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Defining Clear and Complementary Roles for HL7 CDA (Clinical Document Architecture) and DICOM SR (Structured Reporting) in Diagnostic Reporting

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Reporting Integration

- Should be high priority
  - Economic importance of radiologist productivity
  - Referring physicians (radiology's customers) want to see key images
- But, still mostly served by proprietary and custom integration

Reporting integration includes:

- Workflow
  - Managing interpretation worklists
  - Providing orders and relevant clinical information
  - Automatically displaying appropriate images and relevant priors
- Annotation and measurements
  - Key images
  - Markings, measurement calipers and other graphical annotation
  - Measurements acquired in the imaging procedure
- Structured reporting, wherein coded findings and interpretations are created in structured form

The all-DICOM solution

- DICOM SR, along with General Purpose Worklist, was supposed to take care of all this.
- Instead, DICOM SR has found vital uses in key subspecialty areas that produce structured data in the context of the examination or post-processing, including:
  - Cardiology, both Cath Lab and Echo,
  - Fetal biometry in ultrasound,
  - Computer Aided Detection/Diagnosis results, and others.

  These SR documents are not necessarily part of the patient's medical record, but are part of the *Evidence Data*. Evidence Data includes images and waveforms, as well as these SR documents.

Reporting is RIS Turf

- Meanwhile, diagnostic reporting continued in the province of information systems that are based primarily on Health Level Seven (HL7) standards.
- Even if diagnostic reports were created as DICOM SR objects, there is still the problem that the end recipient of diagnostic reports – referring physicians – commonly uses systems with HL7 rather than DICOM capabilities.

DICOM-HL7 Synergy

- At the same time – the late 90's – that SR was being developed in DICOM, HL7 was beginning work on standards for structured documents encoded in Standard Generalized Markup Language (SGML), and later, XML.
  - These were envisioned for not only the classic clinical documents like Clinic Notes and Discharge Summaries, but also for text reports such as Radiology or Pathology reports.
  - This work eventually resulted in the HL7 Clinical Document Architecture, or CDA.
- DICOM and HL7 working groups recognized the need to work together to define standard methods for reporting that meet the needs of practice in today's environment.
- As a result of this collaboration and some overlap of participants, DICOM SR and HL7 CDA are congruent in key areas, such as document identification, versioning and type code, as well as in the document's relation to the patient and to the authoring physicians.

DICOM Interest in CDA

- In the year 2000, DICOM folks were already looking to CDA as a format for exporting DICOM SR content.
  - The idea was to translate SR documents into CDA, something that would have to wait (a long time) for Release 2 of CDA, which adds the capability for representation of structured data in the document body.
- March 2003: Working Group 10 suggested skipping the DICOM SR reporting step altogether, and composing the reports directly in CDA format.
- Use cases for varying types and purposes of diagnostic reporting elaborated at this conference two years ago.
- Standards solutions were considered against these use cases, and gaps were identified and subsequently closed through extensions to the standards.
- The efforts have included
  - discussions in many working groups of DICOM
  - the issuance of DICOM Supplement 101 (HL7 Structured Document Object References), plus
  - continued cooperation with the HL7 Structured Document Technical Committee, which edits the CDA.

