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Minutes

DICOM WG 23: Artificial Intelligence / Application Hosting
Ad Hoc Whitepaper Group
April 28, 2020 | 11:00am – 12:00pm US EDT

Presiding Officers: Brian Bialecki, Ad Hoc Chair

DICOM Secretariat: Carolyn Hull, DICOM/MITA, Shayna Knazik, DICOM/MITA

Voting Members Present

AAPM/Univ. of Arkansas for Medical Sciences	Lawrence Tarbox
ACR	Brian Bialecki
Argentix	Elliot Silver
DesAcc EMEA	Graham King
MITA/NEMA Staff	Shayna Knazik
PixelMed	David Clunie
Sectra	Daniel Forsberg
Siemens Healthineers	Gianluca Paladini

Voting Members Not Present

ACR	James Philbin
ACR	Steve Horii
Agfa	Hamid Nashat
Canon	Kevin O'Donnell
Carl Zeiss Meditec	AG Regis Deshayes
DaPict	Steve Lord
Fovia	Shay Kilby
GE Healthcare	Chris Lindop
Hitachi Healthcare Americas	Ravi Managuli
Imagebiopsy	Michael Egger
Institute of Cancer Research	Simon Doran
Isomics	Steve Pieper
Laitek	Doug Sluis
Medical Image Standards Association of Taiwan	Chung-Yueh Lien
NVIDIA	Brad Genereux
Philips	Jeroen Medema

VISUS	Marc Kaemmerer

Others (Observers, Alt-voting, staff) Present

Blackford Analysis	Keith Houston, Observer
DICOM Secretariat/NEMA/MITA	Stephen Vastagh
German Cancer Research Center	Marco Nolden, Observer
Google	Mikhail Fomitchev, Observer
IB Lab GmbH	Alexander Krumböck, Observer
Microsoft	Neil Tenenholtz, Observer
MITA/NEMA Staff	Carolyn Hull
MITA/NEMA Staff	Zack Hornberger
Nuance	Sander Kloet, Observer
Philips	Chris Melo, Observer
Roche Tissue Diagnostics	Uwe Horchner, Observer
Siemens Healthineers	Joerg Illmann, Observer
Siemens Healthineers	Srividya Rajamani, Alt Voting

1. Opening

1.1. Welcome and roll call – The Secretary identified participants.

1.2. Antitrust and DICOM patent disclosure policy – These were reviewed according to NEMA guidelines.

1.3. Agenda review and approval – The agenda was reviewed and approved.

1.4. Minutes from last meeting – The minutes from the April 14, 2020 call were reviewed and approved.

1.5. New MITA Staff/WG-23 Secretary – Carolyn Hull introduced MITA's new Senior Project Manager to DICOM: Shayna Knazik. Shayna comes from the American Association of Physicists in Medicine (AAPM) with six years of project management experience, as well as three years as Secretary to DICOM WG-28. She will serve as the Secretary of WG-23, and can be reached at sknazik@dicomstandard.org.

2. Whitepaper draft: Background and information (Brian Bialecki)

2.1. Discussion of a potential whitepaper and background. See also documents/model in FTP folder:

Workflow profile that IHE is discussing? Keith: Task requester- modality or user-driven/automatically driven, image study and would like to perform some AI operations on it. Task requester may know what it wants to happen (e.g. whether patient had a stroke). Uses UPS-RS to talk to task manager. Task manager is responsible for doing things with tasks it has been sent. Task manager will forward directly to task performers OR indirectly send a study so analysis can happen. 3 parts: Task requester, manager, and performer.

Room for richer interactions. Which part is AI work flow interested in? Task requester, manager, or performer? Can this spec help?

What is necessary to ensure these applications can communicate? Can become a hurdle to have too many requirements for developers processing pixels or patient data from a chart. Brian does not see it

becoming an issue in the way IHE BUT thinks could be a hurdle to adoption if has to have UPS-RS too. Right now, model can only come to a platform they partnered with.

Need to know if platform is the manager or performer, either way, have a task to do. Have a sub-component that will complete task and pass it information.

Gianluca-perhaps should also look at payloads. Processing solution might reside on the cloud-have to move payload to cloud to be processed. Where data needs to go through multiple stages of processing, have to go to PACS, then back to cloud, etc.

Where is appropriate interoperability boundary? Whether talking about workflow, data, discovery, or a combination of all three?

