IHE EUROPE CONNECTATHON WEEK
THE HAGUE APRIL 19-23 2027



IHE-Europe Connectathon 2027

Ready to test?

Learn what's new in 2027!

IHE RAD Domain and IHE PaLM Domain

IHE EUROPE Integrating the Healthcare Enterprise

IHE CATALYST

Guidelines for the Webinar

- Please keep your microphone muted
- Questions during the session? Please use the chat box. We will address the questions in the second part of the webinar
- Slides will be available on IHE-Europe Connectathon 2027 webpage
- After the webinar, you can find the recording in IHE-Europe YouTube channel

Speakers

Jason Nagels, Co-chair of IHE Radiology Domain

Alessandro Sulis and **Riki Merrick**, Co-chairs of IHE PaLM Domain

The session will be chaired and moderated by Anne-Gaëlle Bergé and Daniel Berezeanu, guiding the discussion and Q&A with our domain experts.

Agenda

- Introduction (Anne-Gaëlle Bergé and Daniel Berezeanu)
- Updates on IHE Radiology Domain
  - *Domain Overview*
  - *Profiles available for Testing*
  - *Spotlight: MADO (Manifest-based Access to DICOM Objects)*
- Updates on IHE PaLM Domain
  - *Domain Overview*
  - *Current Work Focus*
  - *Profiles available for Testing*
- Q&A
- Closing

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IHE-Europe Connectathon 2027

IHE Radiology Domain

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IHE Radiology at a glance

Profiles that keep imaging connected: from the order to the archive, the report and the shared record.

Workflow
Orders, worklists and status, from scheduling to reporting

Image sharing
Find and retrieve images across sites and borders

Reporting
Structured, multimedia and integrated reports

AI in imaging
Deliver and assess AI results in the clinical flow

Image content
Consistent images for mammo, DBT, MR and more

Dose and quality
Radiation exposure and reject monitoring

31
profiles offered for testing at the IHE-Europe Connectathon 2027

13
Trial Implementation profiles, ready for early adopters

NEW
MADO joins the Radiology line-up for 2027

Profiles available for testing

Workflow

- SWF.b
- IRWF.b
- EBIW
- IOCM
- POWR
- CAM
- MAP

Image sharing and access

- XDS-I.b
- XCA-I
- XC-WADO
- MADO
- WIA
- WIC
- IID
- PDI
- ARI

Reporting and results

- IRA
- IMR
- SINR
- ED
- KIN

AI in imaging

- AIR
- AIRA

Image content and display

- MAMMO
- DBT
- DIFF
- BIR
- CPI

Dose and quality

- REM
- REM-NM
- RAM

Final Text | Trial Implementation | New for 2027

31 profiles offered for CAT 2027

Spotlight: MADO

SPOTLIGHT

MADO

Manifest-based Access to DICOM Objects

Retrieve only the images you need, from wherever they live.

Rev 1.2 | Trial Implementation | Aug 2026

Built for the European Health Data Space

Shaped through the IHE-HL7 Europe imaging work to share imaging studies and reports under EHDS, and designed for worldwide use.

A richer imaging study manifest

Extends the XDS-I.b manifest with series-level detail: modality, body region, series descriptions, instance counts and key image flags.

One way to retrieve, any sharing infrastructure

The same WADO-RS retrieve works over MHD, XDS.b or XDS-I.b, and across communities with XC-WADO.

How MADO works

1

Publish

Content Creator

Shares an imaging study manifest (DICOM KOS or FHIR) to the document sharing infrastructure.

2

Discover

Imaging Document Consumer

Finds the patient's manifests, filtering by modality, body region and date.

3

Select

Clinician or application

Picks the study, series or key images of interest from the manifest summary.

4

Retrieve

Imaging Document Source

Returns just those instances from the PACS or VNA via WADO-RS Retrieve [RAD-107].

Across borders?

Group with XC-WADO for cross-community retrieval.

Browser only?

Launch a remote viewer from the manifest's Display URL (IID recommended).

Two encodings

DICOM KOS or FHIR ImagingStudy, with a defined mapping between them.

Three MADO use cases



USE CASE 1

Retrieve selected images

The clinician reviews the study summary in the EHR or PACS, picks the series or images of interest, and retrieves only those.



USE CASE 2

Retrieve key images only

The manifest shows which images were flagged as key (e.g., “For Surgery”), so the clinician can pull just those.



USE CASE 3

Launch a remote viewer

No local DICOM viewer? Open the study in a server-side viewer straight from the browser.

Why it matters: imaging studies can run to gigabytes. MADO avoids pulling the whole study when you only need part of it.

Bring MADO to The Hague

Content Creator

Produces manifests in both DICOM KOS and FHIR formats (configurable), and replaces them when the shared study changes.

Imaging Document Consumer

Reads the manifest, selects instances and issues WADO-RS Retrieve.
Options: KOS-based and/or FHIR-based manifest, Rendered Instances.

Imaging Document Source

Answers WADO-RS Retrieve [RAD-107] with the requested instances. Option: Rendered Instances.

Pair it with

- MHD / MHDS
- XDS.b
- XDS-I.b
- XC-WADO
- IID

Required groupings

- ITI ATNA
- ITI CT

Register by 15 Dec 2026

Questions on MADO?
radiology@ihe.net

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IHE-Europe Connectathon 2027

IHE PaLM Domain

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Pathology and Laboratory Medicine (PaLM)

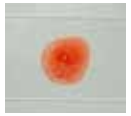


- Exchange of digital assets (data, documents, images) associated with services performed on specimens by clinical laboratories(1) and pathology laboratories(1);
- analytical and peri-analytical automation;
- representation and exchange of structured data related to specimen management, long term storage (for instance in biobanks) and reuse;
- secondary use of laboratory observations and related clinical observations;
- Interoperable workflows of transfusion medicine targeting blood product receivers.













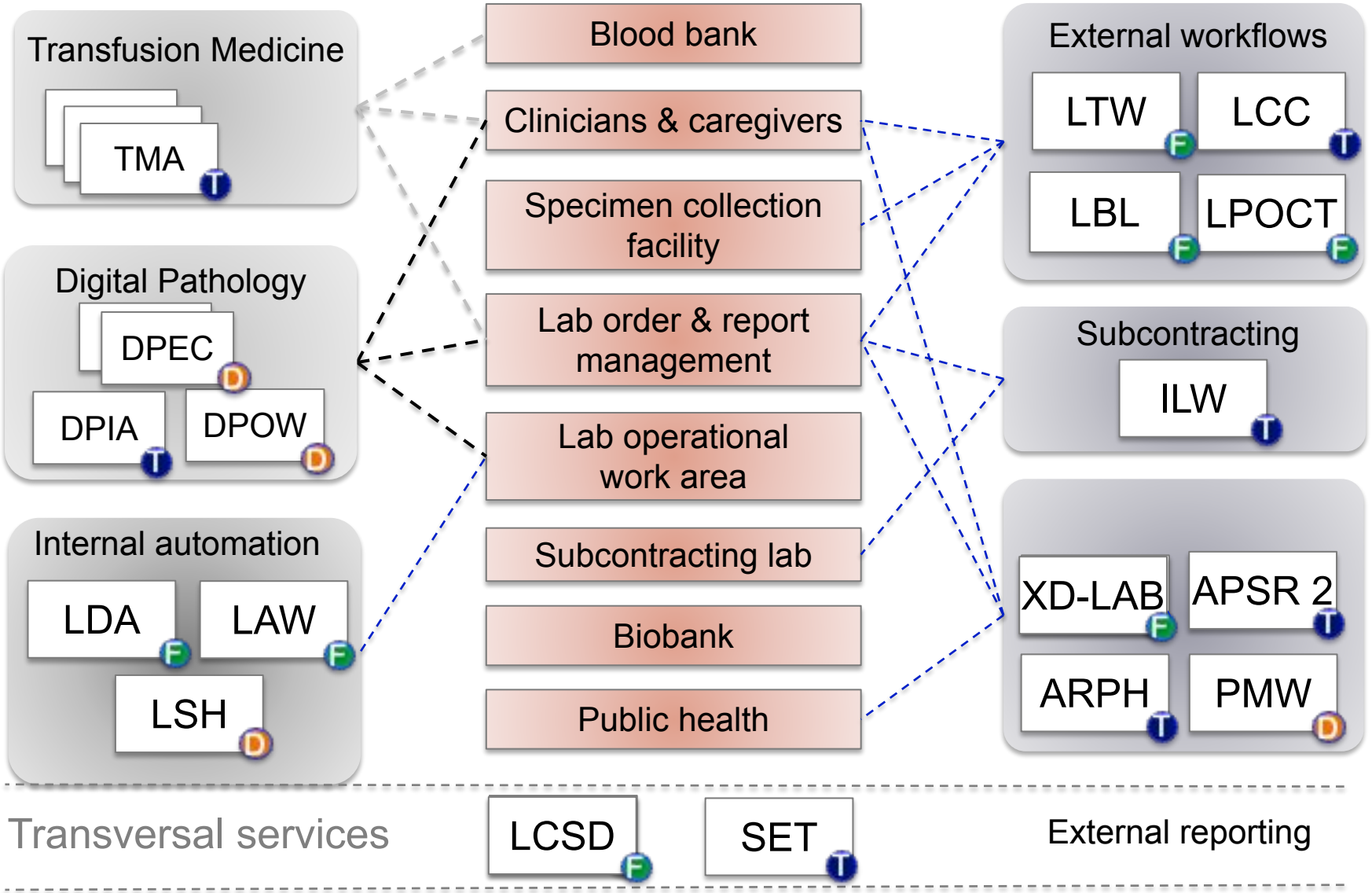
(1): Laboratory specialties in scope: clinical chemistry, hematology, coagulation, blood gas, microbiology, immunology, transfusion medicine, HLA, fertility, AMP, cytogenetic, drug monitoring, toxicology, surgical pathology, autopsy, cytopathology, image cytometry, immunohistochemistry, clinical genomics