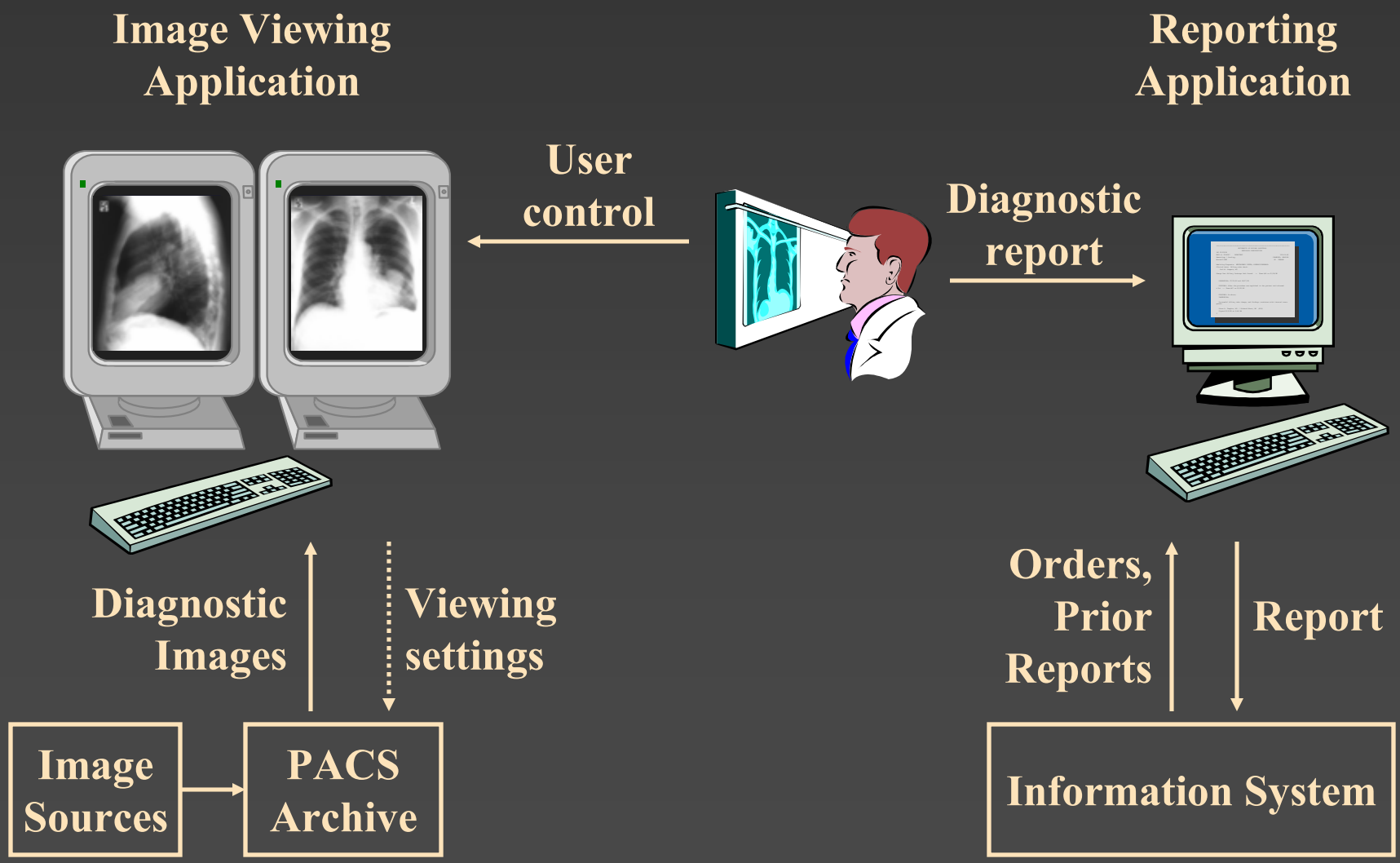
“Evidence” and “Reports”

- Evidence Documents
  - include ultrasound measurements, cath lab structured reports, Computer-Aided Diagnosis results, etc., that are created in the imaging systems context.
  - together with images, are part of the information that a radiologist uses to produce a report. The reporting physician may quote or copy parts of Evidence Documents into the report, but doing so is part of the interpretation process at the reporting physician’s discretion.
  - stored with the images, and DICOM SR clearly being the correct format.
- Reports
  - become part of the patient’s medical record, for which the HL7 CDA was considered ideal. The structured data entry capabilities needed for diagnostic reporting would be available only in CDA Release 2.

