynchronous mode of operation is not supported.

### 4.2.1.1.4 Implementation Identifying Information

Table 4.2-4  
DICOM IMPLEMENTATION CLASS AND VERSION FOR AE STORAGE-SCP

|                             |                             |
|-----------------------------|-----------------------------|
| Implementation Class UID    | 1.3.6.1.4.1.53684.1.0.3.6.5 |
| Implementation Version Name | CVI42_DCMTK_365             |

## 4.2.1.2 Association Initiation Policy

STORAGE-SCP does not initiate associations.

## 4.2.1.3 Association Acceptance Policy

STORAGE-SCP accepts any association for which at least one presentation context is accepted. The calling and called application entity titles are ignored. The responding application entity name will always be identical to the called application entity title which was specified by the remote AE. Association requests may be rejected with the following status codes and reasons.

Table 4.2-5  
ASSOCIATION REJECTION REASONS

| Result             | Source                         | Reason                                 | Description                                  |
|--------------------|--------------------------------|----------------------------------------|----------------------------------------------|
| Rejected permanent | Provider, presentation related | Temporary congestion                   | Resource limitation: process creation failed |
| Rejected transient | User                           | Application context name not supported | Incorrect application context name           |

### 4.2.1.3.1 Activity – Remote AE sends instance(s)

#### 4.2.1.3.1.1 Description and Sequencing of Activities

As one instance is received from a remote AE, STORAGE-SCP will store this instance in the local file system and insert a record into the local database. If the received instance is a duplicate of a previously received instance, the new instance will be discarded.

#### 4.2.1.3.1.2 Accepted Presentation Contexts

Table 4.2-6

ACCEPTABLE PRESENTATION CONTEXTS FOR AE STORAGE-SCP AND  
REAL-WORLD ACTIVITY 'REMOTE AE SENDS INSTANCE(S)'

| Presentation Context Table                 |                             |                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                 |      |           |
|--------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|
| Abstract Syntax                            |                             | Transfer Syntax                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                 | Role | Ext. Neg. |
| Name                                       | UID                         | Name List                                                                                                                                                                                                                                             | UID List                                                                                                                                                                                                                                                                        |      |           |
| Computed Radiography Image Storage         | 1.2.840.10008.5.1.4.1.1.1   | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,<br>JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,<br>1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91 | SCP  | None      |
| CT Image Storage                           | 1.2.840.10008.5.1.4.1.1.2   | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,<br>JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,<br>1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91 | SCP  | None      |
| Digital X-Ray Image Storage For Processing | 1.2.840.10008.5.1.4.1.1.1.1 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,                                                                                                                      | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,                                                                                                                                                                               | SCP  | None      |

|                                                       |                                 |                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                 |     |      |
|-------------------------------------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|
|                                                       |                                 | JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy                                                                                                                                     | 1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,<br>1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91                                                                                                      |     |      |
| Digital X-Ray<br>Image<br>Storage For<br>Presentation | 1.2.840.10008<br>.5.1.4.1.1.1.1 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,<br>JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,<br>1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91 | SCP | None |
| Enhanced CT<br>Image<br>Storage                       | 1.2.840.10008<br>.5.1.4.1.1.2.1 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,<br>JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,<br>1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91 | SCP | None |
| Enhanced MR<br>Image<br>Storage                       | 1.2.840.10008<br>.5.1.4.1.1.4.1 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,<br>JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,                                                                                         | SCP | None |

|                                             |                             |                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                 |     |      |
|---------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|
|                                             |                             |                                                                                                                                                                                                                                                       | 1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91                                                                                                                                                                                            |     |      |
| MR Image Storage                            | 1.2.840.10008.5.1.4.1.1.4   | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,<br>JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,<br>1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91 | SCP | None |
| Multi-frame Single Bit SC Image Storage     | 1.2.840.10008.5.1.4.1.1.7.1 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,<br>JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,<br>1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91 | SCP | None |
| Multi-frame Grayscale Byte SC Image Storage | 1.2.840.10008.5.1.4.1.1.7.2 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,<br>JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,<br>1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91 | SCP | None |

|                                                         |                                       |                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                 |     |      |
|---------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|
| Multi-frame<br>Grayscale<br>Word SC<br>Image<br>Storage | 1.2.840.10008<br>.5.1.4.1.1.7.3       | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,<br>JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,<br>1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91 | SCP | None |
| Multi-frame<br>True Color SC<br>Image<br>Storage        | 1.2.840.10008<br>.5.1.4.1.1.7.4       | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,<br>JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,<br>1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91 | SCP | None |
| Nuclear<br>Medicine<br>Image<br>Storage                 | 1.2.840.10008<br>.5.1.4.1.1.20        | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,<br>JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,<br>1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91 | SCP | None |
| Encapsulated<br>PDF Storage                             | 1.2.840.10008<br>.5.1.4.1.1.104.<br>1 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless                                                                                                                       | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5                                                                                                                                                        | SCP | None |

|                                            |                              |                                                                                                                                                                                                                            |                                                                                                                                                                                                                                            |     |      |
|--------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|
| Positron Emission Tomography Image Storage | 1.2.840.10008.5.1.4.1.1.128  | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian, Deflated Explicit VR LE, RLE Lossless, JPEG Baseline (P1), JPEG Extended (P2+4), JPEG Lossless (P14SV1), JPEG 2000 Lossless, JPEG 2000 Lossy | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2, 1.2.840.10008.1.2.1.99, , 1.2.840.10008.1.2.5, 1.2.840.10008.1.2.4.50, , 1.2.840.10008.1.2.4.51, , 1.2.840.10008.1.2.4.70, , 1.2.840.10008.1.2.4.90, , 1.2.840.10008.1.2.4.91 | SCP | None |
| Secondary Capture Image Storage            | 1.2.840.10008.5.1.4.1.1.7    | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian, Deflated Explicit VR LE, RLE Lossless, JPEG Baseline (P1), JPEG Extended (P2+4), JPEG Lossless (P14SV1), JPEG 2000 Lossless, JPEG 2000 Lossy | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2, 1.2.840.10008.1.2.1.99, , 1.2.840.10008.1.2.5, 1.2.840.10008.1.2.4.50, , 1.2.840.10008.1.2.4.51, , 1.2.840.10008.1.2.4.70, , 1.2.840.10008.1.2.4.90, , 1.2.840.10008.1.2.4.91 | SCP | None |
| Surface Segmentation Storage               | 1.2.840.10008.5.1.4.1.1.66.5 | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian, Deflated Explicit VR LE, RLE Lossless                                                                                                        | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2, 1.2.840.10008.1.2.1.99                                                                                                                                                        | SCP | None |
| Ultrasound Image Storage                   | 1.2.840.10008.5.1.4.1.1.6.1  | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian, Deflated Explicit VR LE, RLE Lossless, JPEG Baseline (P1), JPEG Extended (P2+4), JPEG Lossless (P14SV1), JPEG 2000 Lossless, JPEG 2000 Lossy | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2, 1.2.840.10008.1.2.1.99, , 1.2.840.10008.1.2.5, 1.2.840.10008.1.2.4.50, , 1.2.840.10008.1.2.4.51, , 1.2.840.10008.1.2.4.70, , 1.2.840.10008.1.2.4.90, , 1.2.840.10008.1.2.4.91 | SCP | None |

|                                               |                                  |                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                 |     |      |
|-----------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|
| Ultrasound<br>Multi-frame<br>Image<br>Storage | 1.2.840.10008<br>.5.1.4.1.1.3.1  | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,<br>JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,<br>1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91 | SCP | None |
| X-Ray<br>Angiographic<br>Image<br>Storage     | 1.2.840.10008<br>.5.1.4.1.1.12.1 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless,<br>JPEG Baseline (P1),<br>JPEG Extended (P2+4),<br>JPEG Lossless (P14SV1),<br>JPEG 2000 Lossless,<br>JPEG 2000 Lossy | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>,<br>1.2.840.10008.1.2.5,<br>1.2.840.10008.1.2.4.50<br>,<br>1.2.840.10008.1.2.4.51<br>,<br>1.2.840.10008.1.2.4.70<br>,<br>1.2.840.10008.1.2.4.90<br>,<br>1.2.840.10008.1.2.4.91 | SCP | None |

#### 4.2.1.3.1.2.1 Extended Negotiation

No extended negotiation is performed.

#### 4.2.1.3.1.3 SOP Specific Conformance

##### 4.2.1.3.1.3.1 SOP Specific Conformance to Storage SOP Classes

STORAGE-SCP provides standard conformance to the Storage Service Class.

STORAGE-SCP will receive any supported DICOM instances transmitted on the open association provided that the correct presentation context is used. If an instance is received successfully, it is stored on the local file system and a record is inserted in the local database. For all supported storage SOP classes, no integrity checks of the received instances are performed beyond tests of a very basic structural integrity. In particular, the sending system is not prevented from transmitting incomplete or incorrect IODs. When storing an instance in the local system, group length values and sequence lengths of an instance are re-computed by STORAGE-SCP; these values may, therefore, be changed.

##### 4.2.1.3.1.3.2 Presentation Context Acceptance Criterion

STORAGE-SCP will accept all presentation contexts which contain one of the supported SOP classes and one of the supported transfer syntaxes.

#### 4.2.1.3.1.3.3 Transfer Syntax Selection Policies

In case of uncompressed transmission, the default behavior of STORAGE-SCP is to select for each presentation context containing a supported SOP class the explicit VR transfer syntax with the byte order matching the local machine byte order. If this transfer syntax is not available, the explicit VR transfer syntax with opposite byte order is selected. If this is also unavailable, implicit VR little endian is selected if available, otherwise the presentation context is rejected.

#### 4.2.1.3.1.3.4 Response Status

STORAGE-SCP will behave as described in the Table below when generating the C-STORE response command message.

Table 4.2-7  
RESPONSE STATUS FOR AE STORAGE-SCP AND  
REAL-WORLD ACTIVITY 'REMOTE AE SENDS INSTANCE(S)'

| Service Status | Further Meaning                   | Error Code | Behavior                                                                                                                                                                                                    |
|----------------|-----------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Refused        | Out of resources                  | A700       | Application out of memory, file system or database write error (e. g. disk full or missing rights). The DICOM instance was not stored. An error message is output to the service logs.                      |
| Error          | Data set does not match SOP class | A900       | The SOP Class UID or SOP Instance UID in the C-STORE-RQ does not match the corresponding UID in the received dataset. The DICOM instance was stored anyway. An error message is output to the service logs. |
|                | Cannot understand                 | C000       | The received DICOM instance did not include a SOP Class UID or SOP Instance UID. The DICOM instance was stored anyway. An error message is output to the service logs.                                      |
| Warning        | Coercion of Data Elements         | B000       | Never sent, no coercion is ever performed.                                                                                                                                                                  |
|                | Data Set does not match SOP Class | B007       | Never sent.                                                                                                                                                                                                 |
|                | Elements Discarded                | B006       | Never sent.                                                                                                                                                                                                 |
| Success        | Success                           | 0000       | The DICOM instance was successfully received and stored in the local system.                                                                                                                                |

### 4.2.1.3.2 Activity – Remote AE requests Verification

#### 4.2.1.3.2.1 Description and Sequencing of Activities

A remote AE sends an Echo Request to verify that STORAGE-SCP is awake and listening. STORAGE-SCP responds with success status as long as the request can be parsed.

#### 4.2.1.3.2.2 Accepted Presentation Contexts

Table 4.2-8  
ACCEPTABLE PRESENTATION CONTEXTS FOR AE STORAGE-SCP AND  
REAL-WORLD ACTIVITY 'REMOTE AE REQUESTS VERIFICATION'

| Presentation Context Table |                   |                                                                              |                                                             |      |           |
|----------------------------|-------------------|------------------------------------------------------------------------------|-------------------------------------------------------------|------|-----------|
| Abstract Syntax            |                   | Transfer Syntax                                                              |                                                             | Role | Ext. Neg. |
| Name                       | UID               | Name List                                                                    | UID List                                                    |      |           |
| Verification               | 1.2.840.10008.1.1 | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2 | SCP  | None      |

#### 4.2.1.3.2.2.1 Extended Negotiation

No extended negotiation is performed.

#### 4.2.1.3.2.3 SOP Specific Conformance

##### 4.2.1.3.2.3.1 SOP Specific Conformance to Verification SOP Classes

STORAGE-SCP provides standard conformance to the Verification Service Class.

##### 4.2.1.3.2.3.2 Presentation Context Acceptance Criterion

STORAGE-SCP will accept all presentation contexts which contain the supported SOP class and one of the supported transfer syntaxes.

##### 4.2.1.3.2.3.3 Transfer Syntax Selection Policies

The default behavior of STORAGE-SCP is to select for each presentation context containing a supported SOP class the explicit VR transfer syntax with the byte order matching the local machine byte order. If this transfer syntax is not available, the explicit VR transfer syntax with opposite byte order is selected. If this is also unavailable, implicit VR little endian is selected if available, otherwise the presentation context is rejected.

## 4.2.2 STORAGE-SCU

### 4.2.2.0 SOP Classes

STORAGE-SCU provides standard conformance to the following DICOM SOP classes.

Table 4.2-9  
SOP CLASSES FOR AE STORAGE-SCU

| SOP Class Name                               | SOP Class UID                 | SCU | SCP |
|----------------------------------------------|-------------------------------|-----|-----|
| Verification SOP Class                       | 1.2.840.10008.1.1             | Yes | No  |
| Computed Radiography Image Storage           | 1.2.840.10008.5.1.4.1.1.1     | Yes | No  |
| CT Image Storage                             | 1.2.840.10008.5.1.4.1.1.2     | Yes | No  |
| Digital X-Ray Image Storage For Presentation | 1.2.840.10008.5.1.4.1.1.1.1.1 | Yes | No  |
| Digital X-Ray Image Storage For Processing   | 1.2.840.10008.5.1.4.1.1.1.1   | Yes | No  |
| Enhanced CT Image Storage                    | 1.2.840.10008.5.1.4.1.1.2.1   | Yes | No  |
| Enhanced MR Image Storage                    | 1.2.840.10008.5.1.4.1.1.4.1   | Yes | No  |
| MR Image Storage                             | 1.2.840.10008.5.1.4.1.1.4     | Yes | No  |
| Multi-frame Single Bit SC Image Storage      | 1.2.840.10008.5.1.4.1.1.7.1   | Yes | No  |
| Multi-frame Grayscale Byte SC Image Storage  | 1.2.840.10008.5.1.4.1.1.7.2   | Yes | No  |
| Multi-frame Grayscale Word SC Image Storage  | 1.2.840.10008.5.1.4.1.1.7.3   | Yes | No  |
| Multi-frame True Color SC Image Storage      | 1.2.840.10008.5.1.4.1.1.7.4   | Yes | No  |
| Nuclear Medicine Image Storage               | 1.2.840.10008.5.1.4.1.1.20    | Yes | No  |
| Encapsulated PDF Storage                     | 1.2.840.10008.5.1.4.1.1.104.1 | Yes | No  |
| Positron Emission Tomography Image Storage   | 1.2.840.10008.5.1.4.1.1.128   | Yes | No  |
| Secondary Capture Image Storage              | 1.2.840.10008.5.1.4.1.1.7     | Yes | No  |
| Surface Segmentation Storage                 | 1.2.840.10008.5.1.4.1.1.66.5  | Yes | No  |
| Ultrasound Image Storage                     | 1.2.840.10008.5.1.4.1.1.6.1   | Yes | No  |
| Ultrasound Multi-frame Image Storage         | 1.2.840.10008.5.1.4.1.1.3.1   | Yes | No  |
| X-Ray Angiographic Image Storage             | 1.2.840.10008.5.1.4.1.1.12.1  | Yes | No  |

### 4.2.2.1 Association Policies

#### 4.2.2.1.1 General

STORAGE-SCU initiates but never accepts associations. The DICOM standard application context name, which is always proposed, is:

Table 4.2-10  
DICOM APPLICATION CONTEXT

|                          |                       |
|--------------------------|-----------------------|
| Application context name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

The PDU size is in the range 4096 to 131072 bytes. The default is 16384 bytes.

SOP Class extended negotiation is not supported.

### 4.2.2.1.2 *Number of Associations*

Table 4.2-11

NUMBER OF ASSOCIATIONS AS AN ASSOCIATION INITIATOR FOR AE STORAGE-SCU

|                                             |                                    |
|---------------------------------------------|------------------------------------|
| Maximum number of simultaneous associations | Dependent on system specifications |
|---------------------------------------------|------------------------------------|

### 4.2.2.1.3 *Asynchronous Nature*

Asynchronous mode of operation is not supported.

### 4.2.2.1.4 *Implementation Identifying Information*

Table 4.2-12

DICOM IMPLEMENTATION CLASS AND VERSION FOR AE STORAGE-SCU

|                             |                             |
|-----------------------------|-----------------------------|
| Implementation Class UID    | 1.3.6.1.4.1.53684.1.0.3.6.5 |
| Implementation Version Name | CVI42_DCMTK_365             |

### 4.2.2.2 Association Initiation Policy

STORAGE-SCU attempts to initiate a new association each time the user requests to send a group of instances. In case a large number of instances are to be sent, multiple subsequent associations are initiated each used to send only a part of the instances.

### 4.2.2.2.1 *Activity – Local user requests sending instance(s)*

#### 4.2.2.2.1.1 Description and Sequencing of Activities

For each group of instances selected from the user interface to be transferred, a single attempt will be made to transmit it to the selected remote AE. If the send fails, no retry will be performed but an error message will be reported to the user.