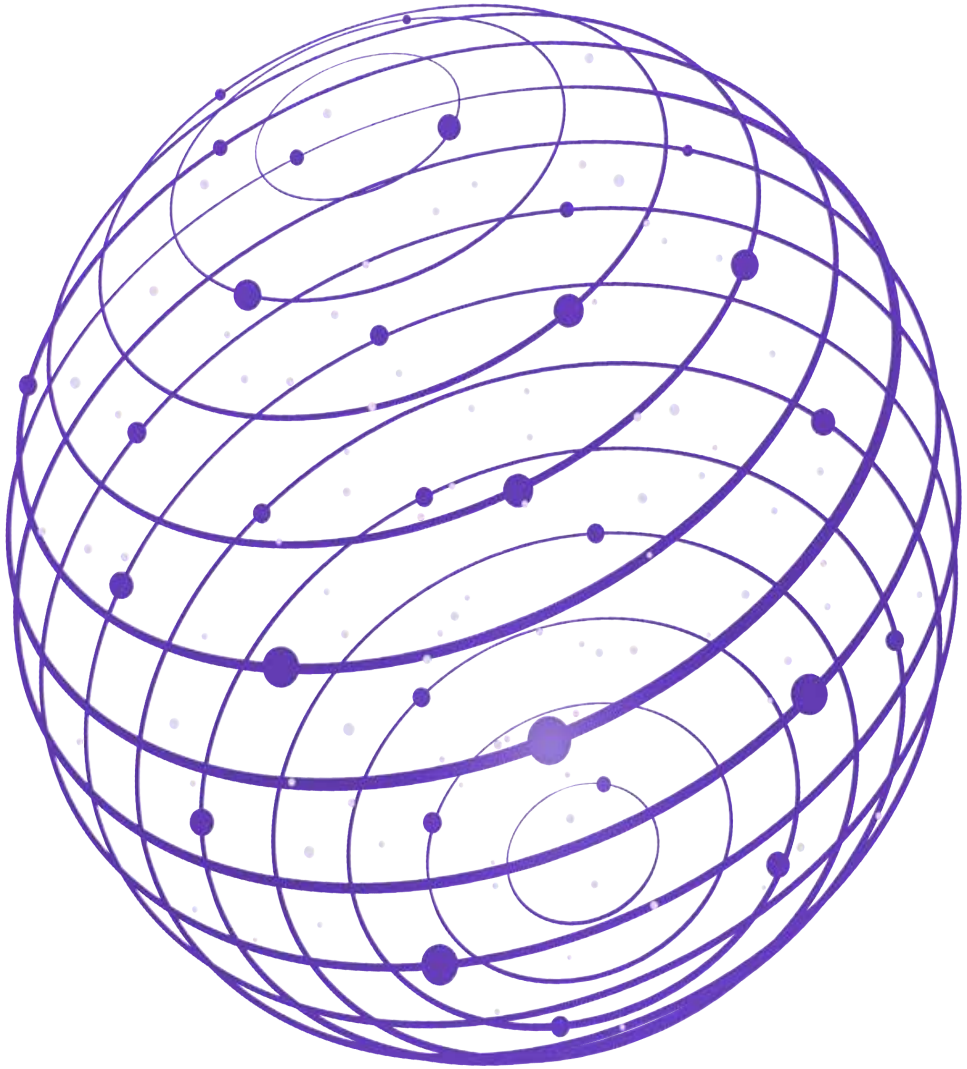
ihe_domains/ihe_pathology_and_laboratory_medicine/

PaLM profiles

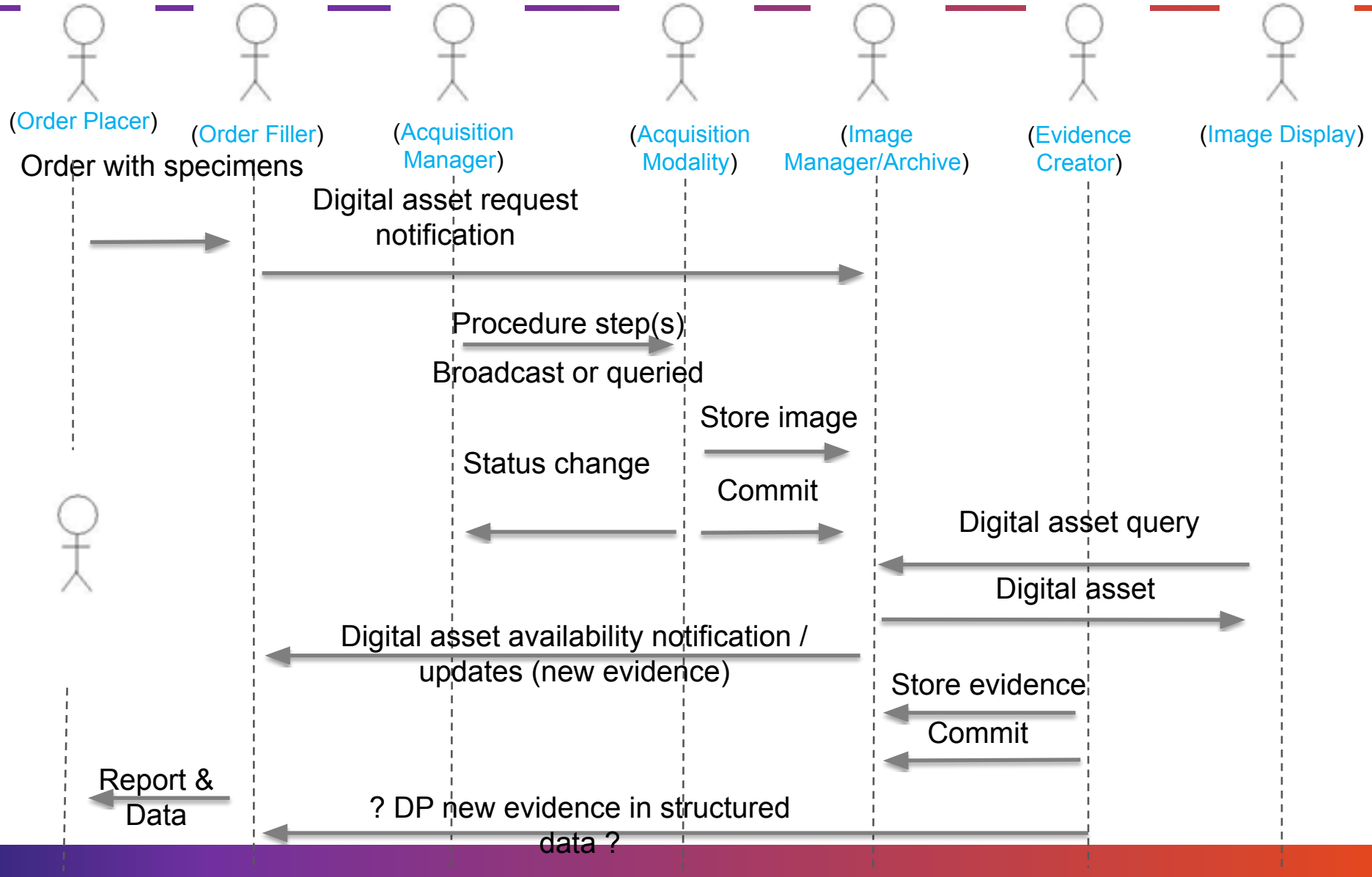
- Final text
- Trial implementation
- Development



