

## **MINUTES**

### **DICOM WORKING GROUP FOUR (Compression)**

**Date and time:** Wednesday, July 15, 2020 | 11:00am-12:00pm US ET

**Presiding Officer:** David Clunie, Chair

**Secretariat:** Shayna Knazik, DICOM/MITA

#### **Voting Members Present**

AetherAI	Pei-Chen Lin
Agfa US Corp	Bill Wallace
Carl Zeiss Meditec AG	Régis Deshayes
DesAcc EMEA Ltd	Graham King
DICOM/MITA	Shayna Knazik
PixelMed	David Clunie
Sectra Imaging IT Solutions AB	Erik Edespong

#### **Voting Members Not Present**

Agfa US Corp	Jos De Baerdemaeker
Corista, LLC	Eric Wirch
GE Healthcare	Yongjian Bao
Korean PACS Standards Committee	Hee-Joung Kim
Neagen	Rami Hietala
University of Warwick	Victor Sanchez

\*Not present at two consecutive meetings and therefore not counted for quorum during this tcon

#### **Others (Observers, Alt-voting, staff) Present**

AAPM/Univ. of Arkansas for Medical Sciences	Larry Tarbox, Observer
AetherAI	Chia-Pin Kang, Observer
Affiliated Pathologists Medical Group	Eric Glassy, Observer
Cloudinary	Jon Sneyers, Observer
DesAcc EMEA Ltd	Konstantinos Alexopoulos, Observer
DICOM/MITA	Carolyn Hull, Alt. Voting
GE Healthcare	Steven Nichols, Observer
Google	Jan Wassenberg, Observer
Pathcore	Dan Hosseinzadeh, Observer

Philips	Nick Haarselhorst, Observer
Philips	Bas Hulsken, Observer
Sectra Imaging IT Solutions AB	Erik Sjöblom, Alt. Voting
Siemens Healthineers	Chris O'Donnell, Observer
StatRad	Chris Hafey, Observer
vICTor Works	Victor Derks, Observer
Vidagos	Cheryl Petersilge, Observer

### 1. Administrative Items:

- The group was welcomed and roll was taken.
- NEMA Antitrust and DICOM patent declaration rules were reviewed.
- David Clunie provided a brief history of the formerly deactivated WG-04, as well as the impetus for the group's reactivation with this teleconference. There were no previous minutes to review since the group has been dormant.

### 2. Considered new compression schemes to add to DICOM, especially for:

- AI (including segmentations, contours and parametric maps)
- enterprise imaging
- digital pathology
- web browser based viewers (performing frame level access and progressive transmission)

### 3. Specific schemes considered included:

- HTJ2K (faster, easier, less effective) esp. in browser viewer progressive role
  - HTJ2K is complex and takes too much time to decompress, but is an ISO Standard.
  - Open sourced and solves fast progressive transfer issue that DICOM doesn't currently cover. Noted speed compared to JPEG-LS.
    1. <https://chafey.github.io/openjphjs/test/browser/index.html>
  - Patent and licensing status: unsure about patent-side but suspected to be patent-free, royalty-free and friendly open-sourced.
  - Browser support: will be improved for larger images. Web assembly implementation.
    1. <https://github.com/aous72/OpenJPH>
- JPEG-XL (now being finalized, open source code available for testing)
  - Jan Wassenberg presented JPEG-XL, which is the modernized JPEG file. It is the latest from the JPEG group and has a number of specific objectives and performance characteristics.
  - <http://ds.jpeg.org/whitepapers/jpeg-xl-whitepaper.pdf>
  - The group discussed what kind of lossy might be acceptable.
  - Comparison with prior formats: type 1 declaration to ISO royalty free. Source code is available for testing
    1. JPEG XL open source: <https://gitlab.com/wg1/jpeg-xl>
  - Lossless compression is based on FLIF and another by the Google team.
  - JPEG-XL is in the final stages of standardization so a lot of encoder improvements will be needed in the future, but the compression density for photographic images saw major reductions compared to JPEG2K lossless.

- lossy and lossless variants of H.265 (HEVC) including HEIF for still images and volumes
  - Single frame use
- iSyntax (now openly documented)
  - Nick Haarselhorst presented iSyntax and the advantages of this type of image compression.
    1. Requires 25% smaller file for storing Whole Slide Images
    2. Allows for quick zoom and pan through images
    3. Can be processed in real-time
    4. Marketed for primary diagnostic use in the US
    5. It is progressing well through the standardization process
- Other schemes for single bit compression (for segmentations), G4, JBIG, JBIG2, FLIF
- deflate and bzip2 for individual image frames +/- DICOMweb bulkdata components
- bzip2 for entire dataset (à la existing deflate) (e.g., for SR)

#### 4. Next T-con

The group decided that there is enough interest from individuals to reactivate this group and set up regular, biweekly calls. The next tcon will take place on July 29<sup>th</sup>, 11am-12pm US ET, and will continue on a biweekly basis.

Dial-in information for all calls can be accessed in the [DICOM Calendar](#), which is available 24/7.

#### 5. Adjournment

The teleconference was adjourned at 12:01pm US EST.

Prepared and submitted: Shayna Knazik, 7/29/2020

Reviewed by Counsel Peter Tolsdorf on 7/30/2020