DICOM and FHIR Track

Connectathon 2021 Report

Track Lead : **Anand Jahagirdar**

Track Co-lead(s) :

Arunachalam Annamalai
Muralidhar Chowdary

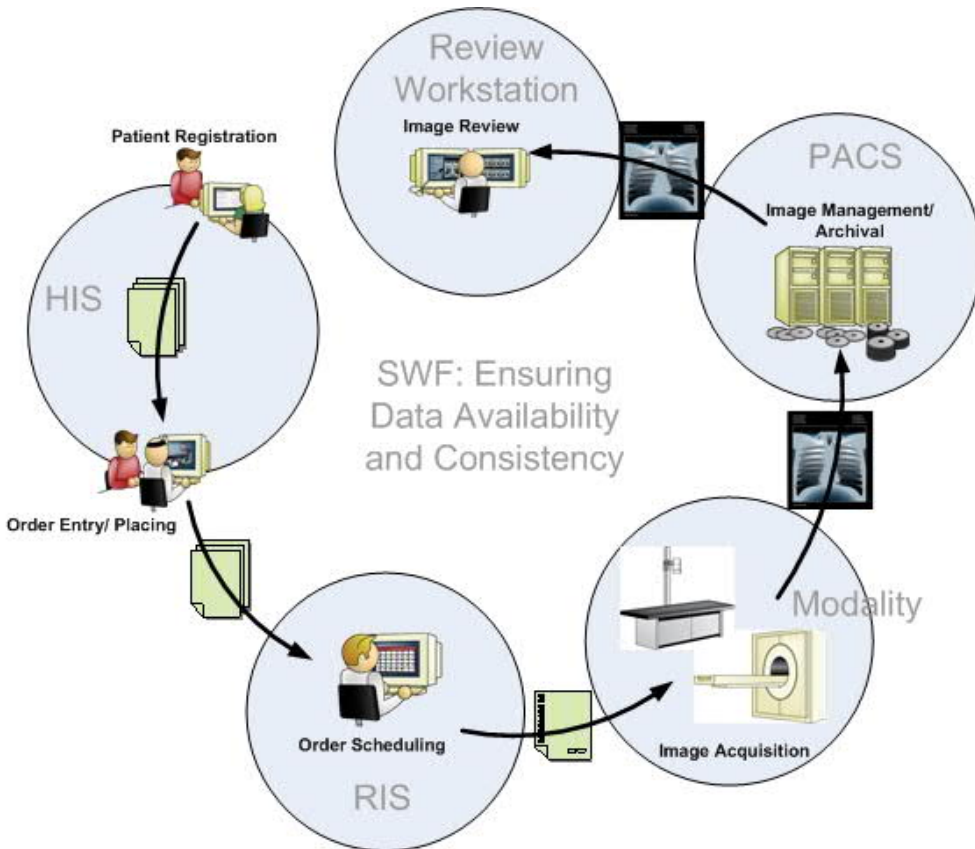Confluence: https://confluence.hl7.org/display/HIN/DICOM+and+FHIR+Track-+Proposal

