



Integrating
the Healthcare
Enterprise



Multi-Country Working Group (MCWG)

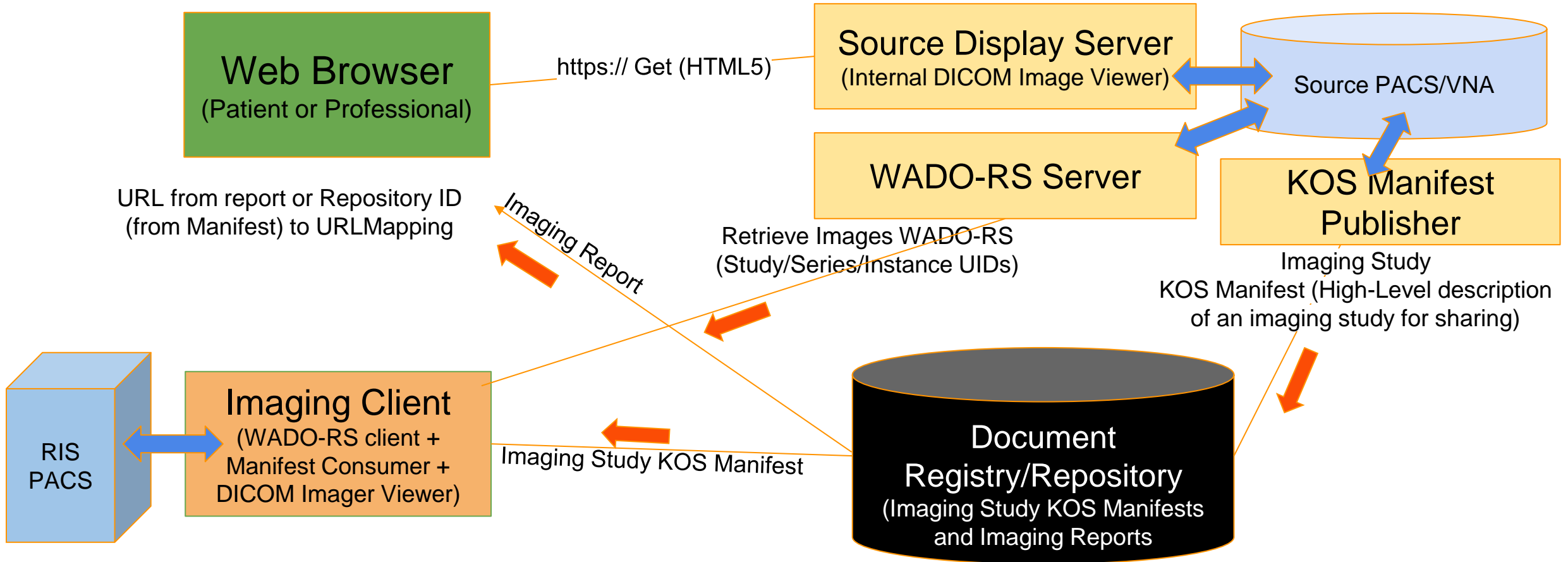
Deployment Tools including Image Sharing Gateway

Approved-Feb 2025

[Multi-country Working Group on Imaging Information Sharing | IHE Europe](#)

1. The MultiCountryWorkingGroup (MCWG) has analysed various deployment challenges for a national or regional ehealth infrastructure for sharing imaging studies and imaging reports.
2. MCWG has produced four sets of recommendations in terms of use cases, technical and semantical interoperability:
 - a. **Profile and Standards Positioning** (May 2024)
Positions the role of HL7 FHIR in the sharing of imaging information architectures, choice of profiles and standards such as MHD(FHIR), XDS-I. Coexistence with XCA and FHIR/MHD, integration of Web Access to DICOM Objects (WADO-RS) in XDS-I.
 - b. **Imaging Metadata and linkages** (December 2023)
Strategies or metadata definitions for filtering access in queries (key filtering elements) and linkages between orders, reports and imaging studies.
 - c. **Extensions to Imaging Study Manifest** (March 2024)
Context of use of imaging study manifests, explain the choice of DICOM KOS, refine the content of imaging study manifest in areas such as patient IDs, accession numbers, additional content in study/series descriptions.
 - d. **Flagging Significant Images in shared Imaging Studies** (December 2024)
Add the capability to the above three MCWG Recommendations to implement in an interoperable way the IHE KIN Profile, thus ensuring that the source producing such a flagging of significant images is fully and easily accessible to the imaging consuming health professional.
3. These slides provide deployment guidance building upon the above recommendations.

