DICOM Digital Pathology Connectathon Technical Requirements

Spring 2025

A Multi-Vendor Demonstration of DICOM Workflow for Digital Pathology

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Contents

Change Log

2024/11/24 – DAC. extensive revisions to illustrate and document technical and logistic requirements
2024/12/09 – DAC. updated C-STORE to STOW bridge description and add link, respond to various comments, update status of DPIA (no change to version yet), emphasize interim nature of registration form (registration not open yet), insert DICOM logo on cover page (with hyperlink to its source)
2024/12/10 – DAC. update CORS requirements and document for scanner, archive, viewer, evidence creator
2024/12/14 – DAC. added link to DPIA/HL7/DICOM mapping requirements document
2024/12/17 – DAC. final review by WG 26, resolve most comments, and update IHE DPIA reference to v1.3 TI, and renamed the document from “DRAFT … Proposal” to “... Technical Requirements”
2025/02/03 – DAC. update timeline and status
2025/03/04 – DAC. update HL7 V2 MLLP connection requirements re. LAB-80 response to LAB-81 query
2025/03/27 – DAC. add timeline milestone for final submission of images and annotations before testing completes, to allow image viewers to have some time to test with them before end of project
2025/04/11 – DAC. emphasize that only ANN and not SR or SEG are being tested.
2025/05/09 – DAC. add patient naming convention previously documented in the demonstration forum

Introduction

A recurring topic of discussion during DICOM WG-26 meetings is how to engage the pathology community with DICOM and raise the level of awareness amongst pathologists about both DICOM and interoperability. Since 2017, WG-26 sponsored “Connectathons” have proven to be a useful tool for both helping increase interoperability awareness in the community, validate the capabilities of participants, and identify areas for improvement in the standard .

The long-term goals of the WG-26 Connectathons are:

- Demonstrate the benefits of DICOM for whole slide imaging to the pathology community
- Engage implementers to further develop DICOM capabilities in their offerings
- Provide a mechanism for experimenting with interoperability improvements
- Identify weaknesses and deficiencies in DICOM for WSI, to improve and expand the standard
- Enhance the technical scope of the demonstration with each iteration
- Integrating WG-26 with the broader interoperability ecosystem (IHE-PALM, etc.)

The Spring 2025 Connectathon is distinctive in that for the first time:

- AP-LIS implementers are expected to participate and provide slide metadata via IHE PaLM DPIA HL7 V2 messages that can be used by the slide scanners
- Full image acquisition workflow (IS->scanner->archive->viewer) is combined with annotation creation (so-called “Evidence Creator” actors) rather than using only pre-staged offline image files to test annotation creation and archiving
- Various workflow-specific services will be optionally tested (like storage commitment)
- Color management by viewer through use of ICC profiles created by scanners is expected

WG-26 Connectathon – Spring 2025

Timeline

Legend:

- Yellow – activities for participants
- Blue – scheduled communication events for participants
- Green – project manager actions
- Pink – General Public & Industry Promotion
- Orange – TBD

Date	Milestone
2024/12/03 – 2025/01/31	Event Promotion Postings: LinkedIn; DPA; ESDIP; ASDP, Other
2024/12/13	Complete overview of technical requirements and draft of final detailed technical requirements
2024/12/17	Final review of technical requirements sufficient to open registration (Tuesday t/con)
2024/12/18 – 2025/01/28	Registration Open
2025/01/20	Final Registration Reminder Post
2025/01/17	Complete final detailed technical requirements (including PaLM DPIA HL7 -> DICOM mapping) - 2025/01/20 - no suggested changes received
2025/01/17	Prior-event image & annotation dataset available (ftp://medical.nema.org/MEDICAL/Dicom/DataSets/WG26/WG26Connectathon2024/) (use Filezilla if your browser hates ftp)
2025/01/21	Monthly WG-26 Meeting (Tuesday t/con)
2025/01/28	Registration Closed
2025/01/29	Acquisition Modalities submit physical slide request to project manager (if they don't have their own
2025/02/03	Participants provide network details to LIS and Archives (to allow configuration to perform query and send data) - IN PROGRESS
2025/02/03	Participant LIS and Archives accessible and details shared - IN PROGRESS

