

# **encephalon**

## **Conformance Statement DICOM 3.0**

## Introduction

This document describes the *encephalon* Video Capture System, which supports the standard DICOM (*Digital Imaging and Communication in Medicine*). The System Application is based on DICOM 3.0, release 2004.

The document is mainly according to the template in the standard publication PS 3.2 and requires that the reader is familiar with the DICOM standard.

*encephalon* currently supports three DICOM Service Classes.

- Basic Worklist Management, Modality Worklist.
- Storage.
- Media Storage.

*Notice:* even though *encephalon* supports the DICOM standard there is no guarantee that the system is compatible with other equipment.

## References

- DICOM standard: PS 3.1-3.8, 3.10-3.12, 3.14-3.16 and supplement.
- NEMA (*National Electrical Manufactures Association*).
- Independent JPEG Group.

## Implementation Model

### Modality Worklist

The Worklist Service Class in *encephalon* retrieves patient data from RIS (*Radiologic Information System*) to a local worklist. Several items can be matched, according to the DICOM standard.

### Storage

The Image Storage System in *encephalon* captures images from connected Video Equipment and stores the images or sequences on Hard Disk in the DICOM format. The Storage Service Class is transmitting the images or sequences to PACS (*Picture Archiving and Communication Systems*).

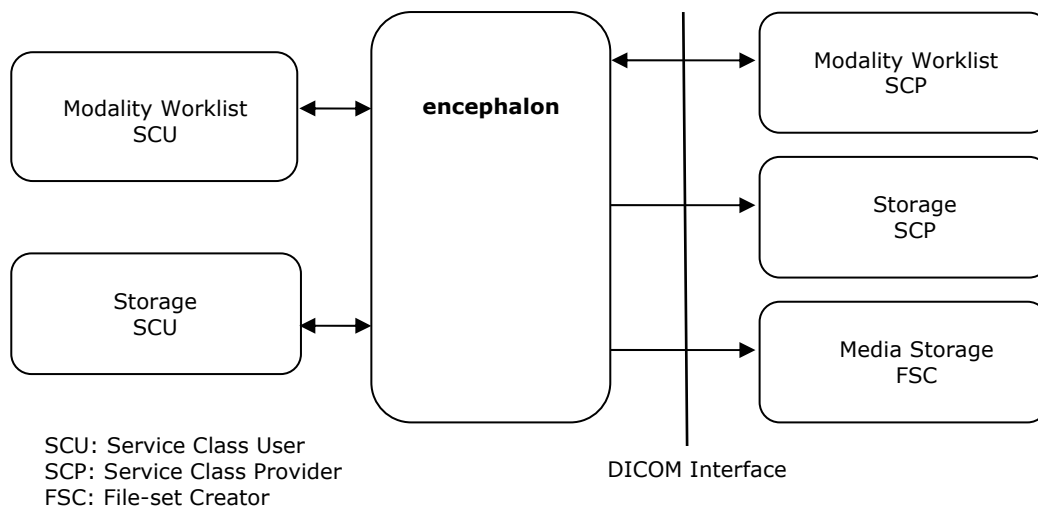
### Media Storage

The Media Storage System in *encephalon* stores captured images or sequences on CD and DVD as FSC (*File-set Creator*). An index file, DICOMDIR, with references to the images or sequences is automatically created by the application.

### Operating System

Microsoft® Windows® 2000 or Windows® XP Pro.

## Application Data Flow Diagram



## Functional Definitions of Application Entities

### General

Each connected Service Class Provider, SCP, has its own AE-title, while the Service Class User, SCU, has the same AE-title for all Service Classes.

### Modality Worklist SCU

Modality Worklist SCU performs an Association Negotiation with Modality Worklist SCP regarding the Presentation Context Items (*Abstract Syntax, Transfer Syntax*) and establishes the association. After the Request Message (*C-FIND*) and Response Message the Modality Worklist SCU is Released and the association is closed down by the application.