Systems involved in an MCWG-based ehealth imaging Deployment



Various elements of a deployment strategy (1)

1. Establish an overall architecture and the needed interoperability specifications base on profiles and standards. Adopt the MCWG recommendations to address gaps.
2. Make available openly the corresponding testing tools and testing plans, so that product developers may design interoperable products
3. If an incentive-based and/or a regulatory framework is put in place targeting specific classes of products, develop functional specifications and interoperability testing tools for such products (PACS/RIS, VNA, Imaging Gateways). Validation process needed to verify compliance.
4. Organize projectathons to allow pre-products to interoperate in a “lab-style environment”. Perform projectathon test plan and award a label to successful products.
5. If an incentive-based and/or a regulatory framework is in place, validate candidate products (in lab and or on-site), after successful projectathon.

Various elements of a deployment strategy (2)

6. Ensure that Document Registries (MHD or XDS) support imaging specific metadata extensions (Identified in the MCWG Metadata Recommendations).
7. Rely on a sharing domain-wide patient and professional identification/authentication policy and process. Policies for access to patient data should be established (role-based access) and handled by the source/consuming application.
8. Establish a Deployment Operations Center that:
 - a. assigns network addresses (Image Sources URL)
 - b. awards digital certificates for TLS configuration
 - c. monitors on-line availability of Imaging Sources (response to WADO-RS)
9. Chose a deployment product sourcing strategy:
 - a. If a common imaging gateway is appropriate, validate such products (projectathon and product validation if chosen).
 - b. If validated products are required, may assist product sourcing via validation.
 - c. Leave sourcing to the deployment organizations and have them decide on their product validation criteria.

⇒ Each ehealth imaging project may leverage one or more of the above elements.



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A Common Imaging Gateway for MCWG-based deployments

MCWG - Imaging Gateway description and goals

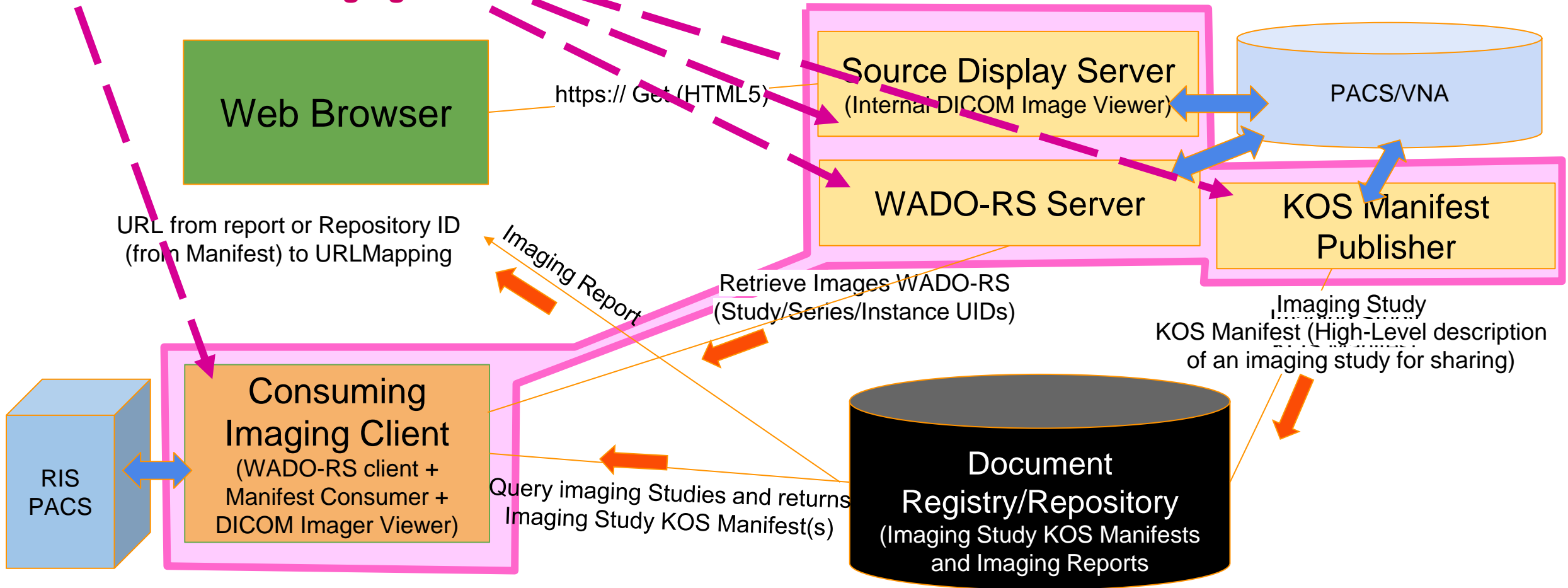
This gateway is intended to **bridge the legacy interfaces available on most PACS and RIS systems to simplify the deployment of a national or regional imaging sharing ehealth infrastructure that complies with the four sets of Recommendations made by MCWG on Imaging:**