2025/01/31 – 2025/04/29	First round of testing
2025/02/23	Project manager ships physical slides to Acquisition Modalities that requested them
2025/03/11	Acquisition managers ready, populated w. metadata and modalities ready to start scanning
2025/03/17	Metadata Enrichment tool link distributed
2025/03/31	All acquisition modalities have sent at least one slide to the archives
2025/04/29	Interim Review of Findings (Tuesday t/con)
2025/04/29	All images and annotations submitted (to give sufficient time for viewers to test with)
2025/04/29 – 2025/05/30	Second round of testing
2025/06/03	Final Review of Findings (Tuesday t/con)
2025/06/03 – 2025/06/17	Final report and presentation preparation
2025/06/17	Final Review of Report and Slides (Tuesday t/con)
	Showcase Preparation and Validation
	Live Event Promotion: LinkedIn; DPA; ESDIP, ASDP; Other
2025/06/26	Presentation of Connectathon Results (15 min)
2025/06/??	Live Event Presentation of Connectathon Findings
	Post Event Promotion
	Draft & Publish Paper on Findings

Proposal

Goals:

- Engage all primary actors in digital pathology interoperability:
    - Anatomic Pathology Laboratory Information System (AP-LIS) (“Acquisition Manager”)
    - Slide Scanner (“Acquisition Modality”)
    - Archive (“Image Archive//Manager”)
    - Viewer (“Image Display”)
    - Annotation Creator (“Evidence Creator”)
    - Consumer (“Image Display” that supports annotations)
- Virtual demonstration of image acquisition workflow from scanning to annotation creation and viewing (end to end)
- Demonstrate the ability of viewers to consume and display Bulk Microscopy Annotations from any creator
- Educate digital pathology users on the value of DICOM interoperability such they will ask for it from their vendors.

Participants

Any organization that develops, supports or operates a technology system related to the goals of the current Connectathon may register to participate. This includes software or hardware vendors who supply a solution that supports transactions as defined in the specification of the primary actors in the digital pathology interoperability ecosystem. It also includes healthcare organizations that operate a technology system.

To participate in the WG-26 Connectathon a participant needs to:

- Register their intent to participate within the open registration period
- Provide a system that meets one or more of the specified actor roles
- Provide a single point of contact for communication during the Connectathon event
- Actively participate in interoperability testing and validation during the event.

Registration

Form to register is at: DPA/ESDIP/DICOM WG-26 Spring 2025 WSI Connectathon - Participant Registration Form

Presentation & Exhibition

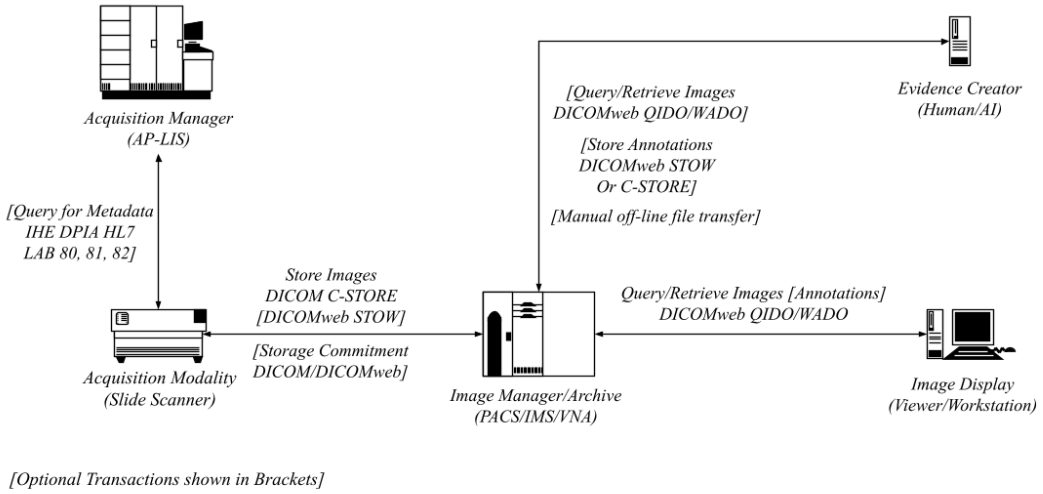
- Results of the WG-26 Connectathon will be publicly presented at the ECDP 2025 Date: Jun 25th – 28th, 2025
    - Location: Barcelona, Spain
    - Event site: https://www.ecdp2025.org/

- Participants of Connectathon are invited to demonstrate their solutions in the Interoperability Showcase at ECDP 2025
- Details and requirements for participating in the Interoperability Showcase will be provided in a separate document.