#### 4.2.2.2.1.2 Proposed Presentation Contexts

Table 4.2-13

PROPOSED PRESENTATION CONTEXTS FOR AE STORAGE-SCU AND REAL-WORLD ACTIVITY 'LOCAL USER REQUESTS SENDING INSTANCE(S)'

| Presentation Context Table         |                           |                                                                              |                                                             |      |           |
|------------------------------------|---------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------|------|-----------|
| Abstract Syntax                    |                           | Transfer Syntax                                                              |                                                             | Role | Ext. Neg. |
| Name                               | UID                       | Name List                                                                    | UID List                                                    |      |           |
| Computed Radiography Image Storage | 1.2.840.10008.5.1.4.1.1.1 | JPEG Baseline (P1)                                                           | 1.2.840.10008.1.2.4.50                                      | SCU  | None      |
|                                    |                           | JPEG Lossless (P14SV1)                                                       | 1.2.840.10008.1.2.4.70                                      | SCU  | None      |
|                                    |                           | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2 | SCU  | None      |
| CT Image Storage                   | 1.2.840.10008.5.1.4.1.1.2 | JPEG Baseline (P1)                                                           | 1.2.840.10008.1.2.4.50                                      | SCU  | None      |
|                                    |                           | JPEG Lossless (P14SV1)                                                       | 1.2.840.10008.1.2.4.70                                      | SCU  | None      |
|                                    |                           | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2 | SCU  | None      |

|                                             |                               |                                                                                                        |                                                              |     |      |
|---------------------------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----|------|
| Digital X-Ray Image Storage For Processing  | 1.2.840.10008.5.1.4.1.1.1.1.1 | JPEG Baseline (P1)                                                                                     | 1.2.840.10008.1.2.4.50                                       | SCU | None |
|                                             |                               | JPEG Lossless (P14SV1)                                                                                 | 1.2.840.10008.1.2.4.70                                       | SCU | None |
|                                             |                               | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian                           | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2  | SCU | None |
| Enhanced MR Image Storage                   | 1.2.840.10008.5.1.4.1.1.4.1   | JPEG Baseline (P1)                                                                                     | 1.2.840.10008.1.2.4.50                                       | SCU | None |
|                                             |                               | JPEG Lossless (P14SV1)                                                                                 | 1.2.840.10008.1.2.4.70                                       | SCU | None |
|                                             |                               | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian                           | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2  | SCU | None |
| MR Image Storage                            | 1.2.840.10008.5.1.4.1.1.4     | JPEG Baseline (P1)                                                                                     | 1.2.840.10008.1.2.4.50                                       | SCU | None |
|                                             |                               | JPEG Lossless (P14SV1)                                                                                 | 1.2.840.10008.1.2.4.70                                       | SCU | None |
|                                             |                               | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian                           | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2  | SCU | None |
| Multi-frame Single Bit SC Image Storage     | 1.2.840.10008.5.1.4.1.1.7.1   | JPEG Baseline (P1)                                                                                     | 1.2.840.10008.1.2.4.50                                       | SCU | None |
|                                             |                               | JPEG Lossless (P14SV1)                                                                                 | 1.2.840.10008.1.2.4.70                                       | SCU | None |
|                                             |                               | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian                           | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2  | SCU | None |
| Multi-frame Grayscale Byte SC Image Storage | 1.2.840.10008.5.1.4.1.1.7.2   | JPEG Baseline (P1)                                                                                     | 1.2.840.10008.1.2.4.50                                       | SCU | None |
|                                             |                               | JPEG Lossless (P14SV1)                                                                                 | 1.2.840.10008.1.2.4.70                                       | SCU | None |
|                                             |                               | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian                           | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2  | SCU | None |
| Multi-frame Grayscale Word SC Image Storage | 1.2.840.10008.5.1.4.1.1.7.3   | JPEG Baseline (P1)                                                                                     | 1.2.840.10008.1.2.4.50                                       | SCU | None |
|                                             |                               | JPEG Lossless (P14SV1)                                                                                 | 1.2.840.10008.1.2.4.70                                       | SCU | None |
|                                             |                               | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian                           | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2  | SCU | None |
| Multi-frame True Color SC Image Storage     | 1.2.840.10008.5.1.4.1.1.7.4   | JPEG Baseline (P1)                                                                                     | 1.2.840.10008.1.2.4.50                                       | SCU | None |
|                                             |                               | JPEG Lossless (P14SV1)                                                                                 | 1.2.840.10008.1.2.4.70                                       | SCU | None |
|                                             |                               | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian                           | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2  | SCU | None |
| Nuclear Medicine Image Storage              | 1.2.840.10008.5.1.4.1.1.20    | JPEG Baseline (P1)                                                                                     | 1.2.840.10008.1.2.4.50                                       | SCU | None |
|                                             |                               | JPEG Lossless (P14SV1)                                                                                 | 1.2.840.10008.1.2.4.70                                       | SCU | None |
|                                             |                               | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian                           | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2  | SCU | None |
| Encapsulated PDF Storage                    | 1.2.840.10008.5.1.4.1.1.104.1 | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian, Deflated Explicit VR LE, | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2, | SCU | None |

|                                                        |                                  |                                                                                                                                 |                                                                                                                       |     |      |
|--------------------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----|------|
|                                                        |                                  | RLE Lossless                                                                                                                    | 1.2.840.10008.1.2.1.99<br>, 1.2.840.10008.1.2.5                                                                       |     |      |
| Positron<br>Emission<br>Tomography<br>Image<br>Storage | 1.2.840.10008<br>.5.1.4.1.1.128  | JPEG Baseline (P1)                                                                                                              | 1.2.840.10008.1.2.4.50                                                                                                | SCU | None |
|                                                        |                                  | JPEG Lossless (P14SV1)                                                                                                          | 1.2.840.10008.1.2.4.70                                                                                                | SCU | None |
|                                                        |                                  | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian                                              | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2                                                     | SCU | None |
| Secondary<br>Capture<br>Image<br>Storage               | 1.2.840.10008<br>.5.1.4.1.1.7    | JPEG Baseline (P1)                                                                                                              | 1.2.840.10008.1.2.4.50                                                                                                | SCU | None |
|                                                        |                                  | JPEG Lossless (P14SV1)                                                                                                          | 1.2.840.10008.1.2.4.70                                                                                                | SCU | None |
|                                                        |                                  | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian                                              | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2                                                     | SCU | None |
| Surface<br>Segmentation<br>Storage                     | 1.2.840.10008<br>.5.1.4.1.1.66.5 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian,<br>Deflated Explicit VR LE,<br>RLE Lossless | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2,<br>1.2.840.10008.1.2.1.99<br>, 1.2.840.10008.1.2.5 | SCU | None |
| Ultrasound<br>Image<br>Storage                         | 1.2.840.10008<br>.5.1.4.1.1.6.1  | JPEG Baseline (P1)                                                                                                              | 1.2.840.10008.1.2.4.50                                                                                                | SCU | None |
|                                                        |                                  | JPEG Lossless (P14SV1)                                                                                                          | 1.2.840.10008.1.2.4.70                                                                                                | SCU | None |
|                                                        |                                  | RLE Lossless                                                                                                                    | 1.2.840.10008.1.2.5                                                                                                   | SCU | None |
|                                                        |                                  | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian                                              | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2                                                     | SCU | None |
| Ultrasound<br>Multi-frame<br>Image<br>Storage          | 1.2.840.10008<br>.5.1.4.1.1.3.1  | JPEG Baseline (P1)                                                                                                              | 1.2.840.10008.1.2.4.50                                                                                                | SCU | None |
|                                                        |                                  | JPEG Lossless (P14SV1)                                                                                                          | 1.2.840.10008.1.2.4.70                                                                                                | SCU | None |
|                                                        |                                  | RLE Lossless                                                                                                                    | 1.2.840.10008.1.2.5                                                                                                   | SCU | None |
|                                                        |                                  | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian                                              | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2                                                     | SCU | None |
| X-Ray<br>Angiographic<br>Image<br>Storage              | 1.2.840.10008<br>.5.1.4.1.1.12.1 | JPEG Baseline (P1)                                                                                                              | 1.2.840.10008.1.2.4.50                                                                                                | SCU | None |
|                                                        |                                  | JPEG Lossless (P14SV1)                                                                                                          | 1.2.840.10008.1.2.4.70                                                                                                | SCU | None |
|                                                        |                                  | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian                                              | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2                                                     | SCU | None |

STORAGE-SCU will always propose all Presentation Contexts, independently of the instances that are to be sent.

#### 4.2.2.2.1.2.1 Extended Negotiation

No extended negotiation is performed.

#### 4.2.2.2.1.3 SOP Specific Conformance

##### 4.2.2.2.1.3.1 SOP Specific Conformance to Storage SOP Classes

STORAGE-SCU provides standard conformance to the Storage Service Class.

#### 4.2.2.2.1.3.2 Presentation Context Acceptance Criterion

STORAGE-SCU does not accept associations.

#### 4.2.2.2.1.3.3 Transfer Syntax Selection Policies

If offered a choice of transfer syntaxes in the accepted presentation contexts, the default behavior of STORAGE-SCU is to prefer the transfer syntax that is used for the DICOM file stored on the local system. If this transfer syntax is not available, an explicit VR uncompressed transfer syntax is selected. If this is also unavailable, implicit VR little endian is selected. Finally, any matching presentation context is accepted independent of the transfer syntax.

The default behavior may be modified by changing the configuration of STORAGE-SCU.

#### 4.2.2.2.1.3.4 Response Status

STORAGE-SCU will behave as described in the Table below when receiving the C-STORE response command message.

Table 4.2-14

RESPONSE STATUS HANDLING BEHAVIOR FOR AE STORAGE-SCU AND  
REAL-WORLD ACTIVITY 'LOCAL USER REQUESTS SENDING INSTANCE(S)'

| Service Status | Further Meaning                   | Error Code | Behavior                                                                                                                                                        |
|----------------|-----------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Refused        | Out of resources                  | A7xx       | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                     |
| Error          | Data set does not match SOP class | A9xx       | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                     |
|                | Cannot understand                 | Cxxx       | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                     |
| Warning        |                                   | Bxxx       | Transmission of the DICOM instance is considered successful.<br>A warning message is output to the service logs.<br>No message is posted to the user interface. |
| Success        |                                   | 0000       | The DICOM instance was successfully received by the remote AE.<br>No message is reported to the service logs or posted to the user interface.                   |

Table 4.2-15

COMMUNICATION FAILURE BEHAVIOR FOR AE STORAGE-SCU AND  
REAL-WORLD ACTIVITY 'LOCAL USER REQUESTS SENDING INSTANCE(S)'

| Exception                                                                                            | Behavior                                                                         |
|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| TCP/IP connection could not be established within the specified time range (configurable parameter). | An error message is reported to both the service logs and to the user interface. |

|                                                                                                                                        |                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| ASCE response message could not be received within the specified time range (configurable parameter).                                  | An error message is reported to both the service logs and to the user interface. |
| DIMSE response message could not be received within the specified time range (configurable parameter).                                 | An error message is reported to both the service logs and to the user interface. |
| Association aborted by the SCP using A-ABORT or the network layers indicate communication loss (i. e. low-level TCP/IP socket closure) | An error message is reported to both the service logs and to the user interface. |

### 4.2.2.3 Association Acceptance Policy

STORAGE-SCU does not accept associations.

## 4.2.3 STORAGE COMMITMENT-SCP

### 4.2.3.0 SOP Classes

STORAGE COMMITMENT-SCP provides standard conformance to the following DICOM SOP classes.

Table 4.2-16  
SOP CLASSES FOR AE STORAGE COMMITMENT-SCP

| SOP Class Name                          | SOP Class UID        | SCU | SCP |
|-----------------------------------------|----------------------|-----|-----|
| Storage Commitment Push Model SOP Class | 1.2.840.10008.1.20.1 | No  | Yes |

### 4.2.3.1 Association Policies

#### 4.2.3.1.1 General

STORAGE COMMITMENT-SCP accepts associations and supports both synchronous and asynchronous mode for sending response messages depending on the remote AE's behavior. The DICOM standard application context name, which is always proposed, is:

Table 4.2-17  
DICOM APPLICATION CONTEXT

|                          |                       |
|--------------------------|-----------------------|
| Application context name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

The PDU size is in the range 4096 to 131072 bytes. The default is 16384 bytes.

SOP Class extended negotiation is not supported.

#### 4.2.3.1.2 Number of Associations

Table 4.2-18  
NUMBER OF ASSOCIATIONS AS AN ASSOCIATION ACCEPTOR STORAGE COMMITMENT-SCP

|                                             |                                    |
|---------------------------------------------|------------------------------------|
| Maximum number of simultaneous associations | Dependent on system specifications |
|---------------------------------------------|------------------------------------|

#### 4.2.3.1.3 Asynchronous Nature

STORAGE COMMITMENT-SCP may initiate a new association request if the remote AE releases the previous association. When **TruPlan** completes the verification storage commitment of requested files, it creates a new association if required prior to sending N-EVENT-REPORT request. If the remote AE does not release the previous association, **TruPlan** sends N-EVENT-REPORT request on the same association.

#### 4.2.3.1.4 Implementation Identifying Information

Table 4.2-19

DICOM IMPLEMENTATION CLASS AND VERSION FOR AE STORAGE COMMITMENT-SCP

|                             |                             |
|-----------------------------|-----------------------------|
| Implementation Class UID    | 1.3.6.1.4.1.53684.1.0.3.6.5 |
| Implementation Version Name | CVI42_DCMTK_365             |

#### 4.2.3.2 Association Initiation Policy

STORAGE COMMITMENT-SCP may initiate a new association if a remote AE releases an association after receiving N-ACTION-RSP. Please refer to 4.2.3.3 for the association initiation policy as the contents are identical.

#### 4.2.3.3 Association Acceptance Policy

STORAGE COMMITMENT-SCP accepts any association for which at least one presentation context is accepted. Association requests may be rejected with the following status codes and reasons.

Table 4.2-20

ASSOCIATION REJECTION REASONS

| Result             | Source                         | Reason                                 | Description                                  |
|--------------------|--------------------------------|----------------------------------------|----------------------------------------------|
| Rejected permanent | Provider, presentation related | Temporary congestion                   | Resource limitation: process creation failed |
| Rejected transient | User                           | Application context name not supported | Incorrect application context name           |

#### 4.2.3.3.1 Activity – Remote AE requests storage commitment of instances

##### 4.2.3.3.1.1 Description and Sequencing of Activities

As storage commitment request is received from a remote AE, STORAGE COMMITMENT-SCP will process the request and send a response to the remote system.

There are two steps in sending a response. First, STORAGE COMMITMENT-SCP sends N-ACTION response which is an acknowledgement of the request. Then after having processed all requests, an N-EVENT-REPORT request is sent which includes the processed dataset.

##### 4.2.3.3.1.2 Accepted Presentation Contexts

Table 4.2-21

ACCEPTED PRESENTATION CONTEXTS FOR AE STORAGE COMMITMENT-SCP

| Presentation Context Table |                 |  |  |
|----------------------------|-----------------|--|--|
| Abstract Syntax            | Transfer Syntax |  |  |

| Name                                    | UID                  | Name List                                                                          | UID List                                                          | Role | Ext. Neg. |
|-----------------------------------------|----------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------|------|-----------|
| Storage Commitment Push Model SOP Class | 1.2.840.10008.1.20.1 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2 | SCP  | None      |

#### 4.2.3.3.1.2.1 Extended Negotiation

No extended negotiation is performed.

### 4.2.3.3.1.3 SOP Specific Conformance

#### 4.2.3.3.1.3.1 SOP Specific Conformance to Storage Commitment Push Model SOP Classes

STORAGE COMMITMENT-SCP provides standard conformance to the Storage Commitment Service Class.

#### 4.2.3.3.1.3.2 Response Status

STORAGE COMMITMENT-SCP will behave as described in the Table below, when generating the C-FIND response message.

Table 4.2-22

RESPONSE STATUS HANDLING BEHAVIOR FOR AE STORAGE COMMITMENT-SCP

| Service Status | Further Meaning                   | Error Code | Behavior                                                                                                                                                                 |
|----------------|-----------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Refused        | Out of resources                  | A7xx       | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                              |
| Error          | Data set does not match SOP class | A9xx       | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                              |
|                | Cannot understand                 | Cxxx       | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                              |
| Success        |                                   | 0000       | The DICOM Storage Commitment response message was successfully received by the remote AE.<br>No message is reported to the service logs or posted to the user interface. |

## 4.2.4 STORAGE COMMITMENT-SCU

### 4.2.4.0 SOP Classes

STORAGE COMMITMENT-SCU provides standard conformance to the following DICOM SOP classes.

Table 4.2-23  
SOP CLASSES FOR AE STORAGE COMMITMENT-SCU

| SOP Class Name                          | SOP Class UID        | SCU | SCP |
|-----------------------------------------|----------------------|-----|-----|
| Storage Commitment Push Model SOP Class | 1.2.840.10008.1.20.1 | Yes | No  |

### 4.2.4.1 Association Policies

#### 4.2.4.1.1 General

STORAGE COMMITMENT-SCU initiates but never accepts associations. The DICOM standard application context name, which is always proposed, is:

Table 4.2-24  
DICOM APPLICATION CONTEXT

|                          |                       |
|--------------------------|-----------------------|
| Application context name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

The PDU size is in the range 4096 to 131072 bytes. The default is 16384 bytes.

SOP Class extended negotiation is not supported.

#### 4.2.4.1.2 Number of Associations

Table 4.2-25  
NUMBER OF ASSOCIATIONS AS AN ASSOCIATION INITIATOR FOR AE STORAGE COMMITMENT-SCU

|                                             |                                    |
|---------------------------------------------|------------------------------------|
| Maximum number of simultaneous associations | Dependent on system specifications |
|---------------------------------------------|------------------------------------|

#### 4.2.4.1.3 Asynchronous Nature

Asynchronous mode of operation is not supported.

#### 4.2.4.1.4 Implementation Identifying Information

Table 4.2-26  
DICOM IMPLEMENTATION CLASS AND VERSION FOR AE STORAGE-SCU

|                             |                             |
|-----------------------------|-----------------------------|
| Implementation Class UID    | 1.3.6.1.4.1.53684.1.0.3.6.5 |
| Implementation Version Name | CVI42_DCMTK_365             |

### 4.2.4.2 Association Initiation Policy

STORAGE COMMITMENT-SCU attempts to initiate a new association after each time the user has sent a group of instances using STORAGE-SCU application entity.

#### 4.2.4.2.1 Activity –Local user requests storage confirmation of instance(s)

##### 4.2.4.2.1.1 Description and Sequencing of Activities

After the user successfully sends a group of instances to a remote AE, STORAGE COMMITMENT-SCU will be invoked by transmitting a list that contains the group of instances previously sent.

Retries will be performed based on the configuration parameters. User will be reported with a list of unsuccessful transmissions.

#### 4.2.4.2.1.2 Proposed Presentation Contexts

Table 4.2-27

PROPOSED PRESENTATION CONTEXTS FOR AE STORAGE COMMITMENT-SCU AND  
REAL-WORLD ACTIVITY 'LOCAL USER REQUESTS STORAGE CONFIRMATION OF INSTANCES'

| Presentation Context Table              |                      |                                                                                    |                                                                   |      |           |
|-----------------------------------------|----------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------|------|-----------|
| Abstract Syntax                         |                      | Transfer Syntax                                                                    |                                                                   | Role | Ext. Neg. |
| Name                                    | UID                  | Name List                                                                          | UID List                                                          |      |           |
| Storage Commitment Push Model SOP Class | 1.2.840.10008.1.20.1 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2 | SCU  | None      |

STORAGE COMMITMENT-SCU will always propose all Presentation Contexts, independently of the instances that are to be sent.

##### 4.2.4.2.1.2.1 Extended Negotiation

No extended negotiation is performed.

#### 4.2.4.2.1.3 SOP Specific Conformance

##### 4.2.4.2.1.3.1 SOP Specific Conformance to Storage Commitment Push Model SOP Classes

STORAGE COMMITMENT-SCU provides standard conformance to the Storage Commitment Service Class.

##### 4.2.4.2.1.3.2 Presentation Context Acceptance Criterion

STORAGE COMMITMENT-SCU does not accept associations.

##### 4.2.4.2.1.3.3 Transfer Syntax Selection Policies

The default preferred transfer syntax is either explicit VR little endian or explicit VR big endian depending on the byte order of the local system. If this is unavailable, implicit VR little endian is selected.

##### 4.2.4.2.1.3.4 Response Status

STORAGE COMMITMENT-SCU will behave as described in the Table below when receiving the N-EVENT-REPORT response command message.

Table 4.2-28

RESPONSE STATUS HANDLING BEHAVIOR FOR AE STORAGE COMMITMENT-SCU AND  
REAL-WORLD ACTIVITY 'LOCAL USER REQUESTS STORAGE CONFIRMATION OF INSTANCES'

| Service Status | Further Meaning | Error Code | Behavior                                |
|----------------|-----------------|------------|-----------------------------------------|
| Refused        | Syntax error    | 01         | This is treated as a permanent failure. |

|         |                    |    |                                                                                                                                                                                                                |
|---------|--------------------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                    |    | An error message is reported to both the service logs and to the user interface.                                                                                                                               |
| Error   | Input file errors  | 2x | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                                                                    |
|         | Output file errors | 4x | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                                                                    |
|         | Network errors     | 6x | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                                                                    |
| Success |                    | 00 | The list of DICOM Instance(s) was successfully stored or not stored at the remote AE<br>If there are instances not properly stored, a message is reported to the service logs or posted to the user interface. |

#### 4.2.4.3 Association Acceptance Policy

In **TruPlan**, STORAGE COMMITMENT-SCU does not accept new associations and is expected to receive N-EVENT-REPORT request on the same association as N-ACTION.

## 4.2.5 FIND-SCU

### 4.2.5.0 SOP Classes

FIND-SCU provides standard conformance to the following DICOM SOP classes.

Table 4.2-29  
SOP CLASSES FOR AE FIND-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  |

### 4.2.5.1 Association Policies

#### 4.2.5.1.1 General

FIND-SCU initiates but never accepts associations. The DICOM standard application context name, which is always proposed, is:

Table 4.2-30  
DICOM APPLICATION CONTEXT

|                          |                       |
|--------------------------|-----------------------|
| Application context name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

The PDU size is in the range 4096 to 131072 bytes. The default is 16384 bytes.

SOP Class extended negotiation is not supported.

#### 4.2.5.1.2 *Number of Associations*

Table 4.2-31

NUMBER OF ASSOCIATIONS AS AN ASSOCIATION INITIATOR FOR AE FIND-SCU

|                                             |   |
|---------------------------------------------|---|
| Maximum number of simultaneous associations | 1 |
|---------------------------------------------|---|

#### 4.2.5.1.3 *Asynchronous Nature*

Asynchronous mode of operation is not supported.

