



Healthcare Data Exchange Standards 101

PEEK BEHIND THE CURTAIN AND
UNDERSTAND HOW HEALTHCARE
SYSTEMS COMMUNICATE.

Presentation Outline

A DISCUSSION OVERVIEW



The Basics

Timeline of Healthcare Standards

OSI

Why do we need standards

Evolution of standards

Key data standards

HL7

IHE

FHIR

Speculation

About Me



Daniel Berezeanu – interop.IT

WHAT WE'RE ABOUT

IHE – IT-Standards – Making it work.





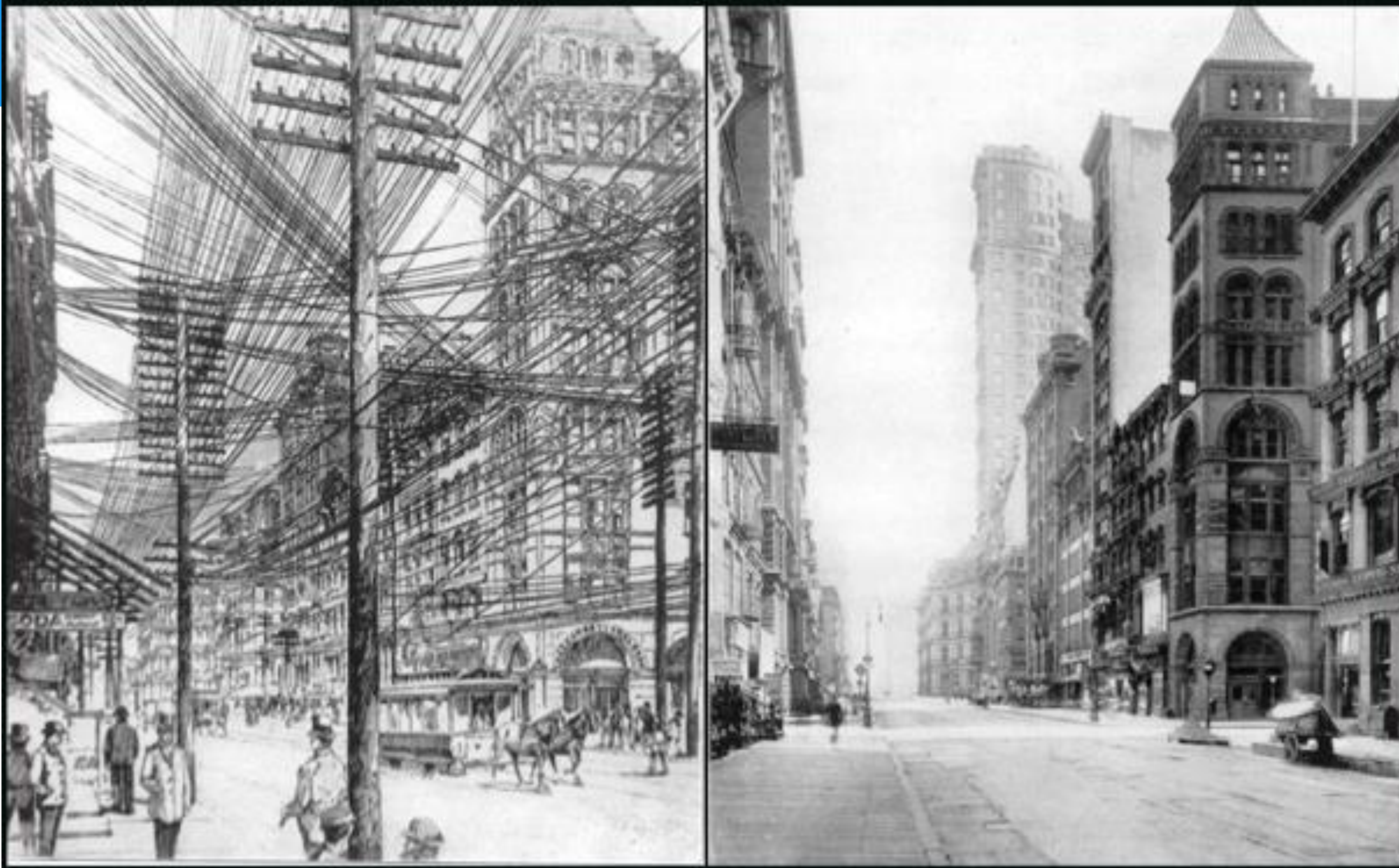
OUR NORTH STAR

Human health is
the great global
connector.

