INTEGRATING THE HEALTHCARE ENTERPISE

Overview

Luxemburg – eHealth Project

Charles Parisot, *IHE-Europe Steering Committee & International Board member, GE healthcare*

10 years of eHealth experience:

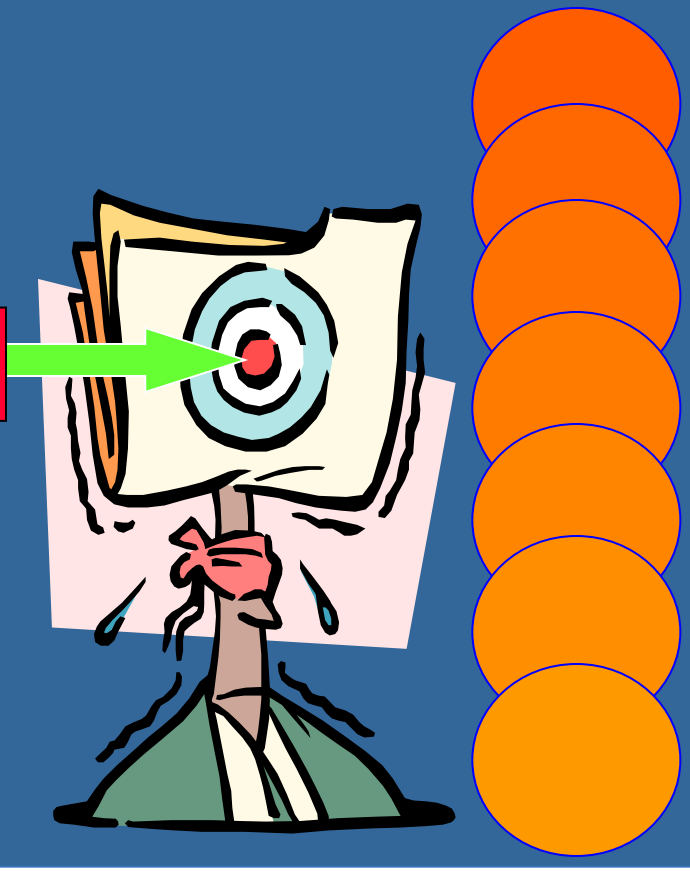
“Interoperability” now recognized as one of the major challenge:

How should we address it ?

Interoperability:
Major Cause of Health IT project failures

Base Standards

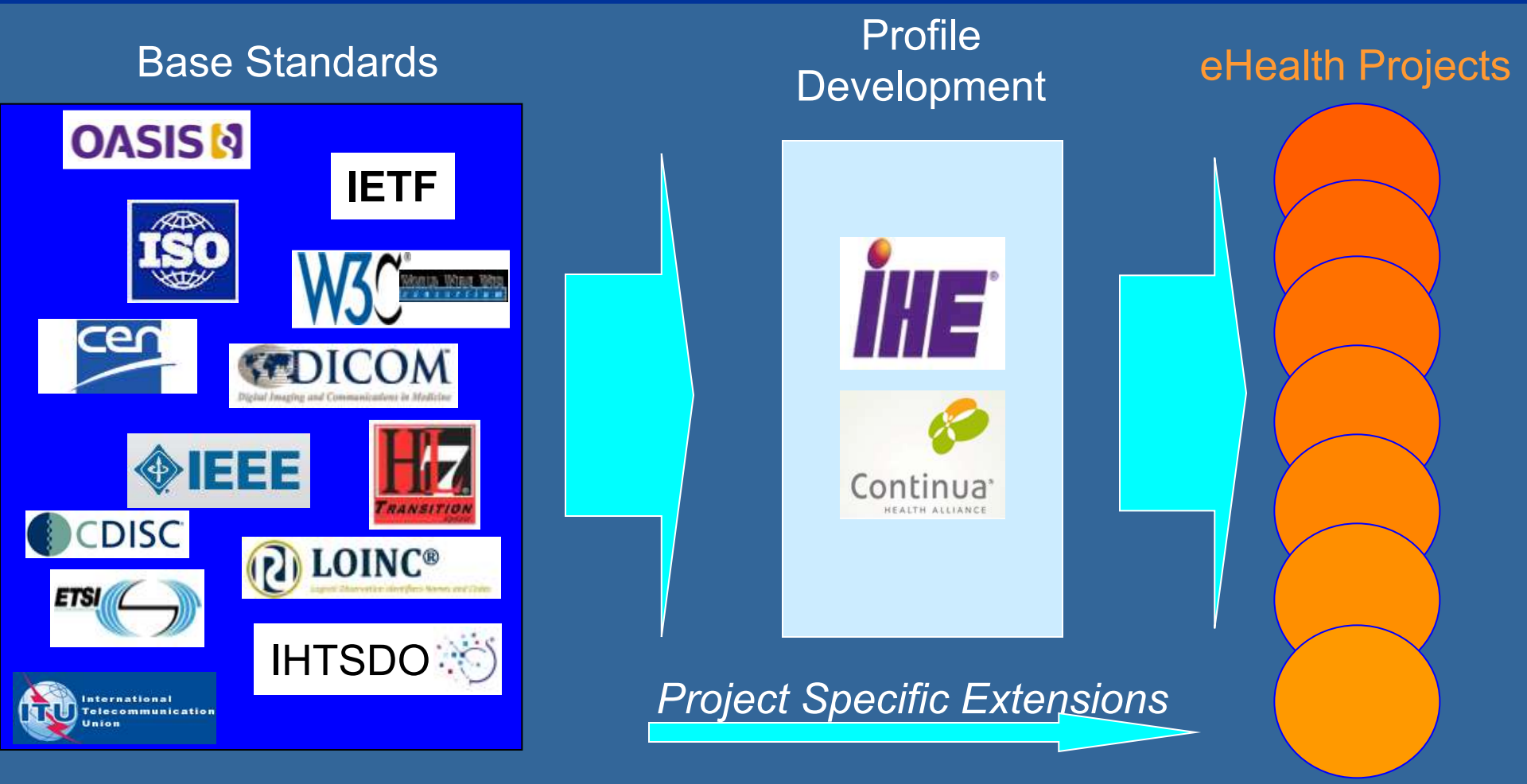
eHealth Projects



Health Interop. Standards: Ignore & Face Consequences

eHealth and Interoperability: How should we act ?

Interoperability: From a problem to a solution



Profiling Organizations Have Emerged

Standards: Necessary…Not Sufficient

- **Standards are**
  - Foundational - to interoperability and communications
  - Broad - varying interpretations and implementations
  - Narrow - may not consider relationships between standards domains
  - Plentiful - often redundant or disjointed
  - Focused - standards implementation guides focus only on a single standard

IHE provides a standard process for implementing multiple standards

IHE: Connecting Standards to Care

- **Healthcare professionals work with industry**
- **Coordinate implementation of standards to meet clinical and administrative needs**
  - Clinicians and HIT professionals identify the key interoperability problems they face
  - Providers and industry work together to develop and make available standards-based solutions
  - Implementers follow common guidelines in purchasing and integrating effective systems

IHE: A forum for agreeing on how to implement standards and processes for making it happen

IHE: A Framework for Interoperability

- A common framework for harmonizing and implementing multiple standards
  - Application-to-application
  - System-to-system
  - Setting-to-setting
- Enables seamless health information movement within and between enterprises, regions, nations
- Promotes unbiased selection and coordinated use of established healthcare and IT standards to address specific clinical needs

Standards Adoption Process

Develop technical specifications

Testing at Connectathons

IHE Demonstrations

Products with IHE

Identify available standards (e.g. HL7, DICOM, IETF, OASIS)

Document Use Case Requirements

Timely access to information

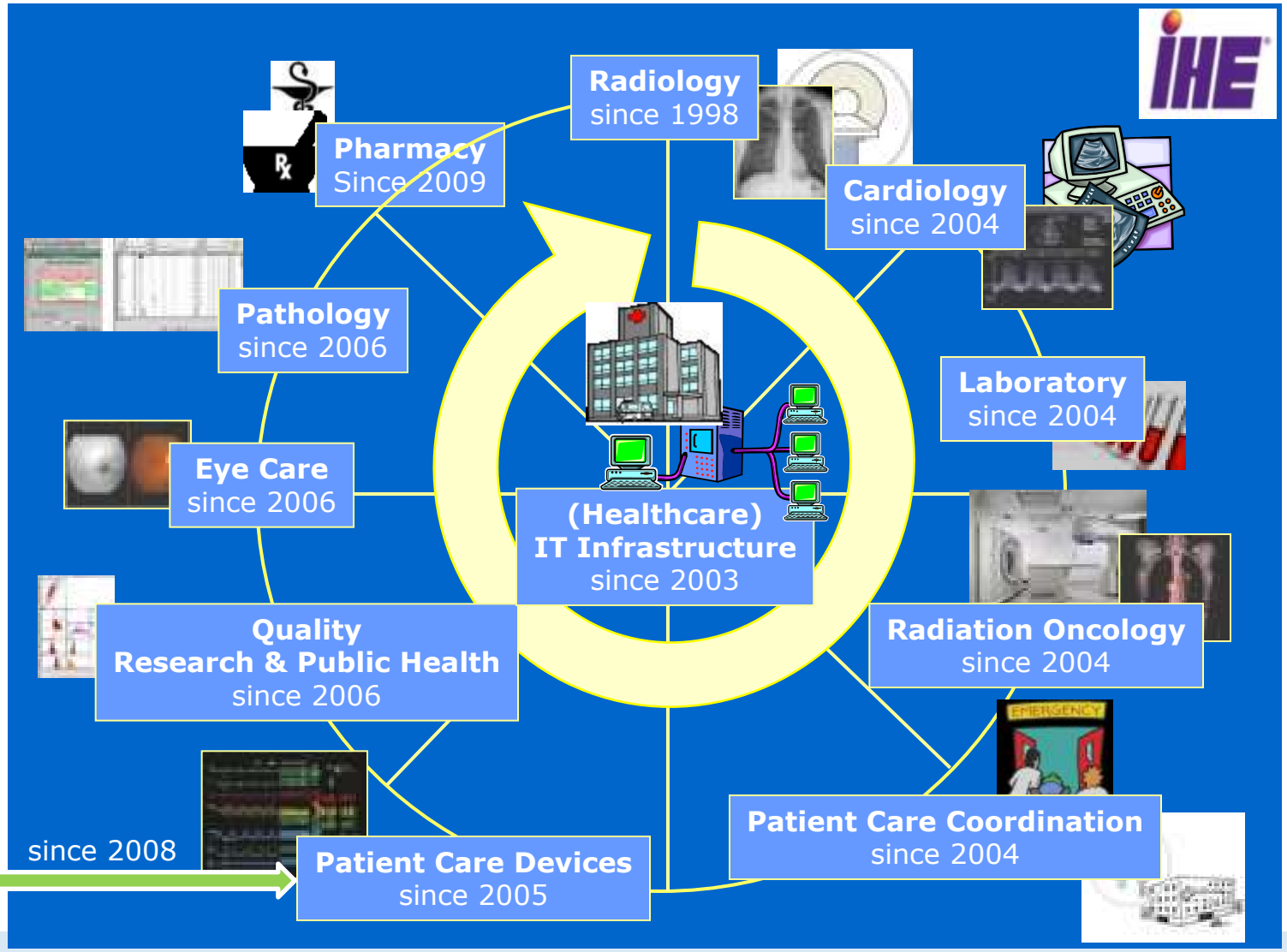
Easy to integrate products

Stakeholder Benefits

- Healthcare providers and health authorities
  - Improved workflows
  - Information whenever and wherever needed
  - Reduced implementation costs
- Vendors
  - Align product interoperability with industry consensus
  - Decreased cost and complexity of interface installation and management
  - Focus competition on functionality/service not information transport
- SDOs
  - Rapid feedback to adjust standards to real-world
  - Establishment of critical mass and widespread adoption