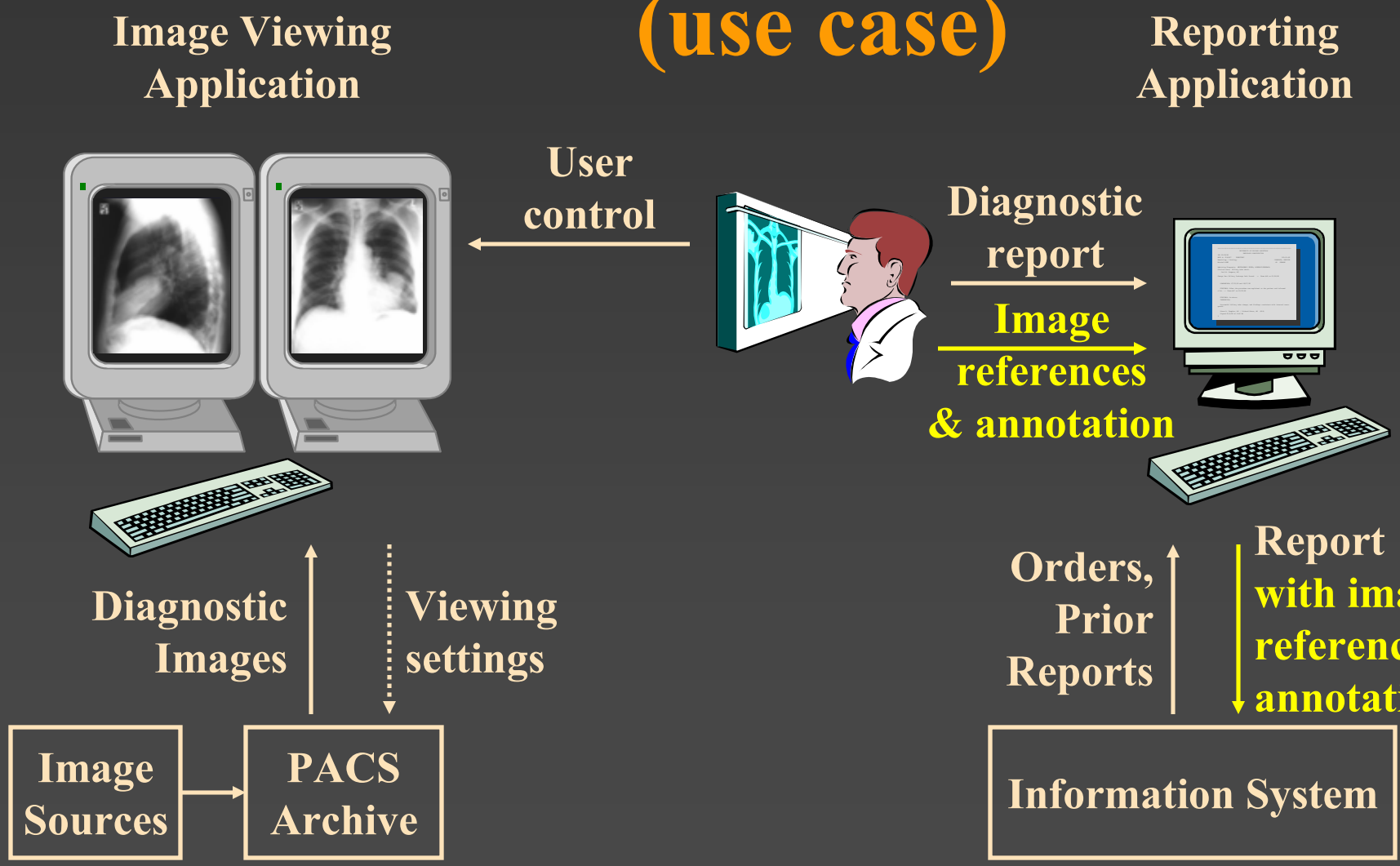
Standards Now Ready

- CDA Release 2 is now published in 2005, and all needed standards are now in place.
- Additions to DICOM in Supplement 101
  - allow inclusion of CDA reports on DICOM removable disks, and
  - define communication of simple image references and annotation from PACS to reporting systems without requiring close integration of the two systems.
- Thus, standards now available support practical and complementary roles of DICOM and HL7 standards at the reporting interface.