PaLM - Current Work Focus: Digital Pathology



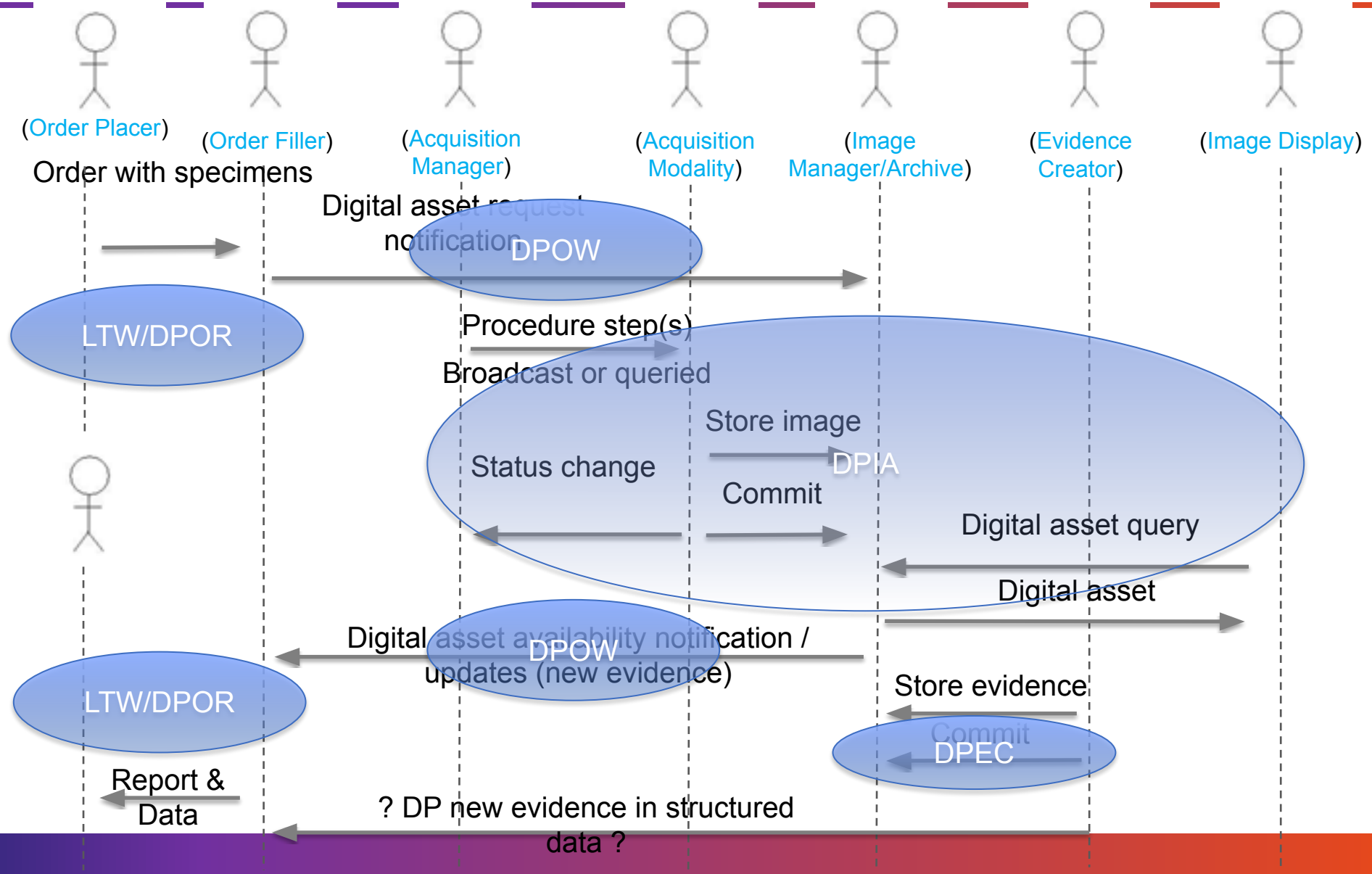
Digital Pathology Transactions



Collaboration with DICOM WG26

- Ensure support for data needed in DICOM Supplement 222
- Identify boundary of usage to DICOM Structured Report and DICOM Segmentation Images
- Create mapping of data elements between HL7 and DICOM Supplements
- Identify standards that need to be augmented to support digital pathology workflows and interoperability of WSI (e.g. SNOMED CT lacks robust support for immunohistochemistry)
  - Partnering with SNOMED to address gaps – work underway!

Digital Pathology Transactions - Profiles



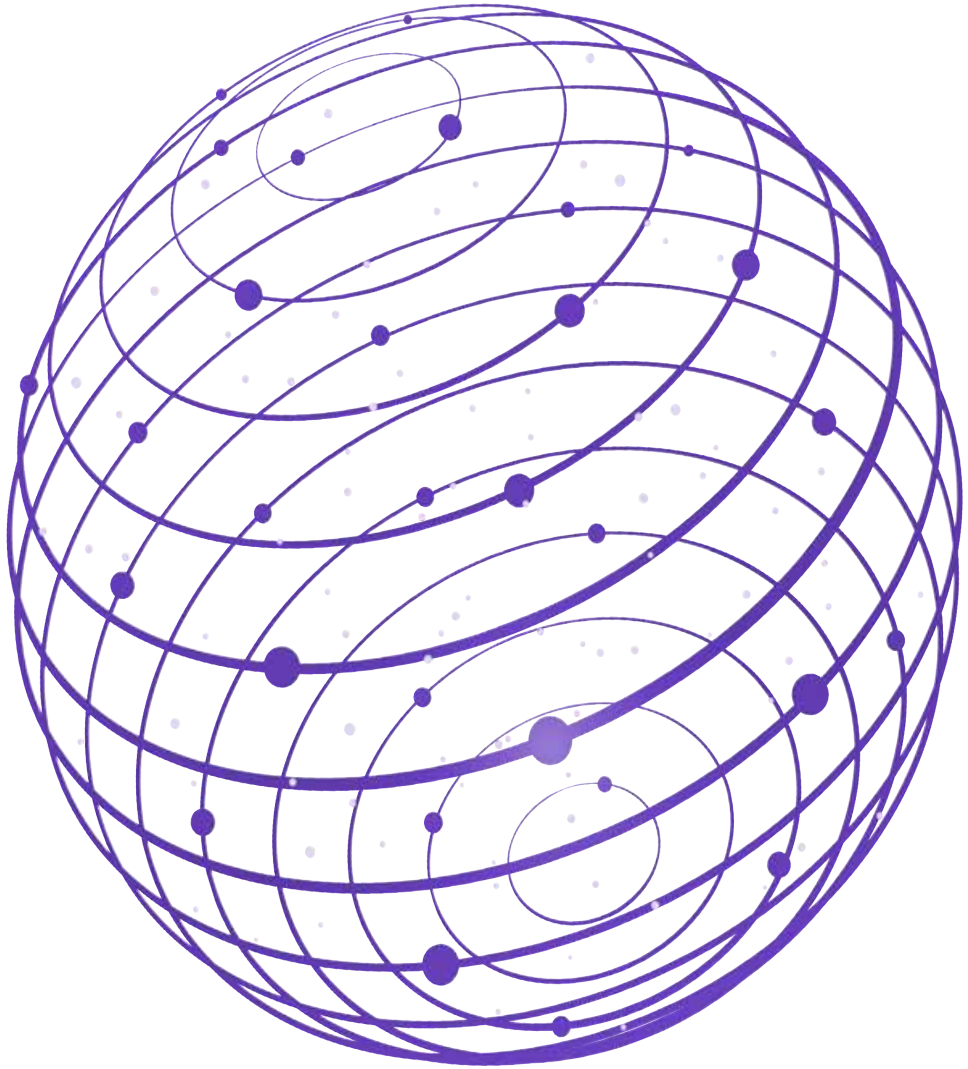
Scope of DP Profiles

- **DPIA** – constrained to creation, storage and display of a DICOM file
- **DPOW** – focused on workflow meeting the communication needs of the image manager/archive (PACS), order filler (LIS), and acquisition manager when new WSIs created
- **DPEC** – evidence creation focused on analysis of a WSI
- **DPOR** – orders/result paradigm between the order placer (EHR) and order filler (LIS) already exists in IHE technical framework as LTW and need not be reinvented unless the digital pathology workflow adds requirements

How can YOU (PACS/Imaging Analytics/Scanner/LIS/EHR-s Vendors) help?