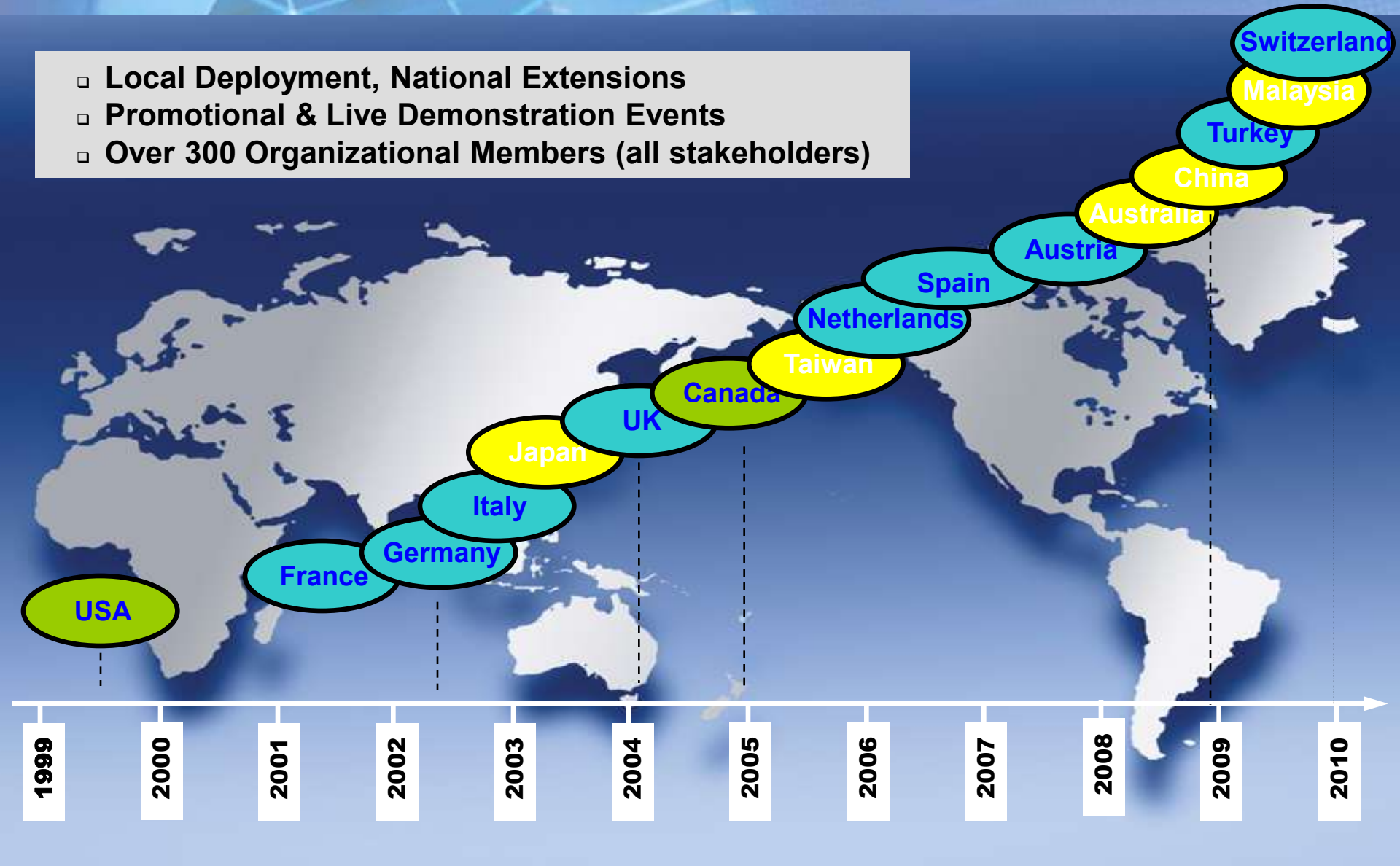
The IHE Development Domains

12 Years of Steady Evolution 1998 – 2010



International Growth of IHE

- Local Deployment, National Extensions
- Promotional & Live Demonstration Events
- Over 300 Organizational Members (all stakeholders)



Pragmatic global standards harmonization + best practices sharing

Interoperability Testing Needs an Ecosystem

Develop technical specifications

Testing at Connectathons

IHE Demonstrations

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IHE Connectathon

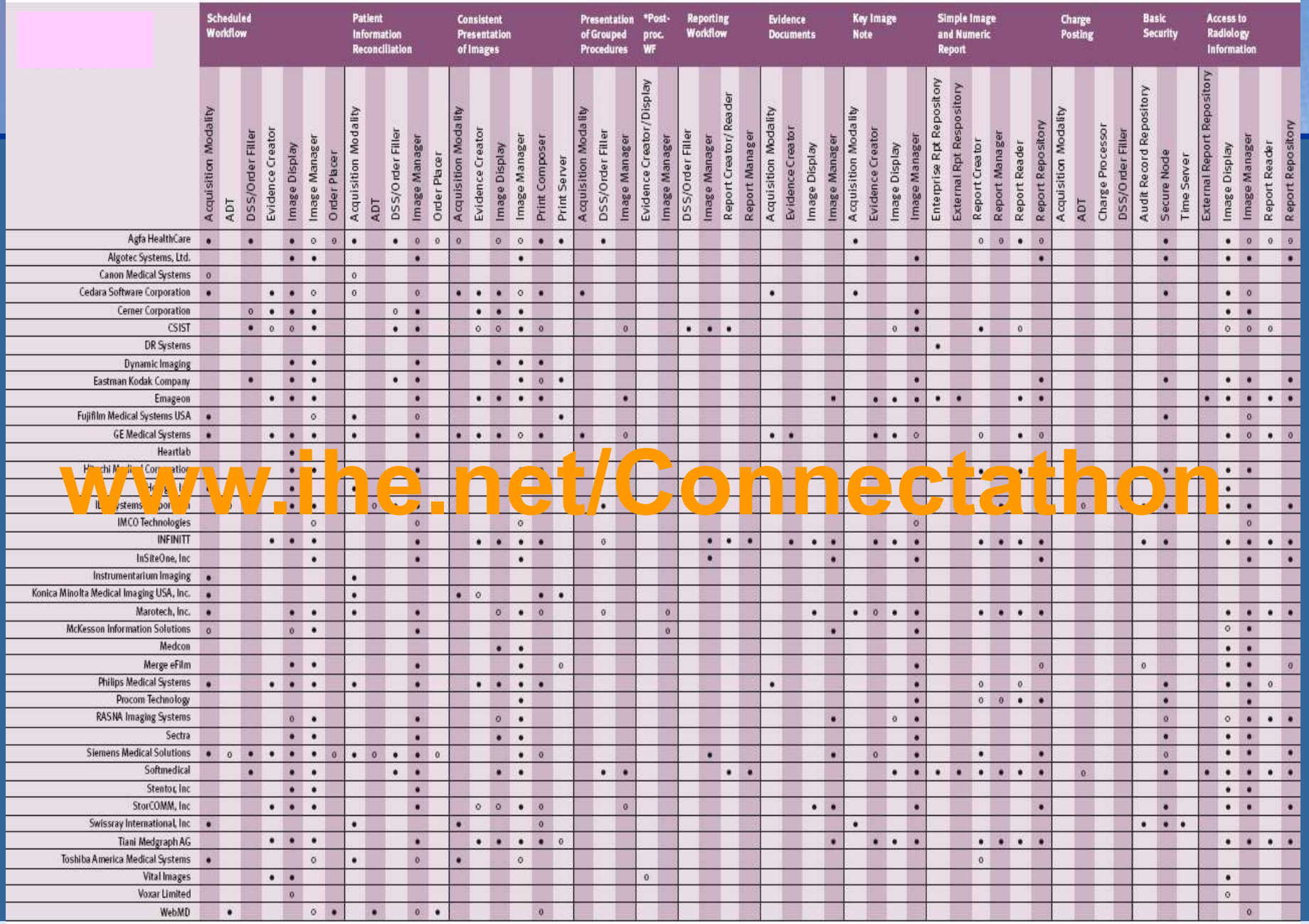
- Open invitation to vendor and other implementers community
- Advanced testing tools (GAZELLE)
- Testing organized and supervised by project management team
- Thousands of cross-vendor tests performed
- Results recorded and published

IHE Connectathons

Massive yearly events :
70-80 vendors

Next Connectathon:
Chicago, USA, January 17-21, 2011
Pisa, ITALY, April 11-15, 2011

Vendors do not pass…
until an IHE Project Manager attest it !



www.ihe.net/Connectathon

• = Results obtained at IHE Radiology North America 2003 Connectathon o = Previous Connetathon results * = Post processing Work Flow

HIMSS Interoperability Showcase

Example: 2010 HIMSS Interoperability Showcase

IHE International Membership

- 370 Member Organizations world-wide
- Effective multi-stakeholder, multi-country balance

  www.ihe.net/governance/member_organizations.cfm

- You may join today !
- Even better, organize an IHE initiative in your country and join IHE International !

IHE Organizational Structure

IHE International Board

Regional Profile Deployment

IHE North America

- Canada
- USA

IHE Asia-Oceania

- China
- Japan
- Korea
- Taiwan

IHE Europe

- Austria
- France
- Germany
- Netherlands
- Italy
- Switzerland
- Spain
- Turkey
- UK

Global Profile Development

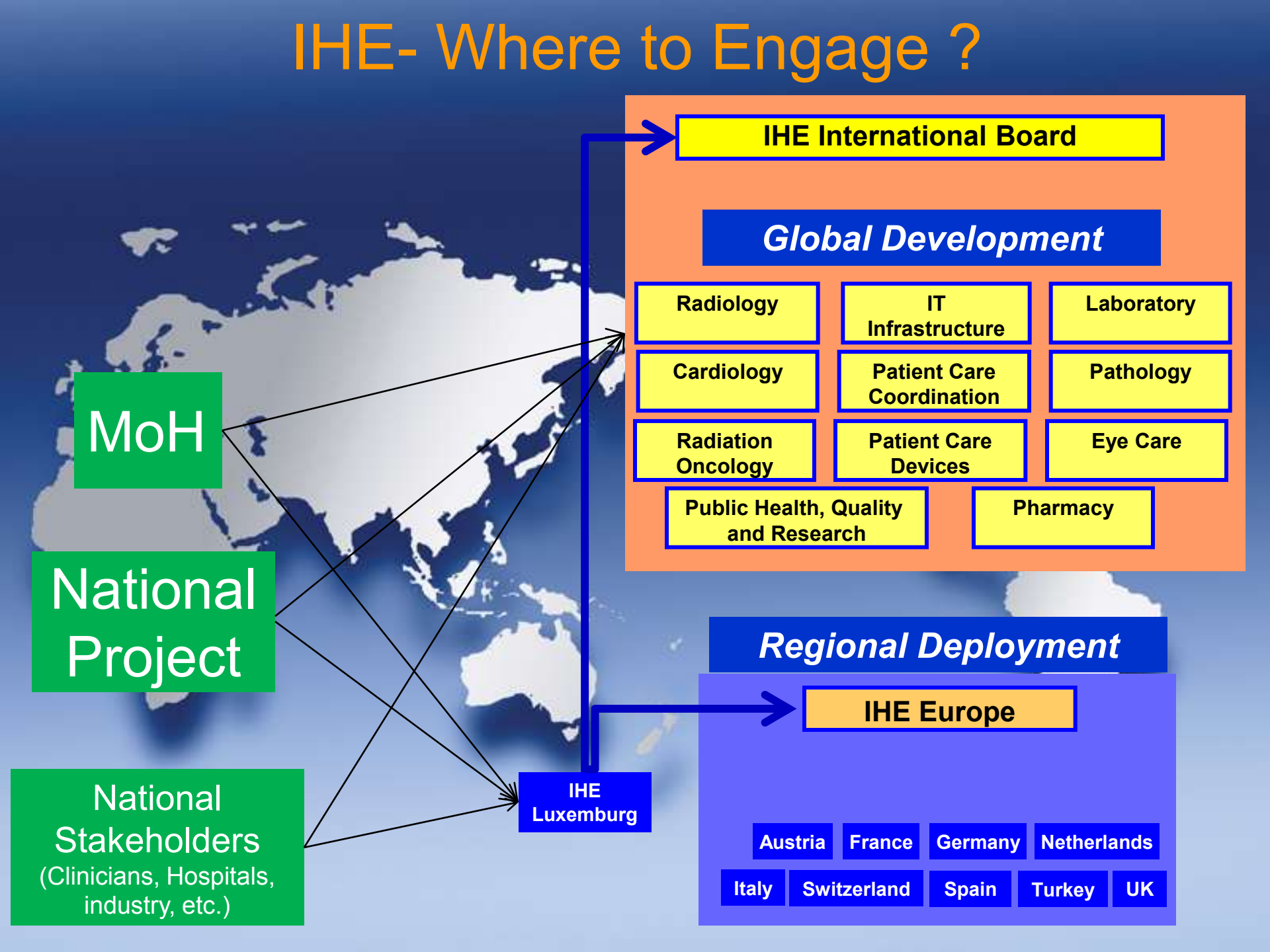
- Radiology
- IT Infrastructure
- Laboratory
- Cardiology
- Patient Care Coordination
- Pathology
- Radiation Oncology
- Patient Care Devices
- Eye Care
- Public Health, Quality and Research
- Pharmacy

Professional Societies / Sponsors/ Health Authorities

ACC	ACP	RSNA	COCIR	SIRM	ESC	JAHIS	METI-MLHW
ACCE	ASIP	SFR	EAR-ECR	BIR	EuroRec	JIRA	MEDIS-DC
ACEP	HIMSS	SFIL	DRG	NICTIZ	ELGA	JRS	JAMI

Contributing & Participating Vendors

IHE- Where to Engage ?



Interoperability: From a problem to a policy

Base Standards

Profile Development & Testing

IHE

Continua HEALTH ALLIANCE

Recognized:
Profile A
Profile B
Profile C
…..

Simple and Effective Profile Recognition Process & Policy

eHealth Projects

Interoperability Specifications

Leverage Synergies of Global Standards and Profiles

Countries/Regions with such a process:

- Austria (ELGA)
- France (ASIP)
- USA (HITSP)
- Italy (Veneto)
- China (MoH)
- Switzerland (ehealth suisse)
- Canada (Infoway)

eHealth and Interoperability: What to do with IHE Profiles ?

What is IHE, how much adopted ?

- **ISO Health Informatics: TR28380 Global Standards Adoption – IHE Process and Profiles**
- **Home Health: CONTINUA and IHE work together. Partners in EU Project Smart Personal Health**
- **Widespread adoption of IHE Profiles by National and Regional Projects around the world: USA, Europe, Asia**
  - US National Health Information Network (NHIN) leverages IHE profiles (XCA, XDR, XCPD, BPPC, ATNA)
  - 12 Country European epSOS Project: IHE-Europe hosting Industry Team, support project interoperability conformance testing (XCA, XCPD, ATNA, XUA, BPPC, CDA Content Modules from PCC).
  - In use in several national and regional projects (Austria, France, South Africa, Italy, Netherlands, USA, Japan, Switzerland, Canada)
  - EU Commission eHealth Interop Mandate 403 leverages IHE process
  - European HITCH project to roadmap conformance testing and certification leverages the IHE testing experience

Use of IHE profiles in eHealth project

Key health systems objectives

Use cases

IHE profiles

Standards

HL7 Transition · ISO · DICOM · LOINC® · OASIS · IHTSDO

Profiles for Use Case A

Content & Terms

- Patient summary
- Lab Report
- Imaging Info Exchange
- ECG Report
- . . .

Services

- Patient Demographics
- X Document sharing
- Health Provider Directory
- . . .