Zulip: https://fhirindia.zulipchat.com/

GitHub: https://github.com/jagsanand/Connectathon2021/tree/main/dicomFHIR

DICOM and FHIR worlds together

Imaging Workflow on FHIR

Encounter EpisodeOfCare
1. Patient admitted to clinic — **Visit**

ServiceRequest CarePlan
2. Doctor creates order — **Order**

ServiceRequest
3. Order gets reviewed — **Protocol**

6. Results are distributed — **Access**

5. Report is written — **Report**

4. Images get acquired — **Acquire**

ImagingStudy

DiagnosticReport Observation

Procedure
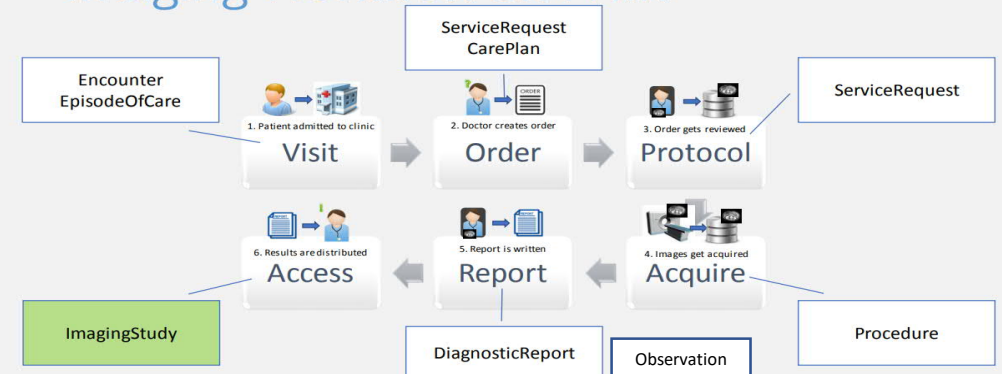
Richer Image Analytics for Triage/Detection

FHIR®
- Diseases / conditions
- Laboratory results
- Reports (structured)

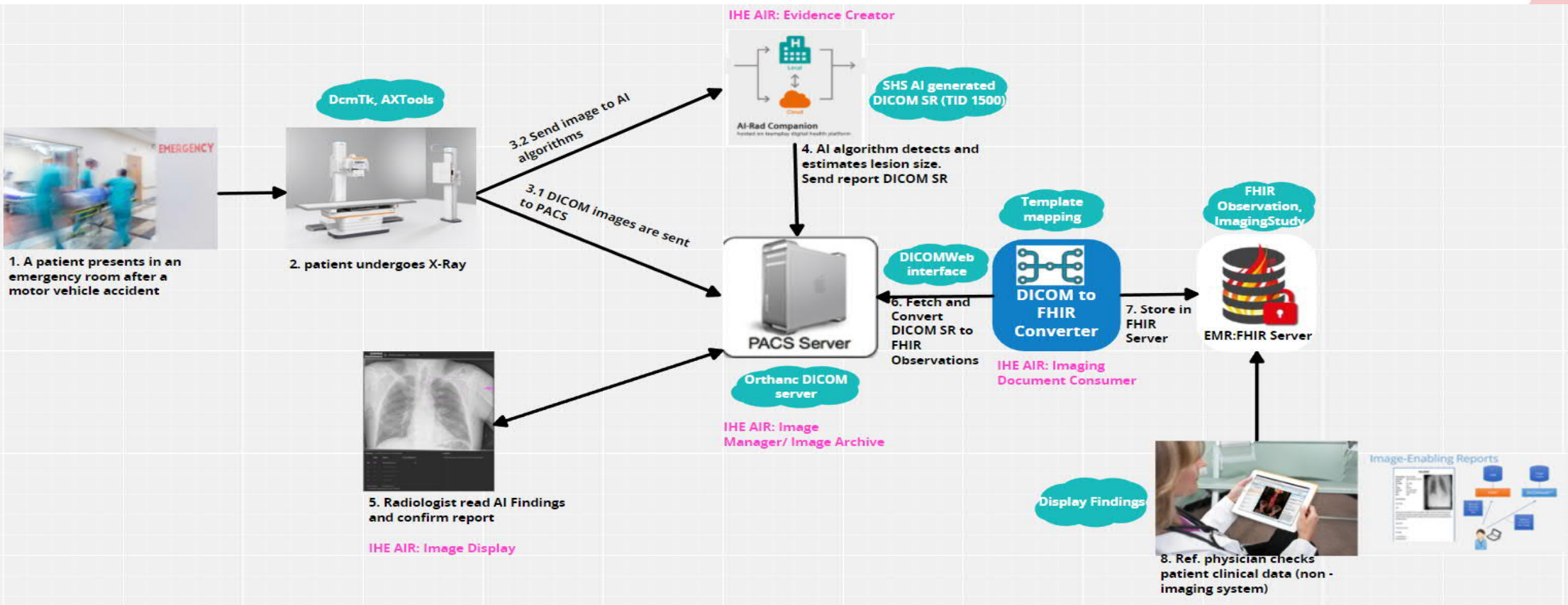**DICOMweb™**
- Images from modalities
- Image metadata

