DICOM Digital Pathology Connectathon Proposal

Version 6

A Multi-Vendor Demonstration of DICOM Workflow for Pathology

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Workflow Subgroup

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Change Log

January 6, 2016
- Original Proposal
- Based on discussion with group members and recommendation at ECP 2015 meeting

March 24, 2016
- Revised proposal (v2)
- Based on discussion and recommendation at USCAP 2016 meeting

April 11, 2017
- Update timeline and added more details
- Cleared list of vendors until they re-confirm
- Update list of supported DICOM protocols to include DICOMWeb
- Updated proposal section with equipment, date, venue information

April 25, 2017
- Updated timeline (combined phase 1 and 2, added venue for rehearsal)
- Updated to list of vendors
- Updated private network information

June 13, 2017
- Update list of participating vendors
- Update list of available tools

August 3, 2017
- Added description of the venue and event

September 9, 2017
- Updated list of participants
Background
A recurring topic of discussion during the past several WG26 meetings (2014-2015) has been about engaging the pathology community with DICOM and demonstrating the capabilities as well as the benefits of DICOM workflow for anatomic pathology. In 2015, WG26 created the Workflow Subgroup (WG26-FLOW) in order to suggest how these goals can be achieved.

Since inception, WG26-FLOW has attracted interest from vendors and clinicians and now includes the following members:

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Vendor</th>
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<tbody>
<tr>
<td>Bruce Beckwith</td>
<td>Philips</td>
</tr>
<tr>
<td>Mikael Wintell</td>
<td>Pathcore</td>
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<tr>
<td></td>
<td>Roche (Ventana)</td>
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<tr>
<td></td>
<td>Leica</td>
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<td>AidPath</td>
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<td>FDA</td>
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WG26-FLOW has conducted several meetings during 2015 and made a recommendation to WG26 at the ECP 2015 Meeting. The recommendation was to organize an Interoperability Showcase to demonstrate benefits of interoperability and DICOM-based workflow to the pathology community. All in attendance at the ECP meeting were in favour of the idea and some were eager to organize it ASAP. The vendors are also supportive of the Showcase.

Objective
The consensus at the ECP 2015 meeting was to propose a relatively simple workflow scenario to vendors, in order to get things moving quickly. We assume that over time the showcase will evolve to include many more workflow scenarios with a higher degree of complexity. In the first showcase, which we hope to schedule in 2016, we would like as many vendors as possible to participate in order to highlight the benefits of interoperability and DICOM.

Showcase Format
At the USCAP 2016 meeting the following format suggested and agreed to:

- Reserve an area on the showcase floor (either at ECP 2016 or CAP 2016)
- Define a simple acquisition workflow (scanning, archival, retrieval)
- Present the workflow at pre-determined times so that many attendees can visit
- Present the same workflow scenario in every presentation
- Ensure that workflow demonstration does not become a scanner contest
- Host a panel discussion with participating vendors to explain DICOM and interoperability
- Ensure that all vendors involved have a change to make the presentation (no bias)
## Implementation Timeline

<table>
<thead>
<tr>
<th>Phase 1 – Planning</th>
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<tr>
<td>April 11&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Review and discuss proposal</td>
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<tr>
<td>April 25&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Secure commitments from participating vendors</td>
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| May 9<sup>th</sup> | Secure commitments from more vendors  
Finalize technical specifications |

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<tr>
<th>Phase 2 – Technical implantation (archival &amp; retrieval)</th>
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| May 16th | Set up cloud-based test environment for image retrieval  
Workstation vendors begin testing image retrieval  
Scanner vendors begin testing image archival |
| June 6th | WebEx session to discuss challenges |
| June 20<sup>th</sup> | WebEx session to discuss challenges |
| July 4th | WebEx session to discuss challenges |
| July 18th | WebEx session to discuss integration challenges |
| August 1<sup>st</sup> | WebEx session to discuss integration challenges |

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<th>Phase 3 – Marketing Material</th>
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<tr>
<td>August 15&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Assign vendor presentation order and content</td>
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<tr>
<td>August 29&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Review vendor presentations</td>
</tr>
<tr>
<td>September 1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Draft a publication on the connecathon and motivation</td>
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<th>Phase 4 – Showcase (Pathology Visions, San Diego, CA)</th>
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<tr>
<td>September 6-8</td>
<td>Rehearse showcase and connectivity (ASCP, Chicago)</td>
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<tr>
<td>October 1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Pre-show setup and rehearsal</td>
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<tr>
<td>October 3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Conduct showcase</td>
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## Workflow Proposal

Demonstrate a vendor neutral pipeline that allows imaging, archival and review (Figure 1). Please note that the following constraints have been agreed to:

1. (ECP 2015) Complex integration challenges are omitted (e.g. analysis, LIS, EMR, APSR) purposefully for the first showcase. In subsequent showcases, we can expand functionality.
2. (USCAP 2016) Basic metadata shall be retrieved from locally stored XML/TXT files and/or a HTTP server to support the workflow.