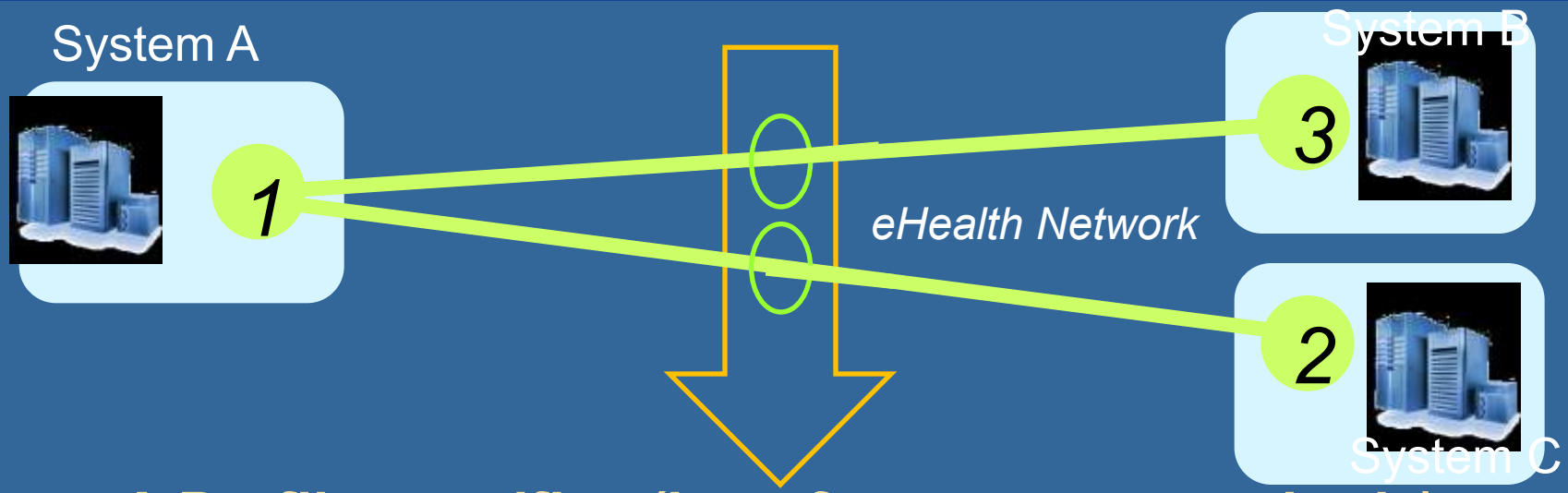
Security and Privacy

- Consent management
- Audit Trail
- . . .

Interop-erability Tests

IHE Connect-athon

Interoperability Procurement



A Profile specifies (by references to standards) what is exchanged "on the wire" between "abstract systems" called actors (e.g. 1,2,3)

For each systems procured:

1 - *Specify the Profile/Actors to be supported (avoids pages of detailed specs)*

2 - *Ask for the IHE Integration Statement (declares Profile/Actors supported)*

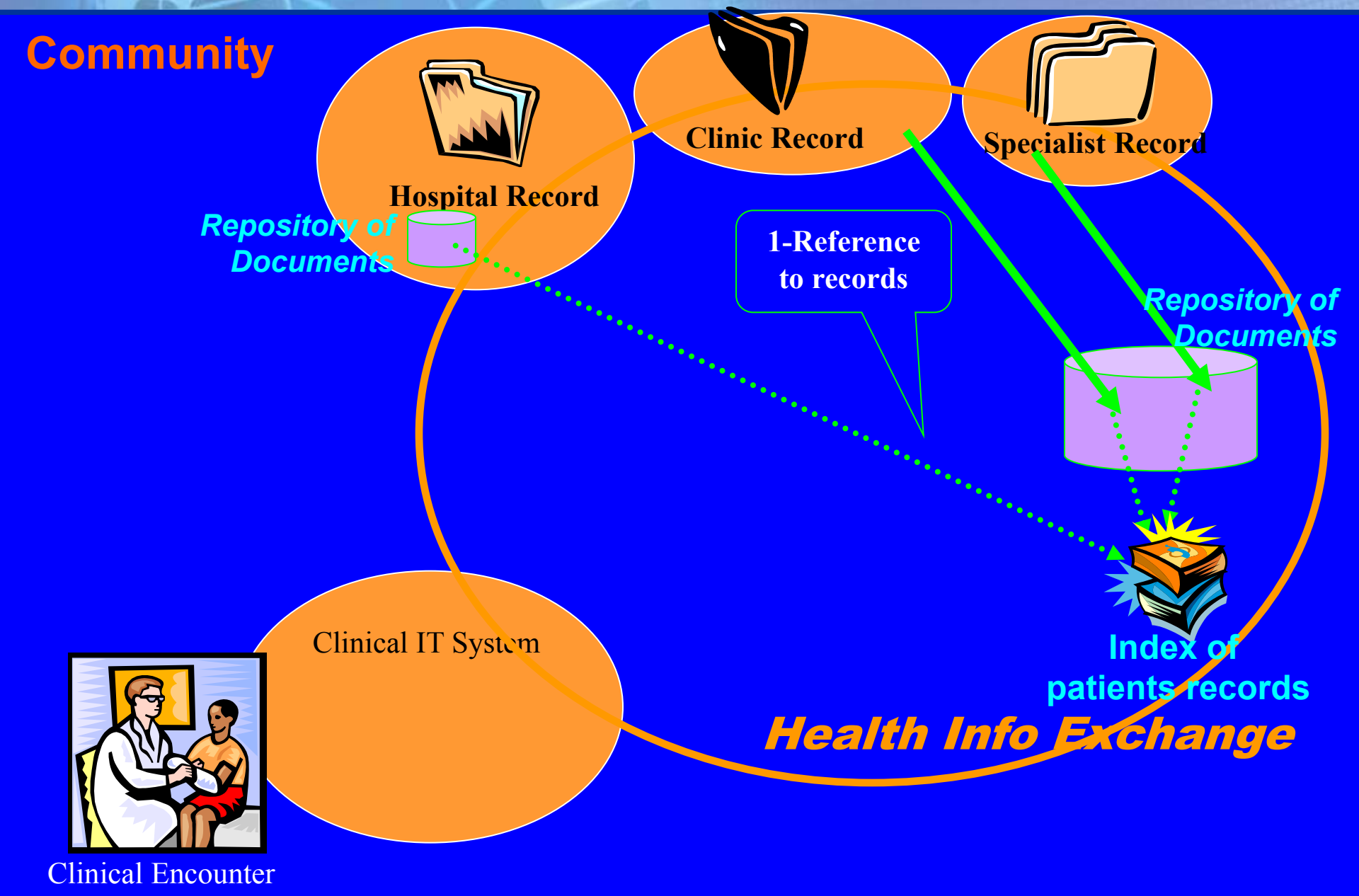
3 – *Ask for a declaration that the Actor/Profile implemented has been tested at an IHE Connectathon (check on the IHE Product Registry).*

4 – *Place contractual commitments to fix non-compliance to IHE Profile Specifications claimed*

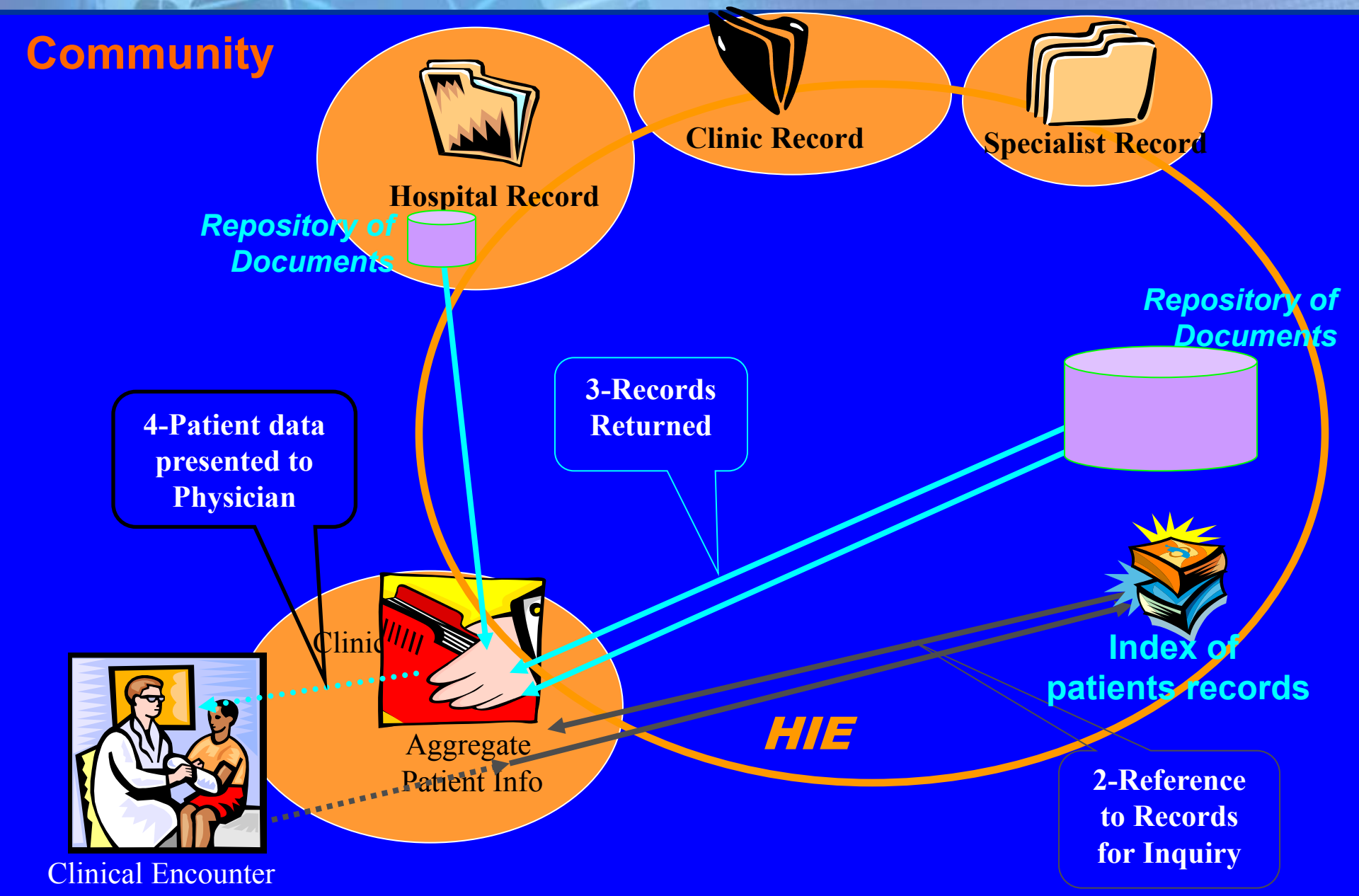
eHealth and Interoperability:

1. **Profiles for National Regional eHealth**
2. Profiles for Intra Hospital Integration
3. Profiles for Home Health

Access to Shared Health Records:IHE-XDS

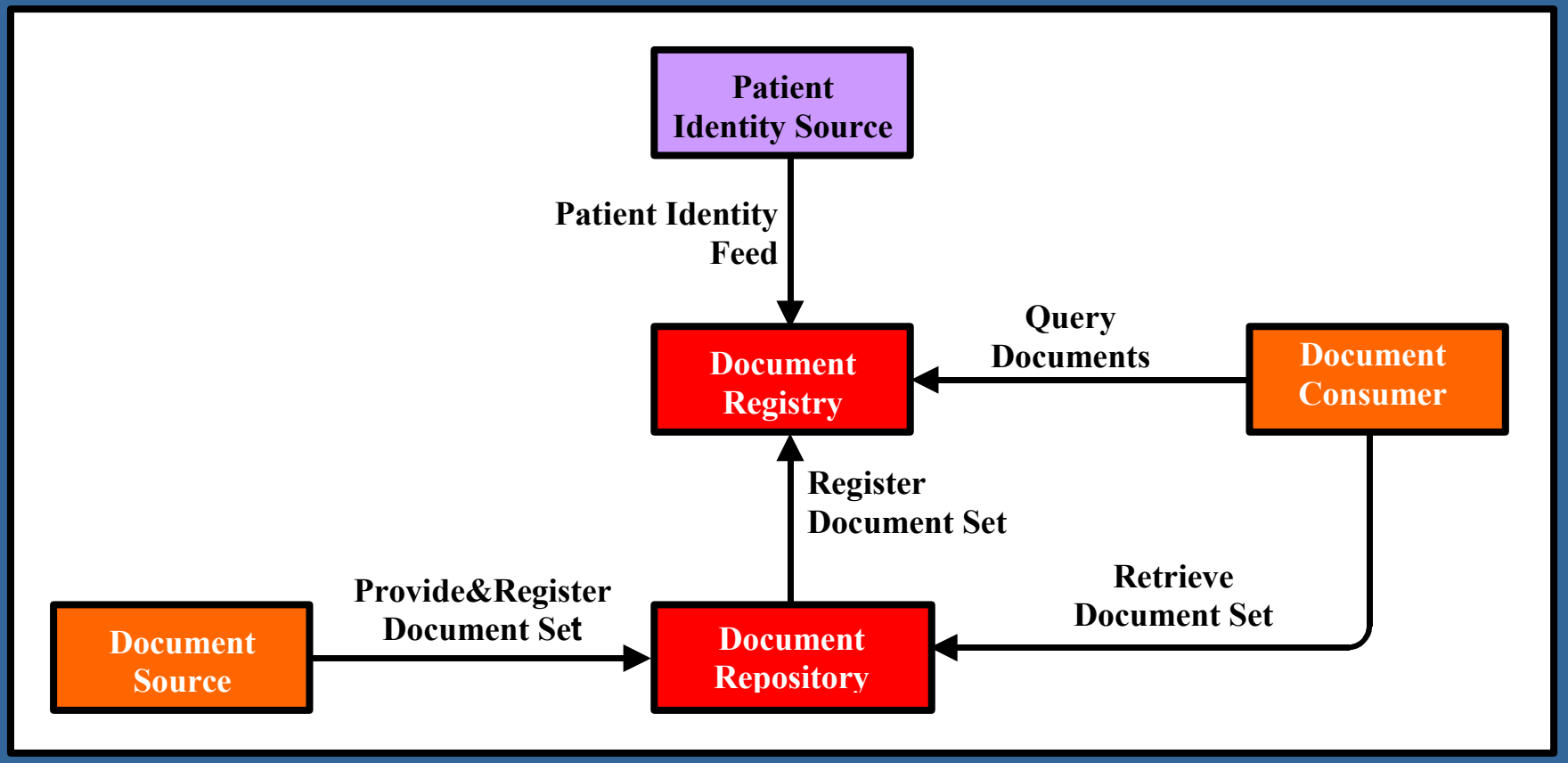


Access to Shared Records : IHE-XDS



Cross-Enterprise Document Sharing (XDS.b)