Analytics enriched by the full story of the patient, given the wealth of healthcare information

Patient Registration
HIS
Order Entry/ Placing
Order Scheduling
RIS
Image Acquisition
Modality
PACS
Image Management/ Archival
Review Workstation — Image Review
SWF: Ensuring Data Availability and Consistency

AI Integration workflow for Connectathon

FHIR CONNECTATHON 2021

- Integrating FHIR® with medical imaging and DICOMweb™

- Extract key content from *DICOM SR* (AI Result , measurement report, etc) into *FHIR* resources, *Observation*

- Review and contribute to Mapping of *DICOM SR* to *FHIR IG proposal*

- Generate *DICOM SR* to *FHIR* mapping using *TID 1500* as described in *IHE AIR*

- Demonstrate an integrated workflow of storing *DICOM SR* based AI results into FHIR Server and display in a FHIR based client application.

- Proposal for DICOM image sharing using ABDM in India context.

Connectathon Activities

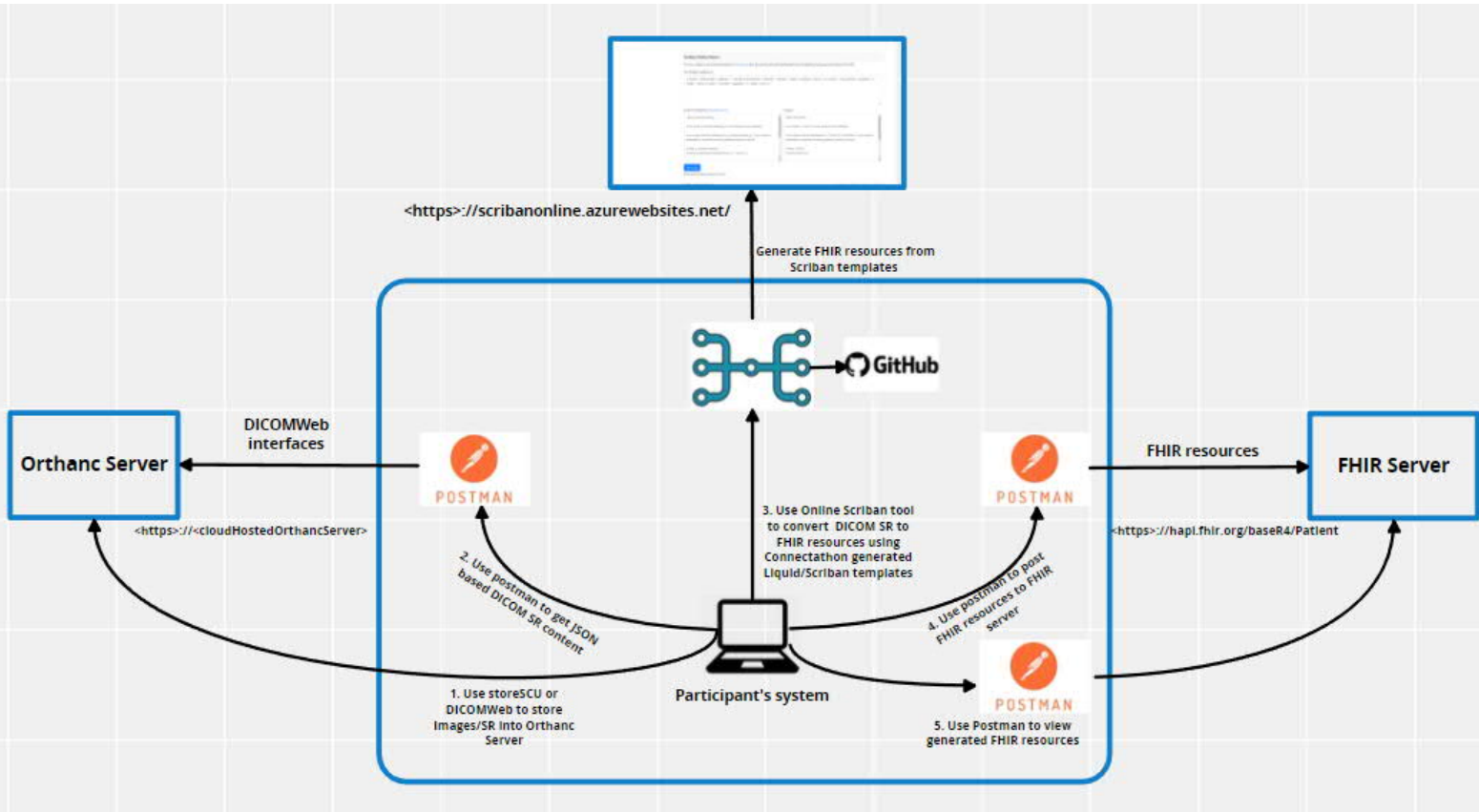

- Store data in Orthanc server
- Retrieve data from Orthanc using DICOMWeb interfaces
- Develop Liquid/Scriban templates for DICOM to FHIR mappings
- Generate FHIR Resources using templates.
- Store FHIR resources in FHIR server.

Connectathon output

- PreConnectathon