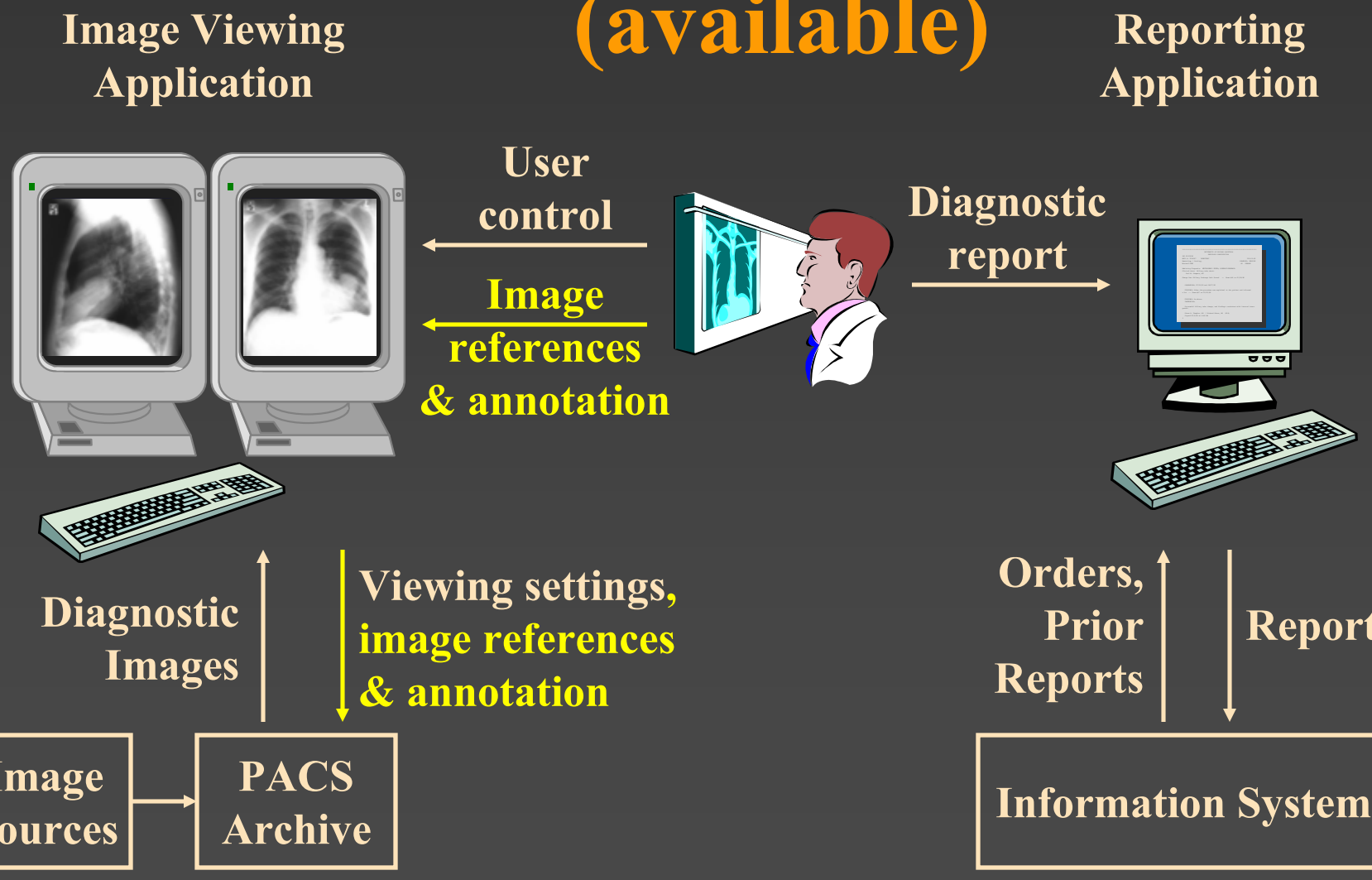
Diagnostic reporting



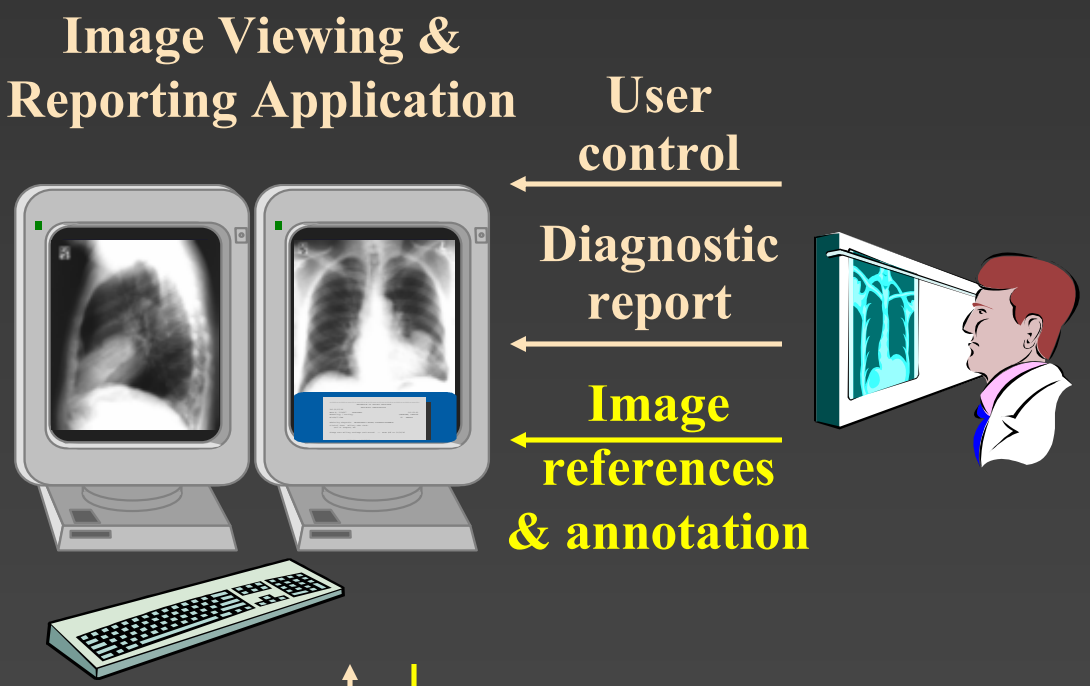
Reporting with annotation (use case)



Reporting with annotation (available)