### Storage SCU

Storage SCU performs an Association Negotiation with Storage SCP regarding the Presentation Context Items and establishes the association. Storage SCU selects one Item if the Storage SCP supports it. Then the Storage SCU is transmitting images or sequences to the Storage SCP and the association is closing down by the application.

### Media Storage FSC

Media Storage FSC creates a DICOMDIR file and stores images and sequences on CD or DVD. The application is warning if the storage level is limited, according to the FSC rules.

## Sequencing of Real-World Activities

1. Patient data is retrieved from the RIS server to a worklist by Modality Worklist SCU. Manual input is possible as well.
2. The images or sequences, including the patient data, is stored locally to a file.
3. The file is transmitted to the PACS server manually or automatically.

## Application Entity Specifications

### Specification

*encephalon* supports the following SOP classes (*Service Object Pair*), according to DICOM 3.0, revision 2004.

### Modality Worklist SCU

Modality Worklist Information Model – FIND: 1.2.840.10008.5.1.4.31.

### Storage SCU

- Secondary Capture Image Storage: 1.2.840.10008.5.1.4.1.1.7.
- Multi-frame True Color Secondary Capture Image Storage: 1.2.840.10008.5.1.4.1.1.7.4.

### Media Storage FSC

Media Storage Directory Storage: 1.2.840.10008.1.3.10.

## Association Establishment Policies

### General

An Association Negotiation is performed before any exchange of data. The SCU releases the association if it is not aborted by the SCP.

The SCU and the SCP is negotiating about Maximum PDU (*Packet Data Unit*) Length. It is configurable, but default: 28 Kbyte.

### Number of Associations

*encephalon* supports two associations simultaneously.

### Asynchronous Nature

Asynchronous communication is not supported.

### Implementation Identifying Information

*encephalon* has the following configurable parameters.

- Implementation Class UID: 1.2.826.0.1.3680043.2.870.x...,  
(granted full permission by *Medical Connections, UK*).
- Implementation Version Name: ENCEPHALON\_xx\_xx.

## Association Initiation Policy

### General

#### *Modality Worklist SCU*

Modality Worklist SCU initiates a separate association for each FIND Request Message .

#### *Storage SCU*

Storage SCU is transmitting several images and sequences for each association.

### Real-World Activity, Modality Worklist SCU

#### *Associated Real-World Activity*

The Modality Worklist SCU in *encephalon* is retrieving patient data from Worklist SCP (RIS) over the network and attach the data to the images or sequences.

*Proposed Presentation Contexts*

- Implicit VR Little Endian Transfer Syntax: 1.2.840.10008.1.2.
- Explicit VR Little Endian Transfer Syntax: 1.2.840.10008.1.2.1.
- Explicit VR Big Endian Transfer Syntax: 1.2.840.10008.1.2.2.

*SOP Specific Conformance Statement*

Attribute Name	Tag ID	Matching	Value/Remarks
Specific Character Set	(0008,0005)		ISO_IR 100
Accession Number	(0008,0050)	Single Value	"Undersökningsnr"
Referring Physician's Name	(0008,0090)	Single Value	"Remitterande klinik"
Patient Name	(0010,0010)	Wild Card	
Patient ID	(0010,0020)	Single Value	"Personnummer"
Patient's Birth Date	(0010,0030)	Single Value	
Patient's Sex	(0010,0040)	Single Value	F, M, O
Medical Alerts	(0010,2000)	Single Value	
Contrast Allergies	(0010,2110)	Single Value	
Study Instance UID	(0020,000D)		From RIS
Requesting Physician	(0032,1032)	Single Value	"Remitterande läkare"
Requested Procedure Description	(0032,1060)	Single Value	"Undersökningstyp"
Special Needs	(0038,0050)	Single Value	
Scheduled Procedure Step Sequence	(0040,0100)		
Sequence	(FFFE,E000)		
>Modality	(0008,0060)	Single Value	
>Requested Contrast Agent	(0032,1070)	Single Value	
>Scheduled Station AE Title	(0040,0001)		
>Scheduled Procedure Step Start Date	(0040,0002)	Range	
>Scheduled Procedure Step Start Time	(0040,0003)	Range	
>Scheduled Performing Physician's Name	(0040,0006)	Single Value	"Undersökningsläkare"
>Scheduled Procedure Step Description	(0040,0007)	Single Value	Copy of (0032,1060)
>Scheduled Procedure Step ID	(0040,0009)		
>Scheduled Station Name	(0040,0010)		
>Scheduled Procedure Step Location	(0040,0011)	Single Value	
>Pre Medication	(0040,0012)	Single Value	
Requested Procedure ID	(0040,1001)	Single Value	"Remissnummer"