3. (USCAP 2016) One VNA shall be used to simply the workflow. Otherwise, scanners and viewers would need to support multiple VNAs simultaneously (which may be difficult and not very common).

4. (USCAP 2016) Each scanner shall have its own unique set of slides to prevent comparison of scan quality in the context of the Showcase.

![Interoperability Showcase Configuration](image)

**Figure 1: Interoperability Showcase Configuration**

**Materials Required**

- Curate a handful (2-3) of anonymized clinical studies per scanner
  - Prefer to have cases with multiple slides
  - Slides shall contain human specimens

- Ensure basic metadata is available in a variety of formats (XML, TXT at the scanner level)
  - Shall contain accession number
  - Shall contain medical record number
  - Shall contain stain type
  - Shall contain optical properties (??)

- Multiple wholeslide scanners
  - Vendors may DICOM-ize files from native format (if scanner output is not DICOM)
  - Vendors shall perform CStore operation to archive images
  - Use of concatenation instances is discouraged due to increased complexity
A single VNA for all scanners and viewers which shall support the following:
- CStore
- CGet - Without Bulk Metadata
- CGet - Frame Level Retrieve
- CFind
- STOW-RS
- WADO-RS
- QIDO-RS

Multiple image viewing solutions shall support one of the following:
- CGet and CFind for query retrieve as defined above
- WASO-RS and QIDO-RS for query and retrieval

Presentation material and a script that can be used during the showcase

Tools Currently Available
- VNA supporting CStore, CFind, CGet, and CMove
- VNA supporting QIDO-RS, WADO-RS and STOW-RS
- VNA supporting frame-level retrieve
- Dicomization utility to create Supp145 files from TIFF (and/or JPEG-2000)
  - Orthanc
  - Objective Pathology
  - Pathcore
  - Aidpath (David De Mena’s Group)
- Desktop and web-based DICOM viewers

Personnel Required
- Pathcore will provide project management staff
- Each participating vendor will provide a point of contact for the project
- Each participating vendor will allocate human resources internally for
  - Technical
  - Marketing

Equipment
- **Scanners**: scanner vendor(s) shall supply own equipment
- **Workstations**: workstation vendor(s) shall supply own equipment
- **VNA**: VNA vendor(s) shall supply own equipment
- **Networking**:
  - A wired network is preferred. We shall encourage the venue to collocate the participating vendors on the exhibit floor (as much as possible).
  - If a wired network is not possible, each vendor shall supply an agreed upon wireless bridge for connecting their equipment to a private network designed for the demonstration. The wireless network will be configured to use a frequency band the minimizes interference.

Venue
Pathology Vision 2017, San Diego
Demonstrations will take place at vendor booths during exhibit hours and the DPA will also host a panel discussion regarding the event.

The preferred location for the demonstration is on the exhibit floor since this avoids relocation of equipment and drives traffic to exhibits. A private network will be created to ensure that all vendors can connect to a reliable network for the demonstration. Coordination between venue and conference organizers is required to ensure we can achieve the above.

Panel Discussion: Tuesday, October 3\textsuperscript{rd} from 3:30–4:30 PM.

The panel will consist of no more than 6 speakers, each receiving approximately 5 minutes to present, and will conclude with Q&A and a highlight of the 2018 Connect-a-Thon.

Date
Pathology Visions
October 1-3, 2017
The organizers of the Pathology Visions conference have offered space and support for the connection.

Budget Required
We anticipate that some budget may be required for travel and marketing. These costs will be minimal since the connectathon will be held at a large pathology meeting (at which the vendors are usually present).

Request for Feedback

From Clinicians
Would such a vendor neutral demonstration be interesting for you and for your colleagues? Are there important elements missing from the suggested workflow? Yes, positive feedback has been received.

From Vendors
In addition to the above, could you please comment on your ability to commit resources, including technical and non-technical staff, for coordination and organization of the Showcase?

From All
Please provide your comments as soon as possible and no later than January 20th. I will collate these and then call a meeting so that we can make some decisions.