- Evaluate use cases in Integrating the Health-care Enterprise Pathology and Laboratory Medicine Guideline for Digital Pathology Interoperability
- Contribute to current profile development:
  - DPOW – profile for digital imaging request and digital image availability notification between image manager/archive (PACS) and order filler (LIS).
  - DPEC – profile for evidence creation by an image analyzer resulting in a new digital asset or quantitative data (AI/ML vendors needed!)
  - Use existing LTW for routine orders to the lab and for image manager/archive transmitting results to order filler.
- Consider having your product in a Connectathon with other leading digital pathology vendors!
- Effort required: monthly 1-2 hour teleconference, document review, Connectathon participation

Digital Pathology Image Acquisition (DPIA)

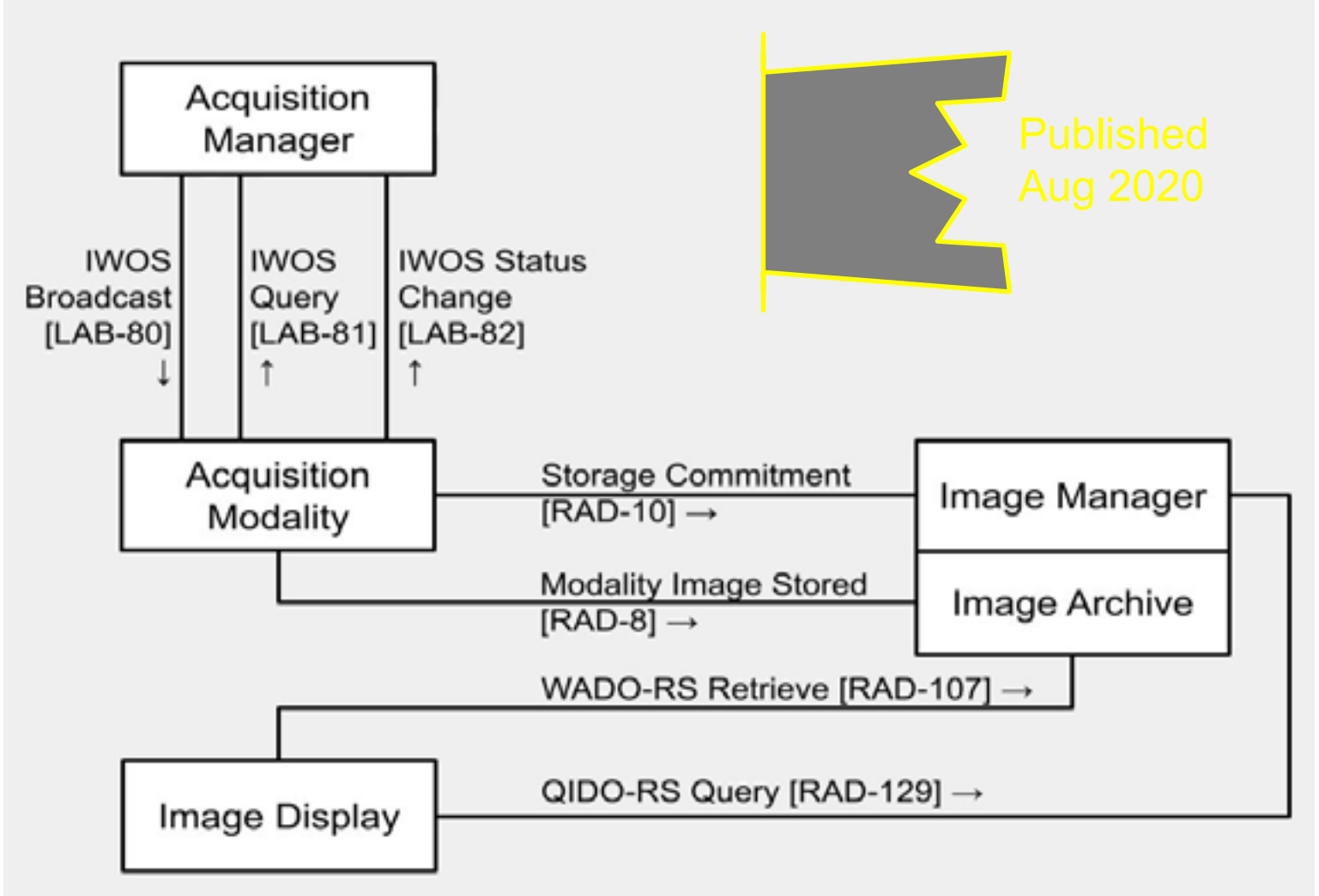


Digital Pathology Image Acquisition (DPIA)

LAW's cousin for Pathology, built in close collaboration with DICOM WG26: profile for acquisition of a digital image from a physical asset, usually a glass slide, but possibly also a gross specimen.

IWOS: Imaging Work Order Step
a service request that defines the detail for image acquisition.

Acquisition Modality
a device (e.g., digital camera or whole slide imaging scanner) that acquires digital images of a physical specimen, to fulfill an IWOS.



DPIA - Use Cases

- Originally focused on simplest approach for WSI acquisition
  - Acquisition Modality (scanner) scans a new WSI, notifies the Acquisition Manager (scanner software), who sends the WSI to the Image Manager/Archive (PACS)
  - Acquisition Manager (scanner software) broadcasts metadata to one or more Acquisition Modalities (scanners) of incoming WSIs that need to be scanned

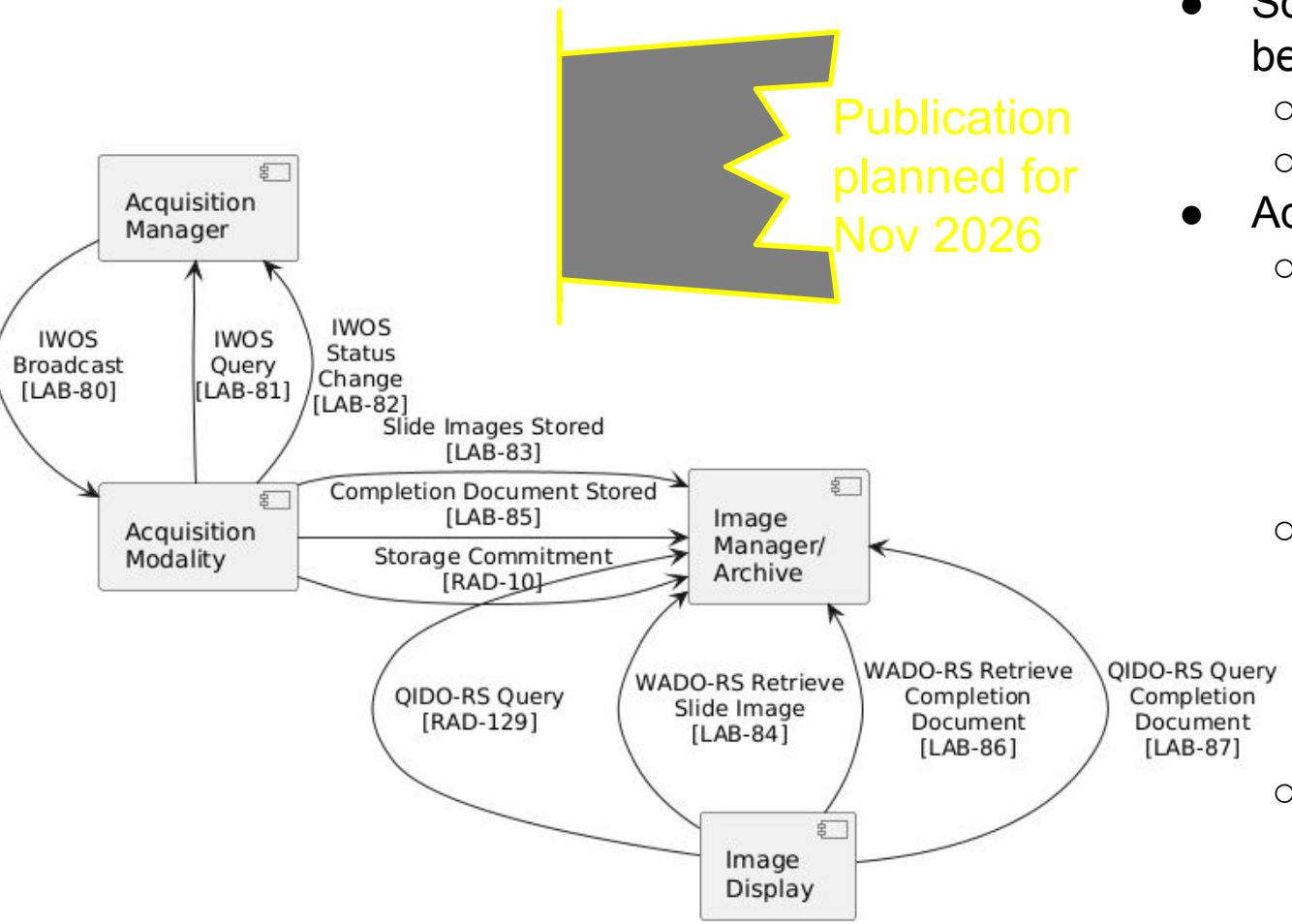
- The latest updates (v1.4 and incoming V1.5) address how to accept critical metadata needed to populate the DICOM WSI file
  - Example: how to tell ER vs PR stain looking at WSI (other than a human reading the label today)

