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# HL7 and DICOM: Complementary Standards, Collaborating Organizations

Bao Yongjian

Principal Architect, GE Healthcare



- History of HL7 and DICOM
- Complementary domains of responsibility
- Collaborative organization
- Cross-standard integration
  - *Imaging Workflow*
  - *Reporting*
  - *Image Access*
  - *Web Services*

# Parallel development



1983: ACR-NEMA committee  
1985: ACR-NEMA Standard 300  
1988: ACR-NEMA 300 v2  
  
1993: DICOM  
1995: Modality Worklist



1984: ASTM E31.11 committee  
1987: HL7 committee; HL7 v1  
1988: ASTM E1238  
1989: HL7 v2.0  
1990: HL7 v2.1 (included E1238)  
1999: HL7 v2.3.1

## **2000: DICOM-HL7 Memorandum of Understanding**

2000: Structured Reporting  
2004: Web Services (WADO)  
2010: SR Transcoding to CDA  
2013: RESTful Web Services

2001: CDA r1  
2005: CDA r2  
2009: CDA Basic Imaging Report  
2014: FHIR DSTU

# Domains of responsibility



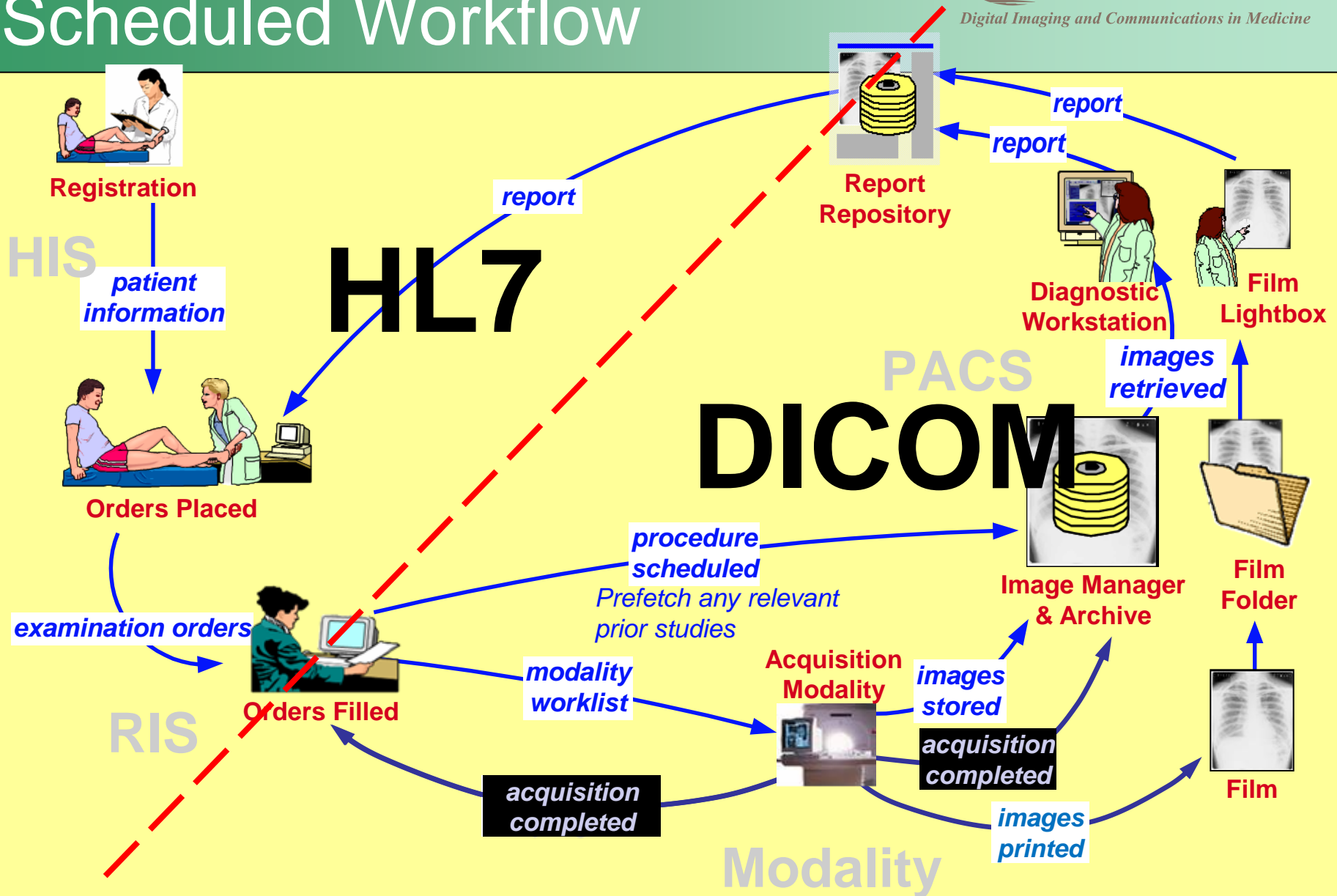
- Workflow inside the imaging department
  - Radiology, Cardiology, Radiation Therapy
- Image data formats
- Image analysis result data
- Radiation dose data
- Image and related data exchange