Connectathon Requirements

Overview

The overall outline of the Connectathon Actors and Transactions is illustrated in the following figure:



[Optional Transactions shown in Brackets]

The Connectathon will be conducted virtually (i.e., over the Internet) using plain text (unencrypted) connections for both HL7 V2 MLLP, DICOM DIMSE and HTTP (DICOMweb) transactions. There will be no on-site component of the testing at the ECDP site, though participants are free to arrange to demonstrate their capabilities onsite if they can arrange it (out of scope of the managed Connectathon, which will be concluded before the event).

[Optional] By prior arrangement, testing partners may also test secure connections, using TLS, with certificate exchange +/- authorization by pre-arranged methods. Google has volunteered to provide its OAUTH2 infrastructure to use for authorization of entities with existing Google identities.

Acquisition Manager (AP-LIS) Requirements

Technical Requirements

1. Support the IHE PaLM Digital Pathology Image Acquisition (DPIA) profile described in the DPIA TI Revision 1.3 document in the Acquisition Manager Role using the specified transactions.
2. Respond to Imaging Work Order Step Query [LAB-81] HL7 V2 message for a single specimen identified by the QPD-3 Glass Slide Identifier.
3. Respond with Imaging Work Order Step Broadcast [LAB-80] HL7 V2 message for the matched specimen
4. Include the specific messages, segments and fields that will be defined in a Connectathon-specific document that enumerates required information and its mapping to appropriate DICOM image header fields, which include patient, specimen and slide identification and description information, including but not limited to appropriate coded entries for each of fixation, embedding and staining (e.g, to cover FFPE HE).
5. Communicate via TCP/IP MLLP as defined for all IHE HL7 V2 transactions.
    a. The LAB-81 query be received on a connection opened by the Acquisition Modality
    b. The LAB-80 response will be returned by the Acquisition Manager on a new connection opened to the pre-configured Acquisition Modality identified by the MSH-3 Sending Application in the LAB-81 query request, and NOT on the same connection as the LAB-81 query.

Logistical Requirements

1. Acquisition Manager participants shall pre-populate their database with sufficient information to support matching with their own slides (or pre-supplied slides if requested) that will be scanned during the testing, coordinated by the project manager.
2. Acquisition Manager participants shall coordinate with the project manager by email when new or corrected metadata is available, or new versions of the transaction messages are implemented.

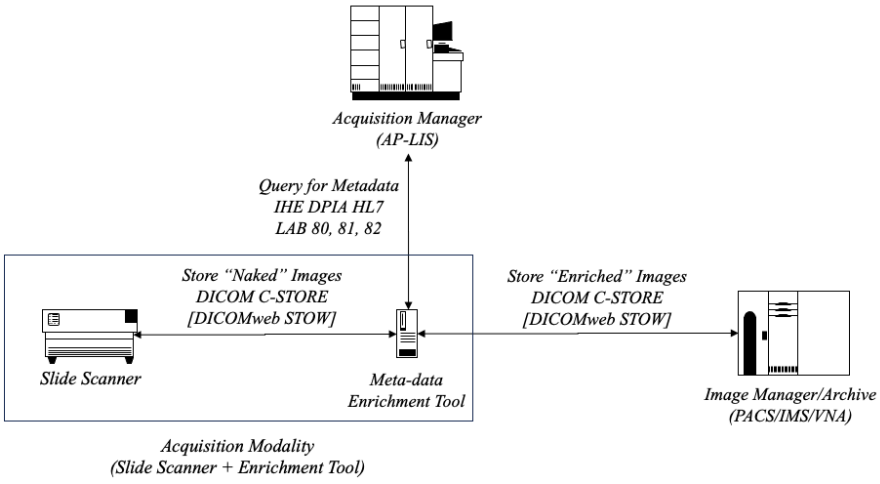
Acquisition Modality (Slide Scanner) Requirements