DPIA: HL7v2 -> DICOM mappings

Table B.1-1: Whole Slide Microscopy Image Storage Attributes obtained from HL7

Attribute	Tag	Source	Example
Patient's ID	(0010,0020)	PID-3	"37386152"
Patient's Name	(0010,0010)	PID-5	"Smith^Mary^Jane"
Patient's Birth Date	(0010,0030)	PID-7	"19600715"
Patient's Birth Time	(0010,0032)	PID-7	
Patient's Sex	(0010,0040)	PID-8	"F"
Ethnic Group	(0010,2160)	PID-10 +/- PID-22	"Black" (Note that in DICOM "Ethnic Group" means "Ethnic group or Race", i.e., not the old US-OMB Latino or not sense)
Quality Control Subject	(0010,0200)	SPM-11	"NO"
Study Instance UID	(0020,000D)	OBX-5 Component 1 Entity Identifier when OBX-3 is DCM: 110180 "Study Instance UID"	"1.3.6.1.4.1.5962.1.2.0.1739193339.66766.0"
Study Date	(0008,0020)	SPM-17 date	"20070323"
Study Time	(0008,0030)	SPM-17 time	"0827"
Accession Number	(0008,0050)	SAC-2, SPM-30 Component 1 ID Number	DPIA "SP19-000425".
Issuer of Accession Number Sequence	(0008,0051)	SAC-2, SPM-30 Component 2 Namespace ID	
Request Attributes Sequence	(0040,0275)		

DPIA - Updates from incoming v1.5



- Some transactions originally defined in Radiology (RAD) have been redefined:
  - RAD 8 - > LAB-83 (Slide Image stored)
  - RAD-107 -> LAB-84 (Retrieve Slide image)
- Added new transactions:
  - **LAB-85 Completion Document Stored.** This transaction transmits a DICOM Key Object Selection (KOS) document listing the complete set of stored images that make up the scan of a single slide in a single acquisition. (Specialization of RAD-29)
  - **LAB-86 WADO-RS Retrieve Completion Document.** This transaction retrieves, via WADO-RS, the DICOM KOS document listing the complete set of stored images that make up the scan of a single slide in a single acquisition. (Specialization of RAD-31 and RAD-107)
  - **LAB- 87 QIDO-RS Query Completion Document.** This transaction queries DICOM KOS SOP Instances over HTTP (QIDO-RS), to support retrieving the document that lists the complete set of images making up an acquisition. (Specialization of RAD-30 and RAD-129)

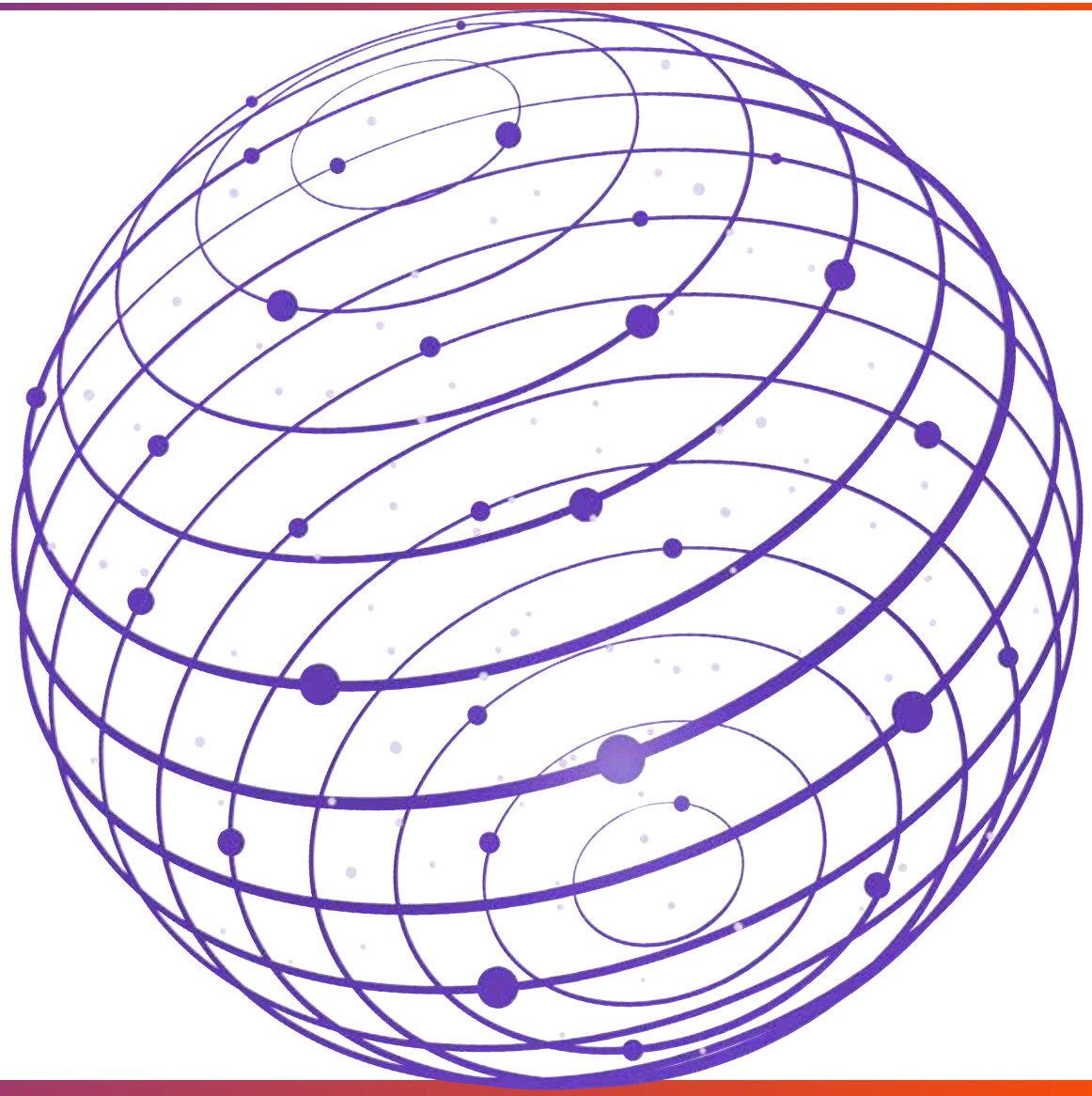
DPIA v1.5 - Transactions overview

Transaction	Opt.
Acquisition Manager	
Imaging Work Order Step Broadcast [LAB-80]	R
Imaging Work Order Step Query [LAB-81]	R
Imaging Work Order Step Status Change [LAB-82]	R
Acquisition Modality	
Imaging Work Order Step Broadcast [LAB-80]	R
Imaging Work Order Step Query [LAB-81]	R
Imaging Work Order Step Status Change [LAB-82]	R
Slide Image Stored [LAB-83]	R
Storage Commitment [RAD-10]	R
Completion Document Stored [LAB-85]	O

R = Required · O = Optional

Transaction	Opt.
Image Manager / Image Archive	
QIDO-RS Query [RAD-129]	R
WADO-RS Retrieve Slide Image [LAB-84]	R
Slide Image Stored [LAB-83]	R
Storage Commitment [RAD-10]	R
Completion Document Stored [LAB-85]	O
QIDO-RS Query Completion Document [LAB-87]	O
WADO-RS Retrieve Completion Document [LAB-86]	O
Image Display	
QIDO-RS Query [RAD-129]	R
WADO-RS Retrieve Slide Image [LAB-84]	R
QIDO-RS Query Completion Document [LAB-87]	O
WADO-RS Retrieve Completion Document [LAB-86]	O