  - Sesions/Webinars on DICOM, DICOMWeb Interface
  - Understand TID 1500, IHE AIR to map the DICOM SR to FHIR
  - Hands-on trainings on tools required for the workflow integration:
    - Orthanc DICOM server, Scriban templating language
- Connectathon
  - ✓ Output 1: Report for review and improvement done for the *DICOM SR to FHIR IG* proposal
    - Review comments/Questions / Clarifications are added to IG proposal
      - https://confluence.hl7.org/display/IMIN/Mapping+of+DICOM+SR+to+FHIR.
      - https://fhirindia.zulipchat.com/#narrow/stream/306951-Connectathon2021/topic/DICOM.20and.20FHIR.20Track/near/264598607
  - ✓ Output 2: Scriban based template for DICOM SR to FHIR (based on TID 1500) mapping stored in Github
    - Available @ https://github.com/jagsanand/Connectathon2021/tree/main/dicomFHIR
  - ✓ Output 3: End2End integration using several opensource tools to demonstrate the integrated workflow
    - Connectathon participants executed the integrated workflow and results stored in public Hapi server.
  - ✓ Output 4: Recommendation to ABDM on the image sharing workflow (to be confirmed)
    - Initial proposal after brainstorming within Connectathon participants is shared in Connectathon2021 GitHub