Technical Requirements

1. After scanning a slide, obtain appropriate metadata from an available source:
    a. [Optional], send an Imaging Work Order Step Query [LAB-81] transaction (MLLP HL7 V2 message) to the (pre-configured, if more than one participant) Acquisition Manager, using the identifier extracted from the barcode in the scanned slide label image as the QPD-3 Glass Slide Identifier, and use the information in the Imaging Work Order Step Query [LAB-81] response HL7 V2 message to populate the DICOM metadata as defined in the Connectathon-specific document.

- The LAB-81 query will be made on a new connection opened by the Acquisition Modality to the (pre-configured, if more than one participant) Acquisition Manager, and will identify itself to the Acquisition Manager using the value of MSH-3 Sending Application
- The Acquisition Modality will expect a LAB-80 response to be returned on a new connection opened by the Acquisition Manager to the pre-configured IP address and port matching the MSH-3 Sending Application value that the Acquisition Modality sent in the LAB-81 query request, and NOT on the same connection as the LAB-81 query was made.

b. [Alternatively] If the scanner is not capable of performing queries to the Acquisition Manager and/or making use of the response, the participant may partner with the supplier of the open-source Metadata Enrichment tool (provided by CitiusTech) and combine to produce a compliant Acquisition Modality; this will be documented as a limitation of participation. This is illustrated in the following figure:



c. [Alternatively] match the identifier extracted from the barcode in the scanned slide label image to a pre-configured set of DICOM metadata; this will be documented as a limitation of participation.

2. Generate DICOM VL Whole Slide Microscopy Image Storage objects that are fully compliant with the IOD
    a. Use the current standard, not Supplement 145, as a reference, since various corrections have been incorporated
3. Generate one DICOM series of WS images per slide
    a. Images from different slides (or the same slide scanned multiple times) shall not be mixed in the same Series (i.e., each scan action will generate a new set of UIDs, including a new Series Instance UID)
4. Include an image with the slide label included in the pixel data in the series

    a. This may be an image of the label only, or an overview image of the entire slide including the label (see ImageType for WSI in the standard)
    b. The information in this image shall be sufficient to extract a query key for the HL7 request to the Acquisition Manager, as stored in DICOM BarcodeValue (2200,0005)
5. Use C-Store to archive instance in PACS
    a. [Optional] STOW-RS may be used instead of C-STORE if the Image Manager/Archive partner supports it, but participants are reminded that the DPIA Profile requires C-STORE support). STOW-RS user agents implemented within web browsers may expect that the Image Manager/Archive will support CORS, including pre-flight (OPTIONS) headers
6. Only true color brightfield images shall be sent
    a. The PhotometricInterpretation shall be appropriate to the compression method used, and is typically RGB (if there has been no color component transformation), YBR_FULL_422 (for baseline JPEG) or YBR_ICT (for JPEG 2000)
    b. It is expected that only lossy compressed images will be sent for the high-resolution and intermediate resolution layers of the pyramid: only baseline JPEG, and JPEG 2000 transfer syntaxes shall be used; the top layer, label and overview images may be sent uncompressed
    c. [Optional] participants can agree to experiment with JPEG XL transfer syntaxes if a scanner/archive/viewer combination can be assembled or a recompressed images can be created for an archive/viewer combination; if sent to an archive, some means of clearly distinguishing these(or using a separate archive) should be coordinated with the project manager, as not expected to be viewable by all consumers
7. A multi-resolution pyramid is required
    a. this need not be decimated by a factor of 2, nor even by a regular factor, but multiple layers are expected (typically 3 to 5 depending on the area of the tissue scanned but more are permitted)
    b. [Optional] if the scanner only provides a single high-resolution layer and can find a partner to build a pyramid from that, this can be coordinated with the project manager but will be documented as a limitation of participation; Acquisition Modality participants should not expect the Image Manager/Archive to build a pyramid, nor the Image Display to function without one.
8. Only DimensionOrganizationType TILED_FULL images shall be sent
    a. i.e., no sparse images – a full raster scan of all tiles in the whole slide regions shall be sent with the tiles in a pre-defined order
    b. the PerFrameFunctionalGroupSequence shall not be present
9. Only single Z-plane images shall be sent
    a. [Optional] By prior arrangement with specific partners multiple Z-plane images may be sent; in addition, it may be useful to acquire and share publicly later multiple Z-plane images even if there are no viewers or annotators that can handle them during the course of the Connectathon; if sent to an archive, some means of clearly distinguishing these(or using a separate archive) should be coordinated with the project manager, as not expected to be viewable by all consumers.
10. Concatenations shall not be used