#### 4.2.5.1.4 *Implementation Identifying Information*

Table 4.2-32

DICOM IMPLEMENTATION CLASS AND VERSION FOR AE FIND-SCU

|                             |                             |
|-----------------------------|-----------------------------|
| Implementation Class UID    | 1.3.6.1.4.1.53684.1.0.3.6.5 |
| Implementation Version Name | CVI42_DCMTK_365             |

### 4.2.5.2 Association Initiation Policy

FIND-SCU attempts to initiate a new association each time the user requests sending a query.

#### 4.2.5.2.1 *Activity – Local user requests sending a query*

##### 4.2.5.2.1.1 Description and Sequencing of Activities

A single attempt will be made to query the remote AE. If the query fails, no retry will be performed but an error message will be reported to the user. In case no error occurs, the result of the query is presented to the user as a list of studies.

##### 4.2.5.2.1.2 Proposed Presentation Contexts

Table 4.2-33

PROPOSED PRESENTATION CONTEXTS FOR AE FIND-SCU AND  
REAL-WORLD ACTIVITY 'LOCAL USER REQUESTS SENDING A QUERY'

| Presentation Context Table                         |                             |                                                                                    |                                                                   |      |           |
|----------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------|------|-----------|
| Abstract Syntax                                    |                             | Transfer Syntax                                                                    |                                                                   | Role | Ext. Neg. |
| Name                                               | UID                         | Name List                                                                          | UID List                                                          |      |           |
| Study Root Query/Retrieve Information Model – FIND | 1.2.840.10008.5.1.4.1.2.2.1 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2 | SCU  | None      |

By default, FIND-SCU will propose all uncompressed transfer syntaxes with local byte ordering first.

##### 4.2.5.2.1.2.1 Extended Negotiation

No extended negotiation is performed. In particular, relational queries are not supported.

##### 4.2.5.2.1.3 SOP Specific Conformance

#### 4.2.5.2.1.3.1 SOP Specific Conformance to C-FIND SOP Classes

FIND-SCU provides standard conformance to the supported C-FIND SOP Class.

Only a single information model, Study Root, is supported. All queries are initiated at the highest level of the information model (the STUDY level). No C-CANCEL requests are ever issued.

Unexpected attributes returned in a C-FIND response (those not requested) are not shown to the user but reported to the service logs. Requested return attributes not returned by the SCP are ignored and left blank in the list on the user interface. Non-matching responses returned by the SCP due to unsupported matching keys are not filtered locally by the FIND-SCU and, thus, will still be presented in the list. No attempt is made to filter out duplicate responses.

Table 4.2-34

STUDY ROOT REQUEST IDENTIFIER FOR AE FIND-SCU

| Attribute Name         | Tag          | Types of Matching       |
|------------------------|--------------|-------------------------|
| Specific Character Set | (0008,0005)  | Single Value            |
| Study Date             | (0008,0020)  | Universal, Single Value |
| Accession Number       | (0008, 0050) | Universal, Wildcard     |
| Modalities in Study    | (0008,0061)  | Single Value            |
| Study Description      | (0008,1030)  | Universal, Wildcard     |
| Patient's Name         | (0010,0010)  | Universal, Wildcard     |
| Patient's ID           | (0010,0020)  | Universal, Wildcard     |
| Patient's Birth Date   | (0010,0030)  | Universal, Single Value |
| Patient's Sex          | (0010,0040)  | Single Value            |
| Study Instance UID     | (0020,000D)  | Single Value            |

At least one of the listed attributes must be supplied with a non-empty value in order for the query to be sent.

#### 4.2.5.2.1.3.2 Presentation Context Acceptance Criterion

FIND-SCU does not accept associations.

#### 4.2.5.2.1.3.3 Transfer Syntax Selection Policies

Since FIND-SCU proposes a single presentation context only, the SCP is responsible for the transfer syntax selection.

#### 4.2.5.2.1.3.4 Response Status

FIND-SCU will behave as described in the Table below when receiving the C-FIND response command message.

Table 4.2-35

RESPONSE STATUS HANDLING BEHAVIOR FOR AE FIND-SCU AND  
REAL-WORLD ACTIVITY 'LOCAL USER REQUESTS SENDING A QUERY'

| Service Status | Further Meaning  | Error Code | Behavior                                |
|----------------|------------------|------------|-----------------------------------------|
| Refused        | Out of resources | A700       | This is treated as a permanent failure. |

|         |                                                                                                                                       |      |                                                                                                                                                                                              |
|---------|---------------------------------------------------------------------------------------------------------------------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                                                                                                                                       |      | An error message is reported to both the service logs and to the user interface.                                                                                                             |
| Failed  | Data set does not match SOP class                                                                                                     | A900 | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                                                  |
|         | Unable to process                                                                                                                     | Cxxx | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                                                  |
| Cancel  | Matching terminated due to Cancel request                                                                                             | FE00 | A warning message is output to the service logs.<br>No message is posted to the user interface.<br>Should never occur since Cancel requests are never issued.                                |
| Success | Matching is complete – No final identifier is supplied                                                                                | 0000 | Current query is completed successfully; resulting list of studies is presented to the user.                                                                                                 |
| Pending | Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys           | FF00 | Current match is added to the internal list of studies but not yet presented to the user.                                                                                                    |
|         | Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier. | FF01 | Current match is added to the internal list of studies but not yet presented to the user.<br>A warning message is output to the service logs.<br>No message is posted to the user interface. |

Table 4.2-36

COMMUNICATION FAILURE BEHAVIOR FOR AE FIND-SCU AND  
REAL-WORLD ACTIVITY 'LOCAL USER REQUESTS SENDING A QUERY'

| Exception                                                                                                                              | Behavior                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| TCP/IP connection could not be established within the specified time range (configurable parameter).                                   | An error message is reported to both the service logs and to the user interface. |
| ASCE response message could not be received within the specified time range (configurable parameter).                                  | An error message is reported to both the service logs and to the user interface. |
| DIMSE response message could not be received within the specified time range (configurable parameter).                                 | An error message is reported to both the service logs and to the user interface. |
| Association aborted by the SCP using A-ABORT or the network layers indicate communication loss (i. e. low-level TCP/IP socket closure) | An error message is reported to both the service logs and to the user interface. |

### 4.2.5.3 Association Acceptance Policy

FIND-SCU does not accept associations.

## 4.2.6 FIND-SCP

### 4.2.6.0 SOP Classes

FIND-SCP provides standard conformance to the following DICOM SOP classes.

Table 4.2-37  
SOP CLASSES FOR AE FIND-SCP

| SOP Class Name                                        | SOP Class UID               | SCU | SCP |
|-------------------------------------------------------|-----------------------------|-----|-----|
| Study Root Query/Retrieve Information Model<br>– FIND | 1.2.840.10008.5.1.4.1.2.2.1 | No  | Yes |

### 4.2.6.1 Association Policies

#### 4.2.6.1.1 General

FIND-SCP accepts but never initiates associations. The DICOM standard application context name, which is always proposed, is:

Table 4.2-38  
DICOM APPLICATION CONTEXT

|                          |                       |
|--------------------------|-----------------------|
| Application context name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

The PDU size is in the range 4096 to 131072 bytes. The default is 16384 bytes.

SOP Class extended negotiation is not supported.

#### 4.2.6.1.2 Number of Associations

Table 4.2-39  
NUMBER OF ASSOCIATIONS AS AN ASSOCIATION ACCEPTOR FIND-SCP

|                                             |                                    |
|---------------------------------------------|------------------------------------|
| Maximum number of simultaneous associations | Dependent on system specifications |
|---------------------------------------------|------------------------------------|

#### 4.2.6.1.3 Asynchronous Nature

Asynchronous mode of operation is not supported.

#### 4.2.6.1.4 Implementation Identifying Information

Table 4.2-40  
DICOM IMPLEMENTATION CLASS AND VERSION FOR AE FIND-SCP

|                             |                             |
|-----------------------------|-----------------------------|
| Implementation Class UID    | 1.3.6.1.4.1.53684.1.0.3.6.5 |
| Implementation Version Name | CVI42_DCMTK_365             |

### 4.2.6.2 Association Initiation Policy

FIND-SCP does not initiate associations.

### 4.2.6.3 Association Acceptance Policy

FIND-SCP accepts any association for which at least one presentation context is accepted. Association requests may be rejected with the following status codes and reasons.

Table 4.2-41

ASSOCIATION REJECTION REASONS

| Result             | Source                         | Reason                                 | Description                                  |
|--------------------|--------------------------------|----------------------------------------|----------------------------------------------|
| Rejected permanent | Provider, presentation related | Temporary congestion                   | Resource limitation: process creation failed |
| Rejected transient | User                           | Application context name not supported | Incorrect application context name           |

#### 4.2.6.3.1 Activity – Remote AE sends a query request

##### 4.2.6.3.1.1 Description and Sequencing of Activities

As query request is received from a remote AE, FIND-SCP will process the request and send a response to the remote system.

##### 4.2.6.3.1.2 Accepted Presentation Contexts

Table 4.2-42

ACCEPTED PRESENTATION CONTEXTS FOR AE FIND-SCP

| Presentation Context Table                         |                             |                                                                              |                                                             |      |           |
|----------------------------------------------------|-----------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------|------|-----------|
| Abstract Syntax                                    |                             | Transfer Syntax                                                              |                                                             | Role | Ext. Neg. |
| Name                                               | UID                         | Name List                                                                    | UID List                                                    |      |           |
| Study Root Query/Retrieve Information Model – FIND | 1.2.840.10008.5.1.4.1.2.2.1 | Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian | 1.2.840.10008.1.2, 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.2 | SCU  | None      |

##### 4.2.6.3.1.2.1 Extended Negotiation

No extended negotiation is performed.

##### 4.2.6.3.1.3 SOP Specific Conformance

##### 4.2.6.3.1.3.1 SOP Specific Conformance to C-FIND SOP Classes

FIND-SCP provides standard conformance to the supported C-FIND SOP Class.

Table 4.2-43

STUDY ROOT REQUEST IDENTIFIER FOR AE FIND-SCP

| Attribute Name   | Tag          | Types of Matching       |
|------------------|--------------|-------------------------|
| Study Date       | (0008,0020)  | Universal, Single Value |
| Accession Number | (0008, 0050) | Universal, Wildcard     |

|                      |             |                         |
|----------------------|-------------|-------------------------|
| Modalities in Study  | (0008,0061) | None                    |
| Study Description    | (0008,1030) | Universal, Wildcard     |
| Patient's Name       | (0010,0010) | Universal, Wildcard     |
| Patient's ID         | (0010,0020) | Universal, Wildcard     |
| Patient's Birth Date | (0010,0030) | Universal, Single Value |
| Patient's Sex        | (0010,0040) | None                    |
| Study Instance UID   | (0020,000D) | None                    |

#### 4.2.6.3.1.3.2 Response Status

FIND-SCP will behave as described in the Table below, when generating the C-FIND response message.

Table 4.2-44

RESPONSE STATUS HANDLING BEHAVIOR FOR AE FIND-SCP

| Service Status | Further Meaning                                        | Error Code | Behavior                                                                                                                                                      |
|----------------|--------------------------------------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Refused        | Out of resources                                       | A700       | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                   |
| Failed         | Data set does not match SOP class                      | A900       | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                   |
|                | Unable to process                                      | Cxxx       | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                   |
| Cancel         | Matching terminated due to Cancel request              | FE00       | A warning message is output to the service logs.<br>No message is posted to the user interface.<br>Should never occur since Cancel requests are never issued. |
| Success        | Matching is complete – No final identifier is supplied | 0000       | Current query is completed successfully;<br>resulting list of studies is send in a response.                                                                  |

## 4.2.7 MOVE-SCU, GET-SCU

### 4.2.7.0 SOP Classes

MOVE-SCU, GET-SCU provides standard conformance to the following DICOM SOP classes.

Table 4.2-45

SOP CLASSES FOR AE MOVE-SCU

| SOP Class Name | SOP Class UID | SCU | SCP |
|----------------|---------------|-----|-----|
|----------------|---------------|-----|-----|

|                                                    |                             |     |    |
|----------------------------------------------------|-----------------------------|-----|----|
| Study Root Query/Retrieve Information Model – MOVE | 1.2.840.10008.5.1.4.1.2.2.2 | Yes | No |
| Study Root Query/Retrieve Information Model – GET  | 1.2.840.10008.5.1.4.1.2.2.3 | Yes | No |

### 4.2.7.1 Association Policies

#### 4.2.7.1.1 General

MOVE-SCU, GET-SCU initiates but never accepts associations. The DICOM standard application context name, which is always proposed, is:

Table 4.2-46

DICOM APPLICATION CONTEXT

|                          |                       |
|--------------------------|-----------------------|
| Application context name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

The PDU size is in the range 4096 to 131072 bytes. The default is 16384 bytes.

SOP Class extended negotiation is not supported.

#### 4.2.7.1.2 Number of Associations

Table 4.2-47

NUMBER OF ASSOCIATIONS AS AN ASSOCIATION INITIATOR FOR AE MOVE-SCU

|                                             |   |
|---------------------------------------------|---|
| Maximum number of simultaneous associations | 1 |
|---------------------------------------------|---|

#### 4.2.7.1.3 Asynchronous Nature

Asynchronous mode of operation is not supported.

#### 4.2.7.1.4 Implementation Identifying Information

Table 4.2-48

DICOM IMPLEMENTATION CLASS AND VERSION FOR AE MOVE-SCU

|                             |                             |
|-----------------------------|-----------------------------|
| Implementation Class UID    | 1.3.6.1.4.1.53684.1.0.3.6.5 |
| Implementation Version Name | CVI42_DCMTK_365             |

### 4.2.7.2 Association Initiation Policy

MOVE-SCU, GET-SCU attempts to initiate a new association each time the user requests retrieval of particular studies. Each study is retrieved using a separate association, i. e. if the user selects multiple studies multiple successive associations are initiated.

#### 4.2.7.2.1 Activity – Local user requests sending a query

##### 4.2.7.2.1.1 Description and Sequencing of Activities

A single attempt will be made to retrieve a study from the remote AE. If the retrieval fails, no retry will be performed but an error message will be reported to the user.

##### 4.2.7.2.1.2 Proposed Presentation Contexts

Table 4.2-49

PROPOSED PRESENTATION CONTEXTS FOR AE MOVE-SCU, GET-SCU AND  
REAL-WORLD ACTIVITY 'LOCAL USER REQUESTS RETRIEVAL OF PARTICULAR STUDIES'

| Presentation Context Table                         |                             |                                                                                    |                                                                   |      |           |
|----------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------|------|-----------|
| Abstract Syntax                                    |                             | Transfer Syntax                                                                    |                                                                   | Role | Ext. Neg. |
| Name                                               | UID                         | Name List                                                                          | UID List                                                          |      |           |
| Study Root Query/Retrieve Information Model – MOVE | 1.2.840.10008.5.1.4.1.2.2.2 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2 | SCU  | None      |
| Study Root Query/Retrieve Information Model – GET  | 1.2.840.10008.5.1.4.1.2.2.3 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2 | SCU  | None      |

By default, MOVE-SCU, GET-SCU will propose all uncompressed transfer syntaxes with local byte ordering first.

#### 4.2.7.2.1.2.1 Extended Negotiation

No extended negotiation is performed.

#### 4.2.7.2.1.3 SOP Specific Conformance

##### 4.2.7.2.1.3.1 SOP Specific Conformance to C-MOVE, C-GET SOP Classes

MOVE-SCU provides standard conformance to the supported C-MOVE SOP Class.

GET-SCU provides standard conformance to the supported C-GET SOP Class.

Only a single information model, Study Root, is supported. All retrieval is performed at the highest level of the information model (the STUDY level). No C-CANCEL requests are ever issued.

The retrieval is performed from the same AE that was used for the query performed by FIND-SCU. The studies are retrieved to the local system by specifying the destination as the AE Title of the local STORAGE-SCP. This implies that the remote AE must be preconfigured to determine the presentation address corresponding to the STORAGE-SCP. The STORAGE-SCP will accept storage requests addressed to it from anywhere, so no pre-configuration of the local AE to accept associations from the remote AE is necessary.

Table 4.2-50

STUDY ROOT REQUEST IDENTIFIER FOR AE MOVE-SCU

| Attribute Name     | Tag         | Request Key               |
|--------------------|-------------|---------------------------|
| Study Instance UID | (0020,000D) | Single Study Instance UID |

#### 4.2.7.2.1.3.2 Presentation Context Acceptance Criterion

MOVE-SCU, GET-SCU does not accept associations.

#### 4.2.7.2.1.3.3 Transfer Syntax Selection Policies

Since MOVE-SCU proposes a single presentation context only, the SCP is responsible for the transfer syntax selection.

#### 4.2.7.2.1.3.4 Response Status

MOVE-SCU will behave as described in the Table below when receiving the C-MOVE response command message.

Table 4.2-51

RESPONSE STATUS HANDLING BEHAVIOR FOR AE MOVE-SCU AND  
REAL-WORLD ACTIVITY 'LOCAL USER REQUESTS RETRIEVAL OF PARTICULAR STUDIES'

| Service Status | Further Meaning                                          | Error Code | Behavior                                                                                                                                                      |
|----------------|----------------------------------------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Refused        | Out of resources – Unable to calculate number of matches | A700       | Retrieval is terminated.<br>An error message is reported to both the service logs and to the user interface.                                                  |
|                | Out of resources – Unable to perform sub-operations      | A701       | Retrieval is terminated.<br>An error message is reported to both the service logs and to the user interface.                                                  |
|                | Move destination unknown                                 | A801       | Retrieval is terminated.<br>An error message is reported to both the service logs and to the user interface.                                                  |
| Failed         | Data set does not match SOP class                        | A900       | Retrieval is terminated.<br>An error message is reported to both the service logs and to the user interface.                                                  |
|                | Unable to process                                        | Cxxx       | Retrieval is terminated.<br>An error message is reported to both the service logs and to the user interface.                                                  |
| Cancel         | Sub-operations terminated due to Cancel indication       | FE00       | A warning message is output to the service logs.<br>No message is posted to the user interface.<br>Should never occur since Cancel requests are never issued. |
| Warning        | Sub-operations complete – One or more failures           | B000       | Retrieval is considered successful.<br>A warning message is output to the service logs.<br>No message is posted to the user interface.                        |
| Success        | Sub-operations complete – No failures                    | 0000       | Current retrieval is completed successfully                                                                                                                   |
| Pending        | Sub-operations are continuing                            | FF00       | Retrieval continues                                                                                                                                           |

Table 4.2-52

COMMUNICATION FAILURE BEHAVIOR FOR AE MOVE-SCU AND  
REAL-WORLD ACTIVITY 'LOCAL USER REQUESTS RETRIEVAL OF PARTICULAR STUDIES'

| Exception | Behavior |
|-----------|----------|
|-----------|----------|

|                                                                                                                                        |                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| TCP/IP connection could not be established within the specified time range (configurable parameter).                                   | An error message is reported to both the service logs and to the user interface. |
| ASCE response message could not be received within the specified time range (configurable parameter).                                  | An error message is reported to both the service logs and to the user interface. |
| DIMSE response message could not be received within the specified time range (configurable parameter).                                 | An error message is reported to both the service logs and to the user interface. |
| Association aborted by the SCP using A-ABORT or the network layers indicate communication loss (i. e. low-level TCP/IP socket closure) | An error message is reported to both the service logs and to the user interface. |

#### 4.2.7.2.1.3.5 Sub-operation dependent behavior

Since the C-MOVE operation is dependent on completion of C-STORE sub-operations that are occurring on a separate association, the question of failure of operations on the other association(s) must be considered.

MOVE-SCU completely ignores whatever activities are taking place in relation to the STORAGE-SCP AE that is receiving the retrieved instances. Once the C-MOVE has been initiated, it runs to completion (or failure) as described in the C-MOVE response command message(s). There is no attempt by MOVE-SCU to confirm that instances have actually been successfully received or locally stored.

Whether or not completely or partially successfully retrievals are made available in the local system to the user is purely dependent on the success or failure of the C-STORE sub-operations, not on any explicit action by MOVE-SCU.

Whether or not the remote AE attempts to retry any failed C-STORE sub-operations is beyond the control of MOVE-SCU.

If the association on which the C-MOVE was issued is aborted for any reason, whether or not the C-STORE sub-operations continue is dependent on the remote AE; the local STORAGE-SCP will continue to accept associations and storage operations regardless.

