Introduction to REM-NM

Radiation Exposure Monitoring for Nuclear Medicine

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Agenda

- A Little History – The REM Profile
- Introduction of REM-NM Profile
  - Features
  - Functional Requirements
  - Workflow Use Cases
  - Dose Information Reporter and Dose Registry
  - Connectathon Review
- Next Steps

REM-NM Profile

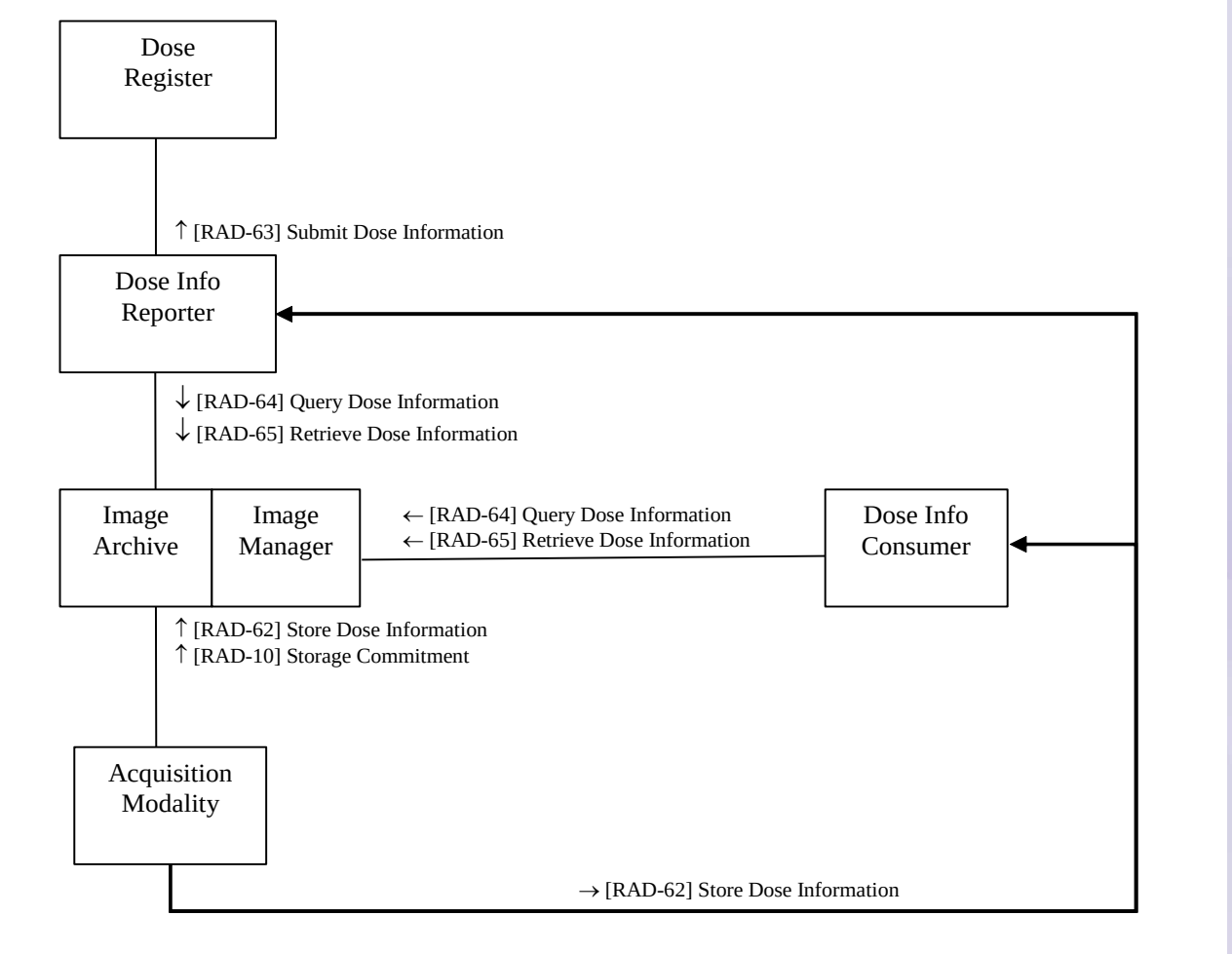
- New Radiology Profile; REM-NM.
  - Supports recording/reporting administered activity and estimated organ radiation dose due to Radiopharmaceutical administration.
  - Includes automatic transmission of administered activity information from hot lab/injector systems to scanner.