    a. i.e., each pyramid layer shall be entirely in a single SOP instance and not chunked and no Concatenation reassembly is expected of the archive or viewer
11. An ICC Profile shall be present in the single OpticalPathSequence Item (as required by the standard) and when applied by the Image Manager/Archive or the Image Display shall be expected to produce the appearance intended by the scanner manufacturer.
12. The WholeSlideMicroscopyImageFrameTypeSequence shall be present in the SharedFunctionalGroupsSequence
13. The specimen preparation details appropriate to the specific labelled slide shall be present
    a. The SpecimenPreparationSequence shall not be empty and shall contain sufficient coded content entries to describe the fixation, embedding and staining; the expected content will be described in a separate Connectathon-specific document,
    b. The source of the data shall be either the AP-LIS or a pre-configured table as described above.
    c. The purpose of this requirement is to demonstrate the value of having that data stored in the DICOM metadata, for indexing in the archive, selection for analysis and presentation to the viewer user.
14. The naming convention for the Patient's Name attribute value are as follows:
    a. when using DPIA, the name shall be of the form "25SP^DPIA_participant_subject", e.g., "25SP^DPIA_AcmeScannerCo_0001"
    b. when not using DPIA, the name shall be of the form "25SP^NOLIS_participant_subject", e.g., "25SP^NOLIS_AcmeScannerCo_ABCD"

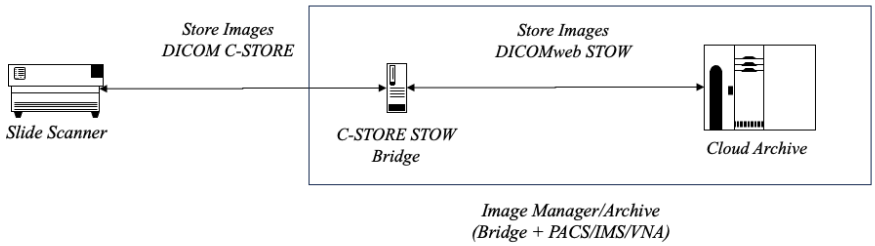
Logistical Requirements

1. Acquisition Modality participants shall submit scanned DICOM images of pre-supplied slides to all configured Image Manager/Archives for retrieval, rendering and annotation by other registered participants. In addition the stored scanned images will be validated using *dciodvfy* by the project manager.
2. Acquisition Modality participants shall submit images and provide corrected updated or replacement images during the testing phases per the demonstration schedule. The project manager shall coordinate removal of prior incorrect images with the Image Manager/Archive participants (since this cannot be done using a standard transaction that is supported within the scope of this Connectathon).
3. Acquisition Modality participants shall notify the project manager by email when new images are uploaded to the Image Manager/Archives and will include in the e-mail a brief description of the changes incorporated and the issues resolved.
    a. Acquisition Modality participants may notify the entire demonstration group using the demonstration Google Group in addition to sending email to the project manager. This has the benefit of getting the word out sooner.