- Interdepartmental workflow
  - Patient management, orders, results, scheduling, billing, master files
- Clinical Lab device automation
- Patient Care
  - Medication management
- Clinical Documents
- Vocabulary management

## DICOM WG-20 $\approx$ HL7 Imaging Integration WG

- Officially separate bodies, but ...
- Meet in joint sessions
- Have the same members (mostly)
- Have the same chairmen
- All motions must pass by rules of both HL7 and DICOM
- ... in effect, a single joint committee

# Cross-standard integration: Scheduled Workflow



# Cross-standard integration: Scheduled Workflow



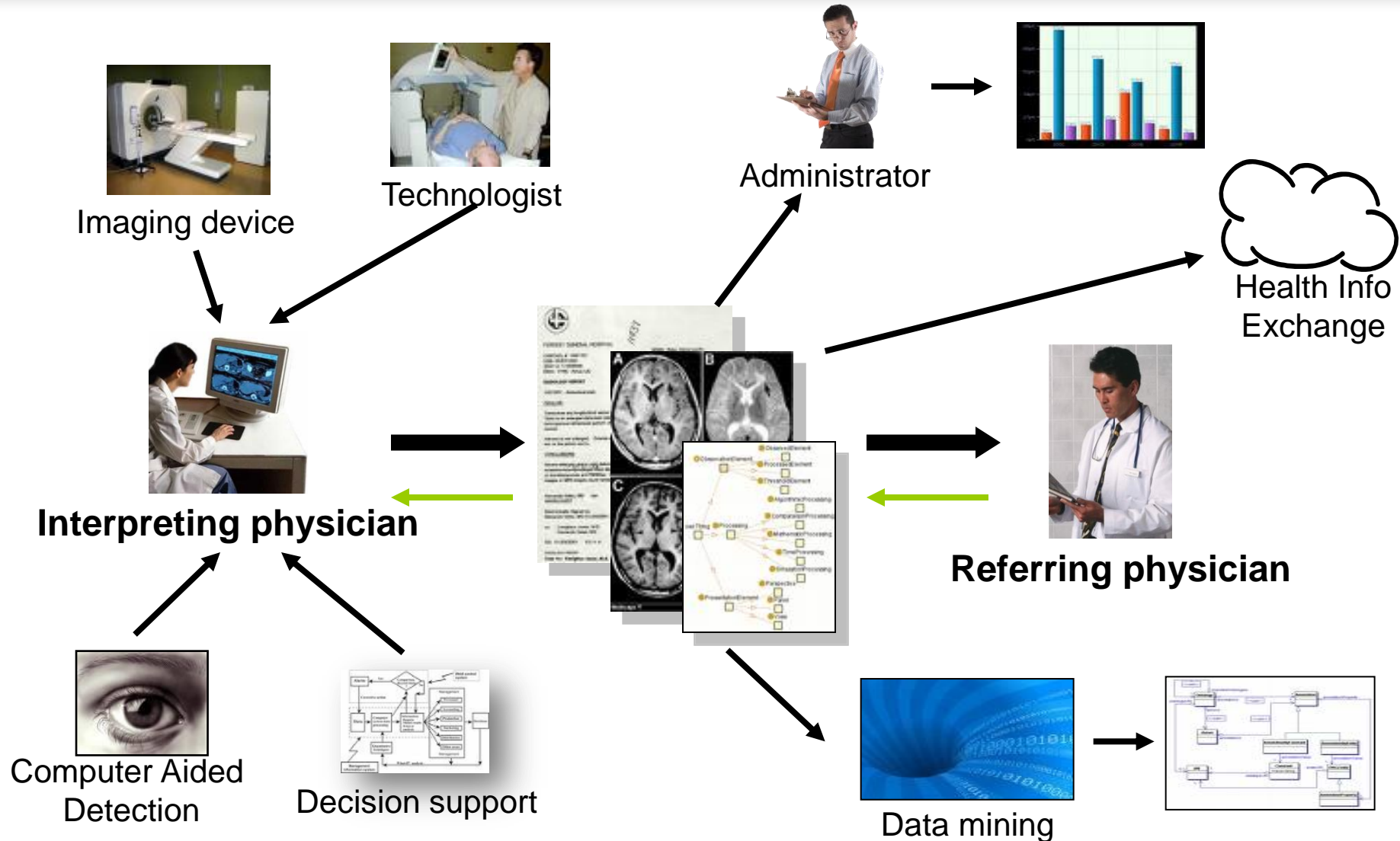
**HL7** – Message exchanges for patient, order, and result management