Background – REM Profile

Regulatory bodies require reporting of X-Ray dose information

- DICOM supports X-Ray dose via Structured Reports (RDSR)
- IHE REM (Radiation Exposure Monitoring) based on the RDSR
  - REM Profile in use since 2009
  - All CTs shipped since 2013 support RDSR/REM

Background – REM Profile cont'd

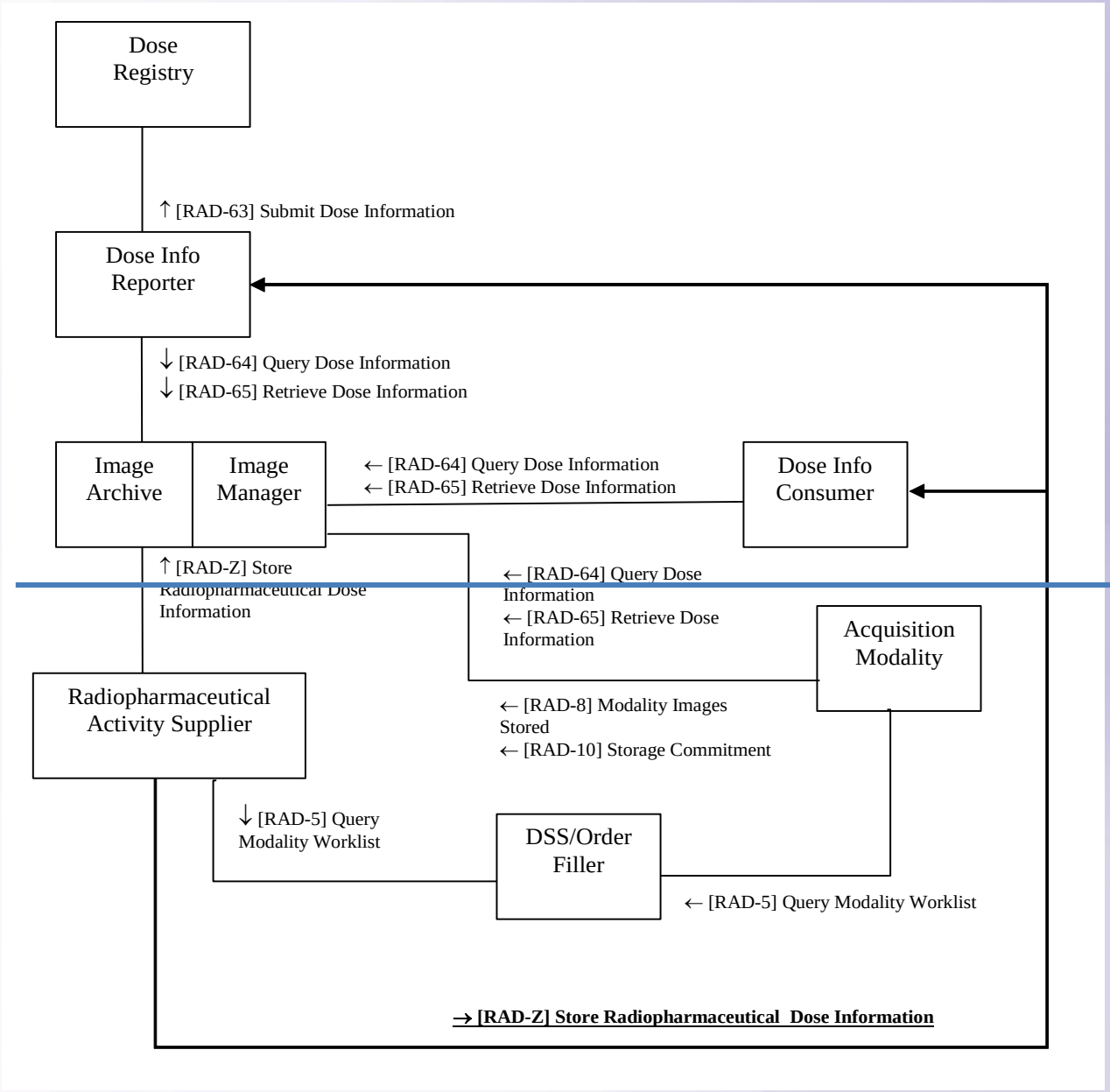


IHE Integrating the Healthcare Enterprise

REM-NM Profile

- Regulatory bodies, professional societies, and institutions are interested in monitoring administered activity for NM and PET procedures. For example:
  - QIBA
  - ASNC - ImageGuide
- DICOM has defined new Structured Report for NM/PET in 2013, similar to CT.
- REM-NM Profile provides a framework for managing reporting of administered activity and estimated dose.
  - PET imaging procedures.
  - NM and SPECT imaging procedures.
  - NM procedures that do not involve imaging.
- REM-NM leverages infrastructure, actors, roles of REM.
- Promotes quantitative imaging by providing accurate activity and time information (e.g. QIBA)

REM-NM Profile Structure



Identical actors and roles as in REM Profile

Differs from REM Profile:

- RAS becomes source of the Dose Report
- Acquisition Modality only consumes reports pulled from Image Manager/Archive
- RAS and Modality pull study info from Worklist