Image Manager/Archive Requirements

Technical Requirements

1. Provide DIMSE functions for DICOM clients
    a. C-STORE for the following SOP Classes
        - VL Whole Slide Microscopy Image Storage (accept from Acquisition Modality)
        - Microscopy Bulk Simple Annotations Storage (accept from Evidence Creator)
    b. [Alternatively] If the Image Manager/Archive is not capable of supporting the C-STORE transaction itself, then a 3rd party C-STORE to STOW bridge can be used, such as the open source Google healthcare-dicom-web-adapter; it is the Image Manager/Archive participant's responsibility to deploy/implement such an adapter if needed. This is illustrated in the following figure:



    c. [Optional] Storage Commitment (Push Model) (from Acquisition Modality and Evidence Creator)
2. Provide DICOMweb functions for HTTP clients
    a. Study Retrieve Transaction (WADO-RS)
        - the Retrieve Pixel Data shall be supported to allow for frame level retrieval of the original compressed encoded pixel data as stored on the server
            - image/jpeg and image/jp2 media types shall be supported
            - "*/*" shall be acceptable as a content type (accept header)
            - single part or multi-part responses may be returned depending on the request
            - compressed byte streams shall not be returned with a content type of application/octet-stream regardless of the presence of a transfer syntax

parameter in the request – this is an error if the stored compressed frame cannot be decompressed

- the Retrieve Rendered resources of this transaction shall be supported to allow for frame level retrieval regardless of the form (transfer syntax) of the original encoded pixel data as stored on the server
  - image/jpeg and image/png media type shall be supported
  - only a single part response shall be returned
  - shall support all of the iccprofile parameters defined for inclusion of the profile in the payload of the frame in the response or server side application of it to the pixel data
- the Retrieve Metadata resource shall be supported
  - the File Meta Information (group 0x0002) data elements, including the TransferSyntaxUID shall not be included in the response (see below for discussion of the AvailableTransferSyntaxeUID query key that may be included to indicate what compressed forms of frame pixel data can be made available)
  - the BulkDataURI mechanism may be used to de-reference large binary blobs included in the metadata such as the ICCProfile; such data elements shall not be dropped completely, they shall either be in-line or available using BulkDataURI

b. Study Search Transaction (QIDO-RS)
- all resources required by the standard for a native implementation shall be supported, including all and specified study, series and instance resources
- all query keys required by the standard for the appropriate resource shall be supported
- the following optional retrieve keys shall be supported
  - None
  - [Optional] Participants may experiment with additional query keys such as ContainerIdentifier, SpecimenIdentifier, BarcodeValue and various text and coded specimen preparation metadata, if together they can assure it is present in the AcquisitionManager response, stored by the AcquisitionModality, indexed by the Image Manager/Archive and requested by the ImageDisplay
- [Optional] the following optional retrieve keys shall be supported
  - AvailableTransferSyntaxUID, which may be included to indicate what compressed forms of frame pixel data can be made available

c. Study Store Transaction (STOW-RS)
- the Store transaction shall be supported for the following SOP Classes:
  - VL Whole Slide Microscopy Image Storage (accept from Acquisition Modality)
  - Microscopy Bulk Simple Annotations Storage (accept from Evidence Creator)

d. Support **CORS** (Cross-Origin Resource Sharing)

- Support HTTP request and response headers to allow browser-based web client applications (query, retrieve and store)) to invoke DICOMweb services and access the returned data
- Support CORS headers in GET requests for WADO-RS and QIDO-RS
- Support CORS headers in POST for the STOW-RS)
- Support CORS OPTIONS requests before other request types (pre-flight).

Logistical Requirements

1. Image Manager/Archive participant will make the configuration information for their Internet-accessible DIMSE and DICOMweb endpoints available per the demonstration timeline.
2. Image Manager/Archive participant will maintain the Internet-accessible archives through at least the end of the Connectathon and not remove access or their contents until the project manager has confirmed the retrieval of the final content for the purpose of public sharing through an alternative static mechanism; that said, the participants are encouraged to make public access to their endpoints after the Connectathon if they are willing.
3. Image Manager/Archive participant will provide other participants with information necessary to submit DICOM images to their Archive (DICOM C-Store) and to search for and retrieve images (QIDO-RS, WADO-RS); this does not mean that they can impose constraints on what is accepted beyond what is specified in the standard and in this document.
4. Image Manager/Archive participant will provide a reasonable amount of trouble shooting for other participants should they have difficulty submitting or retrieving images or annotations.