### 4.2.7.3 Association Acceptance Policy

MOVE-SCU does not accept associations.

## 4.2.8 MOVE-SCP

### 4.2.8.0 SOP Classes

MOVE-SCP provides standard conformance to the following DICOM SOP classes.

Table 4.2-53  
SOP CLASSES FOR AE MOVE-SCP

| SOP Class Name | SOP Class UID | SCU | SCP |
|----------------|---------------|-----|-----|
|----------------|---------------|-----|-----|

|                                                    |                             |     |    |
|----------------------------------------------------|-----------------------------|-----|----|
| Study Root Query/Retrieve Information Model – MOVE | 1.2.840.10008.5.1.4.1.2.2.2 | Yes | No |
|----------------------------------------------------|-----------------------------|-----|----|

## 4.2.8.1 Association Policies

### 4.2.8.1.1 General

MOVE-SCP accepts but never initiates associations. The DICOM standard application context name, which is always proposed, is:

Table 4.2-54

DICOM APPLICATION CONTEXT

|                          |                       |
|--------------------------|-----------------------|
| Application context name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

The PDU size is in the range 4096 to 131072 bytes. The default is 16384 bytes.

SOP Class extended negotiation is not supported.

### 4.2.8.1.2 Number of Associations

Table 4.2-55

NUMBER OF ASSOCIATIONS AS AN ASSOCIATION INITIATOR FOR AE MOVE-SCP

|                                             |                                    |
|---------------------------------------------|------------------------------------|
| Maximum number of simultaneous associations | Dependent on system specifications |
|---------------------------------------------|------------------------------------|

### 4.2.8.1.3 Asynchronous Nature

Asynchronous mode of operation is not supported.

### 4.2.8.1.4 Implementation Identifying Information

Table 4.2-56

DICOM IMPLEMENTATION CLASS AND VERSION FOR AE MOVE-SCP

|                             |                             |
|-----------------------------|-----------------------------|
| Implementation Class UID    | 1.3.6.1.4.1.53684.1.0.3.6.5 |
| Implementation Version Name | CVI42_DCMTK_365             |

## 4.2.8.2 Association Initiation Policy

MOVE-SCP does not initiate associations.

## 4.2.8.3 Association Acceptance Policy

MOVE-SCP accepts any association for which at least one presentation context is accepted. Association requests may be rejected with the following status codes and reasons.

Table 4.2-57

ASSOCIATION REJECTION REASONS

| Result             | Source                         | Reason               | Description                                  |
|--------------------|--------------------------------|----------------------|----------------------------------------------|
| Rejected permanent | Provider, presentation related | Temporary congestion | Resource limitation: process creation failed |

|                    |      |                                        |                                    |
|--------------------|------|----------------------------------------|------------------------------------|
| Rejected transient | User | Application context name not supported | Incorrect application context name |
|--------------------|------|----------------------------------------|------------------------------------|

#### 4.2.8.3.1 Activity – Remote AE sends instance(s)

##### 4.2.8.3.1.1 Description and Sequencing of Activities

As move or get request is received from a remote AE, MOVE-SCP, GET-SCP will process the request and send a response to the remote system.

##### 4.2.8.3.1.2 Accepted Presentation Contexts

Table 4.2-58

ACCEPTED PRESENTATION CONTEXTS FOR AE FIND-SCP

| Presentation Context Table                         |                             |                                                                                    |                                                                   |      |           |
|----------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------|------|-----------|
| Abstract Syntax                                    |                             | Transfer Syntax                                                                    |                                                                   | Role | Ext. Neg. |
| Name                                               | UID                         | Name List                                                                          | UID List                                                          |      |           |
| Study Root Query/Retrieve Information Model – MOVE | 1.2.840.10008.5.1.4.1.2.2.2 | Implicit VR Little Endian,<br>Explicit VR Little Endian,<br>Explicit VR Big Endian | 1.2.840.10008.1.2,<br>1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.2 | SCP  | None      |

##### 4.2.8.3.1.2.1 Extended Negotiation

No extended negotiation is performed.

##### 4.2.8.3.1.3 SOP Specific Conformance

##### 4.2.8.3.1.3.1 SOP Specific Conformance to C-MOVE SOP Classes

MOVE-SCP provides standard conformance to the supported C-MOVE SOP Class.

Table 4.2-59

STUDY ROOT REQUEST IDENTIFIER FOR AE MOVE-SCP

| Attribute Name       | Tag          | Types of Matching       |
|----------------------|--------------|-------------------------|
| Study Date           | (0008,0020)  | Universal, Single Value |
| Accession Number     | (0008, 0050) | Universal, Wildcard     |
| Modalities in Study  | (0008,0061)  | None                    |
| Study Description    | (0008,1030)  | Universal, Wildcard     |
| Patient's Name       | (0010,0010)  | Universal, Wildcard     |
| Patient's ID         | (0010,0020)  | Universal, Wildcard     |
| Patient's Birth Date | (0010,0030)  | Universal, Single Value |
| Patient's Sex        | (0010,0040)  | None                    |
| Study Instance UID   | (0020,000D)  | None                    |

#### 4.2.8.3.1.3.2 Response Status

MOVE-SCP will behave as described in the Table below, when generating the C-FIND response message.

Table 4.2-60  
RESPONSE STATUS HANDLING BEHAVIOR FOR AE MOVE-SCP

| Service Status | Further Meaning                                        | Error Code | Behavior                                                                                                                                                      |
|----------------|--------------------------------------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Refused        | Out of resources                                       | A700       | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                   |
| Failed         | Data set does not match SOP class                      | A900       | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                   |
|                | Unable to process                                      | Cxxx       | This is treated as a permanent failure.<br>An error message is reported to both the service logs and to the user interface.                                   |
| Cancel         | Matching terminated due to Cancel request              | FE00       | A warning message is output to the service logs.<br>No message is posted to the user interface.<br>Should never occur since Cancel requests are never issued. |
| Success        | Matching is complete – No final identifier is supplied | 0000       | Current query is completed successfully; resulting list of studies is send in a response.                                                                     |

## 4.3 Physical Network interfaces

### 4.3.1 Physical Network Interface

The DICOM applications of TruPlan are indifferent to the physical medium over which TCP/IP is used.

### 4.3.2 Additional Protocols

When host names rather than IP addresses are used in the configuration to specify presentation addresses for remote AEs, the application is dependent on the name resolution mechanism of the underlying operating system.

### 4.3.3 IPv4 and IPv6 Support

TruPlan only supports IPv4 connections.

## 4.4 Configuration

The configuration can be changed by the user in the preferences dialog. Details are described in the user manual.

## 4.4.1 AE Title / Presentation Address Mapping

The Calling AE Title of the local AEs is configurable in the preferences dialog. The mapping of the logical name by which remote AEs are described in the user interface to Called AE Titles as well as presentation address (hostname or IP address and port number) is configurable in the preferences dialog.

### 4.4.1.0 Local AE Titles

Table 4.4-1  
AE TITLE CONFIGURATION TABLE

| Application Entity     | Default AE Title | Default TCP/IP Port |
|------------------------|------------------|---------------------|
| STORAGE-SCP            | TRUPLAN          | 2104                |
| STORAGE-SCU            | TRUPLAN          | -                   |
| STORAGE COMMITMENT-SCP | TRUPLAN          | 2104                |
| STORAGE COMMITMENT-SCU | TRUPLAN          | -                   |
| FIND-SCP               | TRUPLAN          | 2104                |
| FIND-SCU               | TRUPLAN          | -                   |
| MOVE-SCP               | TRUPLAN          | 2104                |
| MOVE-SCU               | TRUPLAN          | -                   |
| GET-SCU                | TRUPLAN          | -                   |

### 4.4.1.1 Remote AE Titles

The AE Title, host name or IP address and port number of remote AEs are configured in the preferences dialog.

## 4.4.2 Configurable Parameters

Concerning the STORAGE-SCP application entity, the following parameters are configurable at installation time. For additional parameters, see the user manual.

Table 4.4-2  
CONFIGURABLE PARAMETERS FOR AE STORAGE-SCP

| Parameter                                   | Configurable | Default Value                      |
|---------------------------------------------|--------------|------------------------------------|
| Run background process with STORAGE-SCP     | Yes          | Enabled                            |
| Time-out for ACSE messages                  | Yes          | 60 seconds                         |
| Time-out for DIMSE messages                 | Yes          | 60 seconds                         |
| Maximum PDU size the AE can receive         | No           | 16384                              |
| Maximum number of simultaneous associations | No           | Dependent on system specifications |

Concerning the STORAGE-SCU application entity, the following parameters are configurable at installation time.

Table 4.4-3  
CONFIGURABLE PARAMETERS FOR AE STORAGE-SCU

| Parameter                                               | Configurable | Default Value   |
|---------------------------------------------------------|--------------|-----------------|
| Time-out waiting for response to TCP/IP connect request | Yes          | 60 seconds      |
| Time-out for ACSE messages                              | Yes          | 60 seconds      |
| Time-out for DIMSE messages                             | Yes          | 60 seconds      |
| Maximum PDU size the AE can receive                     | Yes          | 16384           |
| Maximum PDU size the AE actually sends                  | Yes          | As negotiated   |
| Proposed network transfer syntaxes                      | Yes          | See 4.2.2.3.1.2 |
| Proposed networking SOP Classes                         | Yes          | See 4.2.2.3.1.2 |

Concerning the STORAGE COMMITMENT-SCP application entity, the following parameters are configurable at installation time.

Table 4.4-4  
CONFIGURABLE PARAMETERS FOR AE STORAGE COMMITMENT-SCP

| Parameter                                | Configurable | Default Value |
|------------------------------------------|--------------|---------------|
| Enable or disable STORAGE COMMITMENT-SCP | Yes          | Disabled      |

Concerning the STORAGE COMMITMENT-SCU application entity, the following parameters are configurable at installation time.

Table 4.4-5  
CONFIGURABLE PARAMETERS FOR AE STORAGE COMMITMENT-SCU

| Parameter                                               | Configurable | Default Value |
|---------------------------------------------------------|--------------|---------------|
| Enable or disable STORAGE COMMITMENT-SCU                | Yes          | Disabled      |
| Maximum number of retries                               | Yes          | 0             |
| Delay between retries (seconds)                         | Yes          | 0             |
| Time-out waiting for response to TCP/IP connect request | Yes          | 60 seconds    |
| Time-out for ACSE messages                              | Yes          | 60 seconds    |
| Time-out for DIMSE messages                             | Yes          | 60 seconds    |
| Maximum PDU size the AE can receive                     | No           | 16384         |

Concerning the FIND-SCU application entity, the following parameters are configurable at installation time.

Table 4.4-6  
CONFIGURABLE PARAMETERS FOR AE FIND-SCU

| Parameter                                               | Configurable | Default Value |
|---------------------------------------------------------|--------------|---------------|
| Time-out waiting for response to TCP/IP connect request | Yes          | 60 seconds    |
| Time-out for ACSE messages                              | Yes          | 60 seconds    |

|                                     |     |                 |
|-------------------------------------|-----|-----------------|
| Time-out for DIMSE messages         | Yes | 60 seconds      |
| Maximum PDU size the AE can receive | Yes | 16384           |
| Proposed network transfer syntaxes  | Yes | See 4.2.3.3.1.2 |

Concerning the MOVE-SCU application entity, the following parameters are configurable at installation time.

Table 4.4-7  
CONFIGURABLE PARAMETERS FOR AE MOVE-SCU

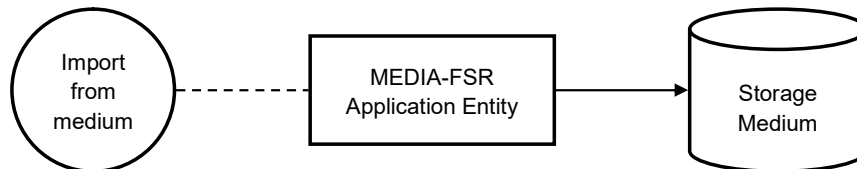
| <b>Parameter</b>                                        | <b>Configurable</b> | <b>Default Value</b> |
|---------------------------------------------------------|---------------------|----------------------|
| Time-out waiting for response to TCP/IP connect request | Yes                 | 60 seconds           |
| Time-out for ACSE messages                              | Yes                 | 60 seconds           |
| Time-out for DIMSE messages                             | Yes                 | 60 seconds           |
| Maximum PDU size the AE can receive                     | Yes                 | 16384                |
| Proposed network transfer syntaxes                      | Yes                 | See 4.2.4.3.1.2      |

## 5 MEDIA Storage

### 5.1 Implementation Model

#### 5.1.1 Application Data Flow Diagram

Conceptually, the media storage service which is implemented in the **TruPlan** system may be modeled as follows:



**Figure 5-1. Application Data Flow Diagram**

The MEDIA-FSR application entity reads DICOM images from a storage medium. The local real-world activity "Import from medium" is executed on user's request.

#### 5.1.2 Functional Definition of AEs

##### 5.1.2.0 Functional Definition of the MEDIA-FSR Application Entity

MEDIA-FSR is activated through the user interface to select a medium for import. All DICOM images that are referenced from the DICOMDIR on the storage medium are imported into the local database. In case the DICOMDIR file is missing, MEDIA-FSR scans all files on the storage medium and imports those DICOM images that are supported by the system.

#### 5.1.3 Sequencing of Real-World Activities

All activities of the MEDIA-FSR application entity are sequentially initiated in the user interface, and another activity may not be initiated until the prior activity has completed.

#### 5.1.4 File Meta Information for Implementation Class and Version

Not applicable.

### 5.2 AE Specifications

#### 5.2.1 MEDIA-FSR

The MEDIA-FSR application entity provides standard conformance to the DICOM Interchange Option of the Media Storage Service Class. The application profiles and roles are the following.

Table 5.2-1  
SUPPORTED APPLICATION PROFILES FOR AE MEDIA-FSR

| Application Profiles Supported | Real-World Activity | Role | SC Option   |
|--------------------------------|---------------------|------|-------------|
| STD-XABC-CD                    | Import from medium  | FSR  | Interchange |
| STD-XA1K-CD                    | Import from medium  | FSR  | Interchange |
| STD-XA1K-DVD                   | Import from medium  | FSR  | Interchange |
| STD-US-ID-SF-CD                | Import from medium  | FSR  | Interchange |
| STD-US-ID-MF-CD                | Import from medium  | FSR  | Interchange |
| STD-GEN-CD                     | Import from medium  | FSR  | Interchange |
| STD-CTMR-CD                    | Import from medium  | FSR  | Interchange |
| STD-CTMR-DVD                   | Import from medium  | FSR  | Interchange |
| STD-CTMR-DVD-RAM               | Import from medium  | FSR  | Interchange |

### 5.2.1.0 File Meta Information

Not applicable.

### 5.2.1.1 Real-World Activities

#### 5.2.1.1.1 Activity – Import from medium

The MEDIA-FSR application entity acts as an FSR using the interchange option when requested to import SOP instances from a storage medium to the local system.

##### 5.2.1.1.1.1 Media Storage Application Profiles

As listed in Table 5.2-1, MEDIA-FSR supports the STD-XABC-CD, STD-XA1K-CD, STD-XA1K-DVD, STD-US-ID-SF-CD, STD-US-ID-MF-CD, STD-GEN-CD, STD-CTMR-CD, STD-CTMR-DVD and STD-CTMR-DVD-RAM application profile for import.

##### 5.2.1.1.1.2 Options

The MEDIA-FSR application entity supports the following SOP classes and transfer syntaxes.

Table 5.2-2  
IODS, SOP CLASSES AND TRANSFER SYNTAXES FOR AE MEDIA-FSR

| Information Object Definition              | SOP Class UID                     | Transfer Syntax                                      | Transfer Syntax UID                            |
|--------------------------------------------|-----------------------------------|------------------------------------------------------|------------------------------------------------|
| Media Storage Directory Storage            | 1.2.840.10008.1.3.10              | Explicit VR Little Endian                            | 1.2.840.10008.1.2.1                            |
| Computed Radiography Image Storage         | 1.2.840.10008.5.1.4.1<br>.1.1     | Explicit VR Little Endian                            | 1.2.840.10008.1.2.1                            |
| CT Image Storage                           | 1.2.840.10008.5.1.4.1<br>.1.2     | Explicit VR Little Endian,<br>JPEG Lossless (P14SV1) | 1.2.840.10008.1.2.1,<br>1.2.840.10008.1.2.4.70 |
| Digital X-Ray Image Storage For Processing | 1.2.840.10008.5.1.4.1<br>.1.1.1.1 | Explicit VR Little Endian                            | 1.2.840.10008.1.2.1                            |

|                                              |                               |                                                                                             |                                                                                             |
|----------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Digital X-Ray Image Storage for Presentation | 1.2.840.10008.5.1.4.1.1.1.1   | Explicit VR Little Endian                                                                   | 1.2.840.10008.1.2.1                                                                         |
| Enhanced CT Image Storage                    | 1.2.840.10008.5.1.4.1.1.2.1   | Explicit VR Little Endian                                                                   | 1.2.840.10008.1.2.1                                                                         |
| Enhanced MR Image Storage                    | 1.2.840.10008.5.1.4.1.1.4.1   | Explicit VR Little Endian                                                                   | 1.2.840.10008.1.2.1                                                                         |
| MR Image Storage                             | 1.2.840.10008.5.1.4.1.1.4     | Explicit VR Little Endian, JPEG Lossless (P14SV1)                                           | 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.4.70                                                 |
| Multi-frame Single Bit SC Image Storage      | 1.2.840.10008.5.1.4.1.1.7.1   | Explicit VR Little Endian                                                                   | 1.2.840.10008.1.2.1                                                                         |
| Multi-frame Grayscale Byte SC Image Storage  | 1.2.840.10008.5.1.4.1.1.7.2   | Explicit VR Little Endian                                                                   | 1.2.840.10008.1.2.1                                                                         |
| Multi-frame Grayscale Word SC Image Storage  | 1.2.840.10008.5.1.4.1.1.7.3   | Explicit VR Little Endian                                                                   | 1.2.840.10008.1.2.1                                                                         |
| Multi-frame True Color SC Image Storage      | 1.2.840.10008.5.1.4.1.1.7.4   | Explicit VR Little Endian                                                                   | 1.2.840.10008.1.2.1                                                                         |
| Nuclear Medicine Image Storage               | 1.2.840.10008.5.1.4.1.1.20    | Explicit VR Little Endian                                                                   | 1.2.840.10008.1.2.1                                                                         |
| Encapsulated PDF Storage                     | 1.2.840.10008.5.1.4.1.1.104.1 | Explicit VR Little Endian                                                                   | 1.2.840.10008.1.2.1                                                                         |
| Positron Emission Tomography Image Storage   | 1.2.840.10008.5.1.4.1.1.128   | Explicit VR Little Endian                                                                   | 1.2.840.10008.1.2.1                                                                         |
| Secondary Capture Image Storage              | 1.2.840.10008.5.1.4.1.1.7     | Explicit VR Little Endian, JPEG Lossless (P14SV1)                                           | 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.4.70                                                 |
| Surface Segmentation Storage                 | 1.2.840.10008.5.1.4.1.1.66.5  | Explicit VR Little Endian                                                                   | 1.2.840.10008.1.2.1                                                                         |
| Ultrasound Image Storage                     | 1.2.840.10008.5.1.4.1.1.6.1   | Explicit VR Little Endian, RLE Lossless                                                     | 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.5                                                    |
| Ultrasound Multi-frame Image Storage         | 1.2.840.10008.5.1.4.1.1.3.1   | Explicit VR Little Endian, RLE Lossless, JPEG Baseline (P1)                                 | 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.5, 1.2.840.10008.1.2.4.50                            |
| X-Ray Angiographic Image Storage             | 1.2.840.10008.5.1.4.1.1.12.1  | Explicit VR Little Endian, JPEG Baseline (P1), JPEG Extended (P2+4), JPEG Lossless (P14SV1) | 1.2.840.10008.1.2.1, 1.2.840.10008.1.2.4.50, 1.2.840.10008.1.2.4.51, 1.2.840.10008.1.2.4.70 |

### 5.3 Augmented and Private Application Profiles

The MEDIA-FSR application entity does not use any augmented or private application profiles.