KATHLEEN SEBELIUS

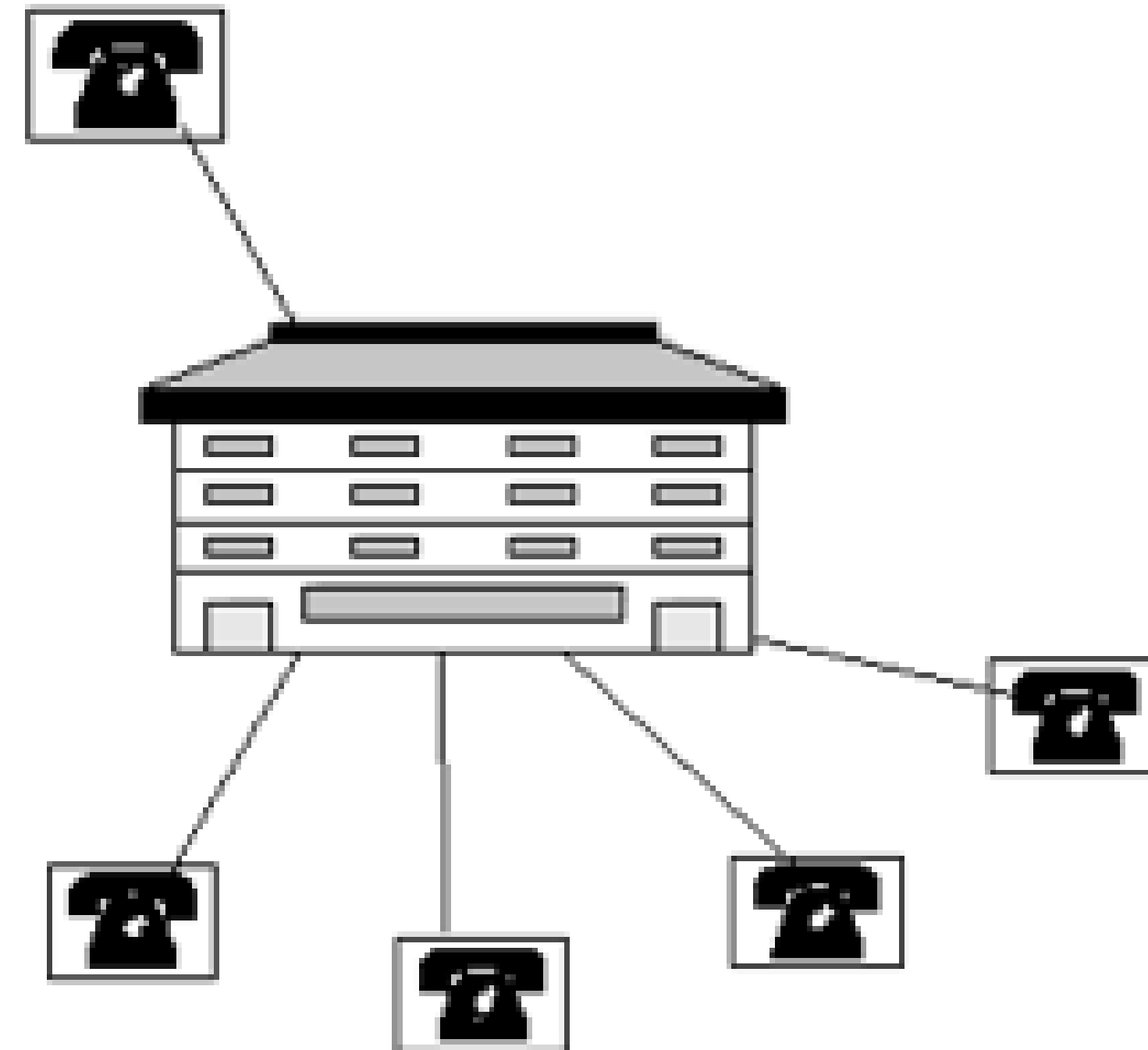