Digital Pathology Order Workflow (DPOW)



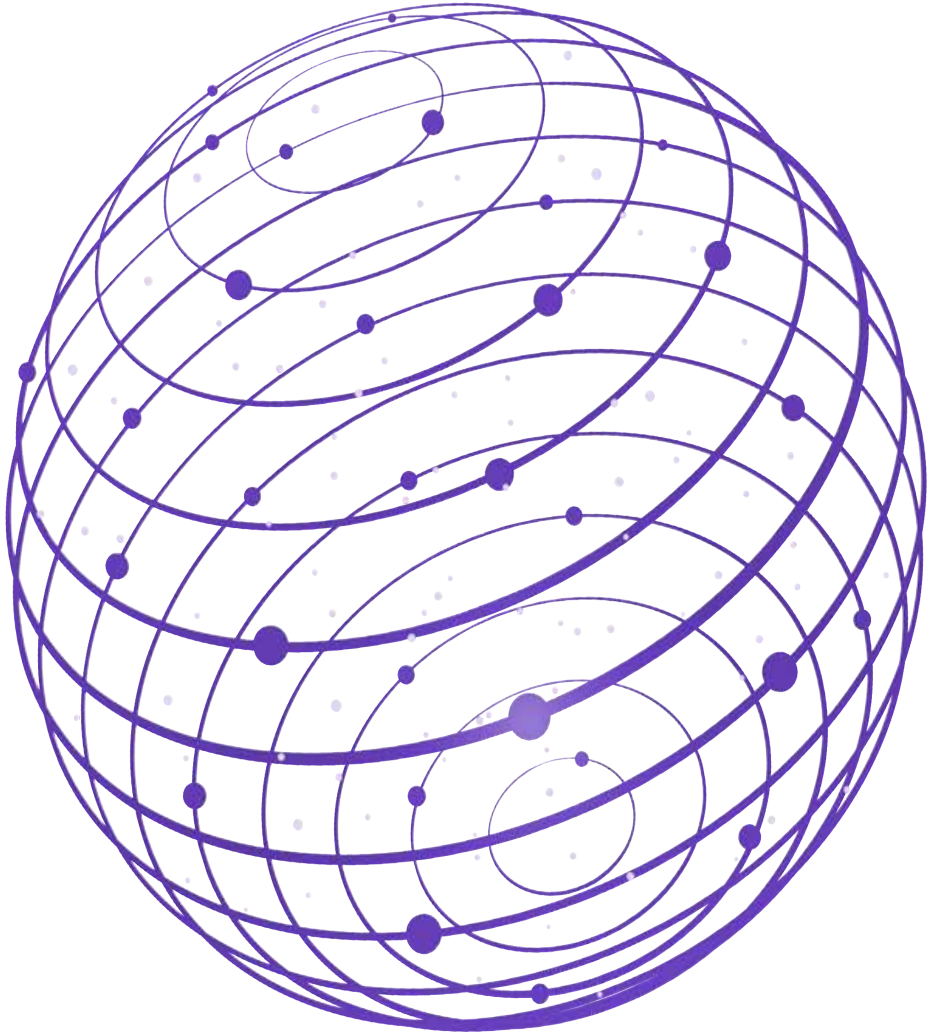
DPOW - Overview

- Provides the systems of the digital pathology ecosystem with the data **needed to drive the ordering and reading workflow**. It covers physical specimen registration (specimen, block, slide), case-level synchronization, notification of digital image availability, and ordering of additional techniques
- Profile development status: **in progress** (first release planned for 2027)
- Documentation (still in draft, soon ready for public comment): **https://build.fhir.org/ig/IHE/PaLM.DPOW/**

DPOW - Use Cases

- Digital asset request notification
  - Order filler (LIS) announces to acquisition manager (IMS) and image manager/archive (PACS) that a request for a digital asset exists
  - This will not reflect physical asset inventory necessarily (which is the sole purview of the order filler)
- Digital asset availability notification
  - Notification from the image manager/archive (PACS) back to the order filler (LIS) on the availability of digital assets for viewing
  - This will allow the order filler (LIS) to communicate to the user whether digitization has been completed
- Communication of WSI related metadata between Image Manager/Archive (PACS) and Order Filler (LIS)
  - For example, right click on an image of a slide and request a recut or IHC stain

Digital Pathology Evidence Creation (DPEC)



DPEC - Overview

- **Evidence creation** focused on analysis of a WSI, resulting in creation of **discrete data** (Q&A pairs), **annotations**, or a **new WSI**
- Analysis may be initiated by user on demand (manual), or may occur on all WSI prior to display (screening) or after the case is verified (QA/QC)
- DPEC can **leverage** the RAD AIR profile as a **basis for DP AI results**
- Profile development status: **in progress**

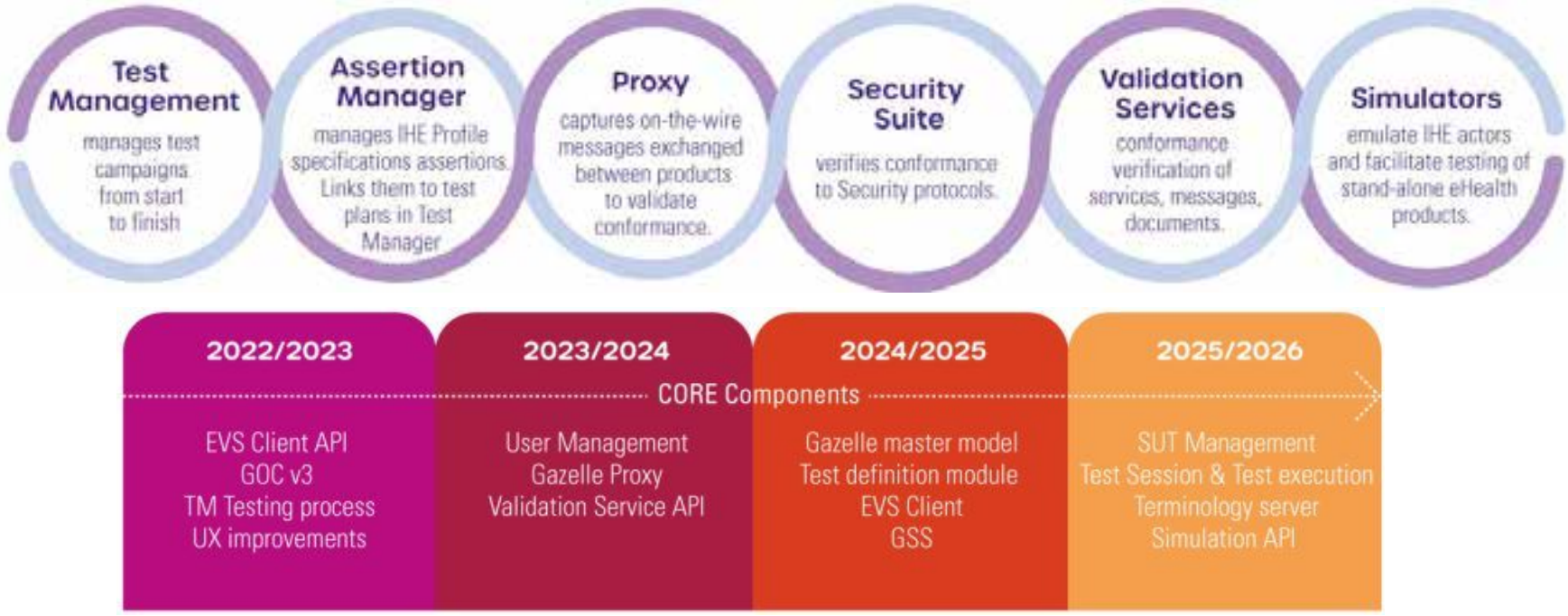
DPEC - Use Cases

- Rare Event Detection (evidence may be new annotations or coordinates)
  - Microorganism detection, e.g. acid-fast bacilli
  - Tumor features, e.g. lymphovascular invasion, margin involvement, lymph node metastasis detection, mitotic figure labeling
- Quantitative Analysis (evidence is numeric data)
  - Biomarker staining, e.g. Ki-67, ER, PR, HER2
  - Mitotic rate count per unit area
- Qualitative Analysis (evidence is Boolean or ordinal data)
  - Tumor identification and/or classification, e.g. tumor of unknown primary, most abnormal cells on a pap smear
  - Prioritization of slide review based on presence or absence of lesional features, e.g. tumor detection
  - Case distribution based on algorithm derived metadata (e.g. complexity of case or presence of tumor etc)
- Events (e.g. Heat Map, evidence may be complex data objects)
  - Record which digital tiles in which digital scans have been viewed by a user
- More Complex Image Manipulation (evidence may be a new WSI)

Gazelle

Gazelle is an open-source, web-based test platform supporting a wide portfolio of interoperability test tools designed to validate interface conformity to IHE Profiles and project-specific, standards-based interoperability specifications.





