



The DICOM Cheat Sheet

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Abstract Syntax

A Synonym for SOP Class in the context of Association Negotiation.

Association

DICOM Networking

A network session between two DICOM Application. An association is a two phases process. The first phase is the negotiation where the context of the session is negotiated and the second phase is the actual command exchange.

Application Entity (AE) Title

A unique name of a node in the DICOM network
Every DICOM AE has a table where the other AE's are configured with their host name or IP address and the port they are listening on.

C-ECHO

DICOM Networking

A DIMSE Command that is used for the verification service that verifies communication between two DICOM Applications. AKA "DICOM ping".

C-FIND

DICOM Networking

A DIMSE Command that performs a "Query" similar to SQL "SELECT" statement.

C-FIND is part of the Q/R Service together with C-MOVE and C-GET. C-FIND is also used in the MWL Service.

C-GET

DICOM Networking

An obsolete DIMSE Command for retrieving DICOM Instances using matching criteria. C-GET is similar to C-MOVE but instead of starting a new association, the instances are sent over the same connection as responses.

C-MOVE

DICOM Networking

A DIMSE Command that does the following: "Application A asks application B to send DICOM Instances stored in Application B to Application C". Application C may or may not be application A itself. When Application B receives the C-MOVE Request it initiates communication with Application C and then performs C-STORE commands for every instance that matches the C-MOVE request identifier. While doing this, Application B may report progress to application A through the connection that A initiated originally when requesting the C-MOVE.

C-STORE

DICOM Networking

A DIMSE Command that sends a DICOM Object (e.g. Image) from one application (Storage SCU) to another (Storage SCP). The C-STORE command is used in the "Storage Service".

CDA

Clinical Document Architecture. CDA, is part of HL7 Version 3 and is a document markup standard that specifies the structure and semantics of clinical documents for the purpose of exchange between healthcare providers and patients. CDA are XML documents.

DICOM

Digital Imaging and Communication in Medicine. DICOM is a standard that specify image and document format, encoding, network protocol, and data model for use by medical imaging applications.

DICOM Data Element

A piece of information that is part of a larger DICOM Object such as patient name or study date. AKA "DICOM Attribute". Every DICOM Data Elements is identified by a DICOM Tag that defines the element's data type.



DICOM Header

Usually refers to the DICOM elements excluding the image pixel data as people conceive DICOM objects as an image with additional data attributes. Actually the image pixel data is a data element like any other. Sometimes may refer to the DICOM File Meta Information header.

DICOM Object

A group of DICOM Data Elements that define some real life object e.g. Image. AKA DICOM Instance. Objects may be stored in files or transferred via network.

DICOM Services

The services that the DICOM standard defines. Applications that conform to the DICOM standard implements DICOM services, either as SCU or as SCP.

DICOM Tag

A number that identifies a specific DICOM Data Element and defines the data element name, content and data type.

The tag is a long number (4 bytes) comprised of two short numbers (2 bytes each), group and element. Related tags usually share the same group, for example patient data elements belong to group 10.

Tags are usually written as a pair of two 4 hexadecimal digits in the following form: (gggg,eeee).

DIMSE

DICOM Networking

DICOM Message Exchange. The DICOM network commands are called DIMSE Commands.

File Meta Information Header

DICOM Files

A header that is added to a DICOM Instance when it is saved to file. The Meta info header is not part of the DICOM Instance itself. It adds information required for parsing the file correctly and identifying the application that saved the file.

HL7

A message exchange standard used for Healthcare IT integration. HL7 is used for transactions like patient registration, service orders and reports. HL7 Messages are typically encoded using pipe | separator between fields.

HL7 version 2 is very popular. HL7 Version 3 is using XML instead of the HL7 V2 pipe notation.

HTML

www

Hypertext Markup Language. The standard language used for creating web pages. HTML is written in the form of HTML elements consisting of tags enclosed in angle brackets (like <html>)

HTTP

Hypertext Transfer Protocol. The protocol that is used for the world wide web (www).

Identifier

DICOM Q/R Service

A DICOM Object that carries a Query in a somewhat similar to SQL SELECT clause. The Identifier is comprised of matching attributes that carry the "WHERE" attributes and universal attributes that carry the "SELECT" attributes.