 **DICOM** – Services for procedure, image, reading management

**IHE** – Specification of workflow and integration details, e.g.:

- *Constraining HL7 and DICOM messages in workflow contexts*
- *Mapping HL7 message fields to DICOM data elements*

# Cross-standard integration: Reporting – DICOM View





## **Clinical Document Architecture (CDA)**

**HL7 standard for clinical documents for exchange, supporting advancing use cases**

- Encoded in Extensible Markup Language (XML)
  - Uses HL7v3 Reference Information Model (RIM) standard XML constructs
- Includes standard **header** and a content-specific **body**
  - **Header** allows consistent management of all documents – doc type, patient, provider, encounter, authentication, etc.
  - **Body** contains document narrative text and multi-media, plus optional coded equivalents

# Cross-standard integration: Reporting - Integration



- DICOM supports CDA encapsulated in DICOM object, and references to CDA documents
- DICOM Part 20 is a specification for transforming DICOM SR reports (“Template 2000”) to CDA (2010)
- DICOM collaborated with HL7 in defining a CDA Implementation Guide for Basic Imaging Reports (2009)
  - Including DICOM object references
- Current work (DICOM Supplement 155) for more advanced imaging reports in CDA

# Cross-standard integration: Image Access



- HL7 generally does not attempt to transfer images, defers to DICOM
  - HL7v2 OBX RP (Reference Pointer) data type
  - FHIR ImagingStudy resource links to WADO
- DICOM defines web access mechanisms
  - WADO-URL, WADO-WS, WADO-RS

# Cross-standard integration: Web Services



## **Fast Health Interoperable Resources** **HL7 next generation web-based standard**



- FHIR defines “Resources” – a set of modular data entities in healthcare, based on HL7v2, v3, and CDA
- Resources are accessible using RESTful web services, or “packaged” into messages or documents
- Focus on implementation – fast and easy to implement
- Standard resources cover ~80% of use cases ... built-in, standard mechanism for extensions ... no longer second-class citizen!

# Cross-standard integration: Web Services



- In emerging web services area, DICOM will rely on HL7 FHIR for common resources (patient, order, schedule, etc.)
- DICOM will define compatible imaging resources

# Summary

- DICOM and HL7 - Similar history
- Complementary domains of responsibility
- Collaborative approach to imaging department needs, and enterprise needs for imaging
- Effective interworking

## Yongjian Bao

- [yongjian.bao@GE.com](mailto:yongjian.bao@GE.com)
- 540 W Northwest Hwy  
Barrington, IL 60010 USA

***Thank you for your attention !***