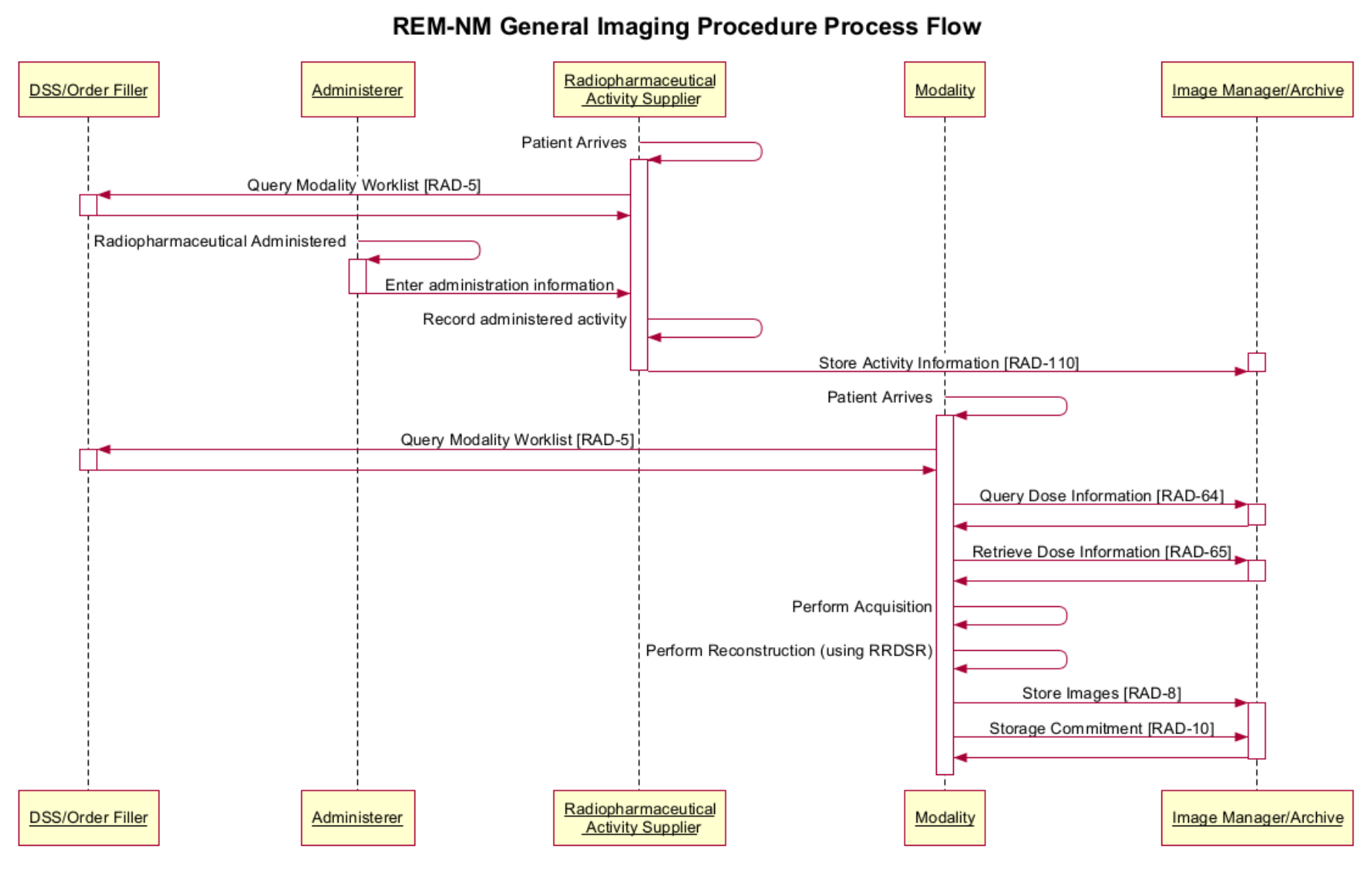
REM-NM High Level Requirements

- Modality and RAS:
  - Must support Consistent Time Profile
  - Must support Worklist Query transactions
- Hybrid Modalities (e.g. PET/CT)
  - Must support both REM and REM-NM
- Use Cases:
  - General Imaging Procedure (Most Common)
  - Non-imaging Procedure
  - Simultaneous Administration and Imaging Procedure
  - Dose Information Reporter Pull-based Workflow
  - Dose Information Reporter Push-based Workflow

Use Case – General Imaging Procedure

- The RAS (Hot lab) retrieves Worklist entry to get patient demographics, order and procedure info.
- Radiopharmaceutical is administered to patient.
- RAS records amount of activity actually administered, generates new Radiopharmaceutical Administration Event UID.
- RAS sends Dose Report (RRDSR) to archive (PACS).
- When scan is set up, modality queries for the Dose Report (using Study Instance UID) and extracts relevant information (admin event UID, activity, date/time, pharmaceutical name, etc., but might not include half-life or positron fraction).
- Modality includes this info in images, and uses information for decay correction, SUVs, etc.

Use Case – Continued



Dose Information Reporter and Dose Registry

- IHE Technical Framework defines these as part of REM Profile
- In many organizations, a Dose Information Reporter will collect Dose objects covering a particular period (e.g., today, this week or last month), analyze them, compare to site policy and generate summary reports.
- All, or a sampled subset of the Dose objects might be submitted to a National Registry to facilitate composing population statistics and other research. Such Dose objects will generally undergo a configurable de-identification process prior to submission.

Example Dose Info Reporter Uses

- Department QA (Process Control)
- Patient Impact Evaluation
  - E.g. Assess impact to fetus when mother was determined to be pregnant after the scan.

Example Dose Registry Uses

- Population Dose and Dose Indicators
- Dose Reference Levels
- Site Benchmarking
- Population Epidemiology
- Clinical Trials
- Longitudinal Patient Dose Record

IHE Europe 2017 Connectathon Review

- 1 RAS Actor
- 2 Image Archive Actors
- 1 Modality
- 2 Dose Information Consumers

Next Steps

- Vendors begin implementation
- Upcoming IHE Connectathons will continue to test REM-NM
- Customers begin to include requirements for REM-NM support in RfPs.
- Dose Registries plan to receive and analyze Radiopharmaceutical Radiation Dose SRs.
- Raise awareness of the standard.