IHE

Integrating the Healthcare Enterprise. An international organization that publishes detailed specifications of how standards like DICOM and HL7 should be used to integrate Healthcare IT Systems. Adhering to the IHE integration profiles may reduce ambiguities and narrow the options within the used standards and therefore increase compatibility.

IOD

Acronym for "Information Object Definition". The DICOM standard defines objects that are the subject of the standard. For example CT Image or Worklist Item. IOD's are defined as a set of Data Elements and rules for their presence and content.



IP Address

Network

A unique address of a computer in the IP network

IP, TCP, TCP/IP

Acronyms for "Internet Protocol" and "Transmission Control Protocol". The first protocols in the computer networking model that is the basis for the internet.

DICOM, HL7, and almost all other computer networking standards use TCP/IP.

Modality Performed Procedure Step (MPPS)

A DICOM Service that is used to report the status of a procedure. MPPS is used together with MWL. MWL provides the task list and MPPS is used to "checkmark" completed tasks.

Modality Worklist Management (MWL)

A DICOM Service that is used for managing "tasks" for Imaging Modalities.

PACS

Picture Archive and Communication System. It is commonly accepted that PACS provides its services using the DICOM Network Protocol.

Part 10 File

DICOM Files

AKA DICOM File. Part 10 of the DICOM standard defines how to save DICOM Objects in files. Part 10 files include the DICOM File Meta Information Header. Before part 10, DICOM files did not have the meta information header.

Port

Network

A port (door/window) in the computer where communication is made through. One host may have many ports and each networking application works through one of them. The standard port for DICOM applications is 104.

Presentation Context

A combination of a SOP Class and Transfer Syntax that is agreed upon between two applications during the association negotiation phase. The transfer syntax is used to serialize the commands and data objects of the service throughout the association.

SCP

Acronym for "Service Class Provider". Synonym for "Server" in general computing terminology.

SCU

Acronym for "Service Class User". Synonym for "Client" in general computing terminology.

Service Object Pair (SOP) Class

A pair of an IOD and DIMSE Service that together defines a capability of a DICOM AE. At association phase, AE's exchange SOP Class UID's and agree on their capabilities.

SOAP

Simple Object Access Protocol. A protocol for exchanging objects between Web Services SOAP uses XML as message and object format and usually relies on HTTP for transmission.

SOP Instance UID

Uniquely identifies one DICOM Instance. Every DICOM Instance has a UID.

Storage Commitment Management (SCM)

A DICOM Service that is used to "pass the ownership" on DICOM Instances from one application to another. It confirms that a DICOM Application stores a set of DICOM Instances in a similar way to the "commit" SQL command. When receiving successful commit result, an application can assume that the instances are safely stored by the other application and can delete them from its own storage.



Transfer Syntax

Defines how data elements are serialized in three (3) aspects: (1) Byte order (Little/Big endian) (2) Explicit or Implicit Value Representation and (3) If and what type of compression is used for the image pixel data element.

Represented as a pre-defined UID.

Transfer syntax is negotiated for every service in the association setup phase and is also part of the file meta information header.

UID

Acronym for "Unique Identifier". UID's are widely used in DICOM and are assigned to objects, classes, transfer syntaxes, special services, and specific data elements. NEMA registers DICOM UID's and every instance of a DICOM application should have a UID prefix that it can use to generate new UID's from.

VM

Value Multiplicity. A DICOM Element may have multiple values. String values are separated by \ while the VM of binary values is determined by dividing the element length in bytes by the size of one value. For example the VM of a data element of type US (Unsigned Short) that has a length of 6 is 3.

VNA

Vendor Neutral Archive. A digital archive for medical documents, including images, that stores documents of multiple standards and formats and provide access through a variety of protocols.

VR

Value Representation. The DICOM Data Type. VR's are named as two letter codes. E.g. UI is the UID. PN is Person Name.

XDS

Acronym for "Cross Enterprise Document Sharing". XDS is an IHE Integration Profile that specifies a method for sharing document across enterprise boundaries.

XML

Extensible Markup Language. A markup language that defines a set of rules for encoding documents in a format which is both human-readable and machine-readable.

WADO

Web Access to DICOM Objects. Part 18 of the DICOM standard details an interface to DICOM Objects using HTTP. WADO enables, for example, retrieving DICOM images as JPEG using an HTTP GET request.