Credits: https://ihe-catalyst.net/test-system-gazelle/

Gazelle core



Core tools

Tool	Description
Test Management	Test Management is the application that supports the testing process, from the registration of the systems under test, through preparation and execution of the test cases, until the generation of the test report.
Proxy	Proxy works as a « Man in the middle ». It captures the messages exchanged between two systems under test; that's a single source of evidences and avoid the participants from digging into their systems' logs to provide pieces of proof. Proxy is bound to the validation services to provide a seamless workflow during testing events.
External Validation Service Front-end	Aka EVSClient, it is a front-end that allows the user to call the validation services from a user-friendly interface. Any validation tool implementing Gazelle-defined interface for validation services can be reached through this portal, allowing a wide variety of custom validators to be offered.
Gazelle Security Suite	Gazelle Security Suite (aka GSS) gathers a set of tools dedicated to security aspect testing: PKI for issuing certificates for testing, TLS simulators, and other security-oriented features.
Gazelle User Module	Gazelle User Module manages the user accounts and allows delegation authentication so your users only use one set of credentials through out your process.

Gazelle tools and ecosystem



Example of validation services

Tool	Description
Gazelle HL7 Validator	Validates HL7v2.x and HL7v3 messages exchanged in the context of IHE and various other eHealth Projects.
Schematron-Based Validator	Validate XML documents against schematrons. It also verifies that the document is well-formed and valid regarding the XSD schema.
CDA Gazelle Object Checker	Validates a large set of different kinds of CDA using a model-based architecture
SAML Validator	Validates SAML token against several eHealth interoperability specifications.

Data generators

Tool	Description
Demographic Data Server	Generates fake (but consistent) patient demographics for a large set of countries. It can be used standalone but it is also used as data source for the Patient Manager and Order Manager simulators.

Simulators

All the Gazelle simulators interact with the validation services to provide feedback to the users regarding the conformance of the messages exchanged with the tool.

Tool	Description
Patient Manager	Emulates the actors defined in the several patient-oriented profiles for IHE and their local extensions. It supports the HL7v2, HL7v3, and HL7 FHIR based profiles, such as (not limited to) Patient Administration Management, Patient Demographic Queries (HL7v2, HL7v3, and for mobile) and many others.
Order Manager	Emulates the actors from a few order-oriented profiles for IHE, like Laboratory Analytical Workflow, Radiology Scheduled Workflow b., Laboratory Testing Workflow.
Gazelle Webservice Tester	Allows the execution of SoapUI scripts from a Graphical User Interface.



MATCH BOX

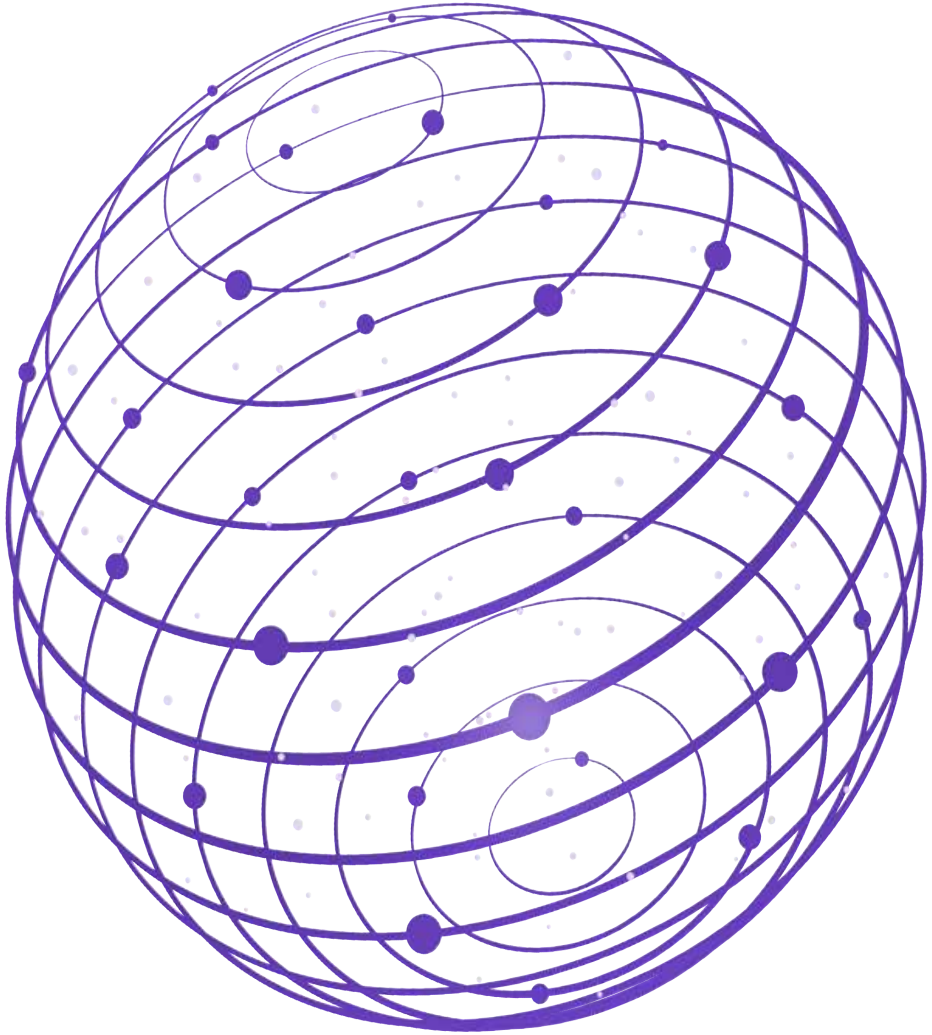
ART DECOR

NIST

ITB Interoperability Test Bed

Credits: https://gazelle.ihe-europe.net/

PaLM Connectathon Testing



PaLM – What we offer for CAT 2027 testing

Final text profiles

- LTW
- LDA
- LAW
- LBL
- LPOCT
- LCSD
- XD-LAB

Trial Implementation profiles

- DPIA
- SET

Profiles under development or TBA in Gazelle for testing

- ILW
- TMA
- LSH
- PMW
- DPOW
- DPEC

Test instances, validators and simulators OK in Gazelle and profile fully tested in past CATs

Test instances OK in Gazelle, validators and simulators under development AND/OR profile not fully tested in past CATs

Profiles still under development and/or with missing Gazelle tests and simulator. Plan: add them to the overall offer ASAP

DPIA Test Cases in Gazelle

Test case ID	Actors under test	Transaction(s)
DPIA_IWOS_Broadcast	ACQUISITION_MANAGER, ACQUISITION_MODALITY	LAB-80
DPIA_IWOS_QUERY	ACQUISITION_MANAGER, ACQUISITION_MODALITY	LAB-80, LAB-81
DPIA_generate_and_validate_samples_wsi_images	ACQUISITION_MODALITY	-
DPIA_store_WSI_images	ACQUISITION_MODALITY, IMAGE_MANAGER/IMAGE ARCHIVER	RAD-8 (new LAB-83), RAD-10
DPIA_WSI_imgs_retr_display	IMAGE_DISPLAY, IMAGE_MANAGER/IMAGE ARCHIVER	RAD-107 (new LAB-84), RAD-129
DPIA_send_lab-82_notification	ACQUISITION_MANAGER, ACQUISITION_MODALITY	LAB-82

Some of these test cases will be updated for The Hague CAT, as they will be compliant with the incoming DPIA 1.5 Supplement

Additional test cases will be also added to test LAB-85, LAB-86 and LAB-87 (all of these three are optional)