Image Display (Viewer) Requirements

Technical Requirements

1. Image Displays shall use the DICOMweb Study Search Transaction (QIDO-RS) to search Image Manager/Archive systems for images (and optionally, annotation) objects.
    - Private query mechanisms are not allowed.
2. Image Displays shall use the Study Retrieve Transaction (WADO-RS) to retrieve images and metadata from Image Manager/Archive systems.
    - Private retrieve methods are not allowed.
    - Retrieve Metadata resources shall be used to retrieve any necessary metadata beyond what was available from the query transaction
    - Frame pixel data shall be retrieved in either original form using Retrieve Pixel Data resources or rendered form using Retrieve Rendered resources
    - The ICCProfile shall be applied either client side by retrieving it from the metadata (using BulkDataURI if necessary) to apply to the original pixel data, or in the case of rendered pixel

data, by specifying the appropriate iccprofile query parameter to either return it in the compressed pixel data stream or apply it server side.
        - [Optional] the user may be provided with control over whether the ICCProfile is applied or not (e.g., to demonstrate its effect)
3. Image Displays shall provide the usual “virtual microscopy” viewing experience to the user, including but not limited to the ability to zoom in and out and pan
    - [Optional] “over-zooming” by up-sampling beyond the resolution of the encoded pixels is permitted but not required
4. Image Displays shall display at least the following DICOM image metadata if present, whether in coded entries or plain text strings (or both)
    - Patient identifiers and description
    - Specimen identifiers and description (including anatomy, fixation, embedding and staining
    - Slide identifiers and description
5. Image Displays implemented within web browsers may expect that the Image Manager/Archive will support CORS, including pre-flight (OPTIONS) request headers.
6. [Optional] Image Displays shall use Study Retrieve Transaction (WADO-RS) to retrieve Annotation objects from Image Manager/Archive systems.
    - Private retrieve methods are not allowed.
7. [If annotations supported] Image Displays shall be able to support query, retrieve and render Annotations on the referenced Image
    - Image Displays shall be able to indicate the presence of annotations at any level of zoom selected by the user, even though they may not be fully rendered (e.g., as an outline) except at or close to the layer on which they are specified (e.g., for large numbers of annotations on a high resolution layer, when zoomed out, some form of heat map or clustering may be used)
    - Image Displays may use outlines or shading or a combination of both, with or without some means of user control over the choice. It is not the intent of the Connectathon to explore the quality of the user experience, but rather to assure the interoperability of the encoding mechanism.
8. [If annotations supported] Image Displays shall be able to support multiple Annotation objects that are associated with one WSI object.
    - Image Displays shall be able to convey the multiple Annotation objects to the user through their user interface.
    - The user shall be able to select and render any of the Annotation objects.
    - Image Displays are not required to support simultaneous rendering of more than one Annotation object (but may do so)
    - Image Displays are not required to support rendering that would compare Annotation objects.
9. [If annotations supported] Viewers shall support and render Annotation objects with multiple Annotation groups.
    - Image Displays shall be able to render all groups at one time or allow the user to render individual groups or subsets of groups.

    - Image Displays are not allowed to render some groups in an Annotation object but not others.
    - Image Displays shall present all groups to the human viewer. Depending on the software, the Image Displays might present some groups but not others. However, the user must have a mechanism to see an inventory of all groups in any Annotation object.
10. [If annotations supported] Image Displays shall support and render all Graphic Type (0070,0023) shapes:
    - POINT
    - POLYLINE
    - POLYGON
    - ELLIPSE
    - RECTANGLE
11. [If annotations supported] Image Displays shall support float and double coordinates

Logistical Requirements

1. Image Display participants shall test all necessary DICOMweb functions using all combinations of Image/Manager Archives and all images contained therein, whether submitted by Acquisition Modality participants or pre-staged from previous Connectathons for initial testing or testing of creation of Annotations
2. Image Display participants shall ensure that it can successfully query for and retrieve images (and optionally annotations) from every Image/Manager Archive
3. Image Display participants shall notify project manager and Image/Manager Archive participant immediately if any issues are found when trying to query for or retrieve image or annotation objects.
4. Image Display participants shall demonstrate to the project manager that it successfully renders every image provided by all Acquisition Modality participants, and optionally, all annotations provided by all Evidence Creator participants.
5. Image Display participants shall notify project manager and scanner participant immediately if any issues are found when trying to render image or annotation data.
6. Image Display participants shall notify the project manager as it completes successful testing with each combination of Image/Manager Archive, Acquisition Modality and Evidence Creator data.
    - Project manager shall inform other participants.
    - Image Display participants may notify the entire demonstration group using the demonstration Google Group in addition to sending email to the project manager. This has the benefit of getting the word out sooner.