Actor/Transaction Diagram



Health Information Exchanges Interoperability: Cross-enterprise Document Sharing

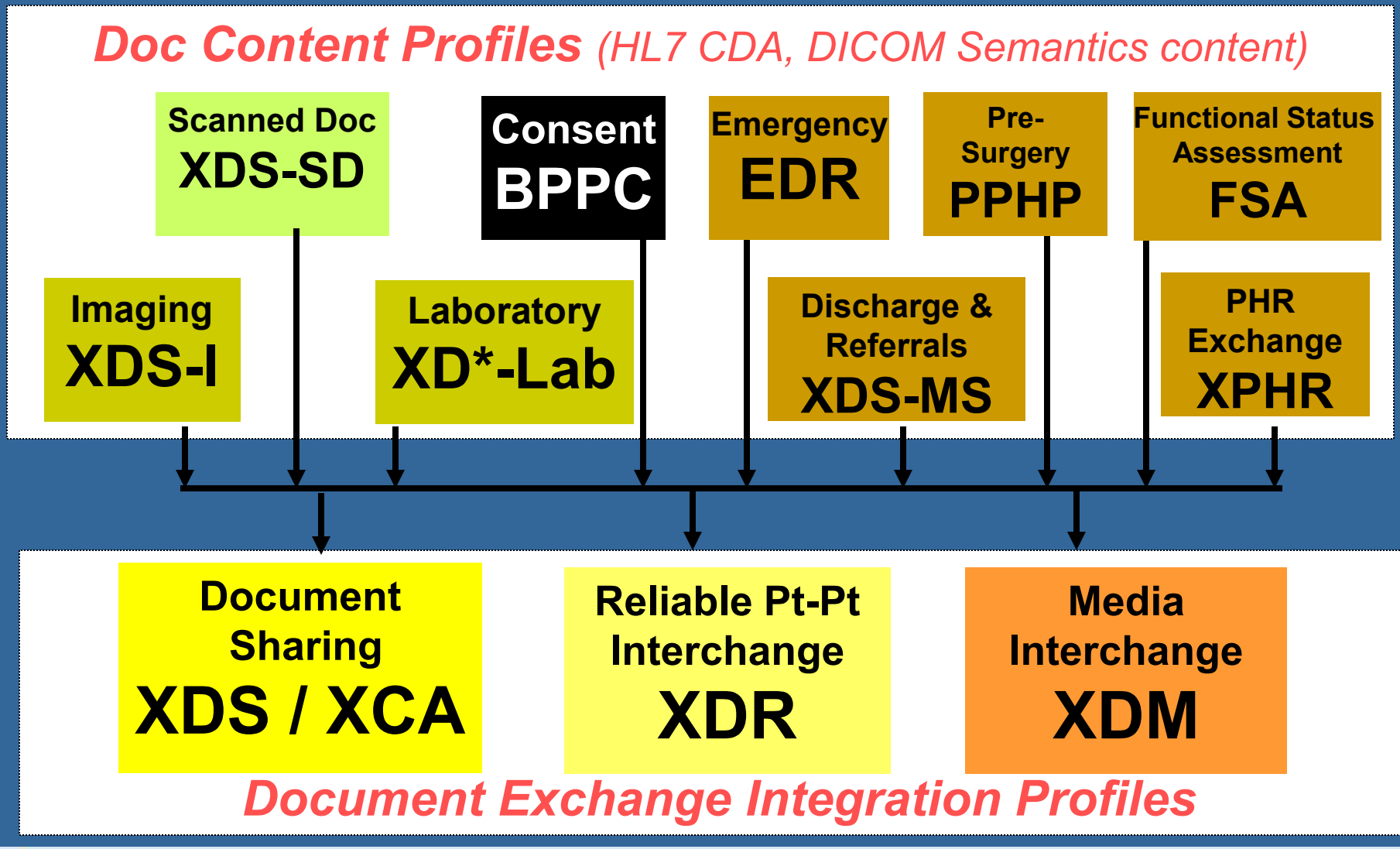
- Cross-Enterprise Document Sharing simplifies clinical data management by defining interoperable infrastructure. *Transparency = Ease of Evolution*
- Patients have guaranteed portability and providers may share information without concerns of aggregation errors. *Digital Documents = Patients and providers empowerment*
- Supports both centralized and decentralized repository architectures. Ease of federation nationally. Flexible privacy, *Flexibility of configurations*
- Addresses the need for a longitudinal healthcare data (health records). Complements to interactive workflow or dynamic access to data.

Why is IHE-XDS a breakthrough ?

- **It based on an International Standards:** Web Service/Soap/XML.
- **Sharing of digital documents as "attested by the source". A proven healthcare community data-sharing paradigm**
  Feeding a central web server is view only and hinders use of EHRs.
- **Efficient to support all types of Health IT Systems and all types of information, structured and unstructured.**
- **Meets both push communication by info sources and on-demand pull in a variety of centralized or distributed architectures.**

Offer a consistent, standards-based and functional record sharing for EHRs, PHRs & other IT Systems

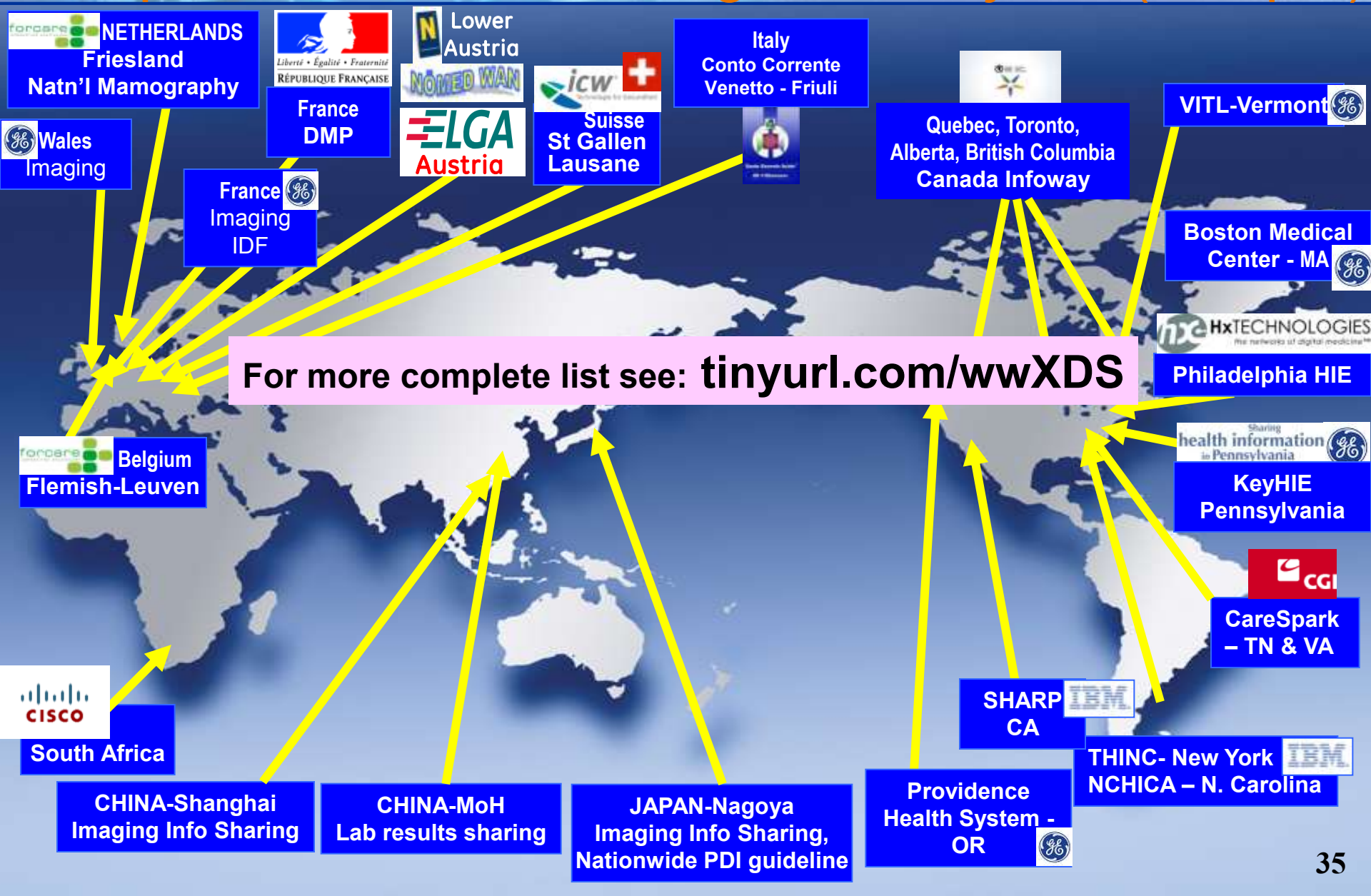
Combining IHE Profiles
Document Content & Modes of Document Exchange



How real is XDS ?

- **Stable specification, tested by 100 vendors**
- First implementation in clinical use in region of Genoa - Italy) since early 2006.
- *Several since: Three Austria regions, State of Vermont, Pensylvania, Nagoya city, South Africa region, Italian & Dutch regions, France, etc.*
- *Adopted by several national programs world-wide*
- *4 open source toolkits available, numerous product implementations in EMRs and Infrastructure offerings.*

IHE, Global Standards-Based Profiles Adopted in National & Regional Projects (sample)



Implementation Tools

Open source implementations are available for XDS, XCA, XCPD, PIX, PDQ, ATNA, CT, and more:

- **Microsoft under codeplex** http://ihe.codeplex.com/
- **NIST under Source Forge** http://sourceforge.net/projects/iheos/
- **HIE-OS under Source Forge** http://sourceforge.net/projects/hieos/
- **FHA CONNECT** http://www.connectopensource.org
- **OHT – IHE Profiles Charter** https://iheprofiles.projects.openhealthtools.org
- **OHT – Open Exchange Forge** https://openexchange.projects.openhealthtools.org
- **OHT – Model Driven Health Tools-Charter** https://mdht.projects.openhealthtools.org

XDS-MS Medical Summary or PHR Extract Exchange

Profile based on HL7 CDA Rel 2 and HL7 CCD IG

Structured and Coded Header
Patient, Author, Authenticator, Institution, Time of Service, etc.

Structured Content with coded sections:

- **Reason for Referral**
- **Vital Signs**
- **Medication**
  - Text Structure Entry
  - Coded Section Entry
- **Studies**
- **Allergies**
  - Text Structure Entry
  - Coded Section Entry
- **Social History**
- **Problems**
  - Text Structure Entry
  - Coded Section Entry
- **Care Plan**

Level 1 → **Header always structured and coded**

Level 2 → **Title-coded sections with non-structured nor coded content (text, lists, tables).**
➔ **Simple Viewing (XML Style sheet)**

Level 3 → **Med, Problems and Allergies as highly structured text.**
➔ **Text easy to import/parse**

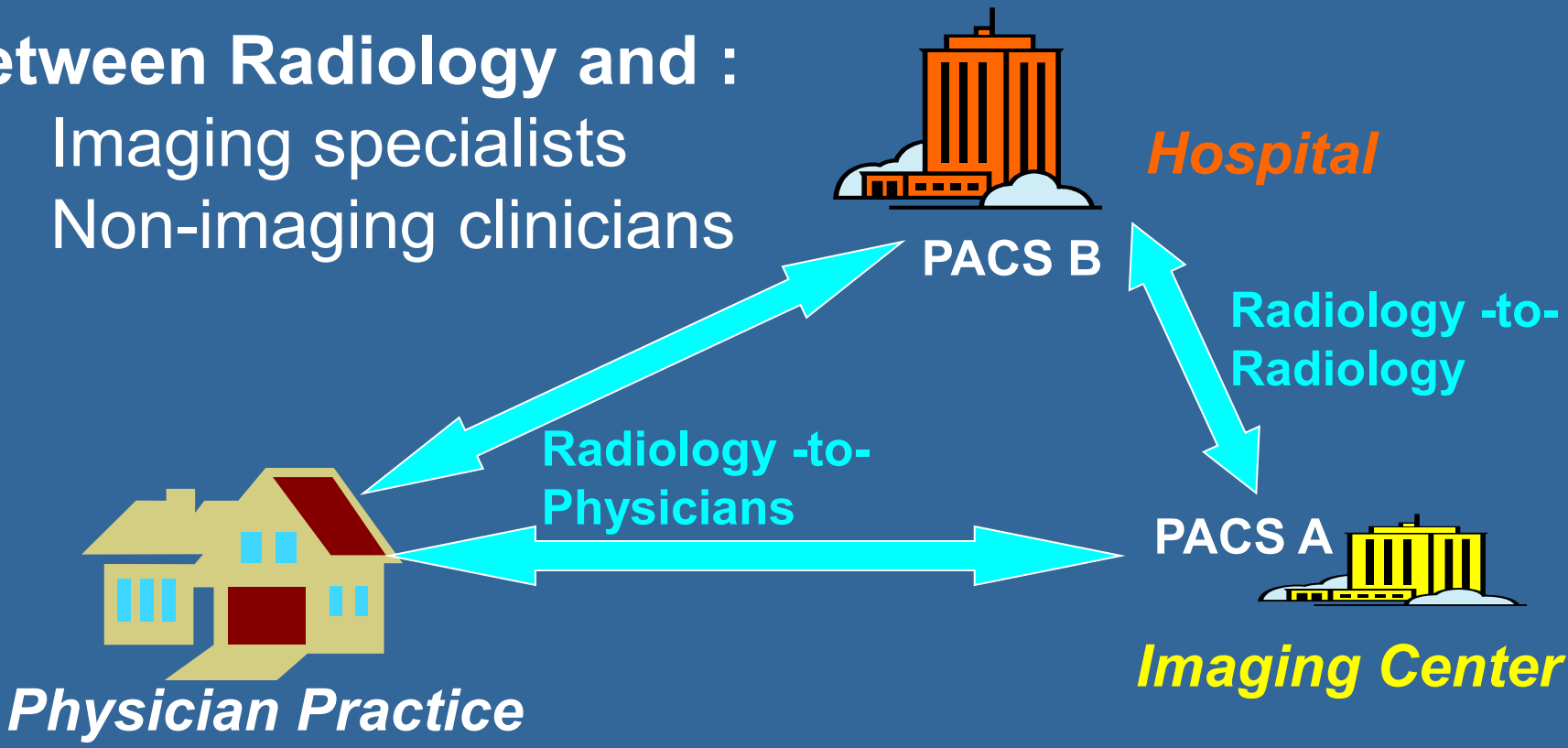
Level 3 → **Med Problems and Allergies have a fine-grain structure with optional coding. Coding Scheme explicitly identified.**

XDS-MS and XPHR enable both semantic interoperability & simple viewing !