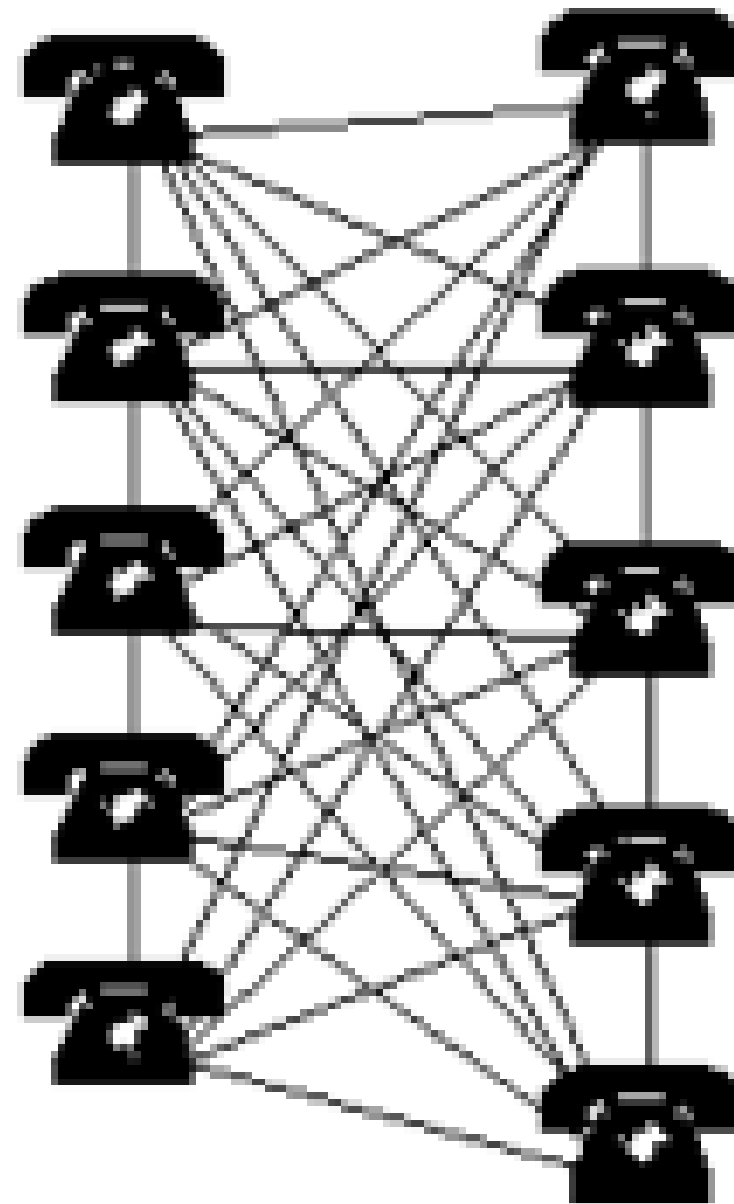