Evidence Creator (Annotator) Requirements

Technical Requirements

1. Evidence Creators shall create DICOM Annotation objects

    - shall use only Microscopy Bulk Simple Annotations IOD (Microscopy Bulk Simple Annotations Storage SOP Class "1.2.840.10008.5.1.4.1.1.91.1")
    - *(other forms of evidence storage (like SR or SEG or PR) will not be tested at this Connectathon)*
    - shall use 2D coordinates only (not 3D coordinates)
    - may be defined with respect to any of the resolution layers for the image series (i.e., does not have to be on the highest resolution layer)
    - may be float or double coordinates
    - may be of any permissible GraphicType
    - may contain multiple Annotation Groups
    - may make multiple Annotation object instances that apply to the same image
    - may contain any number of annotations (e.g., just a few if human-generated, may be millions if machine-generated)
2. Evidence Creators shall provide Annotation objects to all Image/Manager Archives participants that support annotations.
    - The preferred method to submit the Annotation objects is using the DICOM protocol: C-STORE or STOW-RS (and if the latter, CORS shall be supported)
    - [Optional] The successful storage may be confirmed by use of Storage Commitment (Push Model)
    - If the Evidence Creator does not support one of the standard DICOM storage protocols, they may be supplied as files using a file transfer service managed by the project manager, whwill coordinate with the Image/Manager Archive participants to ingest them

Logistical Requirements

1. Evidence Creator participants shall submit annotations to all configured Image Manager/Archives (or the project manager) for retrieval and rendering by other registered participants. In addition the stored annotations will be validated using *dciodvfy* by the project manager.
2. Evidence Creator participants shall submit annotations and provide corrected updated or replacement annotations during the testing phases per the demonstration schedule. The project manager shall coordinate removal of prior incorrect annotations with the Image Manager/Archive participants (since this cannot be done using a standard transaction that is supported within the scope of this Connectathon).
3. Evidence Creator participants shall notify the project manager by email when new annotations are uploaded to the Image Manager/Archives, and will include in the e-mail a brief description of the changes incorporated and the issues resolved.
    - Evidence Creator participants may notify the entire demonstration group using the demonstration Google Group in addition to sending email to the project manager. This has the benefit of getting the word out sooner.

Personnel

Role	Name and Email
Project Manager	David Clunie (dclunie@dclunie.com)

Connectathon Validation

- Validation of compliance with the standard and the Connectathon-specific requirements of the DICOM image and annotation objects will be performed by the project manager using the dciodvfy tool
- HL7 V2 messages will be captured in the participant's log files, that shall be supplied to the project manager, and manually visually inspected for compliance with the IHE DPIA profile and the Connectathon-specific requirements

Summary of Results

The achievements of each participant will be documented using an agreed upon criteria. The results will be tabulated by the project manager acting as an impartial adjudicator, who does not have conflicting interests with the participants. If any conflicts are identified, review by other members of the working group will be obtained.

Licensing of Artifacts

After the Connectathon has completed, all artifacts generated by the transactions between actors, including stored HL7 V2 messages and DICOM images and annotation objects, will be shared publicly under a Creative Commons By Attribution License (CC-BY) with no restrictions on use or redistribution. This has been the practice with previous Connectathons, and agreeing to this is a predicate for active participation.

In addition, all documents and presentations will also be publicly shared, and to the extent that screenshots of displayed information (such as viewers showing images +/- annotations) are included in said documents and presentations, they will be assumed to have a similar CC-BY license. If any viewer participants have concerns about not using screenshots of their implementations in this manner, they should communicate such reservations to the project manager by email.