Use of a shared XDS infrastructure to access Radiology Reports and Images (XDS-I)

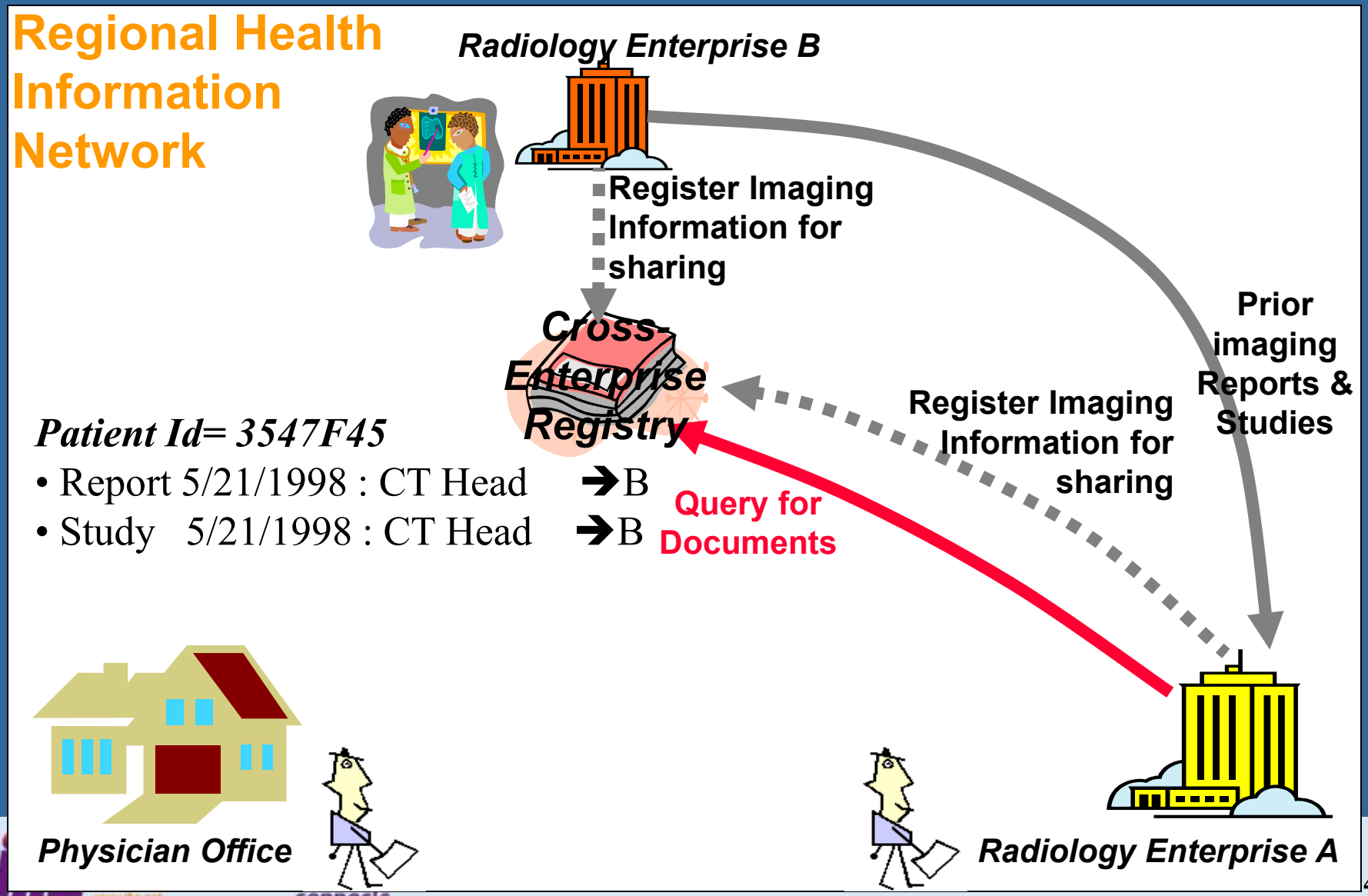
Between Radiology and :

- Imaging specialists
- Non-imaging clinicians

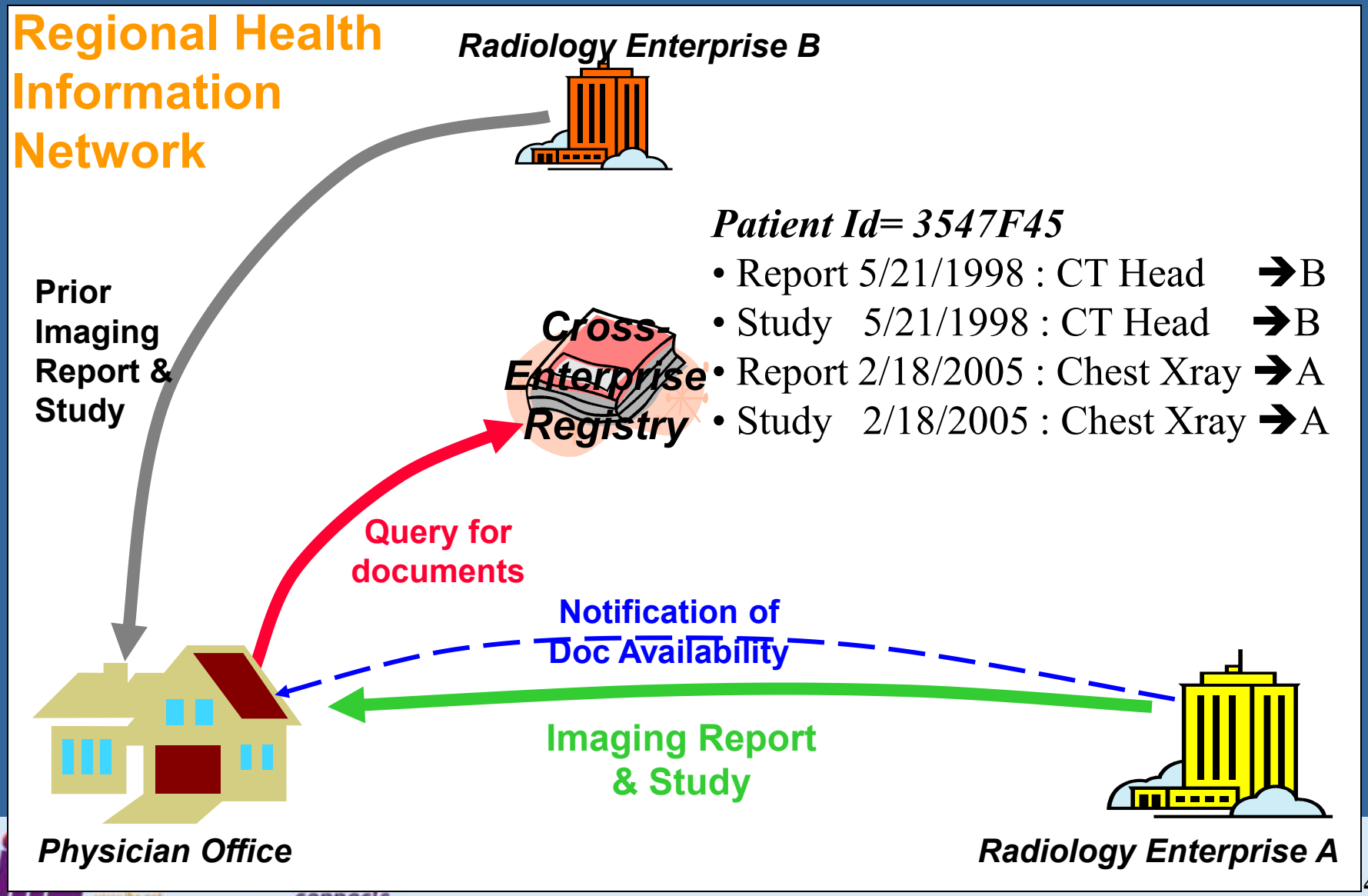


Same XDS Infrastructure (Registry and Repositories) for medical summaries and imaging information !

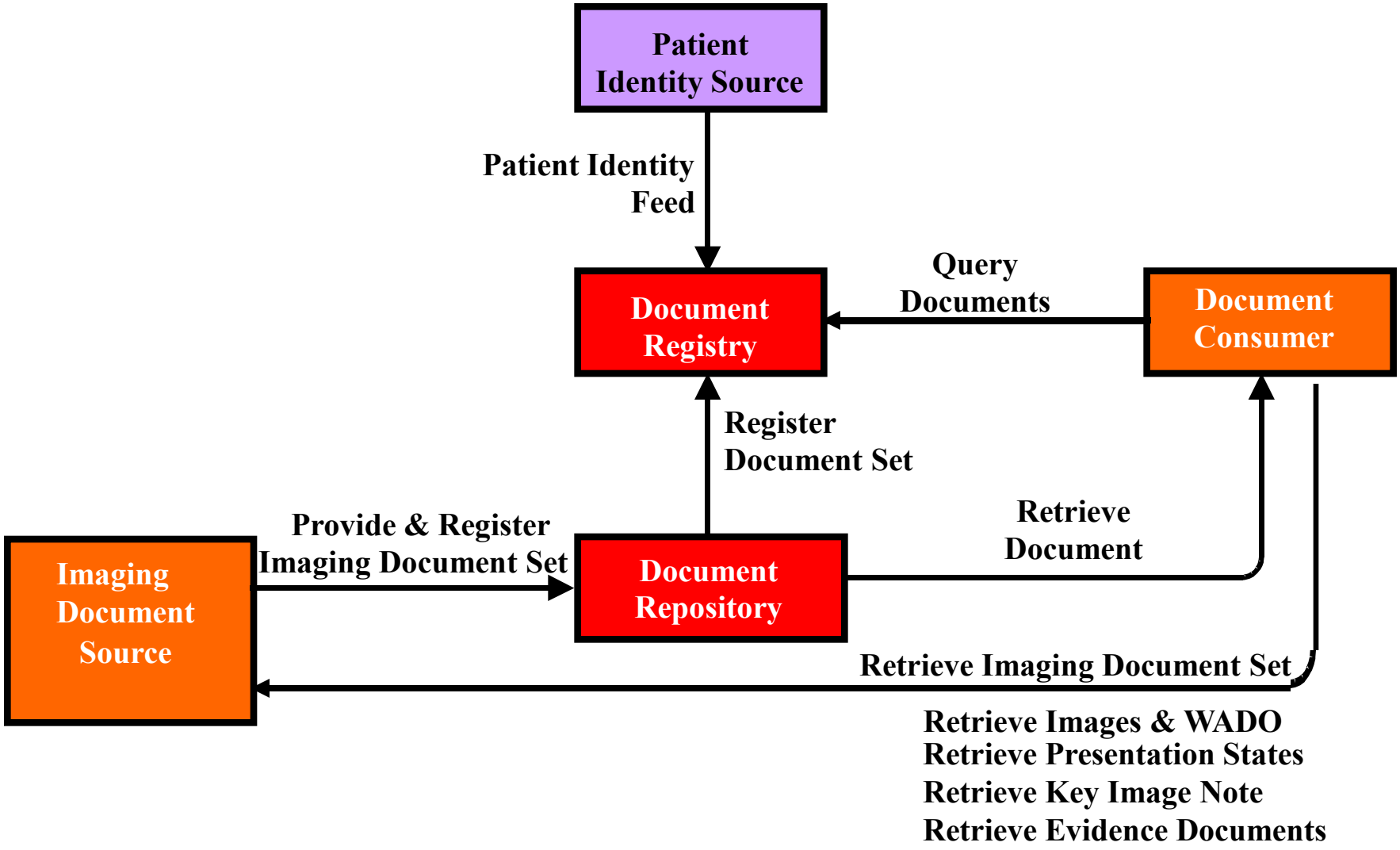
Physicians and Systems within a Regional Health Network - Routine Imaging Referral