1. **Profile and Standards Positioning (May 2024)**
2. **Imaging Metadata and linkages (December 2023)**
3. **Extensions to Imaging Study Manifest (February 2024)**
4. **Significant Images Management (Dec 2024)**

This **MCWG Imaging Gateway (1) publishes KOS Manifests** to a central registry/repository, **(2) accesses** an MHD/XDS compliant **document registry/repository to locate imaging studies** and **(3) retrieves them from an (4) MCWG compliant Source PACS** to view those images on any local Professional's health records software (RIS, HIS, etc.) (see next slide sequence diagram).

It **may be implemented by an independent software component** in front of the PACS or directly within the PACS. Each vendor choose the best way to implement a compliant interface on its product.

The Imaging Gateway serves both as an Imaging Source and as an Imaging Consumer



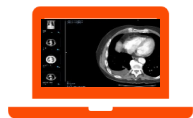
Such a gateway has five main functions :



1. Publish in a shared registry and repository(ies) a DICOM Manifest (KOS) built from information coming from the local source PACS and RIS providing the content of an imaging report header for share context (may be **triggered** by imaging report approval)



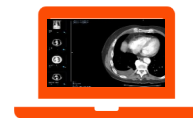
2. Provide access to the PACS source's imaging data by offering to remote imaging consumers (e.g. remote MCWG imaging Gateways) an image retrieve interface (DICOM WADO-RS).



3. Provide source side viewing (hosted on the Source gateway) to be accessed by any remote web browser (professional or patient) through an URL placed in the Imaging Report.



4. Issue queries to the shared registry and repository(ies) to retrieve DICOM Manifest (KOS) and imaging reports.



5. Use the information within the KOS, especially image pointers to retrieve images (DICOM WADO-RS) and display them in its requester side viewer/

MCWG - Imaging Gateway use cases

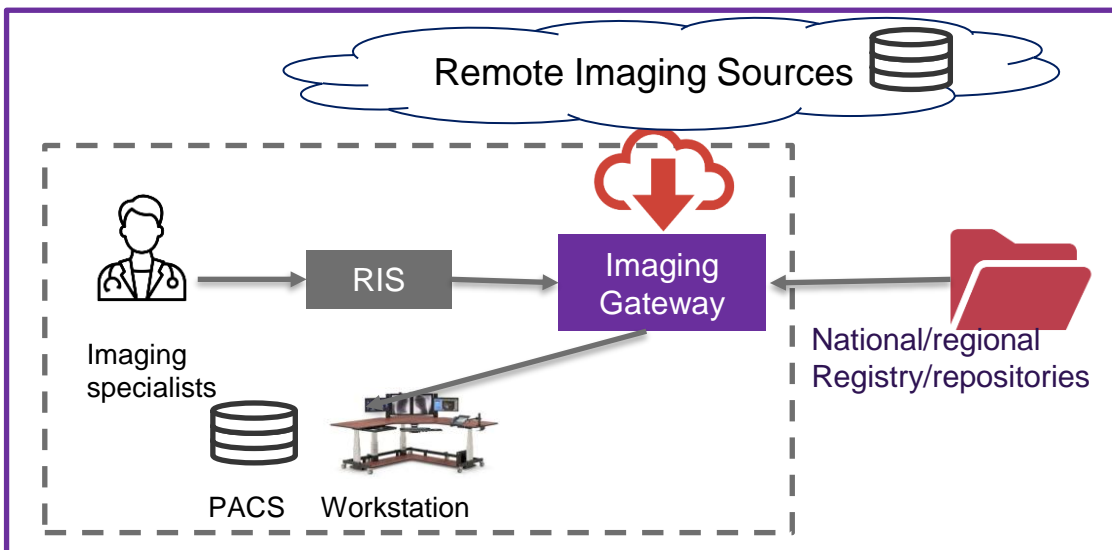
For patients: Be able to view images anytime, anywhere through an URL placed in the Imaging Report.