Integrated solution



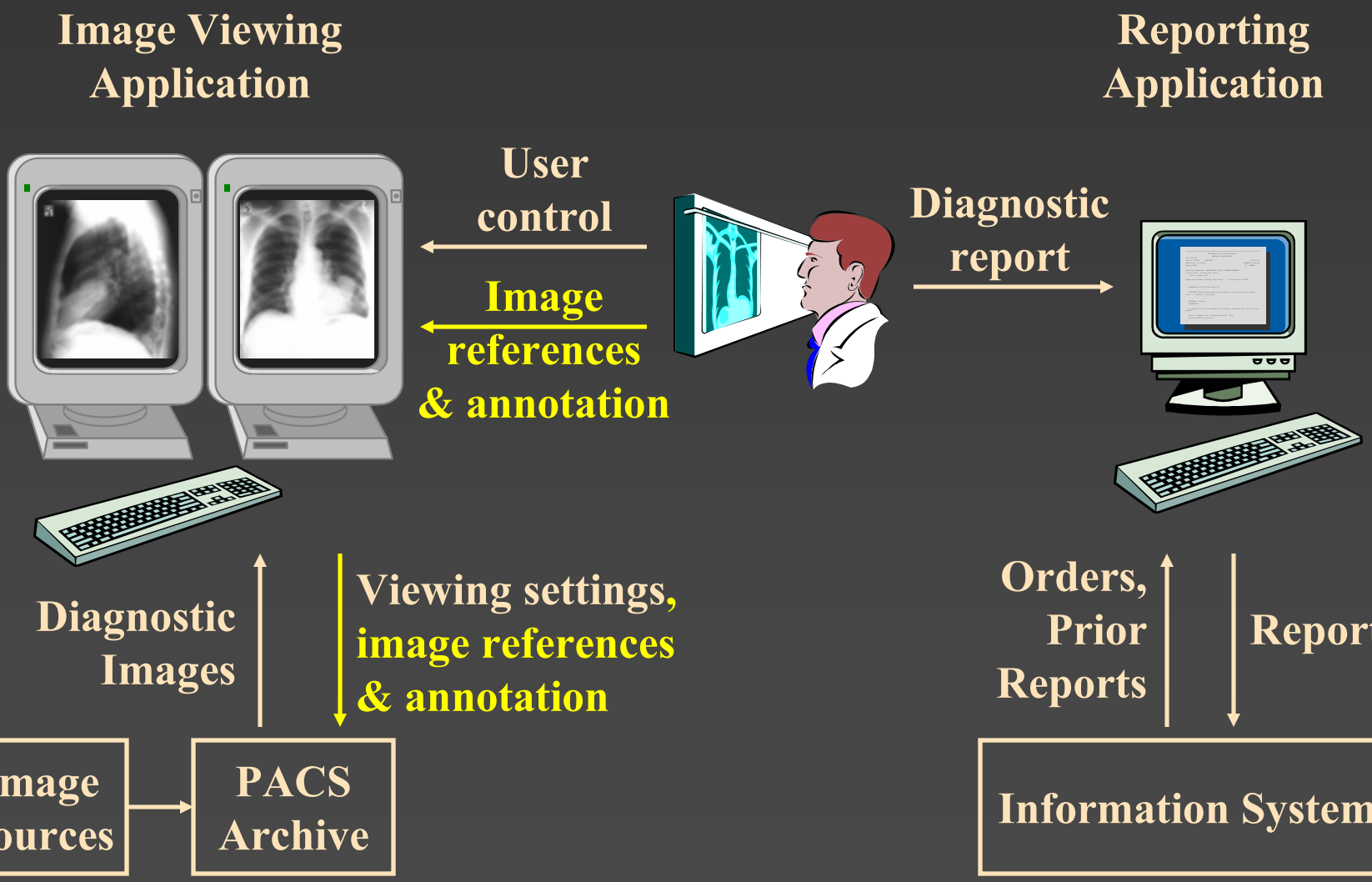
Orders,
Diagnostic images
& Prior reports

