            Digital Imaging and Communications in Medicine (DICOM) -
                 Application/dicom MIME Sub-type Registration

Status of this Memo

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Abstract

   This document describes the registration of the MIME sub-type
   application/dicom (Digital Imaging and Communications in Medicine).
   The baseline encoding is defined by the DICOM Standards Committee in
   "Digital Imaging and Communications in Medicine".

1. DICOM Definition

   Digital Imaging and Communications in Medicine (DICOM) specifies
   protocols and formats for the exchange of images, time-based
   waveforms, reports, and associated information for medical
   applications.

   Individual DICOM objects (such as images) may be encapulsated in
   files and exchanged by e-mail using the Media Type defined herein.
   In addition, a set of DICOM files may be described by an index file,
   DICOMDIR, which may accompany the files that it references.

2. IANA Registration

   MIME media type name: Application

   MIME subtype name: dicom

Required parameters:

   "id" is constructed from a DICOM File ID (see DICOM PS3.11). The
   total length is limited to 71 characters. Each component is
   limited to 8 characters. The delimiter is a forward slash "/".
   There is never a leading delimiter (i.e., this is not a
   traditional path from a root directory).

   If a DICOMDIR (which provides an index of files) is included, then
   it will refer to other DICOM files in the file set by use of this
   File ID. The File ID is not encoded within each DICOM file. If a
   DICOMDIR is not present, then the "id" parameter may be absent.
   Note that the DICOMDIR will also have a Media Type of
   application/dicom and is distinguished from other files by its ID
   of "DICOMDIR".

   For example:
     "ROOTDIR/SUBDIR1/MRSCAN/A789FD07/19991024/ST00234/S00003/I00023"

   Each component shall be character strings made of characters from
   a subset of the G0 repertoire of ISO 8859. This subset consists
   of uppercase alphabetic characters, numeric characters and
   underscore. The following characters are permissable:

   A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V,
   W, X, Y, Z (uppercase)
   1, 2, 3, 4, 5, 6, 7, 8, 9, 0 and _ (underscore)

Optional parameters:

Encoding considerations:

   The DICOM information is binary, therefore the encoding used shall
   support lossless transfer of binary information. Typically, the
   Content-Transfer-Encoding would be set to "Base64".

   Multiple DICOM parts should be included as a Multipart/related
   entity [2387]. Receiving agents shall also support multiple parts
   as a Multipart/mixed entity. When multiple DICOM parts are
   included, one of the parts may be a DICOMDIR, in which case, all
   the files referred to by the DICOMDIR shall also be present. The
   DICOMDIR is not required to be the first Application/dicom part
   encoded in the message, in which case the optional "start"
   parameter should refer to the content-id of the part containing
   the DICOMDIR.

      Multiple DICOM Application/dicom parts may be included with other
      types of parts as a Multipart/mixed entity.

   Security considerations:

      Application/dicom parts contain medical information, including
      individual demographic information. Accordingly, their exchange
      should be restricted to a secure network or within a secure
      wrapper that protects a patient's right to confidentiality
      according to local and national policy. The specific security
      mechanisms are outside the scope of this proposal. Such
      mechanisms as Secured MIME (S/MIME) [2633] or similar might be
      appropriate.

   Interoperability considerations:

      Because DICOM information is specific to the medical (imaging)
      domain, generic e-mail applications may not be able to interpret
      the information.

      The Media Type has been designed in order to allow for

      (i)   DICOM aware applications to interoperate,
      (ii)   generic applications to save the files in a form
             recognizable as DICOM files, that a DICOM application may
             subsequently use.

   Published specification:

      The Digital Imaging and Communications in Medicine (DICOM)
      Standard is a standard of the DICOM Standards Committee, published
      by the National Electrical Manufacturers Association (NEMA), 1300
      N. 17th Street, Rosslyn, Virginia 22209 USA,
      (http://medical.nema.org).

   Applications which use this media:

      Biomedical imaging applications.

   Additional information:

      1. Magic number(s): "DICM" after 128 byte preamble indicates DICOM
                          PS 3.10 file

      2. File extension(s): ".dcm" is recommended for files saved to
                            disk (other than DICOMDIR)

    3. Macintosh file type code: Macintosh File Type "DICM" is
                                  recommended

    4. Object Identifiers: none

   Person to contact for further information:

    1. Name: Howard Clark
    2. E-mail: how_clark@nema.org

   Intended usage:

      Common

      Interchange of biomedical images.

   Author/Change controller:

      DICOM Standards Committee

3. References

   [DICOM]   DICOM Standards Committee, "Digital Imaging and
             Communications in Medicine", 2001.

   [2387]   Levinson, E., "The MIME Multipart/Related Content-type", RFC
             2387, August 1998.

   [2633]   Ramsdell, B., "S/MIME Version 3 Message Specification", RFC
             2633, June 1999.

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Acknowledgement