For Health Professionals:

- Enable Professionals to visualise an exam produced anywhere within the territory.
- Enable Professionals to import a copy of past exams for a given patient

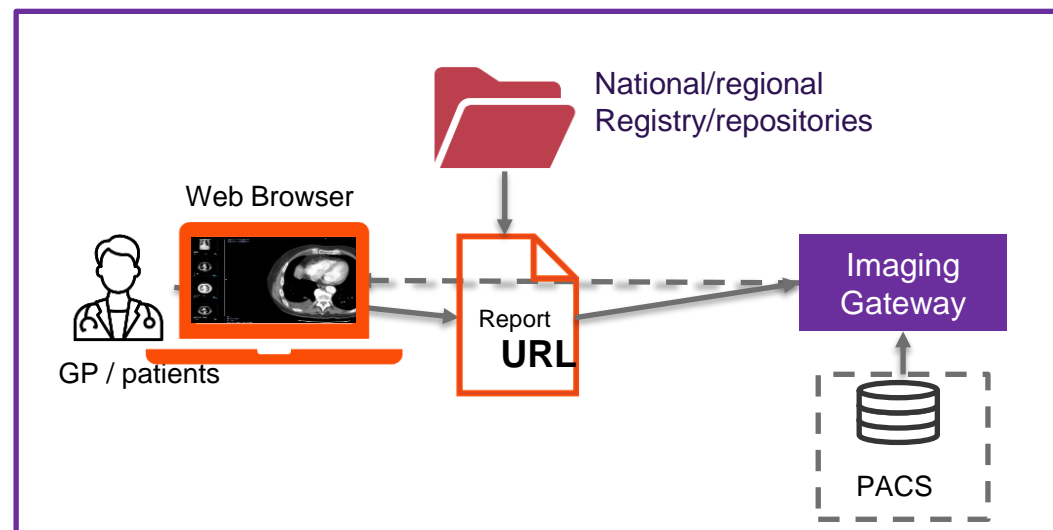
For Imaging Specialists

Consult, visualisatize and import examinations in the imaging environment in order to carry out **comparisons and post-treatment**



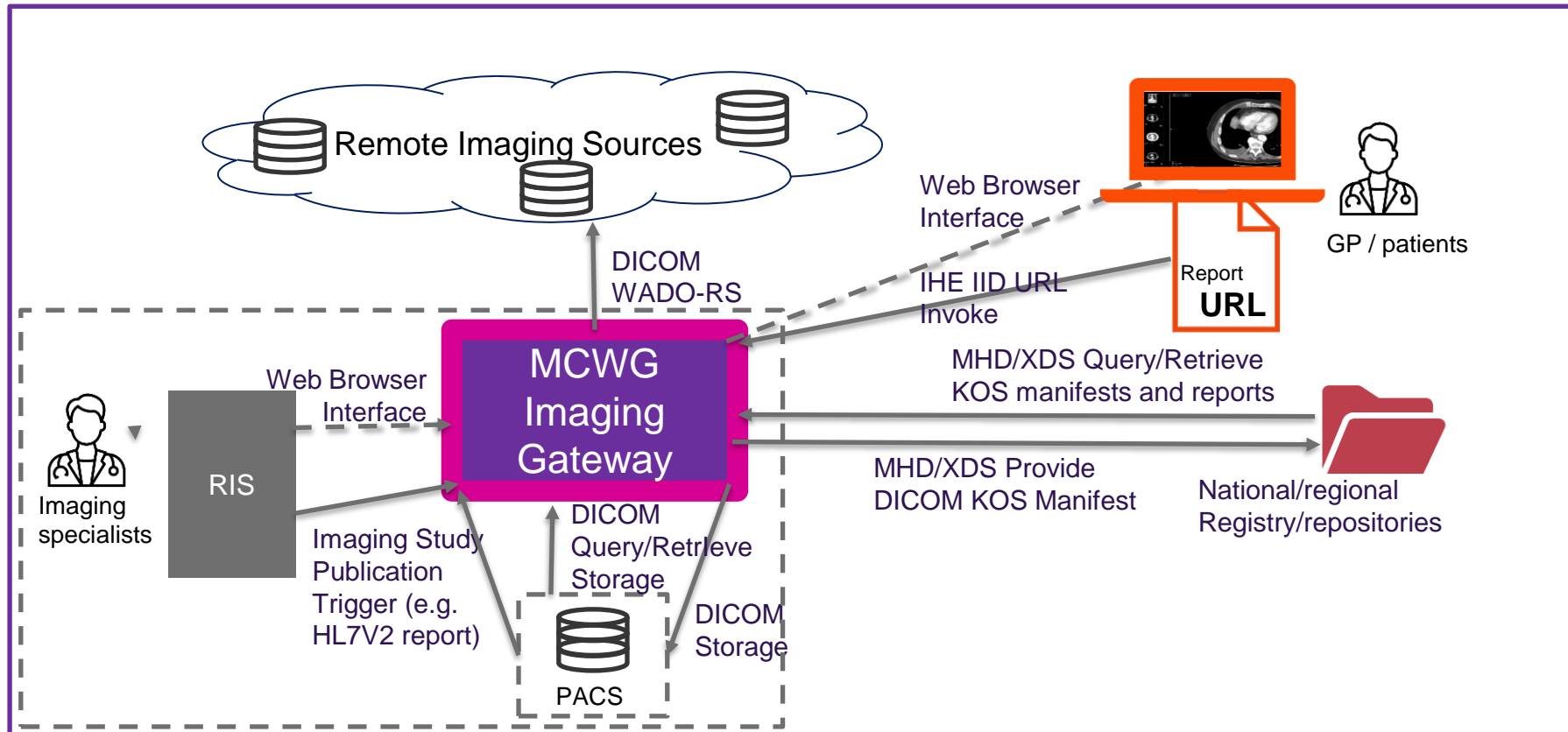
For GPs/patients consulting the examination report

