ITU-T Workshop
Video and Image Coding and Applications (VICA)

Abstract

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Session:	2: Applications
Title of Presentation:	MPEG-2 extends DICOM to new domains (Endoscopy, Microscopy, Surgery)

The DICOM (**D**igital **I**mage and **CO**mmunications in **M**edicine) standard defines both the standard to encode digital image (with the associated medical information) as well as the communication protocol for exchanging DICOM data set over the network. Because of this standard, DICOM modalities from different vendors can interoperate with other DICOM devices present on the hospital network thereby ensuring an optimal workflow.

Radiology is the domain in which DICOM was first applied. Radiology modalities mainly produce still images or series of images (refer to as multi-frame in the DICOM standard). To store these still images, DICOM has defined several commonly used image format (JPEG lossy or lossless in particular).

Because of the inherent benefits of the DICOM file format and communication protocol, the standard has evolved to include modalities beyond radiology. Although endoscopy, microscopy, surgery and other *Visible Light* modalities were recognized for still images they are finally being supported for video data. To encode this video data, MPEG-2 format was selected. Two factors were considered for the choice of this format:
1) In the context of archiving and network transfer the need to compress data, while keeping a good balance between compression rate and image quality (Main Profile @ Main Level was selected);
2) The maturity of this format and its wide use (implying stability). This point is of prime importance for medical data which is archived for long periods. A more upcoming format may lead to difficulties when decoding data several years after the video production.

Recently a major vendor has presented at the EAES conference (*European Association for Endoscopic Surgery*) a Visible Light compatible DICOM workflow. In this workflow an acquisition system is connected to the HIS (Hospital Information System) in order to retrieve patient's demographic data. It allowed to acquire both still images and video sequences from an endoscope. This data was then sent to a PACS (Picture Archiving and Communication System). A DICOM visualisation software was then used to retrieve data

from the PACS for consultation. Eventually, these data were then burned on a CD or DVD for short term archiving or for distribution.

This demonstration illustrated the compatibility of the recent DICOM standard evolution with *Visible Light* modalities. Additional work will focus on how to facilitate video consultation on a network (using streaming protocols for example). More importantly, the acceptance of MPEG-2 as a compression standard for medical applications will necessitate a careful analysis of information loss during compression. New standards such as MPEG-4 will also have to be carefully reviewed for future evolutions.