Physicians and Systems within a Regional Health Network for a Routine Imaging Referral



XDS-I.b Actors and Transactions



XDS-I Options

- **Document Source must support at least one of the following options:**
  - Extensive Set of DICOM Instances
  - PDF Report
  - Text Report
  - Multipart Text/PDF Report

Providers and Vendors

Working Together to Deliver

Interoperable Health Information Systems

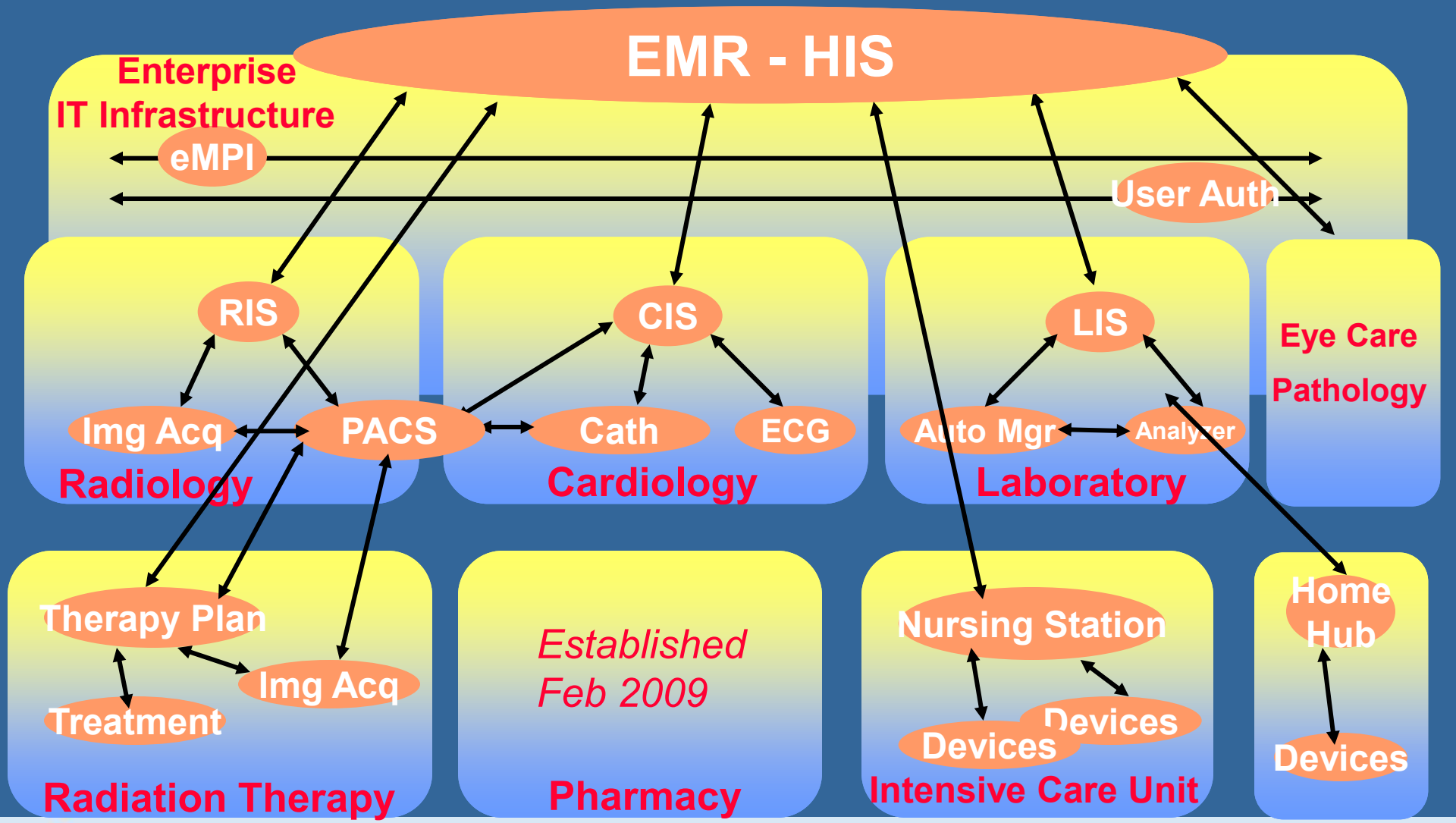
in the Enterprise

And Across Care Settings

➔ *Intra Hospital Workflows and Information Access*

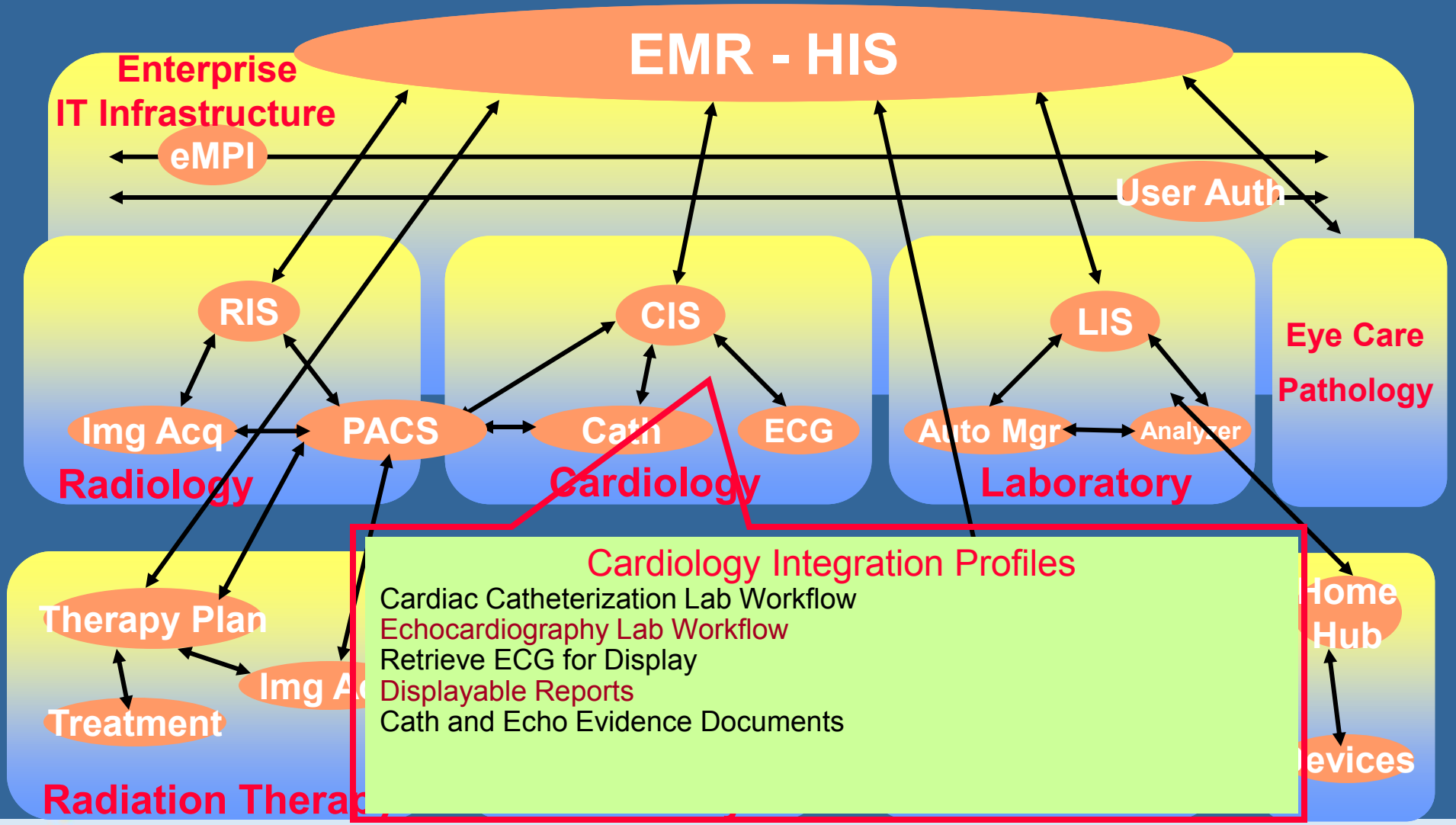
http://www.ihe.net

IHE Solutions within the Enterprise



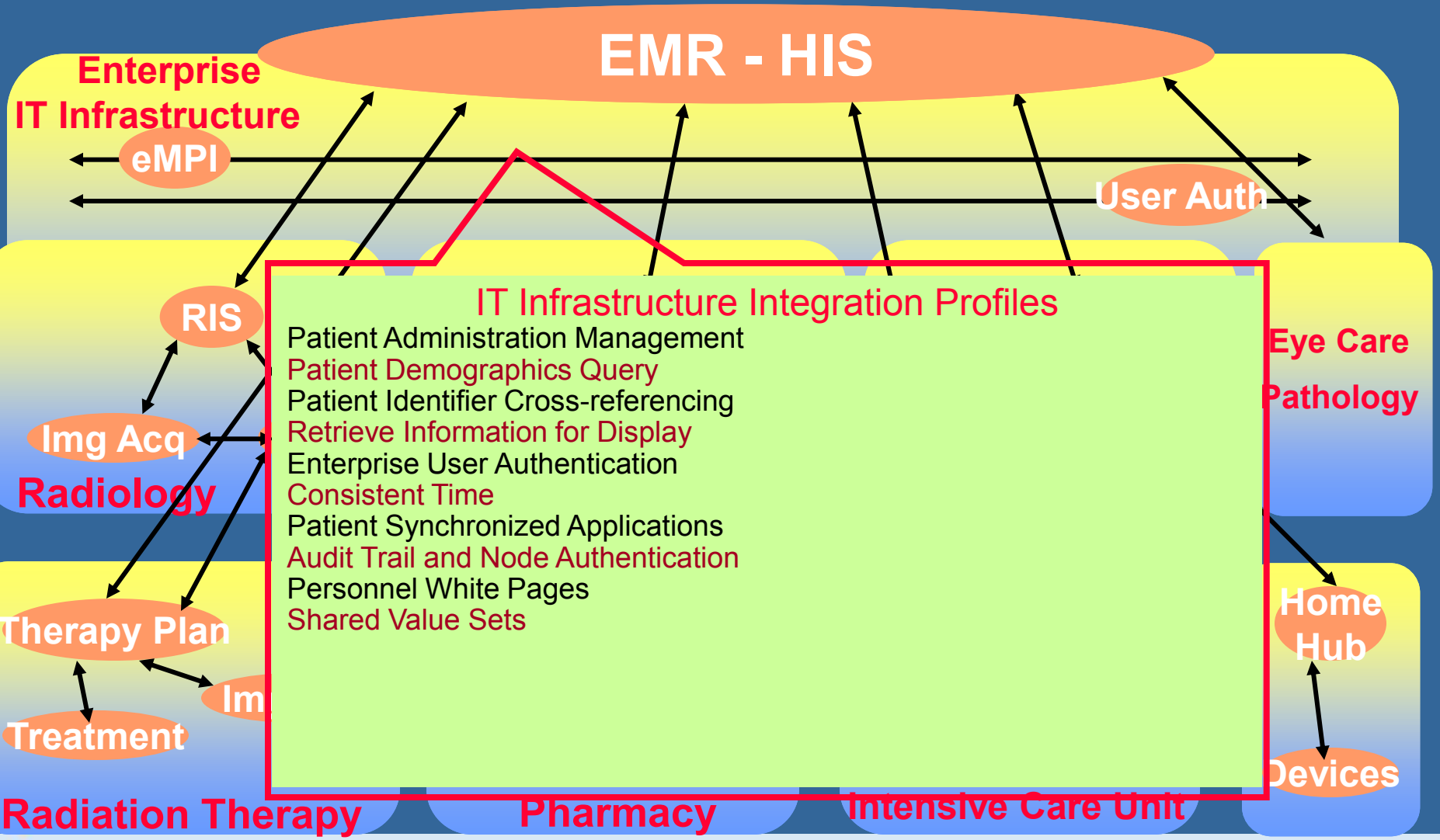
IHE Solutions within the Enterprise

Example: Cardiology



IHE Solutions within the Enterprise

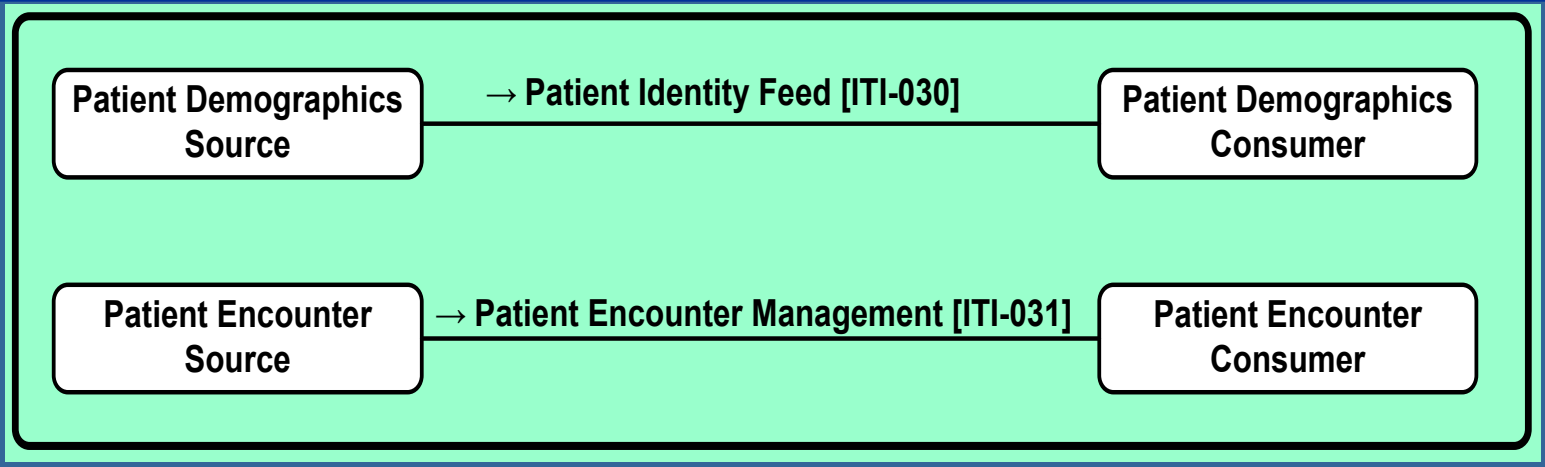
Example: IT Infrastructure



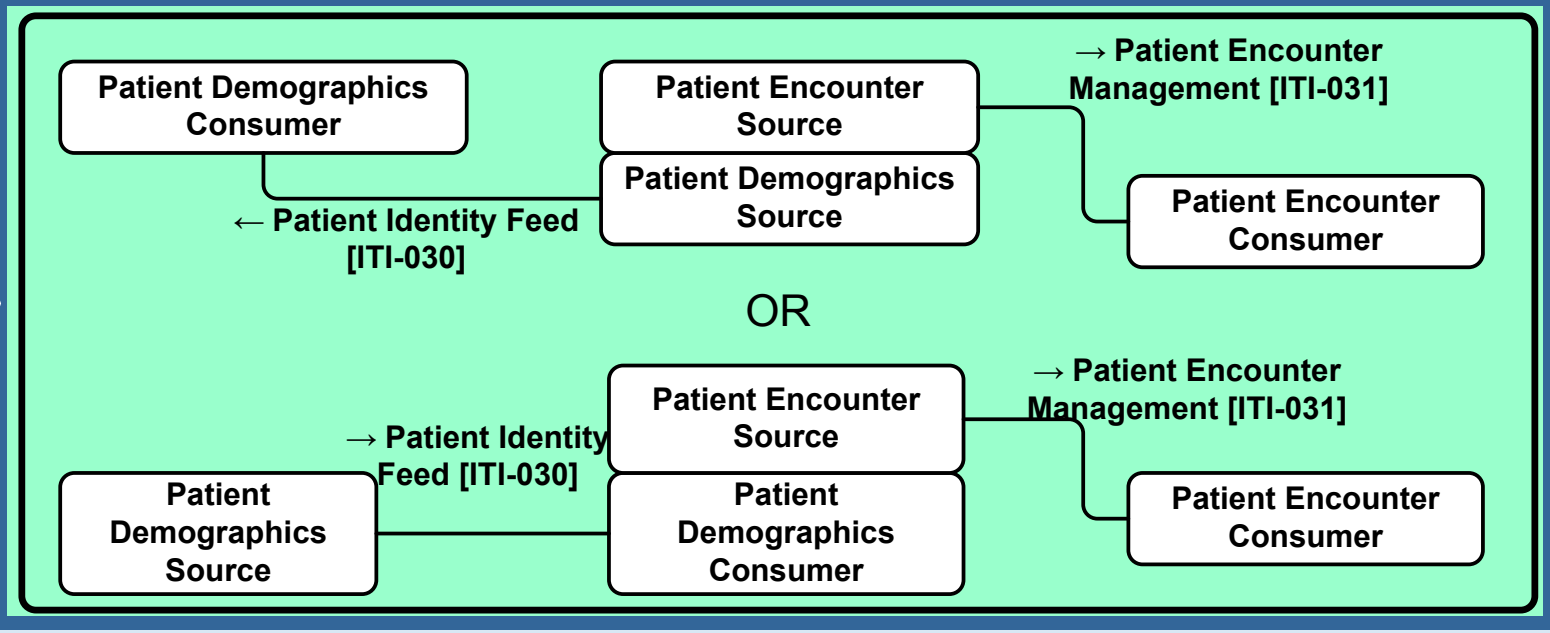
Patient Administration Mgt (PAM)