Once an imaging report is accessed, visualisation with a web browser of an examination from a link in the imaging report..

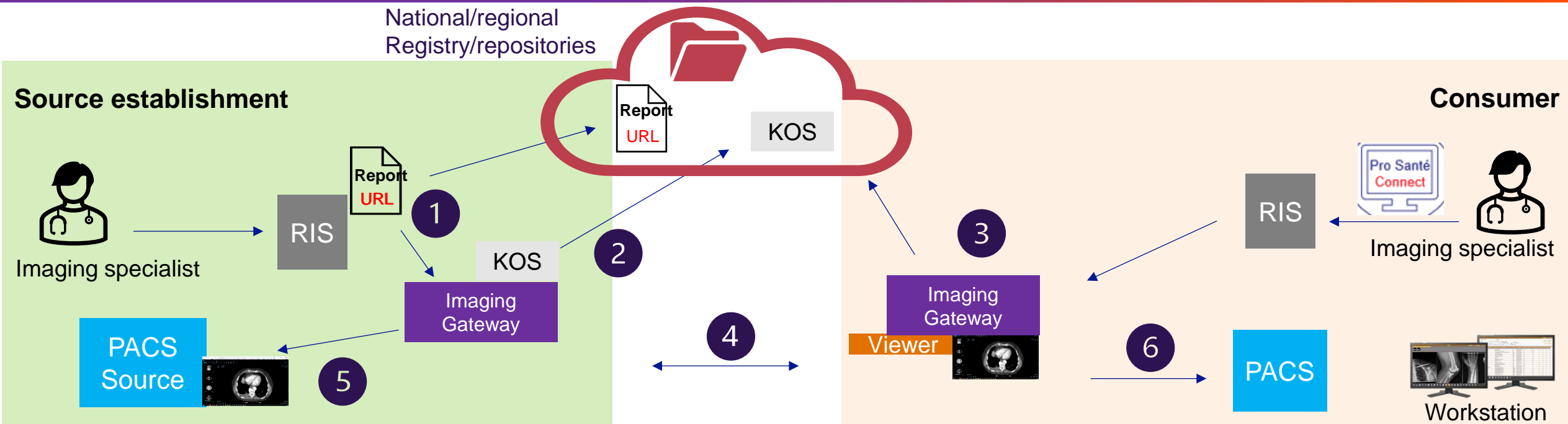


MCWG - Imaging Gateway Standard Interfaces

Standard-Based Interfaces: The **MCWG Imaging Gateway** supports the interfaces to the national/regional infrastructure per the MCWG recommendations (see first slide). In addition, it supports local interfaces based on DICOM Query/Retrieve and Storage widely available on PACS products, as well as RIS Interfaces that are typically based on HL7 V2 conveying a structured report header (e.g. CDA/V2 Observations) or an equivalent publication trigger. It also acts as a web server to offer imaging access to local professionals and remote patients/professionals with a simple web browser.