Gianluca-In DICOM Part 19, have parts that can be mapped to IHE. Maybe do gap analysis and join. Would be good to have payload parsed, simplified for algorithms to consume. Data can be passed around with task performers without having to be returned to PACS system, then able to be stored back.

Brian- where gaps could be if had cloud modeling. Do we want to write a standard for that model? Bias is yes because still delivery of service to healthcare to patient. Want to make sure there is a way to surveil algorithms when they start to degrade or provide false results. Make shareable across multiple platforms. Could begin as an extensible area that could broaden in the future. Idea that there is a missing piece today in the IHE spec to understand that the service is up and running. Walk through the idea of externally and internally chained algorithms wasn't done. Hopes that this group could see how this might work and if there are gaps. Possibly have the spec that Keith has written and move forward with that.

An example - DWI may need to be an array and not DICOM formatted. Something else that possibly builds that. What does that look like? Should we handle? Outside of what UPSRS will give. Should we go into that area?

David Clunie: Yes, referencing cross-industry standard.

Keith: Intention to reduce ad-hoc-ness of people who host algorithms

Keith's proposal begins at the point at which you leave speaking to the hospital system and start doing work being requested.

DC-needs to be able to handle flexible data and "parallelizable" tasks. Be able to fit this into large data sets. Whatever we come out with now should be able to expand.

OAM supports a certain number of models not necessarily specific to this. Would be worth looking at expanding down the line-parallelizing large jobs.

DC-Simplest way to do this is take some tasks: some straightforward, and some less so and start using today's tools. Make boundaries of interoperability now. Thinks use cases would be important.

DC-also data access issues, decide which to send to which task.

K-Might be worth looking at one of case, externally chained use cases from Brian. Have a set of algorithms run in series to produce useful results. Can look at a case that goes out to multiple machines? Get breadth and depth and find the gaps.

DC-Yes. Talking about radiology here, but maybe have computational pathology also who may have differences-cell replications. Ideally, solution should handle computational pathology and radiology.

K-Part of the idea. Community that wants to do that can pick the appropriate one for them.

B-Wants Feedback from group: Is it Reasonable that service discovery and starting the service along with defining data endpoints to put all in one message? Doesn't need to be different ideas: get service up and running and define data afterward. That is how OIM gets this going.

DC-says a good starting point.

B-Plan to work with Keith to draw out a few use cases over the next few weeks to define in a simple version and what that might look like. Would be helpful to hear what type of data you're looking for – **request feedback.** Should definition be limited to transforming data in some way?

Wants input so don't underscope.

G-Parsing info needed by algorithm. Needs data to be sorted in a certain way, in a particular format not necessarily in DICOM.

B-define as out of scope (?)

G-concept that is in the application hosting. Host is responsible for collecting data for app. Maybe should actually isolate this as something that can be done separately.

B-Yes, becomes value of the platform. As we can see models and requirements, that is how we are able to map them.

N- Think of it in terms of protocols. Can sit between and proxy.

K-Preference for what apps/models might want. Is there some existing data or network transport standards? Anything likely to persist long term?

Something group may want to invent. If anyone has found anything like that, we could drop in.

Action: Brian and Keith to draw up simplified version of using the spec to walk through in next meeting. Have what is in and out of scope –try to find whether new spec or change to app. Hosting that would make this work. Broad algorithm and deep algorithm. Then will send to the group. Also as an FYI-IHE AIW profile, public comment ends, 4/29. Still one day left. FYI-there is a new Secretariat.

Talk in two weeks

- **Action follow up from 4/14:**
    - Documents needs an executive summary. About discovery of applications, needs some endpoints about what data sources it can communicate with.

- **Brian** to reach out to contacts to build examples to share with the group prior to the next meeting.

3. **Old or New Business Next meeting:** None.

4. **Next meetings-F2F:** None scheduled at this time.

5. **Next meetings – tcons**

Teleconference (tcons) (2nd and 4th Tuesday, usually 11am – 12pm US ET, unless schedule conflicts)

Tuesday, April 28, 11:00AM US ET

Tuesday, May 5, 11:00AM US ET

Tuesday, May 12, 11:00AM US ET

Tuesday, June 9, 11:00AM US ET

6. **IHE RAD meetings below**

There are no new meeting to add at this time.

7. **Adjourn**

The meeting was adjourned at 12:05pm EDT.

Prepared by: Carolyn Hull

Submitted by: Shayna Knazik

Reviewed by counsel: Clark Silcox, May 12, 2020.