DPIA Test Cases: CAT 2027 Plan

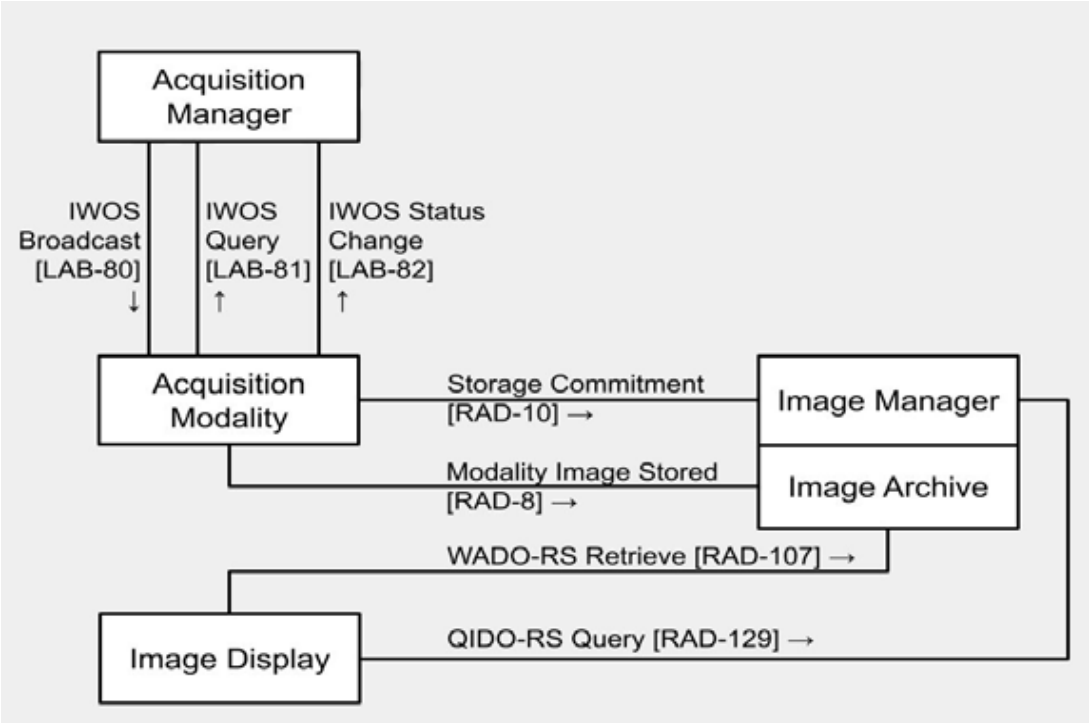
Test case ID	Actors under test	Transaction(s)
DPIA_IWOS_Broadcast	ACQUISITION_MANAGER, ACQUISITION_MODALITY	LAB-80
DPIA_IWOS_QUERY	ACQUISITION_MANAGER, ACQUISITION_MODALITY	LAB-80, LAB-81
DPIA_generate_and_validate_samples_wsi_images	ACQUISITION_MODALITY	-
DPIA_store_WSI_images	ACQUISITION_MODALITY, IMAGE_MANAGER/ARCHIVE	LAB-83, RAD-10
DPIA_WSI_imgs_retr_display	IMAGE_DISPLAY, IMAGE_MANAGER/ARCHIVE	LAB-84. RAD-129
DPIA_send_lab-82_notification	ACQUISITION_MANAGER, ACQUISITION_MODALITY	LAB-82
DPIA_notify_doc_stored	ACQUISITION_MODALITY, IMAGE_MANAGER/ARCHIVE	LAB-85
DPIA_wado-rs_retr_compl_doc	IMAGE_DISPLAY, IMAGE_MANAGER/ARCHIVE	LAB-86
DPIA_qido_rs_qry_compl_doc	IMAGE_DISPLAY, IMAGE_MANAGER/ARCHIVE	LAB-87

WSI Images Validation: DICOM Tools

DICOM tools - developed and maintained by David Clunie - are the reference tools used inside Gazelle for WSI image validation. Here are some, used at CAT:

- **dctable**: it is related to the WSI image series, extracts selected attributes, (e.g. Image Type) from all the images, showing what kind of images are in the series
- **dcentvfy:** checks for consistency of attributes in all the WSI images of the same series (same Patient, same specimen, etc) and it can be run once for all the WSI images of the same study
- **dciodvfy**: has a specific option for WSI (-profile WG26SP2025) and checks that all the required attributes are present

DPIA - CAT 2026 Testing



1 Acquisition Manager

2 Acquisition Modality

3 Image Archiver/Image Manager

3 Image Display

23 verified tests

What we expect for 2027 CAT: to be able to test again the overall DPIA profile, with the new changes coming from v1.5

If successful -> DPIA will be definitely included into PaLM TFs (end of Trial Implementation)

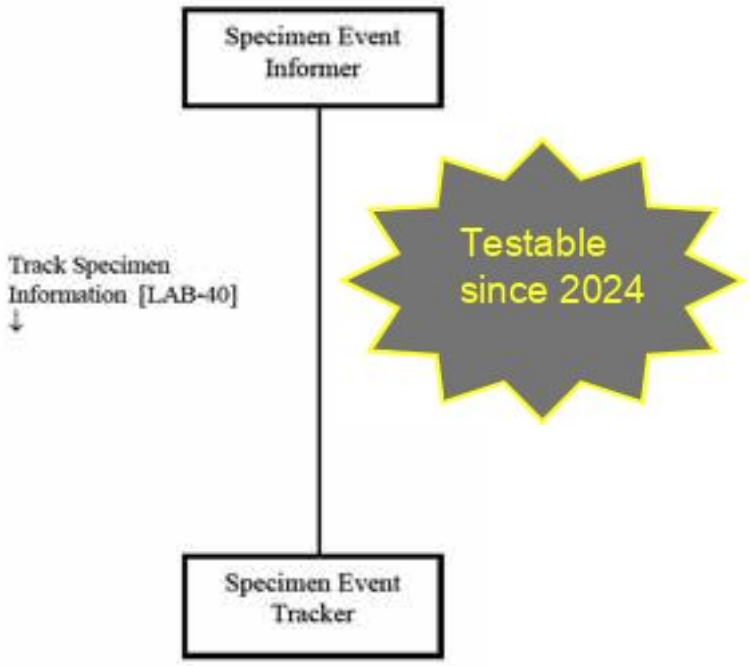
Specimen Event Tracking (SET)

This profile enables tracking of all meaningful events concerning biological specimens in-vitro produced for diagnostic testing, from collection to archival or disposal.

Use Cases:

1. Container Delivery and Specimen Collection Tracking
2. Specimen Inter and Intra organization transfer
3. Specimen tracking within the Laboratory
4. Biobank Specimen Tracking

Events tracked
Containers prepared for specimen collection
Specimen collection succeeded
Specimen collection failed
Specimen departed
Specimen arrived
Specimen accepted
Specimen rejected
Specimen identifier changed
Specimen archived
Specimen retrieved from archive
Specimen procedure step successfully produced a derived specimen
Specimen procedure step succeeded (with no derived specimen)
Specimen procedure step failed
Specimen disposed of



We are therefore still looking for vendors interested in testing the SET profile. In particular, any PaLM vendor whose systems affect the chain of custody of the specimen is a potential candidate.

If you want to contribute

- Apply for IHE International Organizational Membership
  - Visit: www.ihe.net/apply (note IP Policy)
  - Approved monthly by IHE International Board
  - Review IHE's 600+ Organizational Members:
- Join IHE Laboratory Planning & Technical Committees
  - Mailing list: https://groups.google.com/a/ihe.net/forum/#!forum/palm
  - If any issues please contact the CAP staff lead Kevin Schapp serving as the administrative secretariat (kschap@cap.org)
- Non-members have limited participation:
  - Review & comment during Supplement Public Comment period
  - Implement IHE Profiles and test them at connectathons

IHE EUROPE CONNECTATHON WEEK
THE HAGUE APRIL 19-23 2027



IHE-Europe Connectathon 2027

Q&A

IHE EUROPE Integrating the Healthcare Enterprise

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From Monday, 19 April to Friday, 23 April 2027

The Hague, The Netherlands

Where?

Fokker Terminal, Binckhorstlaan 249, 2516 BB The Hague



The registration is now open!!!!

Deadline for registration December 15, 2026

Contacts details



Do you have any general or administrative questions?

Please write to connectathonmanager@ihe-catalyst.net

Do you have any technical questions?

Please write to technical.manager@ihe-europe.net

New registration process for new organizations: contact the technical manager for your account to be created in Gazelle.

IHE EUROPE CONNECTATHON WEEK

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Thank you for joining us!

We hope to see you

in The Hague

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