- Coordinates exchange of patient registrations, updates, and movements for all clinical areas
- Information may be received and processed by consuming applications in any clinical domain
- Optionally allows unambiguous updating of historic patient movement events
- Demographic and encounter tracking works in both inpatient and ambulatory care settings
- Standardizes on HL7 V2.5 and its conformance structures

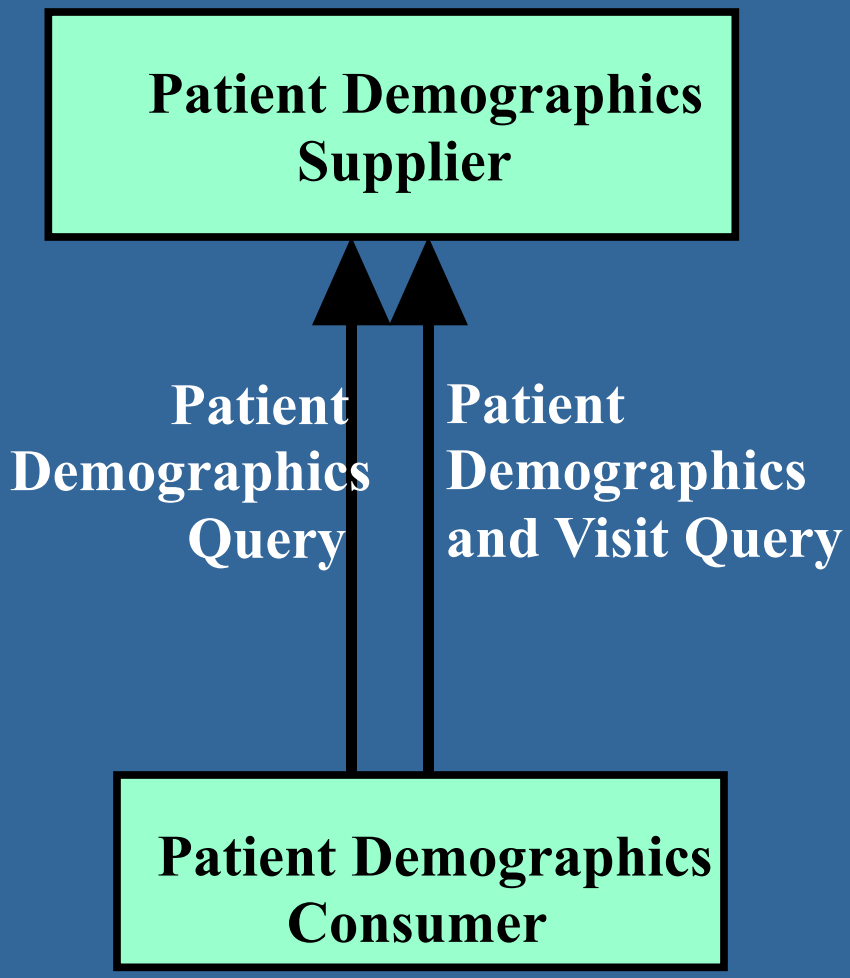
Patient Administration Management
Actor & Transaction: flexibility and compatibility



Flexible Actor grouping



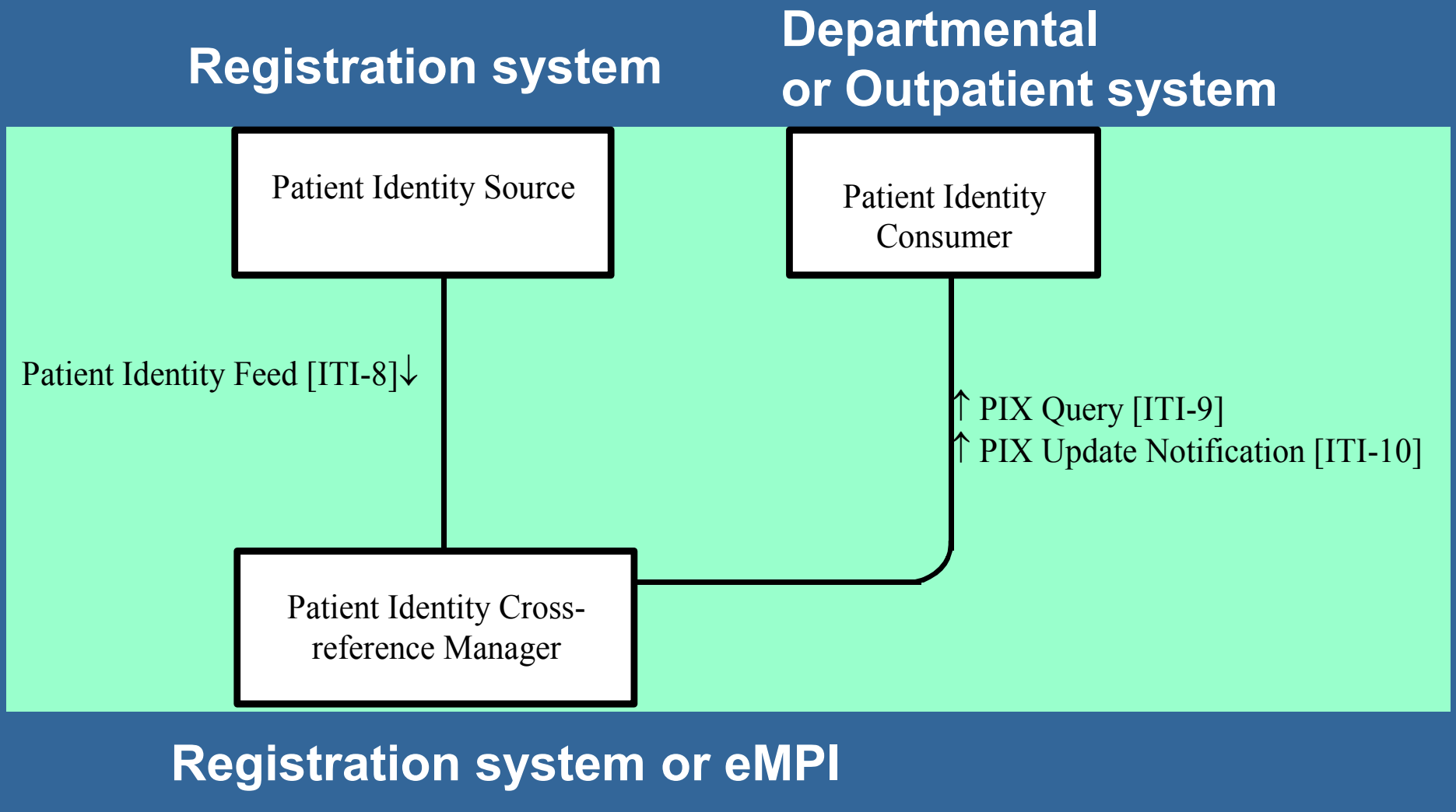
Patient Demographics Query – HL7 V2.5



Registration system or departmental system that is connected on demand to it.

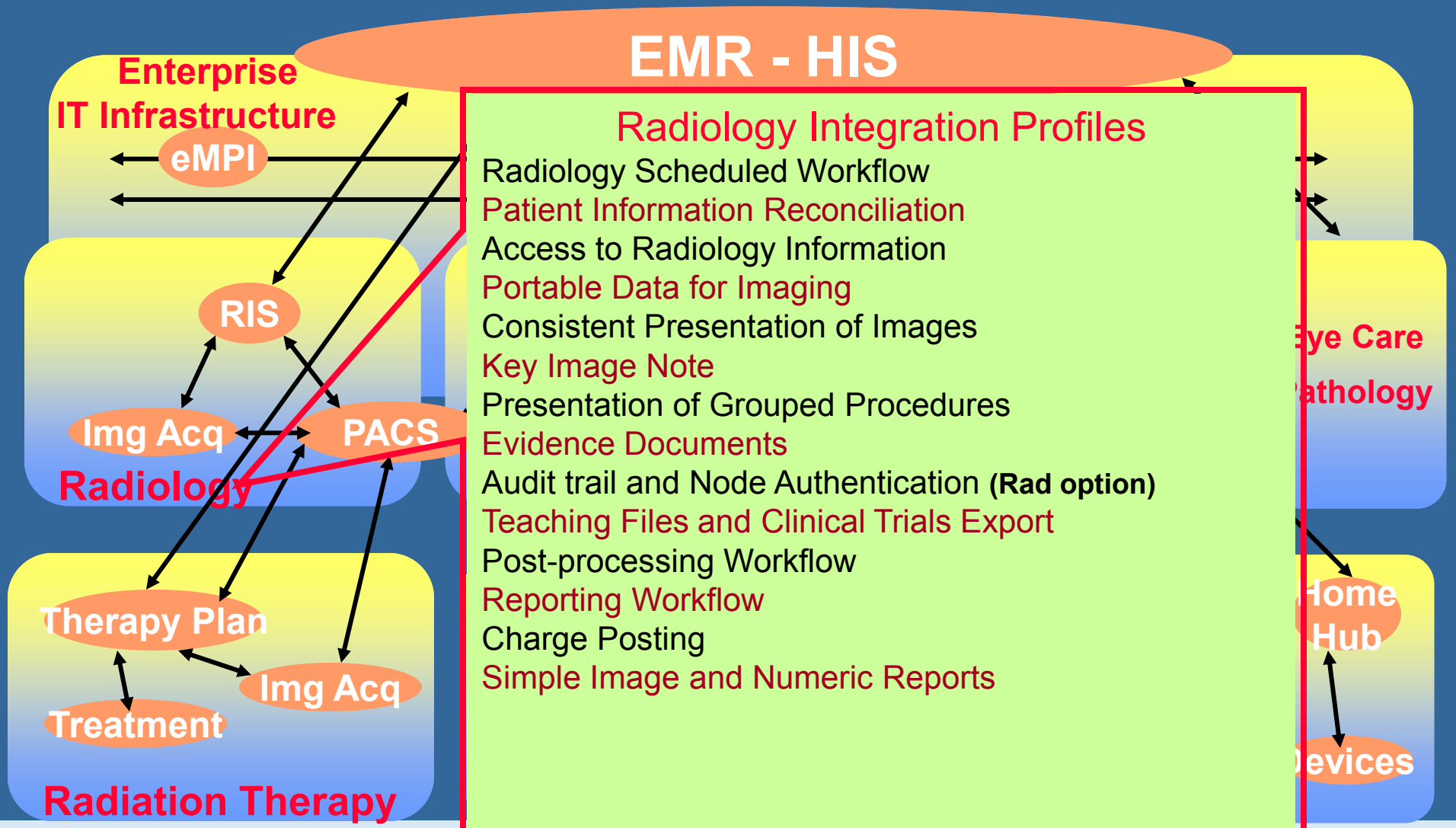
Diverse systems including bedside monitors, physician office systems, lab applications, mobile blood bank registries; might be any system at the point of care.