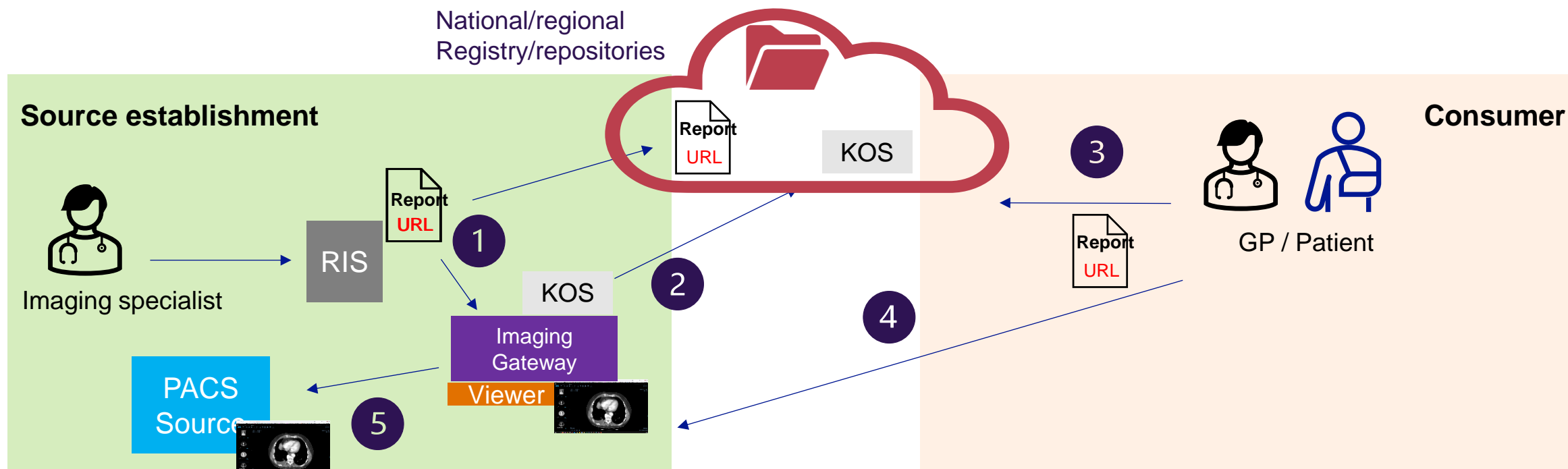


Notes:
The Professional Directories and Authentication Servers are not shown. IUA (Oauth2) based IHE Profile.
The Patient identity and Authentication Servers are not shown. IUA (Oauth2) based IHE Profile.
The internet connections have to be secured through node authentication and audit trails (ATNA Profile).



- 1 : After acquiring the images and storing in PACS, the report is sent to the national repository and to the Common Imaging GW (Trigger)
- 2 : The Common Imaging GW creates the manifest KOS and sends it to the national registry (RAD-68 / ITI-41)
- 3 : The Consumer professional searches the Doc Registry with specific metadata to select the relevant documents (ITI-18 & ITI-43)
- 4 : The Common Imaging GW retrieves the address of the source from the KOS and requests the images (RAD-107)
- 5 : The Common Imaging GW, in the facility where the images were acquired accesses the indicated PACS
- 6 : The health professional can either see the images in the DICOM viewer of the Common Imaging Gateway and/or export them to his PACS/workstation

General Workflow for a requester with a web browser



- 1 : After taking the images and storing in PACS, the report is sent to the national repository and to the Common Imaging GW
- 2 : The Common Imaging GW creates the manifest KOS and sends it to the national registry (RAD-68 / ITI-41)
- 3 : The Consumer searches the Doc Registry with specific metadata to figure out the relevant imaging reports / the patient accesses his reports
- 4 : The URL associated with the Imaging Study is embedded in the imaging report. When the user clicks on the URL a DICOM viewer is remotely launched on the Common Imaging GW (IHE Invoke Image Display).
- 5 : The Common Imaging GW, where the imaging study was acquired access images from the PACS it serves