Session recordings are available on HL7-India YouTube channel

Output stored in Connectathon2021 GitHub

ABDM Image sharing – Proposal
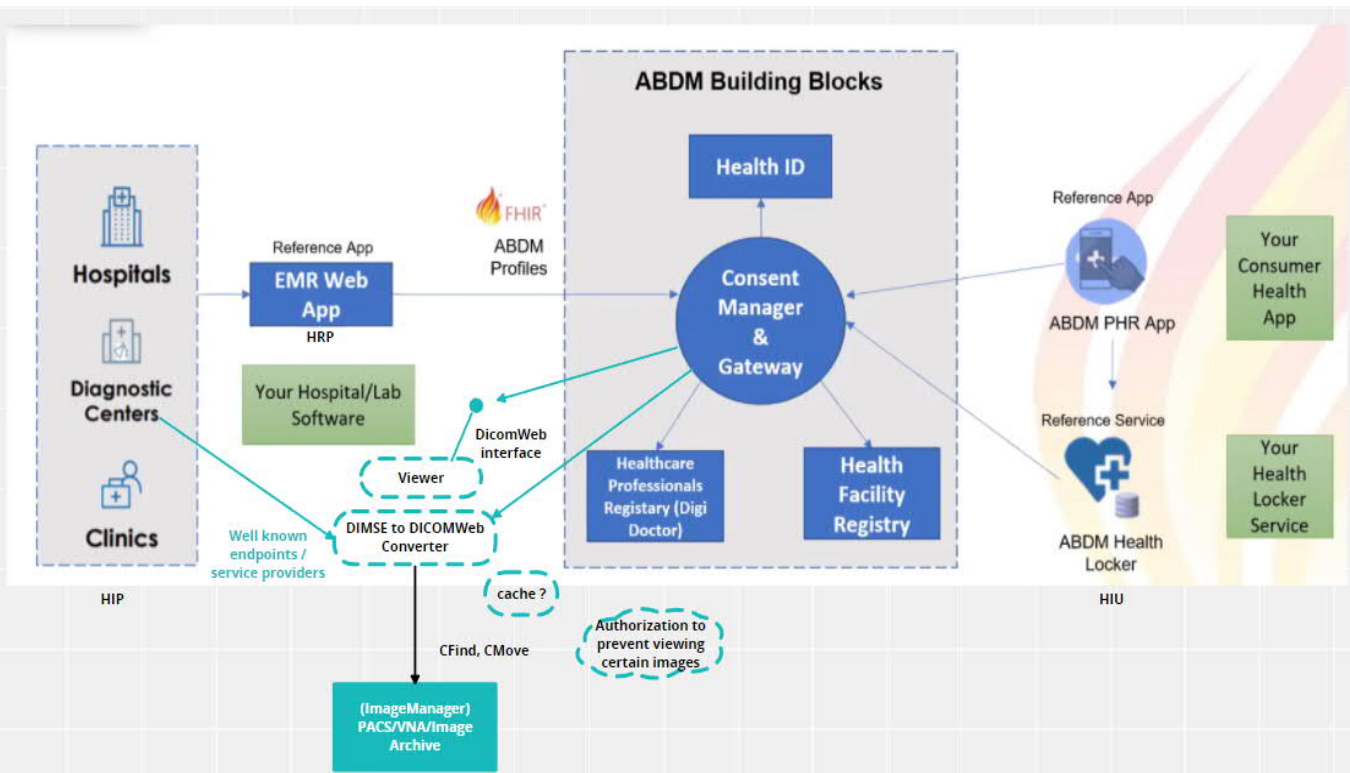
- Make ImagingStudy.endpoint as must support attribute in ABDM ImagingStudy profile
- Support developing product solutions using DICOMWeb interface to integrate legacy PACS/Image Archive to ABDM
- Challenges
  - Performance and Scalability
  - Security (Authorization / Consent Management)