## ***5.4 Media Configuration***

Concerning the MEDIA-FSR application entity, there are no configurable parameters.

## 6 Support of extended character sets

TruPlan does support extended character sets.

Table 8.1

Supported extended character sets

|                 |                      |
|-----------------|----------------------|
| ISO_IR 100      | Latin alphabet No. 1 |
| ISO_IR 101      | Latin alphabet No. 2 |
| ISO_IR 109      | Latin alphabet No. 3 |
| ISO_IR 110      | Latin alphabet No. 4 |
| ISO_IR 144      | Cyrillic             |
| ISO_IR 127      | Arabic               |
| ISO_IR 126      | Greek                |
| ISO_IR 138      | Hebrew               |
| ISO_IR 148      | Latin alphabet No. 5 |
| ISO_IR 13       | Japanese             |
| ISO_IR 166      | Thai                 |
| ISO 2022 IR 6   | Default repertoire   |
| ISO 2022 IR 100 | Latin alphabet No. 1 |
| ISO 2022 IR 101 | Latin alphabet No. 2 |
| ISO 2022 IR 109 | Latin alphabet No. 3 |
| ISO 2022 IR 110 | Latin alphabet No. 4 |
| ISO 2022 IR 144 | Cyrillic             |
| ISO 2022 IR 127 | Arabic               |
| ISO 2022 IR 126 | Greek                |
| ISO 2022 IR 138 | Hebrew               |
| ISO 2022 IR 148 | Latin alphabet No. 5 |
| ISO 2022 IR 13  | Japanese             |
| ISO 2022 IR 166 | Thai                 |
| ISO 2022 IR 87  | Japanese             |
| ISO 2022 IR 159 | Japanese             |
| ISO 2022 IR 149 | Korean               |
| ISO_IR 192      | Unicode in UTF-8     |
| GB18030         | GB18030              |

## 7 SECURITY

### 7.1 Security Profiles

#### 7.1.1 TLS Secure Transport

| Setting        | Configurable | Default Value |
|----------------|--------------|---------------|
| DICOM TLS Port | Yes          | 2762          |

The DICOM TLS port can be configured in the “Network” tab inside cvi42 Web Configurator. The DICOM TLS implementation inherits the same key management strategy as the general TLS connection in the application. The application supports TLS on ingoing and outgoing connections.

The application uses the non-downgrading BCP 195 TLS Profile. It will only negotiate TLS 1.2 or newer and supports the following ciphers.

- TLS\_DHE\_RSA\_WITH\_AES\_128\_GCM\_SHA256
- TLS\_ECDHE\_RSA\_WITH\_AES\_128\_GCM\_SHA256
- TLS\_DHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384
- TLS\_ECDHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384

### 7.2 Association Level Security

The STORAGE-SCP accepts associations from all remote AEs in the default configuration, i. e. there is no restriction to certain AE titles and/or IP addresses. The STORAGE-SCP can be configured to accept only associations from known AEs.

### 7.3 Application Level Security

TruPlan does not support any application level security.

## 8 Annexes

### 8.1 IOD Contents

#### 8.1.1 Created SOP Instances

##### 8.1.1.0 Anonymization of SOP Instances

**TruPlan** supports the anonymization of instances (supported storage SOP classes only) and, thereby, derives a new, anonymized version from an existing instance. The anonymization is based on the Basic Application Level Confidentiality Profile defined in the DICOM standard, but **TruPlan** does not claim conformance to these profiles (see section 7.1) since the original attribute values are not retained in an encrypted manner. **TruPlan** can also configure a separate list of attributes to be excluded from anonymization.

Table 8.1-1  
MODIFIED FIELDS IN ANONYMIZED SOP INSTANCE

| Attribute Name                          | Tag         | Comment                               |
|-----------------------------------------|-------------|---------------------------------------|
| Instance Creator UID                    | (0008,0014) | Replaced by an empty value if present |
| SOP Instance UID                        | (0008,0018) | Replaced by a new value               |
| Accession Number                        | (0008,0050) | Replaced by an empty value if present |
| Institution Name                        | (0008,0080) | Replaced by an empty value if present |
| Institution Address                     | (0008,0081) | Replaced by an empty value if present |
| Referring Physician's Name              | (0008,0090) | Replaced by an empty value if present |
| Referring Physician's Address           | (0008,0092) | Replaced by an empty value if present |
| Referring Physician's Telephone Numbers | (0008,0094) | Replaced by an empty value if present |
| Station Name                            | (0008,1010) | Replaced by an empty value if present |
| Study Description                       | (0008,1030) | Replaced by an empty value if present |
| Series Description                      | (0008,103E) | Replaced by "Series Description"      |
| Institutional Department Name           | (0008,1040) | Replaced by an empty value if present |
| Physician(s) of Record                  | (0008,1048) | Replaced by an empty value if present |
| Performing Physicians' Name             | (0008,1050) | Replaced by an empty value if present |

|                                    |             |                                                                                 |
|------------------------------------|-------------|---------------------------------------------------------------------------------|
| Name of Physician(s) Reading Study | (0008,1060) | Replaced by an empty value if present                                           |
| Operators' Name                    | (0008,1070) | Replaced by an empty value if present                                           |
| Admitting Diagnoses Description    | (0008,1080) | Replaced by an empty value if present                                           |
| Derivation Description             | (0008,2111) | Replaced by an empty value if present                                           |
| Patient's Name                     | (0010,0010) | Replaced by a dummy value                                                       |
| Patient ID                         | (0010,0020) | Replaced by an empty value if present                                           |
| Patient's Birth Date               | (0010,0030) | Configurable to be replaced by an empty value or keep the birth year if present |
| Patient's Birth Time               | (0010,0032) | Replaced by an empty value if present                                           |
| Patient's Sex                      | (0010,0040) | Replaced by an empty value if present                                           |
| Other Patient IDs                  | (0010,1000) | Replaced by an empty value if present                                           |
| Other Patient Names                | (0010,1001) | Replaced by an empty value if present                                           |
| Patient's Age                      | (0010,1010) | Replaced by an empty value if present                                           |
| Patient's Size                     | (0010,1020) | Replaced by an empty value if present                                           |
| Patient's Weight                   | (0010,1030) | Replaced by an empty value if present                                           |
| Ethnic Group                       | (0010,2160) | Replaced by an empty value if present                                           |
| Occupation                         | (0010,2180) | Replaced by an empty value if present                                           |
| Additional Patient History         | (0010,21B0) | Replaced by an empty value if present                                           |
| Patient Comments                   | (0010,4000) | Replaced by an empty value if present                                           |
| Device Serial Number               | (0018,1000) | Replaced by an empty value if present                                           |
| Protocol Name                      | (0018,1030) | Replaced by an empty value if present                                           |
| Study Instance UID                 | (0020,000D) | Replaced by a new value                                                         |
| Series Instance UID                | (0020,000E) | Replaced by a new value                                                         |
| Study ID                           | (0020,0010) | Replaced by an empty value if present                                           |

|                                                    |             |                                          |
|----------------------------------------------------|-------------|------------------------------------------|
| Frame of Reference UID                             | (0020,0052) | Replaced by a new value                  |
| Image Comments                                     | (0020,4000) | Replaced by an empty value if present    |
| Request Attributes Sequence                        | (0040,0275) | Replaced by an empty sequence if present |
| Storage Media File Set UID                         | (0088,0140) | Replaced by an empty value if present    |
| <b>Additional Attributes</b>                       |             |                                          |
| Study Date                                         | (0008,0020) | Replaced by an empty value if present    |
| Series Date                                        | (0008,0021) | Replaced by an empty value if present    |
| Acquisition Date                                   | (0008,0022) | Replaced by an empty value if present    |
| Content Date                                       | (0008,0023) | Replaced by "16000101"                   |
| Study Time                                         | (0008,0030) | Replaced by an empty value if present    |
| Series Time                                        | (0008,0031) | Replaced by an empty value if present    |
| Institution Code Sequence                          | (0008,0082) | Replaced by an empty value if present    |
| Operator Identification Sequence                   | (0008,1072) | Replaced by an empty value if present    |
| Physicians of Record Identification Sequence       | (0008,1049) | Replaced by an empty sequence if present |
| Performing Physician Identification Sequence       | (0008,1052) | Replaced by an empty sequence if present |
| Physician(s) Reading Study Identification Sequence | (0008,1062) | Replaced by an empty sequence if present |
| Referring Physician Identification Sequence        | (0008,0096) | Replaced by an empty sequence if present |
| Referenced Patient Sequence                        | (0008,1120) | Replaced by an empty sequence if present |
| Issuer of Patient ID                               | (0010,0021) | Replaced by an empty value if present    |
| Type Of Patient ID                                 | (0010,0022) | Replaced by an empty value if present    |
| Issuer Of Patient ID Qualifiers Sequence           | (0010,0024) | Replaced by an empty sequence if present |
| Patient Insurance Plan Code Sequence               | (0010,0050) | Replaced by an empty sequence if present |
| Patient Primary Language Code Sequence             | (0010,0101) | Replaced by an empty sequence if present |

|                                                 |             |                                          |
|-------------------------------------------------|-------------|------------------------------------------|
| Patient Primary Language Modifier Code Sequence | (0010,0102) | Replaced by an empty sequence if present |
| Other Patient IDs Sequence                      | (0010,1002) | Replaced by an empty sequence if present |
| Patient Birth Name                              | (0010,1005) | Replaced by an empty value if present    |
| Patient Mother Birth Name                       | (0010,1060) | Replaced by an empty value if present    |
| Military Rank                                   | (0010,1080) | Replaced by an empty value if present    |
| Branch Of Service                               | (0010,1081) | Replaced by an empty value if present    |
| Medical Record Locator                          | (0010,1090) | Replaced by an empty value if present    |
| Medical Alerts                                  | (0010,2000) | Replaced by an empty value if present    |
| Allergies                                       | (0010,2110) | Replaced by an empty value if present    |
| Country Of Residence                            | (0010,2150) | Replaced by an empty value if present    |
| Region Of Residence                             | (0010,2152) | Replaced by an empty value if present    |
| Patient Telephone Numbers                       | (0010,2154) | Replaced by an empty value if present    |
| Smoking Status                                  | (0010,21A0) | Replaced by an empty value if present    |
| Pregnancy Status                                | (0010,21C0) | Replaced by an empty value if present    |
| Last Menstrual Date                             | (0010,21D0) | Replaced by an empty value if present    |
| Patient Religious Preference                    | (0010,21F0) | Replaced by an empty value if present    |
| Patient Species Description                     | (0010,2201) | Replaced by an empty value if present    |
| Patient Species Code Sequence                   | (0010,2202) | Replaced by an empty sequence if present |
| Patient Sex Neutered                            | (0010,2203) | Replaced by an empty value if present    |
| Patient Breed Description                       | (0010,2292) | Replaced by an empty value if present    |
| Patient Breed Code Sequence                     | (0010,2293) | Replaced by an empty sequence if present |
| Breed Registration Sequence                     | (0010,2294) | Replaced by an empty sequence if present |

|                                              |             |                                          |
|----------------------------------------------|-------------|------------------------------------------|
| Breed Registration Number                    | (0010,2295) | Replaced by an empty value if present    |
| Breed Registry Code Sequence                 | (0010,2296) | Replaced by an empty sequence if present |
| Responsible Person                           | (0010,2297) | Replaced by an empty value if present    |
| Responsible Person Role                      | (0010,2298) | Replaced by an empty value if present    |
| Responsible Organization                     | (0010,2299) | Replaced by an empty value if present    |
| Requesting Physician Identification Sequence | (0032,1031) | Replaced by an empty sequence if present |
| Requesting Physician                         | (0032,1032) | Replaced by an empty value if present    |
| Requesting Service                           | (0032,1033) | Replaced by an empty value if present    |
| Requesting Service Code Sequence             | (0032,1034) | Replaced by an empty sequence if present |
| Requested Procedure Description              | (0032,1060) | Replaced by an empty value if present    |
| Requested Procedure Code Sequence            | (0032,1064) | Replaced by an empty sequence if present |
| Requested Contrast Agent                     | (0032,1070) | Replaced by an empty value if present    |
| Study Status ID                              | (0032,000A) | Replaced by an empty value if present    |
| Study Priority ID                            | (0032,000C) | Replaced by an empty value if present    |
| Study ID Issuer                              | (0032,0012) | Replaced by an empty value if present    |
| Study Verified Date                          | (0032,0032) | Replaced by an empty value if present    |
| Study Verified Time                          | (0032,0033) | Replaced by an empty value if present    |
| Study Read Date                              | (0032,0034) | Replaced by an empty value if present    |
| Study Read Time                              | (0032,0035) | Replaced by an empty value if present    |
| Scheduled Study Start Date                   | (0032,1000) | Replaced by an empty value if present    |
| Scheduled Study Start Time                   | (0032,1001) | Replaced by an empty value if present    |
| Scheduled Study Stop Date                    | (0032,1010) | Replaced by an empty value if present    |

|                                       |             |                                          |
|---------------------------------------|-------------|------------------------------------------|
| Scheduled Study Stop Time             | (0032,1011) | Replaced by an empty value if present    |
| Scheduled Study Location              | (0032,1020) | Replaced by an empty value if present    |
| Scheduled Study Location AE Title     | (0032,1021) | Replaced by an empty value if present    |
| Reason For Study                      | (0032,1030) | Replaced by an empty value if present    |
| Study Arrival Date                    | (0032,1040) | Replaced by an empty value if present    |
| Study Arrival Time                    | (0032,1041) | Replaced by an empty value if present    |
| Study Completion Date                 | (0032,1050) | Replaced by an empty value if present    |
| Study Completion Time                 | (0032,1051) | Replaced by an empty value if present    |
| Study Component Status ID             | (0032,1055) | Replaced by an empty value if present    |
| Study Comments                        | (0032,4000) | Replaced by an empty value if present    |
| Referenced Patient Alias Sequence     | (0038,0004) | Replaced by an empty sequence if present |
| Visit Status ID                       | (0038,0008) | Replaced by an empty value if present    |
| Admission ID                          | (0038,0010) | Replaced by an empty value if present    |
| Issuer Of Admission ID Sequence       | (0038,0014) | Replaced by an empty sequence if present |
| Route Of Admissions                   | (0038,0016) | Replaced by an empty value if present    |
| Admitting Date                        | (0038,0020) | Replaced by an empty value if present    |
| Admitting Time                        | (0038,0021) | Replaced by an empty value if present    |
| Special Needs                         | (0038,0050) | Replaced by an empty value if present    |
| Service Episode ID                    | (0038,0060) | Replaced by an empty value if present    |
| Service Episode Description           | (0038,0062) | Replaced by an empty value if present    |
| Issuer Of Service Episode ID Sequence | (0038,0064) | Replaced by an empty sequence if present |
| Pertinent Documents Sequence          | (0038,0100) | Replaced by an empty sequence if present |

|                                               |             |                                          |
|-----------------------------------------------|-------------|------------------------------------------|
| Current Patient Location                      | (0038,0300) | Replaced by an empty value if present    |
| Patient Institution Residence                 | (0038,0400) | Replaced by an empty value if present    |
| Patient State                                 | (0038,0500) | Replaced by an empty value if present    |
| Patient Clinical Trial Participation Sequence | (0038,0502) | Replaced by an empty sequence if present |
| Visit Comments                                | (0038,4000) | Replaced by an empty value if present    |
| Issuer Of Admission ID                        | (0038,0011) | Replaced by an empty value if present    |
| Scheduled Admission Date                      | (0038,001A) | Replaced by an empty value if present    |
| Scheduled Admission Time                      | (0038,001B) | Replaced by an empty value if present    |
| Scheduled Discharge Date                      | (0038,001C) | Replaced by an empty value if present    |
| Scheduled Discharge Time                      | (0038,001D) | Replaced by an empty value if present    |
| Scheduled Patient Institution Residence       | (0038,001E) | Replaced by an empty value if present    |
| Discharge Date                                | (0038,0030) | Replaced by an empty value if present    |
| Discharge Time                                | (0038,0032) | Replaced by an empty value if present    |
| Discharge Diagnosis Description               | (0038,0040) | Replaced by an empty value if present    |
| Discharge Diagnosis Code Sequence             | (0038,0044) | Replaced by an empty sequence if present |
| Issuer Of Service Episode ID                  | (0038,0061) | Replaced by an empty value if present    |
| Scheduled Station AE Title                    | (0040,0001) | Replaced by an empty value if present    |
| Scheduled Procedure Step Start Date           | (0040,0002) | Replaced by an empty value if present    |
| Scheduled Procedure Step Start Time           | (0040,0003) | Replaced by an empty value if present    |
| Scheduled Procedure Step End Date             | (0040,0004) | Replaced by an empty value if present    |
| Scheduled Procedure Step End Time             | (0040,0005) | Replaced by an empty value if present    |
| Scheduled Performing Physician Name           | (0040,0006) | Replaced by an empty value if present    |

|                                                        |             |                                          |
|--------------------------------------------------------|-------------|------------------------------------------|
| Scheduled Procedure Step Description                   | (0040,0007) | Replaced by an empty value if present    |
| Scheduled Protocol Code Sequence                       | (0040,0008) | Replaced by an empty value if present    |
| Scheduled Procedure Step ID                            | (0040,0009) | Replaced by an empty value if present    |
| Stage Code Sequence                                    | (0040,000A) | Replaced by an empty sequence if present |
| Scheduled Performing Physician Identification Sequence | (0040,000B) | Replaced by an empty sequence if present |
| Scheduled Station Name                                 | (0040,0010) | Replaced by an empty value if present    |
| Scheduled Procedure Step Location                      | (0040,0011) | Replaced by an empty value if present    |
| Pre Medication                                         | (0040,0012) | Replaced by an empty value if present    |
| Scheduled Procedure Step Status                        | (0040,0020) | Replaced by an empty value if present    |
| Order Placer Identifier Sequence                       | (0040,0026) | Replaced by an empty sequence if present |
| Order Filler Identifier Sequence                       | (0040,0027) | Replaced by an empty sequence if present |
| Local Namespace Entity ID                              | (0040,0031) | Replaced by an empty value if present    |
| Universal Entity ID                                    | (0040,0032) | Replaced by an empty value if present    |
| Universal Entity ID Type                               | (0040,0033) | Replaced by an empty value if present    |
| Identifier Type Code                                   | (0040,0035) | Replaced by an empty value if present    |
| Assigning Facility Sequence                            | (0040,0036) | Replaced by an empty sequence if present |
| Assigning Jurisdiction Code Sequence                   | (0040,0039) | Replaced by an empty sequence if present |
| Assigning Agency Or Department Code Sequence           | (0040,003A) | Replaced by an empty sequence if present |
| Scheduled Procedure Step Sequence                      | (0040,0100) | Replaced by an empty sequence if present |
| Referenced Non Image Composite SOP Instance Sequence   | (0040,0220) | Replaced by an empty sequence if present |
| Performed Station AE Title                             | (0040,0241) | Replaced by an empty value if present    |
| Performed Station Name                                 | (0040,0242) | Replaced by an empty value if present    |

|                                                               |             |                                          |
|---------------------------------------------------------------|-------------|------------------------------------------|
| Performed Location                                            | (0040,0243) | Replaced by an empty value if present    |
| Performed Procedure Step Start Date                           | (0040,0244) | Replaced by an empty value if present    |
| Performed Procedure Step Start Time                           | (0040,0245) | Replaced by an empty value if present    |
| Performed Procedure Step End Date                             | (0040,0250) | Replaced by an empty value if present    |
| Performed Procedure Step End Time                             | (0040,0251) | Replaced by an empty value if present    |
| Performed Procedure Step Status                               | (0040,0252) | Replaced by an empty value if present    |
| Performed Procedure Step ID                                   | (0040,0253) | Replaced by an empty value if present    |
| Performed Procedure Step Description                          | (0040,0254) | Replaced by an empty value if present    |
| Performed Procedure Type Description                          | (0040,0255) | Replaced by an empty value if present    |
| Performed Protocol Code Sequence                              | (0040,0260) | Replaced by an empty sequence if present |
| Performed Protocol Type                                       | (0040,0261) | Replaced by an empty value if present    |
| Scheduled Step Attributes Sequence                            | (0040,0270) | Replaced by an empty sequence if present |
| Request Attributes Sequence                                   | (0040,0275) | Replaced by an empty sequence if present |
| Comments On The Performed Procedure Step                      | (0040,0280) | Replaced by an empty value if present    |
| Performed Procedure Step Discontinuation Reason Code Sequence | (0040,0281) | Replaced by an empty sequence if present |
| Quantity Sequence                                             | (0040,0293) | Replaced by an empty sequence if present |
| Quantity                                                      | (0040,0294) | Replaced by an empty value if present    |
| Billing Item Sequence                                         | (0040,0296) | Replaced by an empty sequence if present |
| Total Time Of Fluoroscopy                                     | (0040,0300) | Replaced by an empty value if present    |
| Total Number Of Exposures                                     | (0040,0301) | Replaced by an empty value if present    |
| Entrance Dose                                                 | (0040,0302) | Replaced by an empty value if present    |
| Exposed Area                                                  | (0040,0303) | Replaced by an empty value if present    |