**Real-World Activity, Storage SCU**

*Associated Real-World Activity*

The Storage SCU in *encephalon* is transmitting the images and the sequences to Storage SCP (PACS) over the network.

*Proposed Presentation Context*

- Explicit VR Little Endian Transfer Syntax: 1.2.840.10008.1.2.1.
- JPEG Baseline (Process 1) Default Transfer Syntax for 8 Bit Image Compression: 1.2.840.1008.1.2.4.50.

*SOP Specific Conformance Statement*

Attribute Name	Tag ID	Value/Remarks
Specific Character Set	(0008,0005)	ISO_IR 100
Image Type	(0008,0008)	ORIGINAL or DERIVED
SOP Class UID	(0008,0016)	
SOP Instance UID	(0008,0018)	
Study Date	(0008,0020)	
Series Date	(0008,0021)	
Image Date	(0008,0023)	
Study Time	(0008,0030)	
Series Time	(0008,0031)	
Image Time	(0008,0033)	

Accession Number	(0008,0050)	"Undersökningsnummer"
Modality	(0008,0060)	
Conversion Type	(0008,0064)	DV
Manufacturer	(0008,0070)	encephal medical systems
Institution Name	(0008,0080)	
Study Description	(0008,1030)	
Performing Physicians' Name	(0008,1050)	"Läkare"
Patient Name	(0010,0010)	
Patient ID	(0010,0020)	"Personnummer"
Patient's Birth Date	(0010,0030)	
Patient's Sex	(0010,0040)	F, M, O
Study Instance UID	(0020,000D)	From RIS or Generated
Series Instance UID	(0020,000E)	Generated
Study ID	(0020,0010)	"Remisnummer"
Series Number	(0020,0011)	1
Instance (Image) Number	(0020,0013)	
Samples per Pixel	(0028,0002)	3
Photometric Interpretation	(0028,0004)	YBR_FULL_422 or RGB
Planar Configuration	(0028,0006)	0
Number of Frames	(0028,0008)	
Frame Increment Pointer	(0028,0009)	Point to (0020,0013)
Rows	(0028,0010)	576
Columns	(0028,0011)	768
Bits Allocated	(0028,0100)	8
Bits Stored	(0028,0101)	8
High Bit	(0028,0102)	7
Pixel Representation	(0028,0103)	0
Lossy Image Compression	(0028,2110)	
Pixel Data	(7FE0,0010)	

## Real-World Activity, Media Storage FSC

### *Associated Real-World Activity*

The Media Storage in *encephalon* is storing the images or sequences from the local Hard Disk to CD or DVD.

### *Proposed Presentation Context*

- Explicit VR Little Endian Transfer Syntax: 1.2.840.10008.1.2.1.

## Communication Profiles

### **Supported Communication Stack**

*encephalon* supports DICOM 3.0 TCP/IP (*Transfer Control Protocol/Internet Protocol*), according to PS 3.8 in the DICOM standard.

### **TCP/IP Stack**

*encephalon* is using the TCP/IP communication in Microsoft® Windows® 2000 or Windows® XP Pro operation system.

### **Configuration**

The configuration of *encephalon* is performed by authorized staff from *encephal medical systems*.

### **Support of Extended Character Sets**

*encephalon* supports Extended Character Set: ISO\_IR 100.