Track Participants

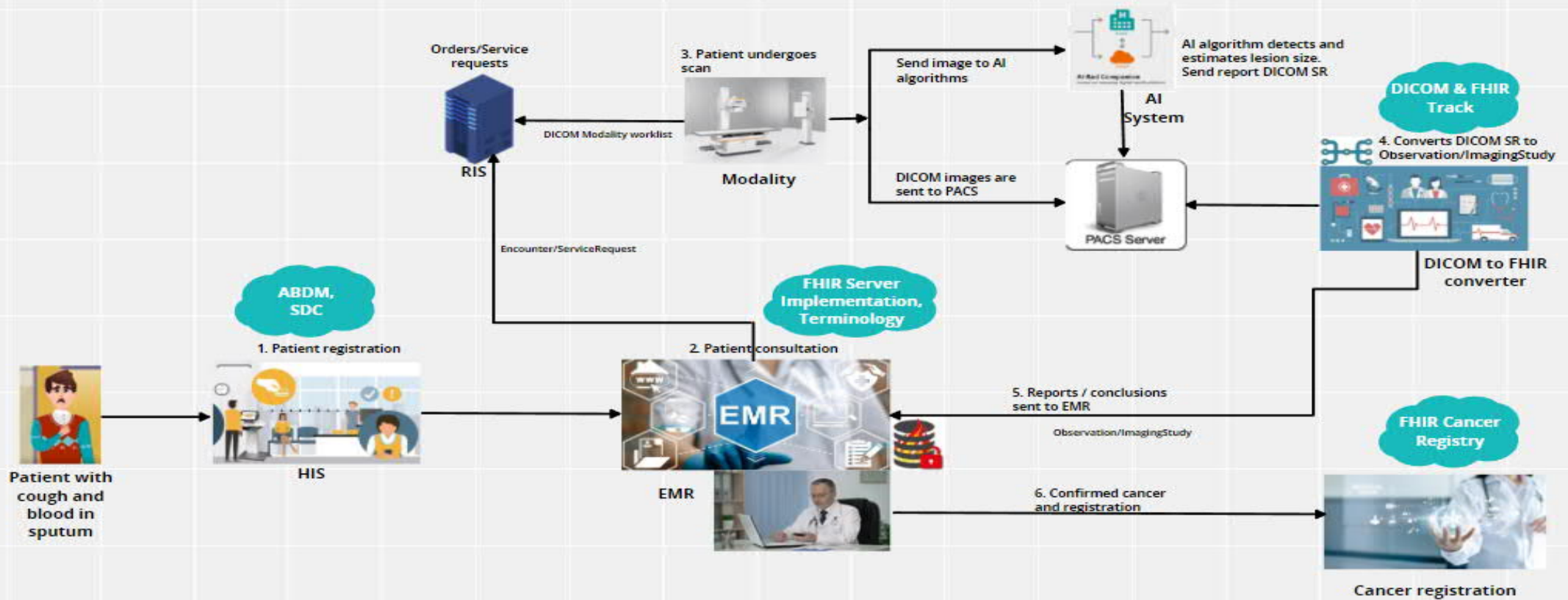| SIEMENS Healthineers	forgeahead	PHILIPS Healthcare	MEDSYNAPTIC	XYRAM We Care...	CitiusTech
1. Anand Jahagirdar 2. Arunachalam Annamalai 3. Hemant Jain 4. Kartik Joshi 5. Kiran Kumar Gollapelly 6. Muralidhar Chowdary 7. Savitri K I 8. Shlok Panpalia 9. Vivek Dikshith 10. Veena Jayan	1. Aditya Chaturvedi 2. Philip Cherian 3. Suryapratap Singh 4. Venu Malyala	1. Nikhilesh Sonar 2. Vivek S 3. Yogalakshmi Selvarajan	1. Amit Joshi	1. Ankita Srivastava	1. Virendra Shinde

Gold Sponsor   Silver Sponsors   Supported By

KARKINOS   AliveCor   KIMS HOSPITALS   HIMSS INDIA   National Resource Centre for EHR Standards

Integrated Clinical workflow

Orders/Service requests

3. Patient undergoes scan

Send image to AI algorithms

AI algorithm detects and estimates lesion size. Send report DICOM SR

AI System

DICOM & FHIR Track

4. Converts DICOM SR to Observation/ImagingStudy

DICOM Modality worklist

DICOM images are sent to PACS

PACS Server

RIS

Modality

DICOM to FHIR converter

Encounter/ServiceRequest

FHIR Server Implementation, Terminology

ABDM, SDC

1. Patient registration

2. Patient consultation

5. Reports / conclusions sent to EMR

FHIR Cancer Registry

EMR

Observation/ImagingStudy

Patient with cough and blood in sputum

HIS

EMR

6. Confirmed cancer and registration

Cancer registration