|                                             |             |                                          |
|---------------------------------------------|-------------|------------------------------------------|
| Distance Source To Entrance                 | (0040,0306) | Replaced by an empty value if present    |
| Exposure Dose Sequence                      | (0040,030E) | Replaced by an empty value if present    |
| Comments On Radiation Dose                  | (0040,0310) | Replaced by an empty value if present    |
| X Ray Output                                | (0040,0312) | Replaced by an empty value if present    |
| Half Value Layer                            | (0040,0314) | Replaced by an empty value if present    |
| Organ Dose                                  | (0040,0316) | Replaced by an empty value if present    |
| Organ Exposed                               | (0040,0318) | Replaced by an empty value if present    |
| Billing Procedure Step Sequence             | (0040,0320) | Replaced by an empty sequence if present |
| Film Consumption Sequence                   | (0040,0321) | Replaced by an empty sequence if present |
| Billing Supplies And Devices Sequence       | (0040,0324) | Replaced by an empty sequence if present |
| Performed Series Sequence                   | (0040,0340) | Replaced by an empty sequence if present |
| Comments On The Scheduled Procedure Step    | (0040,0400) | Replaced by an empty value if present    |
| Protocol Context Sequence                   | (0040,0440) | Replaced by an empty sequence if present |
| Content Item Modifier Sequence              | (0040,0441) | Replaced by an empty sequence if present |
| Scheduled Specimen Sequence                 | (0040,0500) | Replaced by an empty sequence if present |
| Container Identifier                        | (0040,0512) | Replaced by an empty value if present    |
| Issuer Of The Container Identifier Sequence | (0040,0513) | Replaced by an empty sequence if present |
| Alternate Container Identifier Sequence     | (0040,0515) | Replaced by an empty sequence if present |
| Container Type Code Sequence                | (0040,0518) | Replaced by an empty sequence if present |
| Container Description                       | (0040,051A) | Replaced by an empty value if present    |
| Container Component Sequence                | (0040,0520) | Replaced by an empty sequence if present |
| Specimen Identifier                         | (0040,0551) | Replaced by an empty value if present    |

|                                                        |             |                                          |
|--------------------------------------------------------|-------------|------------------------------------------|
| Specimen UID                                           | (0040,0554) | Replaced by an empty value if present    |
| Acquisition Context Sequence                           | (0040,0555) | Replaced by an empty sequence if present |
| Acquisition Context Description                        | (0040,0556) | Replaced by an empty value if present    |
| Specimen Description Sequence                          | (0040,0560) | Replaced by an empty sequence if present |
| Issuer Of The Specimen Identifier Sequence             | (0040,0562) | Replaced by an empty sequence if present |
| Specimen Type Code Sequence                            | (0040,059A) | Replaced by an empty sequence if present |
| Specimen Short Description                             | (0040,0600) | Replaced by an empty value if present    |
| Specimen Detailed Description                          | (0040,0602) | Replaced by an empty value if present    |
| Specimen Preparation Sequence                          | (0040,0610) | Replaced by an empty sequence if present |
| Specimen Preparation Step Content Item Sequence        | (0040,0612) | Replaced by an empty sequence if present |
| Specimen Localization Content Item Sequence            | (0040,0620) | Replaced by an empty sequence if present |
| Requested Procedure ID                                 | (0040,1001) | Replaced by an empty value if present    |
| Reason For The Requested Procedure                     | (0040,1002) | Replaced by an empty value if present    |
| Requested Procedure Priority                           | (0040,1003) | Replaced by an empty value if present    |
| Patient Transport Arrangements                         | (0040,1004) | Replaced by an empty value if present    |
| Requested Procedure Location                           | (0040,1005) | Replaced by an empty value if present    |
| Confidentiality Code                                   | (0040,1008) | Replaced by an empty value if present    |
| Reporting Priority                                     | (0040,1009) | Replaced by an empty value if present    |
| Reason For Requested Procedure Code Sequence           | (0040,100A) | Replaced by an empty sequence if present |
| Names Of Intended Recipients Of Results                | (0040,1010) | Replaced by an empty value if present    |
| Intended Recipients Of Results Identification Sequence | (0040,1011) | Replaced by an empty value if present    |
| Reason For Performed Procedure Code Sequence           | (0040,1012) | Replaced by an empty sequence if present |

|                                                        |             |                                          |
|--------------------------------------------------------|-------------|------------------------------------------|
| Person Identification Code Sequence                    | (0040,1101) | Replaced by an empty sequence if present |
| Person Address                                         | (0040,1102) | Replaced by an empty value if present    |
| Person Telephone Numbers                               | (0040,1103) | Replaced by an empty value if present    |
| Requested Procedure Comments                           | (0040,1400) | Replaced by an empty value if present    |
| Issue Date Of Imaging Service Request                  | (0040,2004) | Replaced by an empty value if present    |
| Issue Time Of Imaging Service Request                  | (0040,2005) | Replaced by an empty value if present    |
| Order Entered By                                       | (0040,2008) | Replaced by an empty value if present    |
| Order Enterer Location                                 | (0040,2009) | Replaced by an empty value if present    |
| Order Callback Phone Number                            | (0040,2010) | Replaced by an empty value if present    |
| Placer Order Number Imaging Service Request            | (0040,2016) | Replaced by an empty value if present    |
| Filler Order Number Imaging Service Request            | (0040,2017) | Replaced by an empty value if present    |
| Imaging Service Request Comments                       | (0040,2400) | Replaced by an empty value if present    |
| Confidentiality Constraint On Patient Data Description | (0040,3001) | Replaced by an empty value if present    |
| General Purpose Scheduled Procedure Step Status        | (0040,4001) | Replaced by an empty value if present    |
| General Purpose Performed Procedure Step Status        | (0040,4002) | Replaced by an empty value if present    |
| General Purpose Scheduled Procedure Step Priority      | (0040,4003) | Replaced by an empty value if present    |
| Scheduled Processing Applications Code Sequence        | (0040,4004) | Replaced by an empty sequence if present |
| Scheduled Procedure Step Start Date Time               | (0040,4005) | Replaced by an empty value if present    |
| Multiple Copies Flag                                   | (0040,4006) | Replaced by an empty value if present    |
| Performed Processing Applications Code Sequence        | (0040,4007) | Replaced by an empty sequence if present |
| Human Performer Code Sequence                          | (0040,4009) | Replaced by an empty sequence if present |
| Scheduled Procedure Step Modification Date Time        | (0040,4010) | Replaced by an empty value if present    |

|                                                                     |             |                                          |
|---------------------------------------------------------------------|-------------|------------------------------------------|
| Expected Completion Date Time                                       | (0040,4011) | Replaced by an empty value if present    |
| Resulting General Purpose Performed Procedure Steps Sequence        | (0040,4015) | Replaced by an empty sequence if present |
| Referenced General Purpose Scheduled Procedure Step Sequence        | (0040,4016) | Replaced by an empty sequence if present |
| Scheduled Workitem Code Sequence                                    | (0040,4018) | Replaced by an empty sequence if present |
| Performed Workitem Code Sequence                                    | (0040,4019) | Replaced by an empty sequence if present |
| Input Availability Flag                                             | (0040,4020) | Replaced by an empty value if present    |
| Input Information Sequence                                          | (0040,4021) | Replaced by an empty sequence if present |
| Relevant Information Sequence                                       | (0040,4022) | Replaced by an empty sequence if present |
| Referenced General Purpose Scheduled Procedure Step Transaction UID | (0040,4023) | Replaced by an empty value if present    |
| Scheduled Station Name Code Sequence                                | (0040,4025) | Replaced by an empty sequence if present |
| Scheduled Station Class Code Sequence                               | (0040,4026) | Replaced by an empty sequence if present |
| Scheduled Station Geographic Location Code Sequence                 | (0040,4027) | Replaced by an empty sequence if present |
| Performed Station Name Code Sequence                                | (0040,4028) | Replaced by an empty sequence if present |
| Performed Station Class Code Sequence                               | (0040,4029) | Replaced by an empty sequence if present |
| Performed Station Geographic Location Code Sequence                 | (0040,4030) | Replaced by an empty sequence if present |
| Requested Subsequent Workitem Code Sequence                         | (0040,4031) | Replaced by an empty sequence if present |
| Non DICOM Output Code Sequence                                      | (0040,4032) | Replaced by an empty sequence if present |
| Output Information Sequence                                         | (0040,4033) | Replaced by an empty sequence if present |
| Scheduled Human Performers Sequence                                 | (0040,4034) | Replaced by an empty sequence if present |
| Actual Human Performers Sequence                                    | (0040,4035) | Replaced by an empty sequence if present |
| Human Performer Organization                                        | (0040,4036) | Replaced by an empty value if present    |
| Human Performer Name                                                | (0040,4037) | Replaced by an empty value if present    |

|                                                 |             |                                          |
|-------------------------------------------------|-------------|------------------------------------------|
| Raw Data Handling                               | (0040,4040) | Replaced by an empty value if present    |
| Entrance Dose In mGy                            | (0040,8302) | Replaced by an empty value if present    |
| Verifying Organization                          | (0040,A027) | Replaced by an empty value if present    |
| Verification Date Time                          | (0040,A030) | Replaced by an empty value if present    |
| Observation Date Time                           | (0040,A032) | Replaced by an empty value if present    |
| Value Type                                      | (0040,A040) | Replaced by an empty value if present    |
| Concept Name Code Sequence                      | (0040,A043) | Replaced by an empty sequence if present |
| Continuity Of Content                           | (0040,A050) | Replaced by an empty value if present    |
| Verifying Observer Sequence                     | (0040,A073) | Replaced by an empty sequence if present |
| Verifying Observer Name                         | (0040,A075) | Replaced by an empty value if present    |
| Author Observer Sequence                        | (0040,A078) | Replaced by an empty sequence if present |
| Participant Sequence                            | (0040,A07A) | Replaced by an empty sequence if present |
| Custodial Organization Sequence                 | (0040,A07C) | Replaced by an empty sequence if present |
| Participation Type                              | (0040,A080) | Replaced by an empty value if present    |
| Participation Date Time                         | (0040,A082) | Replaced by an empty value if present    |
| Observer Type                                   | (0040,A084) | Replaced by an empty value if present    |
| Verifying Observer Identification Code Sequence | (0040,A088) | Replaced by an empty sequence if present |
| Referenced Waveform Channels                    | (0040,A0B0) | Replaced by an empty value if present    |
| Date Time                                       | (0040,A120) | Replaced by an empty value if present    |
| Date                                            | (0040,A121) | Replaced by an empty value if present    |
| Time                                            | (0040,A122) | Replaced by an empty value if present    |
| Person Name                                     | (0040,A123) | Replaced by an empty value if present    |

|                                               |             |                                          |
|-----------------------------------------------|-------------|------------------------------------------|
| UID                                           | (0040,A124) | Replaced by an empty value if present    |
| Concept Code Sequence                         | (0040,A168) | Replaced by an empty sequence if present |
| Purpose Of Reference Code Sequence            | (0040,A170) | Replaced by an empty sequence if present |
| Annotation Group Number                       | (0040,A180) | Replaced by an empty value if present    |
| Modifier Code Sequence                        | (0040,A195) | Replaced by an empty sequence if present |
| Measured Value Sequence                       | (0040,A300) | Replaced by an empty sequence if present |
| Numeric Value Qualifier Code Sequence         | (0040,A301) | Replaced by an empty sequence if present |
| Numeric Value                                 | (0040,A30A) | Replaced by an empty value if present    |
| Predecessor Documents Sequence                | (0040,A360) | Replaced by an empty sequence if present |
| Referenced Request Sequence                   | (0040,A370) | Replaced by an empty sequence if present |
| Performed Procedure Code Sequence             | (0040,A372) | Replaced by an empty sequence if present |
| Current Requested Procedure Evidence Sequence | (0040,A375) | Replaced by an empty sequence if present |
| Pertinent Other Evidence Sequence             | (0040,A385) | Replaced by an empty sequence if present |
| HL7 Structured Document Reference Sequence    | (0040,A390) | Replaced by an empty sequence if present |
| Completion Flag                               | (0040,A491) | Replaced by an empty value if present    |
| Completion Flag Description                   | (0040,A492) | Replaced by an empty value if present    |
| Verification Flag                             | (0040,A493) | Replaced by an empty value if present    |
| Archive Requested                             | (0040,A494) | Replaced by an empty value if present    |
| Preliminary Flag                              | (0040,A496) | Replaced by an empty value if present    |
| Content Template Sequence                     | (0040,A504) | Replaced by an empty sequence if present |
| Identical Documents Sequence                  | (0040,A525) | Replaced by an empty sequence if present |
| Content Sequence                              | (0040,A730) | Replaced by an empty sequence if present |

|                                    |             |                                          |
|------------------------------------|-------------|------------------------------------------|
| Waveform Annotation Sequence       | (0040,B020) | Replaced by an empty sequence if present |
| Template Identifier                | (0040,DB00) | Replaced by an empty value if present    |
| Referenced Content Item Identifier | (0040,DB73) | Replaced by an empty value if present    |
| HL7 Instance Identifier            | (0040,E001) | Replaced by an empty value if present    |
| HL7 Document Effective Time        | (0040,E004) | Replaced by an empty value if present    |
| HL7 Document Type Code Sequence    | (0040,E006) | Replaced by an empty sequence if present |
| Retrieve URI                       | (0040,E010) | Replaced by an empty value if present    |
| Retrieve Location UID              | (0040,E011) | Replaced by an empty value if present    |

The various UIDs are replaced in a way that the original hierarchy of Study, Series and Instance is preserved. Also the new Frame of Reference UID is assigned in a consistent manner.

Private data elements can be removed completely from the anonymized instance if the system is configured accordingly.

For all Secondary Capture SOP classes, the instances are only anonymized if the element value of Burned in Annotation (0028,0301) is "NO". If the element is missing or the value is "YES", the instance is skipped and a warning message is reported to the user.

The processing of some attribute values during instance anonymization can be disabled if the system is configured accordingly. In this case, a warning message containing all skipped instance attributes is reported to the user.

Table 8.1-2

## OPTIONALLY MODIFIED FIELDS IN ANONYMIZED SOP INSTANCE

| Attribute Name       | Tag         |
|----------------------|-------------|
| Institution Name     | (0008,0080) |
| Institution Address  | (0008,0081) |
| Study Description    | (0008,1030) |
| Series Description   | (0008,103E) |
| Patient's Birth Date | (0010,0030) |
| Patient's Sex        | (0010,0040) |
| Patient's Age        | (0010,1010) |
| Patient's Size       | (0010,1020) |
| Patient's Weight     | (0010,1030) |
| Ethnic Group         | (0010,2160) |
| Protocol Name        | (0018,1030) |

|                  |             |
|------------------|-------------|
| Study Date       | (0008,0020) |
| Series Date      | (0008,0021) |
| Acquisition Date | (0008,0022) |
| Study Time       | (0008,0030) |
| Series Time      | (0008,0031) |

### 8.1.1.1 Secondary Capture Image IOD

**TruPlan** creates Secondary Capture Image objects containing a proprietary stream of a **TruPlan** session file, stored in private attributes. In this case, the pixel data contains a representative image of the **TruPlan** session.

The following tables describe the modules and attributes of the underlying IOD.

Table 8.1-3

#### SECONDARY CAPTURE IMAGE IOD MODULES

| IE        | Module                    | Reference    | Presence of Module |
|-----------|---------------------------|--------------|--------------------|
| Patient   | Patient                   | Table 8.1-7  | Always             |
|           | Clinical Trial Subject    | –            | Never              |
| Study     | General Study             | Table 8.1-8  | Always             |
|           | Patient Study             | –            | Never              |
|           | Clinical Trial Study      | –            | Never              |
| Series    | General Series            | Table 8.1-9  | Always             |
|           | Clinical Trial Series     | –            | Never              |
| Equipment | General Equipment         | Table 8.1-10 | Always             |
|           | SC Equipment              | Table 8.1-11 | Always             |
| Image     | General Image             | Table 8.1-12 | Always             |
|           | Image Pixel               | Table 8.1-13 | Always             |
|           | Device                    | –            | Never              |
|           | Specimen                  | –            | Never              |
|           | Overlay Plane             | –            | Never              |
|           | Modality LUT              | Table 8.1-14 | Not always         |
|           | VOI LUT                   | –            | Never              |
|           | ICC Profile               | –            | Never              |
|           | SOP Common                | Table 8.1-15 | Always             |
|           | Common Instance Reference | –            | Never              |
|           | Private Data              | Table 8.1-16 | Always             |

### 8.1.1.2 Multi-frame True Color SC Image IOD

**TruPlan** creates Multi-frame True Color SC Image objects containing parts of the original images with additional drawings (e. g. contours, overlays). This happens with Rotational export series and with exporting TruPlan report images.

The following tables describe the modules and attributes of the underlying IOD.

Table 8.1-49

#### MULTI-FRAME TRUE COLOR SC IMAGE IOD MODULES

| IE                 | Module                                    | Reference    | Presence of Module |
|--------------------|-------------------------------------------|--------------|--------------------|
| Patient            | Patient                                   | Table 8.1-7  | Always             |
|                    | Clinical Trial Subject                    | -            | Never              |
| Study              | General Study                             | Table 8.1-8  | Always             |
|                    | Patient Study                             | -            | Never              |
|                    | Clinical Trial Study                      | -            | Never              |
| Series             | General Series                            | Table 8.1-9  | Always             |
|                    | Clinical Trial Series                     | -            | Never              |
| Equipment          | General Equipment                         | Table 8.1-10 | Always             |
|                    | SC Equipment                              | Table 8.1-11 | Always             |
| Frame of Reference | Frame of Reference                        | -            | Never              |
|                    | Synchronization                           | -            | Never              |
| Image              | General Image                             | Table 8.1-12 | Always             |
|                    | Image Pixel                               | Table 8.1-42 | Always             |
|                    | Image Plane<br>(selected attributes only) | Table 8.1-43 | Not always         |
|                    | Cine                                      | -            | Never              |
|                    | Multi-frame                               | Table 8.1-44 | Always             |
|                    | Frame Pointers                            | -            | Never              |
|                    | Device                                    | -            | Never              |
|                    | Specimen                                  | -            | Never              |
|                    | Multi-frame Functional Groups             | -            | Never              |
|                    | Multi-frame Dimension                     | -            | Never              |
|                    | SC Image                                  | -            | Never              |
|                    | SC Multi-frame Image                      | Table 8.1-45 | Always             |
|                    | SC Multi-frame Vector                     | -            | Never              |
|                    | SOP Common                                | Table 8.1-46 | Always             |
|                    | Frame Extraction                          | -            | Never              |

### 8.1.1.3 Encapsulated PDF IOD

**TruPlan** creates Encapsulated PDF objects containing a PDF copy of a generated report. The following tables describe the modules and attributes of the underlying IOD. Most attributes that are never present in a created SOP instance are omitted from the tables in order to increase the readability.