Viewing settings,
Reports, image
references & annotation

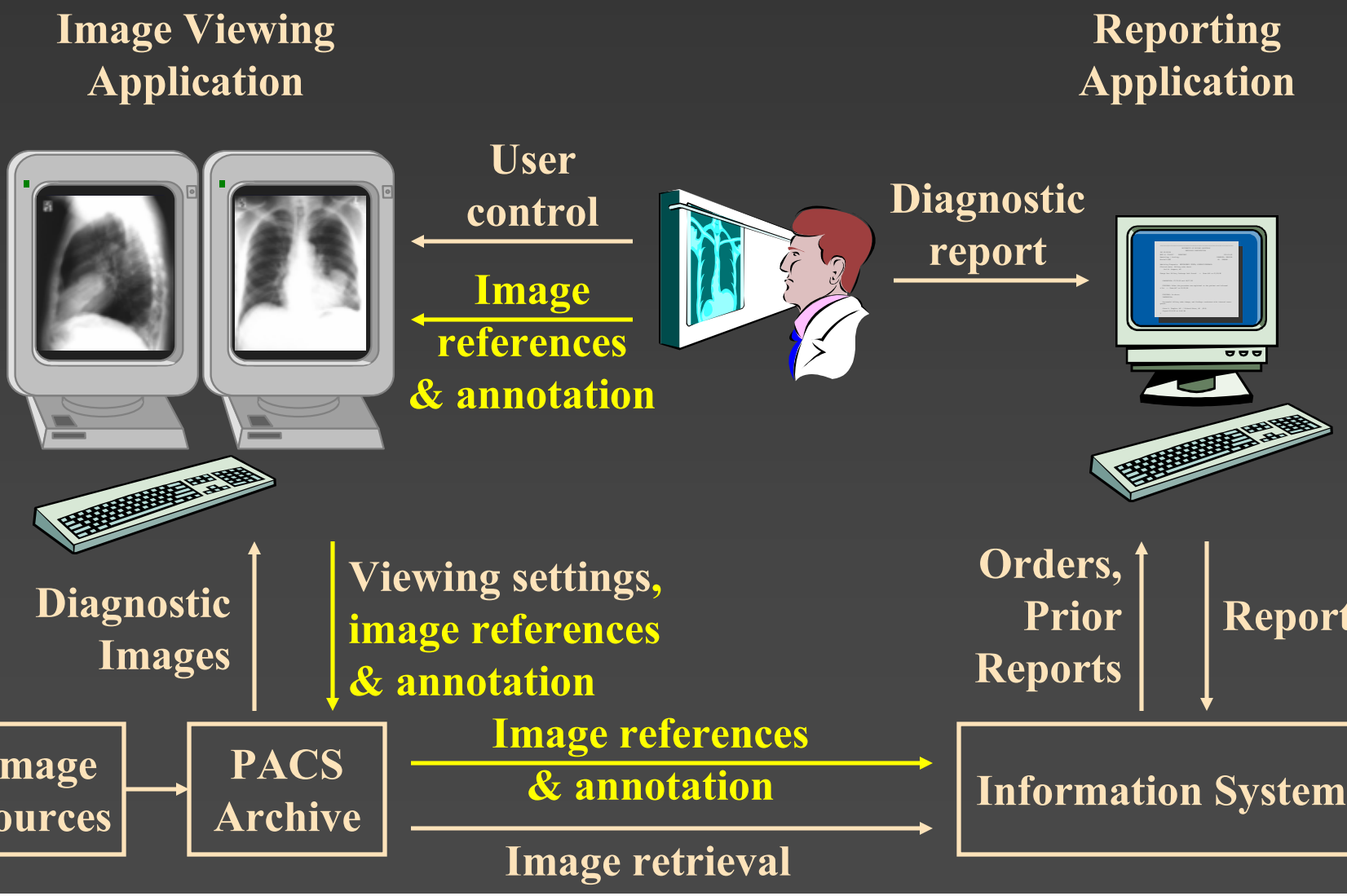
Image
Sources

Integrated PACS &
Information System

Loosely integrated reporting



Loosely integrated reporting



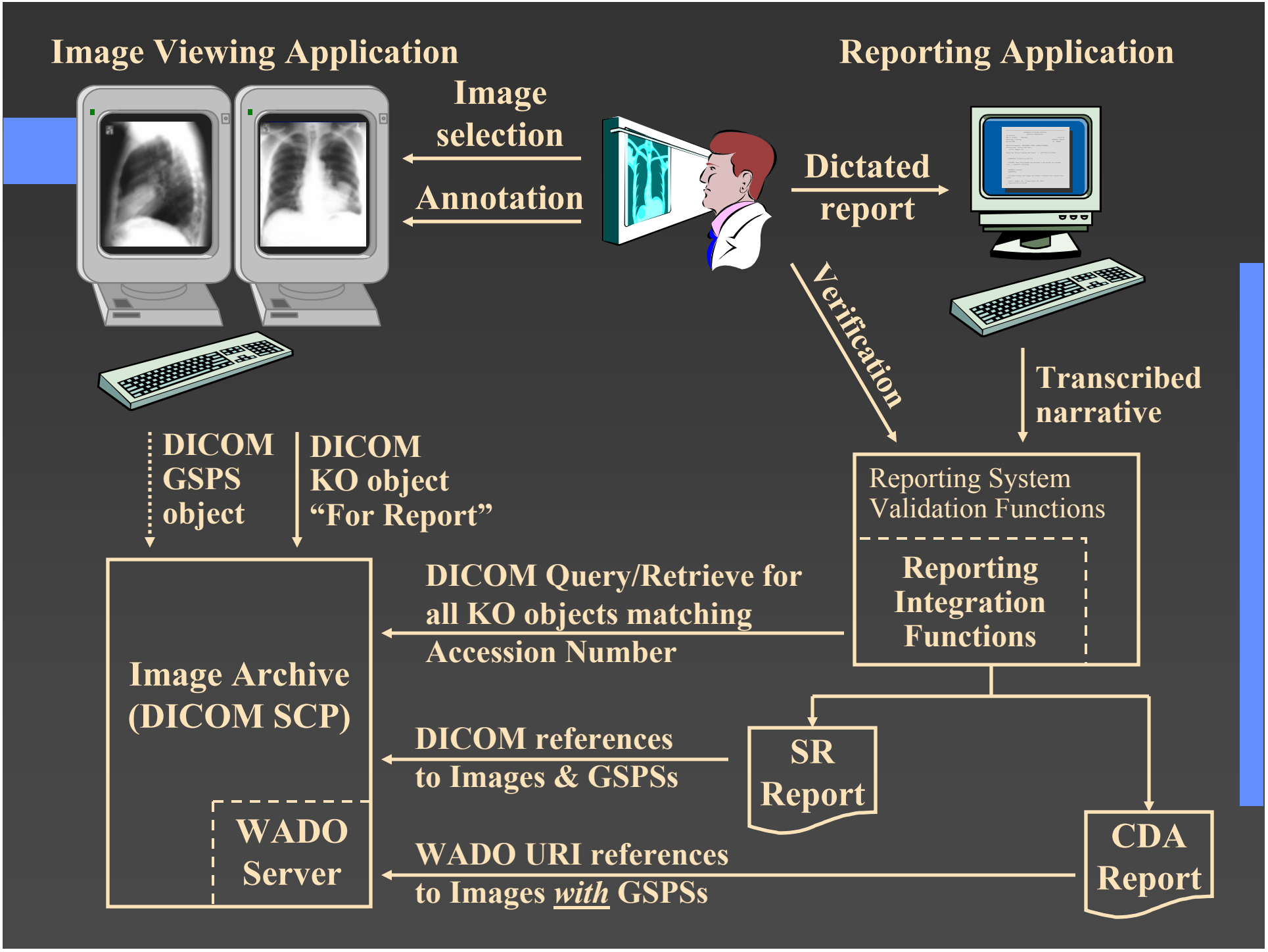


Image Viewing Application
Reporting Application
Image selection
Annotation
Dictated report
Verification
Transcribed narrative
DICOM GSPS object
DICOM KO object "For Report"
Reporting System Validation Functions
Reporting Integration Functions
DICOM Query/Retrieve for all KO objects matching Accession Number
Image Archive (DICOM SCP)
DICOM references to Images & GSPSs
SR Report
WADO Server
WADO URI references to Images with GSPSs
CDA Report

Also in Supplement 101

- CDA documents can be referenced from within DICOM objects
- CDA documents can be indexed in DICOMDIR on DICOM storage media
  - You can put a collection of images and/or HL7 documents on DICOM portable media

CDA Implementation Guides

- Balloted as HL7 Informative Documents
- Describe what amount to “templates” for CDA Documents.
  - Specify constraints on CDA content
  - Provide Schematron validation of instances
  - Each Implementation Guide has a Template ID attribute that is included in the root element of the conforming document
- Care Record Summary IG being balloted
- WG20/IISIG is preparing an IG for Diagnostic Imaging Reports

Conclusions

- CDA now being seen as primary format for diagnostic reports
  - Supp 101's definition of SR report and its equivalent CDA is most practical at this time, though the CDA structure is not normative text in DICOM
  - Direct definition of CDA report to be done in 2006 by a balloted HL7 Implementation Guide
  - Does not require tight integration of imaging and reporting workstations
  - Method is extensible to reports with more structure
- DICOM SR will see continued and expanding use for Evidence Documents created in the imaging exam setting.