Patient Identifier Cross-referencing-HL7 V2.5



IHE Solutions within the Enterprise

Example: Radiology



Radiology Integration Profiles

- Radiology Scheduled Workflow
- Patient Information Reconciliation
- Access to Radiology Information
- Portable Data for Imaging
- Consistent Presentation of Images
- Key Image Note
- Presentation of Grouped Procedures
- Evidence Documents
- Audit trail and Node Authentication **(Rad option)**
- Teaching Files and Clinical Trials Export
- Post-processing Workflow
- Reporting Workflow
- Charge Posting
- Simple Image and Numeric Reports

Scheduled Workflow Profile

Registration

HIS

patient information

Orders Placed

examination ord

Orders Filled

RIS

procedure scheduled

Prefetch any relevant prior studies

modality worklist

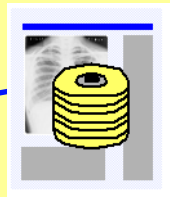
Acquisition Modality

images stored

acquisition completed

acquisition completed

Modality



Report Repository

Diagnostic Workstation

Film Lightbox

PACS

images retrieved

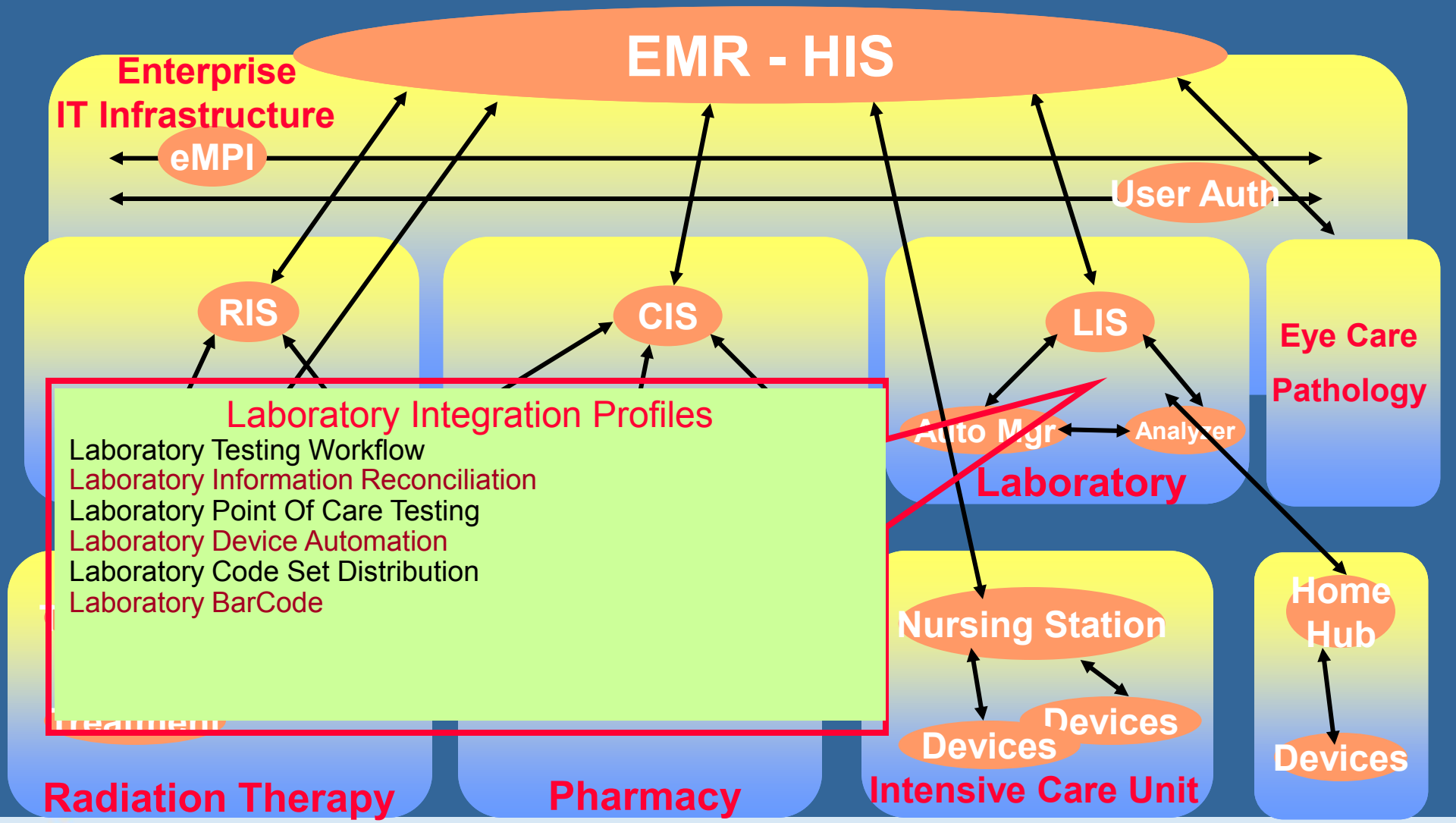
Image Manager & Archive

Film Folder

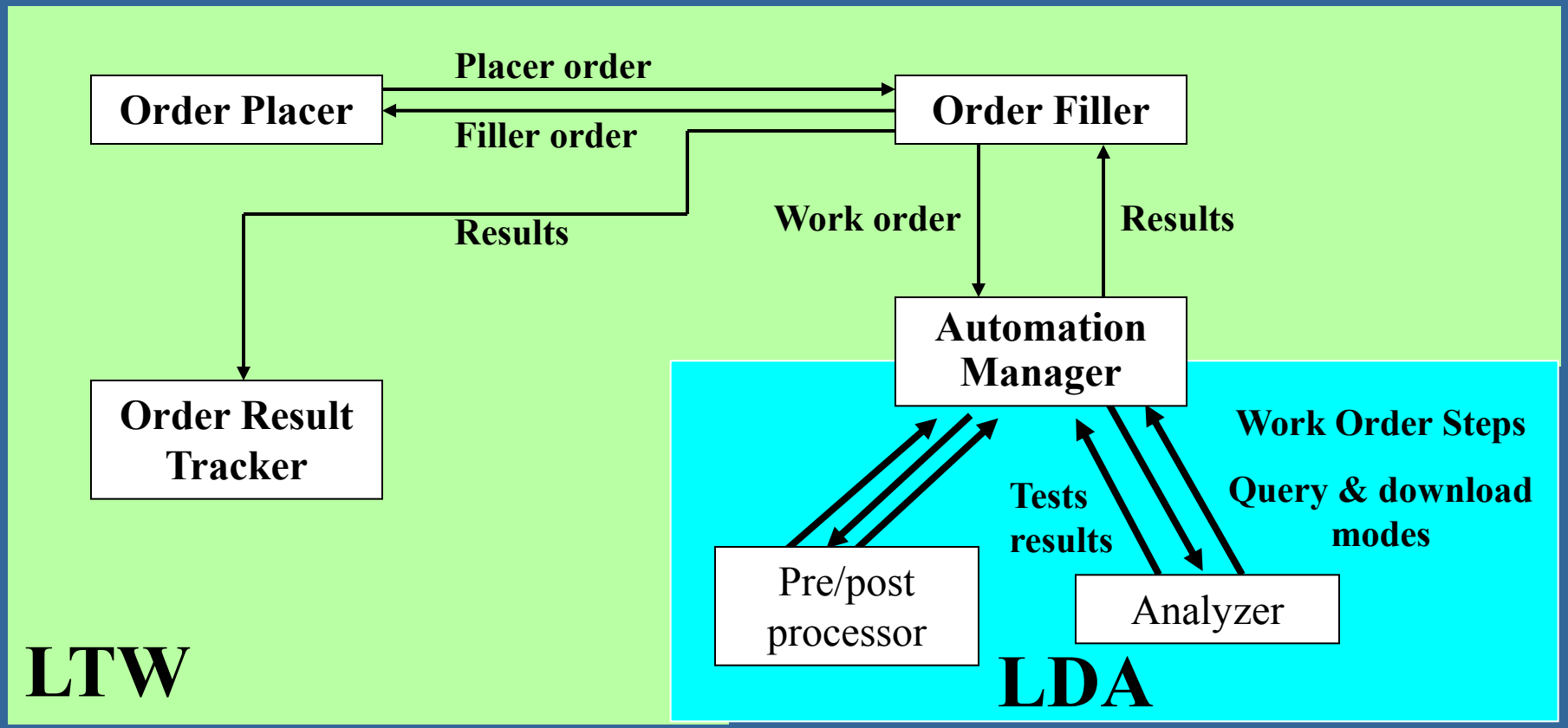
Film

IHE Solutions within the Enterprise

Example: Laboratory



Laboratory Testing Workflow (LTW) & Laboratory Device Automation (LDA)

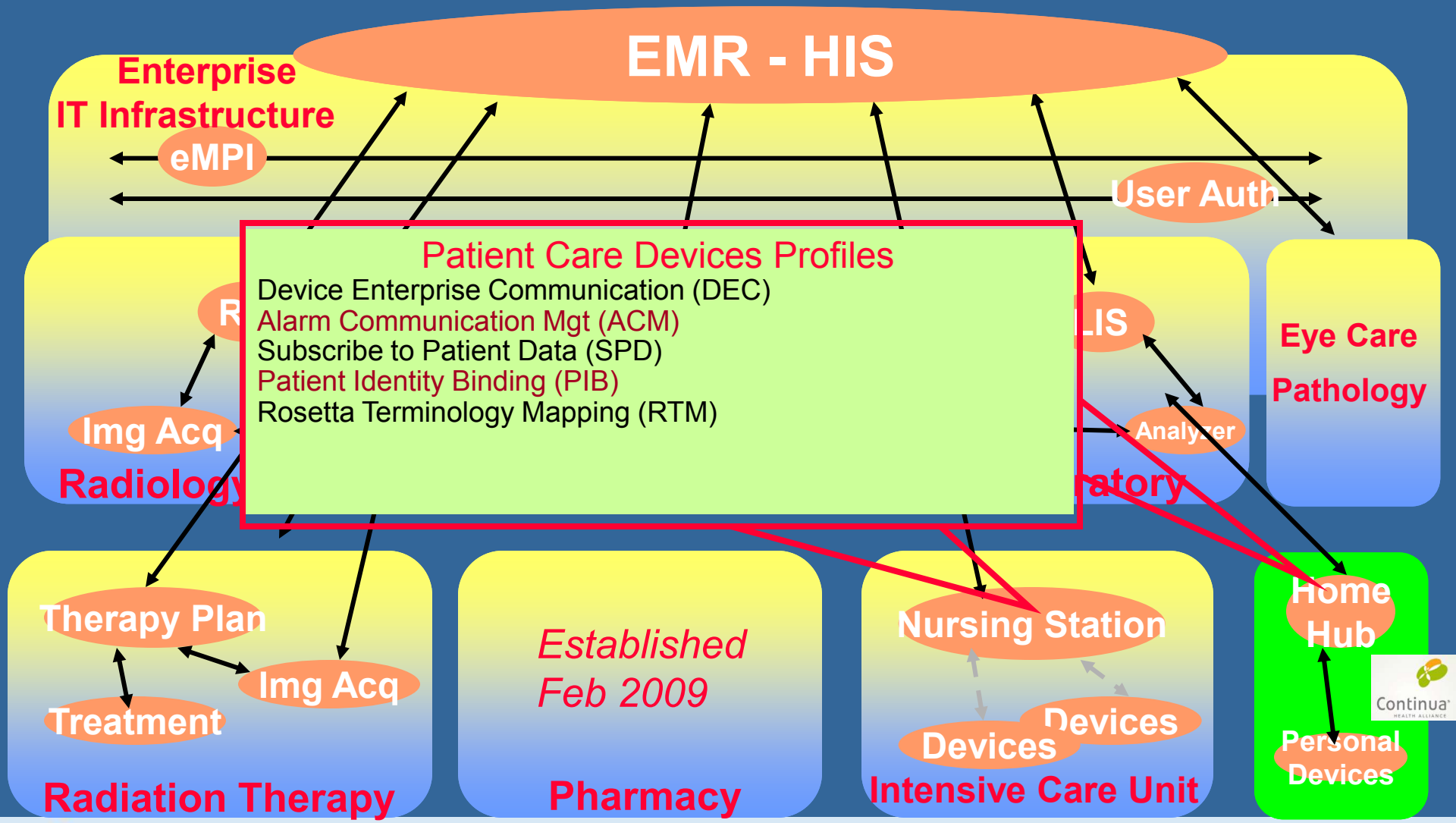


Profiles based on HL7 V2.5.1

Solid implementation experience

IHE Solutions within the Enterprise

Example: Patient Care Devices



Providers and Vendors

Working Together to Deliver

Interoperable Health Information Systems

in the Enterprise

and Across Care Settings

http://www.ihe.net


IHE
changing the way healthcare
www.ihe.net
connects
WWW.IHE.NET