Table 8.1-4

#### ENCAPSULATED PDF IOD MODULES

| IE                    | Module                       | Reference    | Presence of Module |
|-----------------------|------------------------------|--------------|--------------------|
| Patient               | Patient                      | Table 8.1-17 | Always             |
|                       | Clinical Trial Subject       | –            | Never              |
| Study                 | General Study                | Table 8.1-18 | Always             |
|                       | Patient Study                | –            | Never              |
|                       | Clinical Trial Study         | –            | Never              |
| Series                | Encapsulated Document Series | Table 8.1-19 | Always             |
|                       | Clinical Trial Series        | –            | Never              |
| Equipment             | General Equipment            | Table 8.1-20 | Always             |
|                       | SC Equipment                 | Table 8.1-21 | Always             |
| Encapsulated Document | Encapsulated Document        | Table 8.1-22 | Always             |
|                       | SOP Common                   | Table 8.1-23 | Always             |

### 8.1.1.4 Surface Segmentation IOD

**TruPlan** creates Surface Segmentation objects from user generated structures. The following tables describe the modules and attributes of the underlying IOD. Most attributes that are never present in a created SOP instance are omitted from the tables to increase the readability.

Table 8.1-5

#### SURFACE SEGMENTATION IOD MODULES

| IE                 | Module                 | Reference    | Presence of Module |
|--------------------|------------------------|--------------|--------------------|
| Patient            | Patient                | Table 8.1-24 | Always             |
|                    | Clinical Trial Subject | –            | Never              |
| Study              | General Study          | Table 8.1-25 | Always             |
|                    | Patient Study          | –            | Never              |
|                    | Clinical Trial Study   | –            | Never              |
| Series             | General Series         | Table 8.1-26 | Always             |
|                    | Segmentation Series    | Table 8.1-27 | Always             |
|                    | Clinical Trial Series  | –            | Never              |
| Frame of Reference | Frame of Reference     | Table 8.1-28 | Always             |
| Equipment          | General Equipment      | Table 8.1-29 | Always             |

|       |                            |              |        |
|-------|----------------------------|--------------|--------|
|       | Enhanced General Equipment | Table 8.1-30 |        |
| Image | Surface Segmentation       | Table 8.1-31 | Always |
|       | Surface Mesh               | Table 8.1-32 | Always |
|       | Common Instance Reference  | Table 8.1-33 | Always |
|       | SOP Common                 | Table 8.1-34 | Always |

### 8.1.1.5 CT Image IOD

**TruPlan** creates CT Image objects that are copied from existing source DICOM instances and stored with several changed attributes. This happens for LAA MIP export series and for Burned Markers series. The following tables describe the modules and attributes of the underlying IOD. The attributes that remain unchanged from the source DICOM instances are omitted from the tables to increase the readability.

Table 8.1-6

#### CT IMAGE IOD MODULES

| IE                 | Module                    | Reference    | Presence of Module             |
|--------------------|---------------------------|--------------|--------------------------------|
| Patient            | Patient                   | –            | Not always <sup>1</sup>        |
|                    | Clinical Trial Subject    | –            | Not always <sup>1</sup>        |
| Study              | General Study             | –            | Not always <sup>1</sup>        |
|                    | Patient Study             | –            | Not always <sup>1</sup>        |
|                    | Clinical Trial Study      | –            | Not always <sup>1</sup>        |
| Series             | General Series            | Table 8.1-35 | Always                         |
|                    | Clinical Trial Series     | –            | Not always <sup>1</sup>        |
| Frame of Reference | Frame of Reference        | –            | Not always <sup>1</sup>        |
|                    | Synchronization           | –            | Not always <sup>1</sup>        |
| Equipment          | General Equipment         | Table 8.1-36 | Always                         |
| Image              | General Image             | Table 8.1-37 | Always                         |
|                    | General Reference         | Table 8.1-41 | Only for LAA MIP export series |
|                    | Image Pixel               | Table 8.1-38 | Always                         |
|                    | Image Plane               | –            | Not always <sup>1</sup>        |
|                    | Contrast/Bolus            | –            | Not always <sup>1</sup>        |
|                    | Device                    | –            | Not always <sup>1</sup>        |
|                    | Specimen                  | –            | Not always <sup>1</sup>        |
|                    | CT Image                  | Table 8.1-39 | Always                         |
|                    | Multi-energy CT Image     | –            | Not always <sup>1</sup>        |
|                    | Overlay Plane             | –            | Not always <sup>1</sup>        |
|                    | VOI LUT                   | –            | Not always <sup>1</sup>        |
|                    | SOP Common                | Table 8.1-40 | Always                         |
|                    | Common Instance Reference | –            | Not always <sup>1</sup>        |

<sup>1</sup> If present in source DICOM image

## Common Secondary Capture Image Modules

Table 8.1-7  
PATIENT MODULE OF CREATED SOP INSTANCES

| Attribute Name       | Tag         | VR | Value                     | Presence of Value      |
|----------------------|-------------|----|---------------------------|------------------------|
| Patient's Name       | (0010,0010) | PN | From original DICOM image | Always                 |
| Patient ID           | (0010,0020) | LO | From original DICOM image | Always, might be empty |
| Issuer of Patient ID | (0010,0021) | LO | From original DICOM image | Always, might be empty |
| Type of Patient ID   | (0010,0022) | CS | From original DICOM image | Always, might be empty |
| Patient's Birth Date | (0010,0030) | DA | From original DICOM image | Always, might be empty |
| Patient's Sex        | (0010,0040) | CS | From original DICOM image | Always, might be empty |

Table 8.1-8  
GENERAL STUDY MODULE OF CREATED SOP INSTANCES

| Attribute Name             | Tag         | VR | Value                     | Presence of Value      |
|----------------------------|-------------|----|---------------------------|------------------------|
| Study Date                 | (0008,0020) | DA | From original DICOM image | Always, might be empty |
| Study Time                 | (0008,0030) | TM | From original DICOM image | Always, might be empty |
| Accession Number           | (0008,0050) | SH | From original DICOM image | Always, might be empty |
| Referring Physician's Name | (0008,0090) | PN | From original DICOM image | Always, might be empty |
| Study Description          | (0008,1030) | LO | From original DICOM image | Always, might be empty |
| Study Instance UID         | (0020,000D) | UI | From original DICOM image | Always                 |
| Study ID                   | (0020,0010) | SH | From original DICOM image | Always, might be empty |

Table 8.1-9  
GENERAL SERIES MODULE OF CREATED SOP INSTANCES

| Attribute Name      | Tag         | VR | Value                                                    | Presence of Value |
|---------------------|-------------|----|----------------------------------------------------------|-------------------|
| Series Instance UID | (0020,000E) | UI | Generated automatically                                  | Always            |
| Series Number       | (0020,0011) | IS | 901 for saved session, otherwise Generated Automatically | Always            |
| Patient Position    | (0018,5100) | CS |                                                          | Always            |
| Modality            | (0008,0060) | CS | "OT"                                                     | Always            |

Table 8.1-10  
GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES

| Attribute Name            | Tag         | VR | Value                          | Presence of Value |
|---------------------------|-------------|----|--------------------------------|-------------------|
| Manufacturer              | (0008,0070) | LO | "CircleCVI"                    | Always            |
| Institution Name          | (0008,0080) | LO |                                | Never             |
| Station Name              | (0008,1010) | SH |                                | Never             |
| Manufacturer's Model Name | (0008,1090) | LO | "TruPlan"                      | Always            |
| Software Versions         | (0018,1020) | LO | <b>TruPlan</b> current version | Always            |

Table 8.1-11  
SC EQUIPMENT MODULE OF CREATED SOP INSTANCES

| Attribute Name                             | Tag         | VR | Value                          | Presence of Value             |
|--------------------------------------------|-------------|----|--------------------------------|-------------------------------|
| Conversion Type                            | (0008,0064) | CS | "WSD"                          | Always                        |
| Modality                                   | (0008,0060) | CS | See Table 8.1-9                |                               |
| Secondary Capture Device Software Versions | (0008,1019) | LO | <b>TruPlan</b> current version | Only for True Color SC Images |

Table 8.1-12  
GENERAL IMAGE MODULE OF CREATED SOP INSTANCES

| Attribute Name | Tag         | VR | Value                        | Presence of Value |
|----------------|-------------|----|------------------------------|-------------------|
| Image Type     | (0008,0008) | CS |                              | Never             |
| Content Date   | (0008,0023) | DA | Date of the content creation | Always            |
| Content Time   | (0008,0033) | TM | Time of the content creation | Always            |

|                        |             |    |                                                               |            |
|------------------------|-------------|----|---------------------------------------------------------------|------------|
| Instance Number        | (0020,0013) | IS | Sequential number increased for each instance within a series | Always     |
| Patient Orientation    | (0020,0020) | CS |                                                               | Empty      |
| Burned In Annotation   | (0028,0301) | CS |                                                               | Never      |
| Presentation LUT Shape | (2050,0020) | CS | "IDENTITY" if Photometric Interpretation is "MONOCHROME2"     | Not always |

Table 8.1-13

## IMAGE PIXEL MODULE OF CREATED SOP INSTANCES

| Attribute Name             | Tag         | VR | Value                                                                                             | Presence of Value |
|----------------------------|-------------|----|---------------------------------------------------------------------------------------------------|-------------------|
| Samples Per Pixel          | (0028,0002) | US | "1" if Photometric Interpretation is "MONOCHROME2",<br>"3" if Photometric Interpretation is "RGB" | Always            |
| Photometric Interpretation | (0028,0004) | CS | "MONOCHROME2" or "RGB"                                                                            | Always            |
| Planar Configuration       | (0028,0006) | US | 0 if Photometric Interpretation is "RGB"                                                          | Not always        |
| Rows                       | (0028,0010) | US | Depends on the height of the image                                                                | Always            |
| Columns                    | (0028,0011) | US | Depends on the width of the image                                                                 | Always            |
| Pixel Aspect Ratio         | (0028,0034) | IS |                                                                                                   | Never             |
| Bits Allocated             | (0028,0100) | US | 8                                                                                                 | Always            |
| Bits Stored                | (0028,0101) | US | 8                                                                                                 | Always            |
| High Bit                   | (0028,0102) | US | 7                                                                                                 | Always            |
| Pixel Representation       | (0028,0103) | US | 0                                                                                                 | Always            |
| Pixel Data                 | (7FE0,0010) | OW | Depends on the content of the image                                                               | Always            |

Table 8.1-14

## MODALITY LUT MODULE OF CREATED SOP INSTANCES

| Attribute Name    | Tag         | VR | Value                                              | Presence of Value |
|-------------------|-------------|----|----------------------------------------------------|-------------------|
| Rescale Intercept | (0028,1052) | DS | "1" if Photometric Interpretation is "MONOCHROME2" | Not always        |
| Rescale Slope     | (0028,1053) | DS | "0" if Photometric Interpretation is "MONOCHROME2" | Not always        |

|              |             |    |                                                           |            |
|--------------|-------------|----|-----------------------------------------------------------|------------|
| Rescale Type | (0028,1054) | LO | "IDENTITY" if Photometric Interpretation is "MONOCHROME2" | Not always |
|--------------|-------------|----|-----------------------------------------------------------|------------|

Table 8.1-15  
SOP COMMON MODULE OF CREATED SOP INSTANCES

| Attribute Name         | Tag         | VR | Value                       | Presence of Value |
|------------------------|-------------|----|-----------------------------|-------------------|
| Specific Character Set | (0008,0005) | CS | "ISO_IR 192"                | Always            |
| SOP Class UID          | (0008,0016) | UI | "1.2.840.10008.5.1.4.1.1.7" | Always            |
| SOP Instance UID       | (0008,0018) | UI | Generated automatically     | Always            |

Table 8.1-16  
PRIVATE DATA MODULE OF CREATED SOP INSTANCES

| Attribute Name  | Tag         | VR | Value                                               | Presence of Value |
|-----------------|-------------|----|-----------------------------------------------------|-------------------|
| Private Creator | (0025,0035) | LO | "HEARTVISION CIRCLECVI"                             | Always            |
| Session Stream  | (0025,3510) | OB | Proprietary stream of a <b>TruPlan</b> session file | Always            |

### 8.1.1.6 Encapsulated PDF Modules

Table 8.1-17  
PATIENT MODULE OF CREATED SOP INSTANCES

| Attribute Name       | Tag         | VR | Value                     | Presence of Value      |
|----------------------|-------------|----|---------------------------|------------------------|
| Patient's Name       | (0010,0010) | PN | From original DICOM image | Always                 |
| Patient ID           | (0010,0020) | LO | From original DICOM image | Always, might be empty |
| Issuer of Patient ID | (0010,0021) | LO | From original DICOM image | Always, might be empty |
| Type of Patient ID   | (0010,0022) | CS | From original DICOM image | Always, might be empty |

|                      |             |    |                           |                        |
|----------------------|-------------|----|---------------------------|------------------------|
| Patient's Birth Date | (0010,0030) | DA | From original DICOM image | Always, might be empty |
| Patient's Sex        | (0010,0040) | CS | From original DICOM image | Always, might be empty |
| Other Patient IDs    | (0010,1000) | LO | From original DICOM image | Always, might be empty |
| Ethnic Group         | (0010,2160) | SH | From original DICOM image | Always, might be empty |

Table 8.1-18  
GENERAL STUDY MODULE OF CREATED SOP INSTANCES

| Attribute Name             | Tag         | VR | Value                     | Presence of Value      |
|----------------------------|-------------|----|---------------------------|------------------------|
| Study Date                 | (0008,0020) | DA | From original DICOM image | Always, might be empty |
| Study Time                 | (0008,0030) | TM | From original DICOM image | Always, might be empty |
| Accession Number           | (0008,0050) | SH | From original DICOM image | Always, might be empty |
| Referring Physician's Name | (0008,0090) | PN | From original DICOM image | Always, might be empty |
| Study Description          | (0008,1030) | LO | From original DICOM image | Always, might be empty |
| Study Instance UID         | (0020,000D) | UI | From original DICOM image | Always                 |
| Study ID                   | (0020,0010) | SH | From original DICOM image | Always, might be empty |

Table 8.1-19  
ENCAPSULATED DOCUMENT SERIES MODULE OF CREATED SOP INSTANCES

| Attribute Name      | Tag         | VR | Value                   | Presence of Value |
|---------------------|-------------|----|-------------------------|-------------------|
| Series Instance UID | (0020,000E) | UI | Generated automatically | Always            |
| Series Number       | (0020,0011) | IS | 902                     | Always            |
| Modality            | (0008,0060) | CS | "DOC"                   | Always            |
| Series Description  | (0008,103E) | LO | "TruPlan Report"        | Always            |

Table 8.1-20

## GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES

| Attribute Name            | Tag          | VR | Value                          | Presence of Value |
|---------------------------|--------------|----|--------------------------------|-------------------|
| Manufacturer              | (0008,0070)  | LO | "CircleCVI"                    | Always            |
| Institution Name          | (0008,0080)  | LO | From original DICOM image      | Never             |
| Station Name              | (0008,1010)  | SH | From original DICOM image      | Never             |
| Manufacturer's Model Name | (0008,1090)  | LO | "TruPlan"                      | Always            |
| Software Versions         | (0018,1020)  | LO | <b>TruPlan</b> current version | Always            |
| Device Serial Number      | (00181,1000) | LO | Current version                | Always            |

Table 8.1-21

## SC EQUIPMENT MODULE OF CREATED SOP INSTANCES

| Attribute Name  | Tag         | VR | Value | Presence of Value |
|-----------------|-------------|----|-------|-------------------|
| Conversion Type | (0008,0064) | CS | "WSD" | Always            |
| Modality        | (0008,0060) | CS | "DOC" | Always            |

Table 8.1-22

## ENCAPSULATED DOCUMENT MODULE OF CREATED SOP INSTANCES

| Attribute Name                     | Tag         | VR | Value                        | Presence of Value      |
|------------------------------------|-------------|----|------------------------------|------------------------|
| Content Date                       | (0008,0023) | DA | Date of the content creation | Always                 |
| Content Time                       | (0008,0033) | TM | Time of the content creation | Always                 |
| Instance Number                    | (0020,0013) | IS | 1                            | Always                 |
| Burned In Annotation               | (0028,0301) | CS | "YES"                        | Always                 |
| Document Title                     | (0042,0010) | ST | "TruPlan Report"             | Always                 |
| Concept Name Code Sequence         | (0040,A043) | SQ |                              | Always, might be empty |
| MIME Type of Encapsulated Document | (0042,0012) | LO | "application/pdf"            | Always                 |

Table 8.1-23

## SOP COMMON MODULE OF CREATED SOP INSTANCES

| Attribute Name         | Tag         | VR | Value                           | Presence of Value |
|------------------------|-------------|----|---------------------------------|-------------------|
| Specific Character Set | (0008,0005) | CS | "ISO_IR 100"                    | Always            |
| SOP Class UID          | (0008,0016) | UI | "1.2.840.10008.5.1.4.1.1.104.1" | Always            |
| SOP Instance UID       | (0008,0018) | UI | Generated automatically         | Always            |

### 8.1.1.7 Surface Segmentation Modules

Table 8.1-24

PATIENT MODULE OF CREATED SOP INSTANCES

| Attribute Name       | Tag         | VR | Value                     | Presence of Value      |
|----------------------|-------------|----|---------------------------|------------------------|
| Patient's Name       | (0010,0010) | PN | From original DICOM image | Always                 |
| Patient ID           | (0010,0020) | LO | From original DICOM image | Always, might be empty |
| Patient's Birth Date | (0010,0030) | DA | From original DICOM image | Always, might be empty |
| Patient's Sex        | (0010,0040) | CS | From original DICOM image | Always, might be empty |

Table 8.1-25

GENERAL STUDY MODULE OF CREATED SOP INSTANCES

| Attribute Name             | Tag         | VR | Value                     | Presence of Value      |
|----------------------------|-------------|----|---------------------------|------------------------|
| Study Date                 | (0008,0020) | DA | From original DICOM image | Always, might be empty |
| Study Time                 | (0008,0030) | TM | From original DICOM image | Always, might be empty |
| Accession Number           | (0008,0050) | SH | From original DICOM image | Always, might be empty |
| Referring Physician's Name | (0008,0090) | PN | From original DICOM image | Always, might be empty |
| Study Instance UID         | (0020,000D) | UI | From original DICOM image | Always                 |
| Study ID                   | (0020,0010) | SH | From original DICOM image | Empty                  |

Table 8.1-26

GENERAL SERIES MODULE OF CREATED SOP INSTANCES

| Attribute Name      | Tag         | VR | Value                   | Presence of Value |
|---------------------|-------------|----|-------------------------|-------------------|
| Series Instance UID | (0020,000E) | UI | Generated automatically | Always            |
| Series Number       | (0020,0011) | IS | See Table 8.1-27        |                   |
| Series Description  | (0008,103E) | LO |                         | Always            |
| Modality            | (0008,0060) | CS | See Table 8.1-27        |                   |

Table 8.1-27

## SEGMENTATION SERIES MODULE OF CREATED SOP INSTANCES

| Attribute Name | Tag         | VR | Value | Presence of Value |
|----------------|-------------|----|-------|-------------------|
| Series Number  | (0020,0011) | IS | "902" | Always            |
| Modality       | (0008,0060) | CS | "SEG" | Always            |

Table 8.1-28

## FRAME OF REFERENCE MODULE OF CREATED SOP INSTANCES

| Attribute Name               | Tag         | VR | Value                     | Presence of Value |
|------------------------------|-------------|----|---------------------------|-------------------|
| Frame of Reference UID       | (0020,0052) | UI | From original DICOM image | Always            |
| Position Reference Indicator | (0020,1040) | LO | From original DICOM image | Always            |

Table 8.1-29

## GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES

| Attribute Name            | Tag         | VR | Value                          | Presence of Value |
|---------------------------|-------------|----|--------------------------------|-------------------|
| Manufacturer              | (0008,0070) | LO | "CircleCVI"                    | Always            |
| Manufacturer's Model Name | (0008,1090) | LO | "TruPlan"                      | Always            |
| Software Versions         | (0018,1020) | LO | <b>TruPlan</b> current version | Always            |

Table 8.1-30

## ENHANCED GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES

| Attribute Name            | Tag         | VR | Value                          | Presence of Value |
|---------------------------|-------------|----|--------------------------------|-------------------|
| Manufacturer              | (0008,0070) | LO | "CircleCVI"                    | Always            |
| Manufacturer's Model Name | (0008,1090) | LO | "TruPlan"                      | Always            |
| Device Serial Number      | (0018,1000) | LO | Current version                | Always            |
| Software Versions         | (0018,1020) | LO | <b>TruPlan</b> current version | Always            |

Table 8.1-31

## SURFACE SEGMENTATION MODULE OF CREATED SOP INSTANCES

| Attribute Name              |                                           | Tag         | VR | Value                        | Presence of Value |
|-----------------------------|-------------------------------------------|-------------|----|------------------------------|-------------------|
| Content Date                |                                           | (0008,0023) | DA | Date of the content creation | Always            |
| Content Time                |                                           | (0008,0033) | TM | Time of the content creation | Always            |
| Instance Number             |                                           | (0020,0013) | IS | 1                            | Always            |
| Content Label               |                                           | (0070,0087) | CS | "TRUPLAN_SSO"                | Always            |
| Content Description         |                                           | (0070,0081) | LO |                              | Always            |
| Content Creator's Name      |                                           | (0070,0084) | PN |                              | Empty             |
| Segment Sequence            |                                           | (0062,0002) | SQ | Sequence of segment data     | Always            |
|                             | Segment Number                            | (0062,0004) | US |                              | Always            |
|                             | Segment Label                             | (0062,0005) | LO |                              | Always            |
|                             | Segment Algorithm Type                    | (0062,0008) | CS | "AUTOMATIC"                  | Always            |
|                             | Segmented Property Category Code Sequence | (0062,0003) | SQ |                              | Always            |
|                             | Code Value                                | (0008,0100) | SH | "91723000"                   | Always            |
|                             | Code Scheme Designator                    | (0008,0102) | SH | "SCT"                        | Always            |
|                             | Code Meaning                              | (0008,0104) | LO | "Anatomical Structure"       | Always            |
|                             | Segmented Property Type Code Sequence     | (0062,000F) | SQ |                              | Always            |
|                             | Code Value                                | (0008,0100) | SH | "122485"                     | Always            |
|                             | Code Scheme Designator                    | (0008,0102) | SH | "DCM"                        | Always            |
|                             | Code Meaning                              | (0008,0104) | LO | "Sphere"                     | Always            |
|                             | Anatomic Region Sequence                  | (0008,2218) | SQ |                              | Always            |
|                             | Code Value                                | (0008,0100) | SH | "T-D0010"                    | Always            |
|                             | Code Scheme Designator                    | (0008,0102) | SH | "SRT"                        | Always            |
|                             | Code Meaning                              | (0008,0104) | LO | "Entire Body"                | Always            |
| Surface Count               |                                           | (0066,002A) | UL |                              | Always            |
| Referenced Surface Sequence |                                           | (0066,002B) | SQ |                              | Always            |
|                             | Referenced Surface Number                 | (0066,002C) | UL |                              | Always            |

|  |                                                              |                             |             |    |                           |        |
|--|--------------------------------------------------------------|-----------------------------|-------------|----|---------------------------|--------|
|  | Segment Surface Generation Algorithm Identification Sequence |                             | (0066,002D) | SQ |                           | Always |
|  |                                                              | Algorithm version           | (0066,0031) | LO | "1"                       | Always |
|  |                                                              | Algorithm Name              | (0066,0036) | LO | "Manual Processing"       | Always |
|  | Algorithm Family Code Sequence                               |                             |             |    |                           |        |
|  |                                                              | Code Value                  | (0008,0100) | SH | "123109"                  | Always |
|  |                                                              | Code Scheme Designator      | (0008,0102) | SH | "DCM"                     | Always |
|  |                                                              | Code Meaning                | (0008,0104) | LO | " Manual Processing "     | Always |
|  | Segment Surface Source Instance Sequence                     |                             | (0066,002E) | SQ |                           | Always |
|  |                                                              | Referenced SOP Class UID    | (0008,1150) | UI | From original DICOM image | Always |
|  |                                                              | Referenced SOP Instance UID | (0008,1155) | UI | From original DICOM image | Always |

Table 8.1-32  
SURFACE MESH OF CREATED SOP INSTANCES

| Attribute Name                      |                | Tag         | VR | Value     | Presence of Value |
|-------------------------------------|----------------|-------------|----|-----------|-------------------|
| Number Of Surfaces                  |                | (0066,0001) | UL |           | Always            |
| Surface Sequence                    |                | (0066,0002) | SQ |           | Always            |
|                                     | Surface Number | (0066,0003) | UL |           | Always            |
| Surface Processing                  |                | (0066,0009) | CS |           | Empty             |
| Recommended Display Grayscale Value |                | (0062,000C) | US |           | Always            |
| Recommended Display CIELab Value    |                | (0062,000D) | US |           | Always            |
| Recommended Presentation Opacity    |                | (0066,000C) | FL | 1.0       | Always            |
| Recommended Presentation Type       |                | (0066,000D) | CS | "SURFACE" | Always            |
| Finite Volume                       |                | (0066,000E) | CS | "UNKOWN"  | Always            |
| Manifold                            |                | (0066,0010) | CS | "UNKOWN"  | Always            |
| Surface Comments                    |                | (0066,0004) | LT |           | Empty             |
| Surface Points Sequence             |                | (0066,0011) | SQ |           | Always            |

|  |                                  |             |    |  |                                   |
|--|----------------------------------|-------------|----|--|-----------------------------------|
|  | Number Of Surface Points         | (0066,0015) | UL |  | Always                            |
|  | Point Coordinates Data           | (0066,0016) | OF |  | Always                            |
|  | Surface Points Normals Sequence  | (0066,0012) | SQ |  | Optional                          |
|  | Number Of Vectors                | (0066,001E) | UL |  | Optional                          |
|  | Vector Dimensionality            | (0066,001F) | US |  | Optional                          |
|  | Vector Coordinate Data           | (0066,0021) | OF |  | Optional                          |
|  | Surface Mesh Primitives Sequence | (0066,0013) | SQ |  | Always                            |
|  | Triangle Point Index List        | (0066,0023) | OW |  | If number of indices $\leq$ 65535 |
|  | Edge Point Index List            | (0066,0024) | OW |  | Empty                             |
|  | Vertex Point Index List          | (0066,0025) | OW |  | Empty                             |
|  | Triangle Strip Sequence          | (0066,0026) | SQ |  | Empty                             |
|  | Triangle Fan Sequence            | (0066,0027) | SQ |  | Empty                             |
|  | Line Sequence                    | (0066,0028) | SQ |  | Empty                             |
|  | Facet Sequence                   | (0066,0034) | SQ |  | Empty                             |
|  | Long Triangle Point Index List   | (0066,0041) | OL |  | Always                            |
|  | Long Edge Point Index List       | (0066,0042) | OL |  | Empty                             |
|  | Long Vertex Point Index List     | (0066,0043) | OL |  | Empty                             |

Table 8.1-33

## COMMON INSTANCE REFERENCE MODULE OF CREATED SOP INSTANCES

| Attribute Name               |                             | Tag         | VR | Value                     | Presence of Value |
|------------------------------|-----------------------------|-------------|----|---------------------------|-------------------|
| Referenced Series Sequence   |                             | (0008,1115) | SQ |                           | Always            |
|                              | Series Instance UID         | (0020,000E) | UI | From original DICOM image | Always            |
| Referenced Instance Sequence |                             | (0008,114A) | SQ |                           | Always            |
|                              | Referenced SOP Class UID    | (0008,1150) | UI | From original DICOM image | Always            |
|                              | Referenced SOP Instance UID | (0008,1155) | UI | From original DICOM image | Always            |

Table 8.1-34

SOP COMMON MODULE OF CREATED SOP INSTANCES

| Attribute Name         | Tag         | VR | Value                          | Presence of Value |
|------------------------|-------------|----|--------------------------------|-------------------|
| Specific Character Set | (0008,0005) | CS | "ISO_IR 192"                   | Always            |
| SOP Class UID          | (0008,0016) | UI | "1.2.840.10008.5.1.4.1.1.66.5" | Always            |
| SOP Instance UID       | (0008,0018) | UI | Generated automatically        | Always            |

### 8.1.1.8 CT Image Modules

Table 8.1-35

GENERAL SERIES MODULE OF CREATED SOP INSTANCES

| Attribute Name      | Tag         | VR | Value                   | Presence of Value |
|---------------------|-------------|----|-------------------------|-------------------|
| Series Instance UID | (0020,000E) | UI | Generated automatically | Always            |
| Series Description  | (0008,103E) | LO |                         | Always            |

Table 8.1-36

GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES

| Attribute Name            | Tag         | VR | Value                          | Presence of Value |
|---------------------------|-------------|----|--------------------------------|-------------------|
| Manufacturer              | (0008,0070) | LO | "CircleCVI"                    | Always            |
| Manufacturer's Model Name | (0008,1090) | LO | "TruPlan"                      | Always            |
| Device Serial Number      | (0018,1000) | LO | Current version                | Always            |
| Software Versions         | (0018,1020) | LO | <b>TruPlan</b> current version | Always            |

Table 8.1-37

GENERAL IMAGE MODULE OF CREATED SOP INSTANCES

| Attribute Name | Tag         | VR | Value                        | Presence of Value |
|----------------|-------------|----|------------------------------|-------------------|
| Content Date   | (0008,0023) | DA | Date of the content creation | Always            |
| Content Time   | (0008,0033) | TM | Time of the content creation | Always            |

Table 8.1-38

IMAGE PIXEL MODULE OF CREATED SOP INSTANCES

| Attribute Name       | Tag         | VR | Value | Presence of Value |
|----------------------|-------------|----|-------|-------------------|
| Pixel Representation | (0028,0103) | US | 1     | Always            |

|                            |             |    |                                     |                         |
|----------------------------|-------------|----|-------------------------------------|-------------------------|
| Smallest Image Pixel Value | (0028,0106) | SS |                                     | Not always <sup>2</sup> |
| Largest Image Pixel Value  | (0028,0107) | SS |                                     | Not always <sup>2</sup> |
| Pixel Data                 | (7FE0,0010) | OW | Depends on the content of the image | Always                  |

Table 8.1-39

## CT IMAGE MODULE OF CREATED SOP INSTANCES

| Attribute Name    | Tag         | VR | Value | Presence of Value |
|-------------------|-------------|----|-------|-------------------|
| Samples Per Pixel | (0028,0002) | US | 1     | Always            |
| Bits Allocated    | (0028,0100) | US | 16    | Always            |
| Bits Stored       | (0028,0101) | US | 16    | Always            |
| High Bit          | (0028,0102) | US | 15    | Always            |
| Rescale Intercept | (0028,1052) | DS | "0.0" | Always            |
| Rescale Slope     | (0028,1053) | DS | "1.0" | Always            |
| Rescale Type      | (0028,1054) | LO | "HU"  | Never             |

Table 8.1-40

## SOP COMMON MODULE OF CREATED SOP INSTANCES

| Attribute Name   | Tag         | VR | Value                   | Presence of Value |
|------------------|-------------|----|-------------------------|-------------------|
| SOP Instance UID | (0008,0018) | UI | Generated automatically | Always            |

Table 8.1-41

## GENERAL REFERENCE OF CREATED SOP INSTANCES

| Attribute Name               | Tag         | VR | Value | Presence of Value |
|------------------------------|-------------|----|-------|-------------------|
| Referenced Image Sequence    | (0008,1140) | SQ |       | Always            |
| Referenced Instance Sequence | (0008,114A) | SQ |       | Never             |
| Derivation Description       | (0008,2111) | ST |       | Never             |
| Source Image Sequence        | (0008,2112) | SQ |       | Never             |
| Derivation Code Sequence     | (0008,9215) | SQ |       | Never             |
| Source Instance Sequence     | (0008,0013) | SQ |       | Never             |

<sup>2</sup> If source DICOM image is not multi-frame

### 8.1.1.9 Multi-frame True Color SC Image Modules

Table 8.1-42

IMAGE PIXEL MODULE OF CREATED SOP INSTANCES

| Attribute Name             | Tag         | VR | Value                               | Presence of Value |
|----------------------------|-------------|----|-------------------------------------|-------------------|
| Samples Per Pixel          | (0028,0002) | US | 3                                   | Always            |
| Photometric Interpretation | (0028,0004) | CS | "RGB"                               | Always            |
| Planar Configuration       | (0028,0006) | US | 0                                   | Always            |
| Rows                       | (0028,0010) | US | Depends on the height of the image  | Always            |
| Columns                    | (0028,0011) | US | Depends on the width of the image   | Always            |
| Pixel Aspect Ratio         | (0028,0034) | IS |                                     | Never             |
| Bits Allocated             | (0028,0100) | US | 8                                   | Always            |
| Bits Stored                | (0028,0101) | US | 8                                   | Always            |
| High Bit                   | (0028,0102) | US | 7                                   | Always            |
| Pixel Representation       | (0028,0103) | US | 0                                   | Always            |
| Pixel Data                 | (7FE0,0010) | OW | Depends on the content of the image | Always            |

Table 8.1-43

IMAGE PLANE MODULE OF CREATED SOP INSTANCES (SELECTED ATTRIBUTES)

| Attribute Name              | Tag         | VR | Value | Presence of Value |
|-----------------------------|-------------|----|-------|-------------------|
| Image Orientation (Patient) | (0020,0037) | DS |       | Always            |
| Image Position (Patient)    | (0020,0032) | DS |       | Always            |
| Pixel Spacing               | (0028,0030) | DS |       | Not Always        |

Table 8.1-44

MULTI-FRAME MODULE OF CREATED SOP INSTANCES

| Attribute Name          | Tag         | VR | Value                                                | Presence of Value |
|-------------------------|-------------|----|------------------------------------------------------|-------------------|
| Number of Frames        | (0008,0008) | IS | Number of frames present in the Pixel Data attribute | Always            |
| Frame Increment Pointer | (0028,0009) | AT | See Table 8.1-21                                     |                   |

Table 8.1-45

## SC MULTI-FRAME IMAGE MODULE OF CREATED SOP INSTANCES

| Attribute Name          | Tag         | VR | Value                    | Presence of Value  |
|-------------------------|-------------|----|--------------------------|--------------------|
| Frame Increment Pointer | (0028,0009) | AT |                          | Never              |
| Pixel Spacing           | (0028,0030) | DS | Calculated pixel spacing | Only if applicable |
| Burned in Annotation    | (0028,0301) | CS | "YES"                    | Always             |

Table 8.1-46

## SOP COMMON MODULE OF CREATED SOP INSTANCES

| Attribute Name                  | Tag         | VR | Value                                                                                 | Presence of Value |
|---------------------------------|-------------|----|---------------------------------------------------------------------------------------|-------------------|
| Specific Character Set          | (0008,0005) | CS | "ISO_IR 100" if original DICOM image is "ISO_IR 100" or empty, otherwise "ISO_IR 192" | Always            |
| SOP Class UID                   | (0008,0016) | UI | "1.2.840.10008.5.1.4.1.1.7.4"                                                         | Always            |
| SOP Instance UID                | (0008,0018) | UI | Generated automatically                                                               | Always            |
| Contributing Equipment Sequence | (0018,A001) | SQ | From original DIOCM image                                                             | Always            |

### 8.1.1.10 Storage Commitment IOD

Table 8.1-47

## N-EVENT-REPORT ATTRIBUTES OF STORAGE COMMITMENT PUSH MODEL SOP INSTANCES

| Attribute Name          | Tag         | VR | Value                                          | Presence of Value |
|-------------------------|-------------|----|------------------------------------------------|-------------------|
| Instance Creation Date  | (0008,0012) | DA | Date of content creation                       | Always            |
| Instance Creation Time  | (0008,0013) | TM | Time of content creation                       | Always            |
| Transaction UID         | (0008,1195) | UI | Generated automatically                        | Always            |
| Failed SOP Sequence     | (0008,1198) | SQ | List of storage commitment failed instances    | Might be empty    |
| Referenced SOP Sequence | (0008,1199) | SQ | List of storage commitment succeeded instances | Might be empty    |

## 8.1.2 Usage of Attribute from Received IODs

The STORAGE-SCP application entity makes use of the following attributes from an incoming DICOM object.

Table 8.1-48  
USED FIELDS IN RECEIVED IOD FOR AE STORAGE-SCP

| Attribute Name      | Tag         | Comment                                                             |
|---------------------|-------------|---------------------------------------------------------------------|
| SOP Class UID       | (0008,0016) | Used to determine whether SOP Class is supported by the application |
| SOP Instance UID    | (0008,0018) | Used to derive local filename                                       |
| Study Instance UID  | (0020,000D) | Used for the local database                                         |
| Series Instance UID | (0020,000E) | Used for the local database                                         |

All four attributes listed in Table 8.1-48 must be present in the received instances with non-empty values in order to be processed by the system.

### 8.1.3 Attribute Mapping

TruPlan does not use any attribute mapping.

### 8.1.4 Coerced / Modified Fields

TruPlan does not modify any fields.

The anonymization of existing SOP instances is described in section 8.1.1.1.

## 8.2 Data Dictionary of Private Attributes

The private attributes added to created SOP instances are listed in Table 8.2-1. TruPlan reserves blocks of private attributes in group 0x0025. Further details on the usage of these private attributes are described in Section 8.1.

Table 8.2-1  
DATA DICTIONARY OF PRIVATE ATTRIBUTES IN CREATED SOP INSTANCES

| Tag         | Attribute Name  | VR | VM | Attribute Description                                                                                                         |
|-------------|-----------------|----|----|-------------------------------------------------------------------------------------------------------------------------------|
| (0025,0035) | Private Creator | LO | 1  | Identification of the creator of the group of private data elements                                                           |
| (0025,3510) | Session Stream  | OB | 1  | Proprietary stream of a TruPlan session file, containing information on display setting, contour definitions and measurements |

The following private attributes are supported in received SOP Instances.

Table 8.2-2  
DATA DICTIONARY OF PRIVATE ATTRIBUTES FOR GENERAL ELECTRICS DEVICES

| Tag         | Attribute Name  | VR | VM |
|-------------|-----------------|----|----|
| (0019,0010) | Private Creator | LO | 1  |

|             |                       |    |   |
|-------------|-----------------------|----|---|
| (0019,10CB) | Flow Axis             | SS | 1 |
| (0019,10CC) | Velocity Encoding     | SS | 1 |
| (0019,10E2) | Velocity Encode Scale | DS | 1 |
| (0043,1030) | Vas Collapse Flag     | SS | 1 |
| (0043,1032) | Raw Data Type         | SS | 1 |

Table 8.2-3

## DATA DICTIONARY OF PRIVATE ATTRIBUTES FOR PHILIPS DEVICES

| Tag         | Attribute Name             | VR | VM  |
|-------------|----------------------------|----|-----|
| (2001,101A) | PC Velocity                | FL | 1-n |
| (2005,1572) | Inversion Delay Time       | FL | 1   |
| (2005,10A0) | Perfusion Time             | FL | 1   |
| (2005,1409) | Original Rescale Intercept | DS | 1   |
| (2005,140A) | Original Rescale Slope     | DS | 1   |
| (2005,140B) | Original Rescale Type      | LO | 1   |
| (2005,140F) | Philips Function Sequence  | SQ | 1   |

Table 8.2-4

## DATA DICTIONARY OF PRIVATE ATTRIBUTES FOR SIEMENS DEVICES

| Tag         | Attribute Name         | VR | VM |
|-------------|------------------------|----|----|
| (0029,1010) | CSA Image Header Info  | OB | 1  |
| (0029,1020) | CSA Series Header Info | OB | 1  |
| (0051,1016) | Image Type Text        | LO | 1  |
| (0021,11FE) | Temp Function Sequence | SQ | 1  |

Table 8.2-5

## DATA DICTIONARY OF PRIVATE ATTRIBUTES FOR TOSHIBA DEVICES

| Tag         | Attribute Name                 | VR | VM |
|-------------|--------------------------------|----|----|
| (700d,1000) | Velocity Encoding Scale Factor | DS | 1  |

The Private Creator element is not checked for the supported private groups, but the value of the Manufacturer (0008,0070) data element. Please note that this behavior conforms to the specifications of the two device manufacturers.

## 8.3 Coded Terminology and Templates

TruPlan does not use any coded terminology or templates.

## 8.4 Grayscale Image Consistency

TruPlan does not make use of the DICOM Grayscale Standard Display Function.

## ***8.5 Standard Extended / Specialized / Private SOP Classes***

TruPlan uses a private data module for the SC Image IOD. See section 8.1.1 for details.

The system does not support any specialized or private SOP classes.

## ***8.6 Private Transfer Syntaxes***

TruPlan does not use any private transfer syntaxes.