Back to the
basics



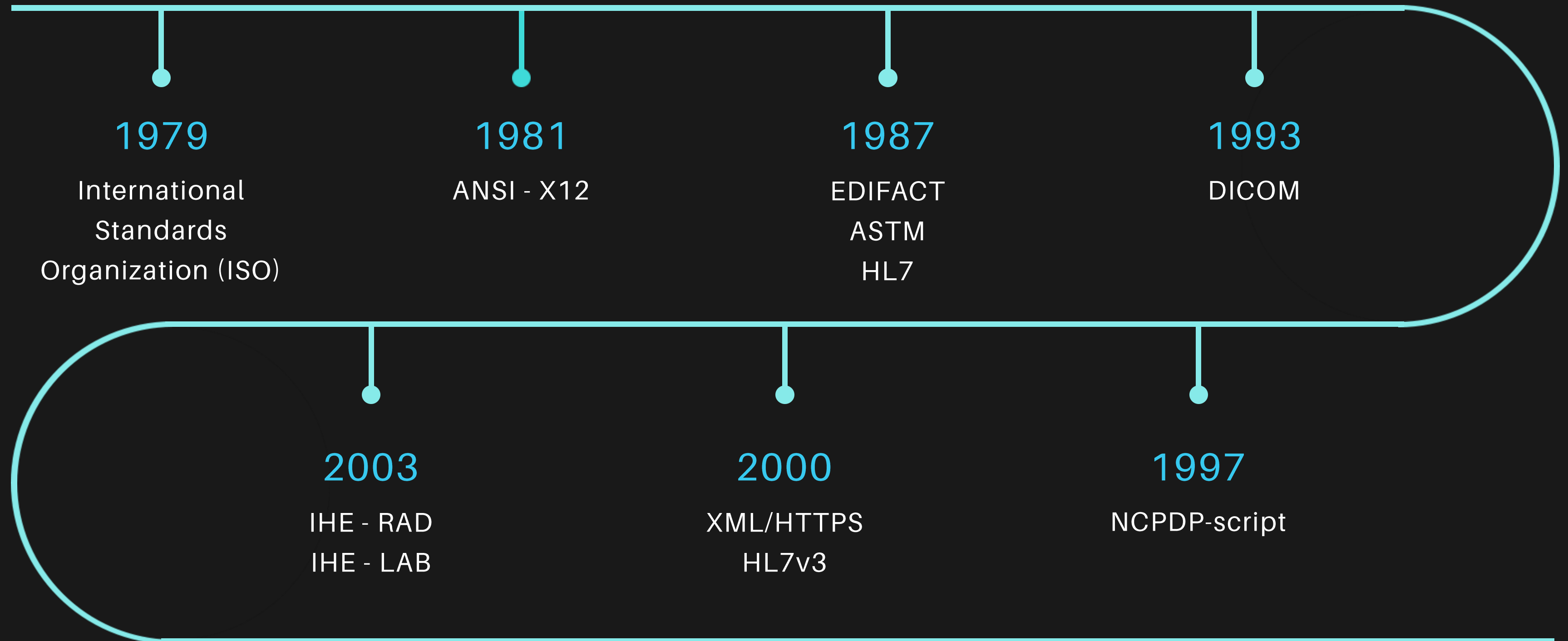
ARCHITECTURE

GOING FROM POINT TO POINT TO ...



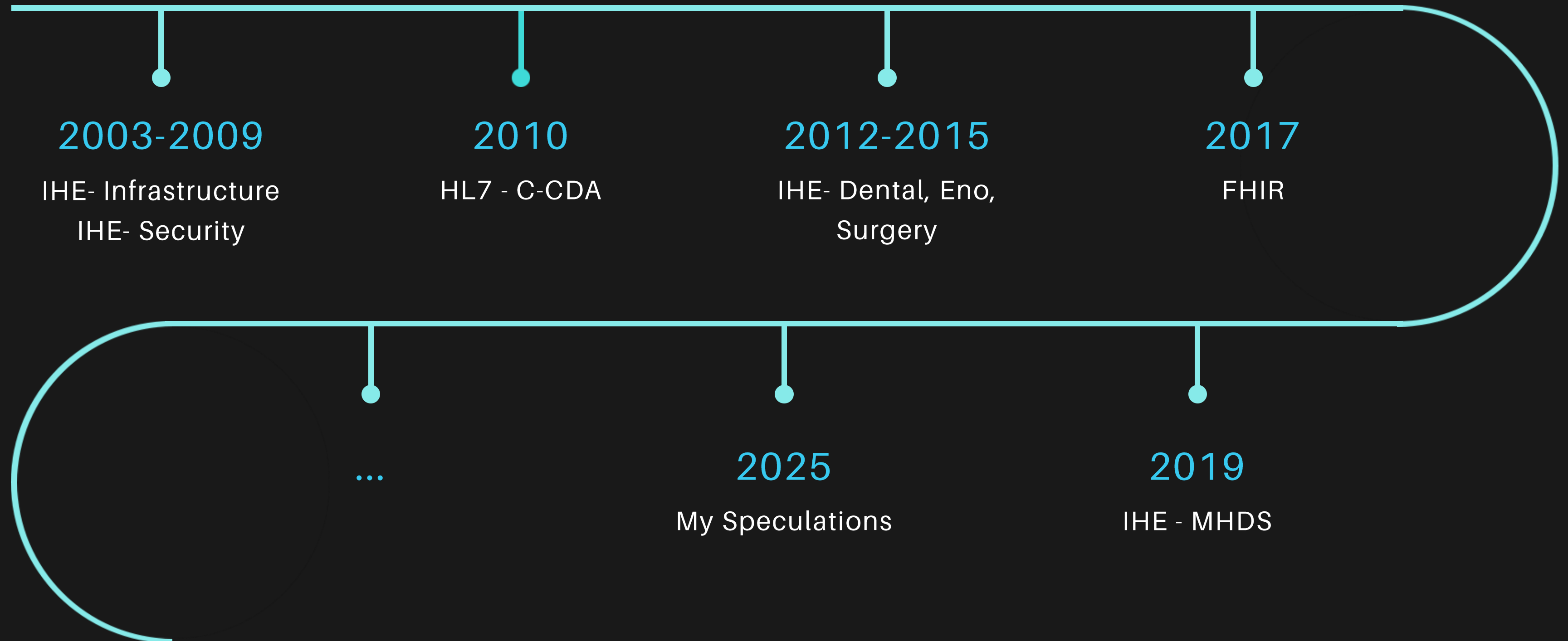
History of Healthcare Standards

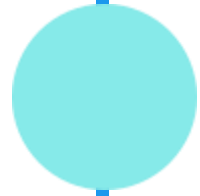
Summary Timeline



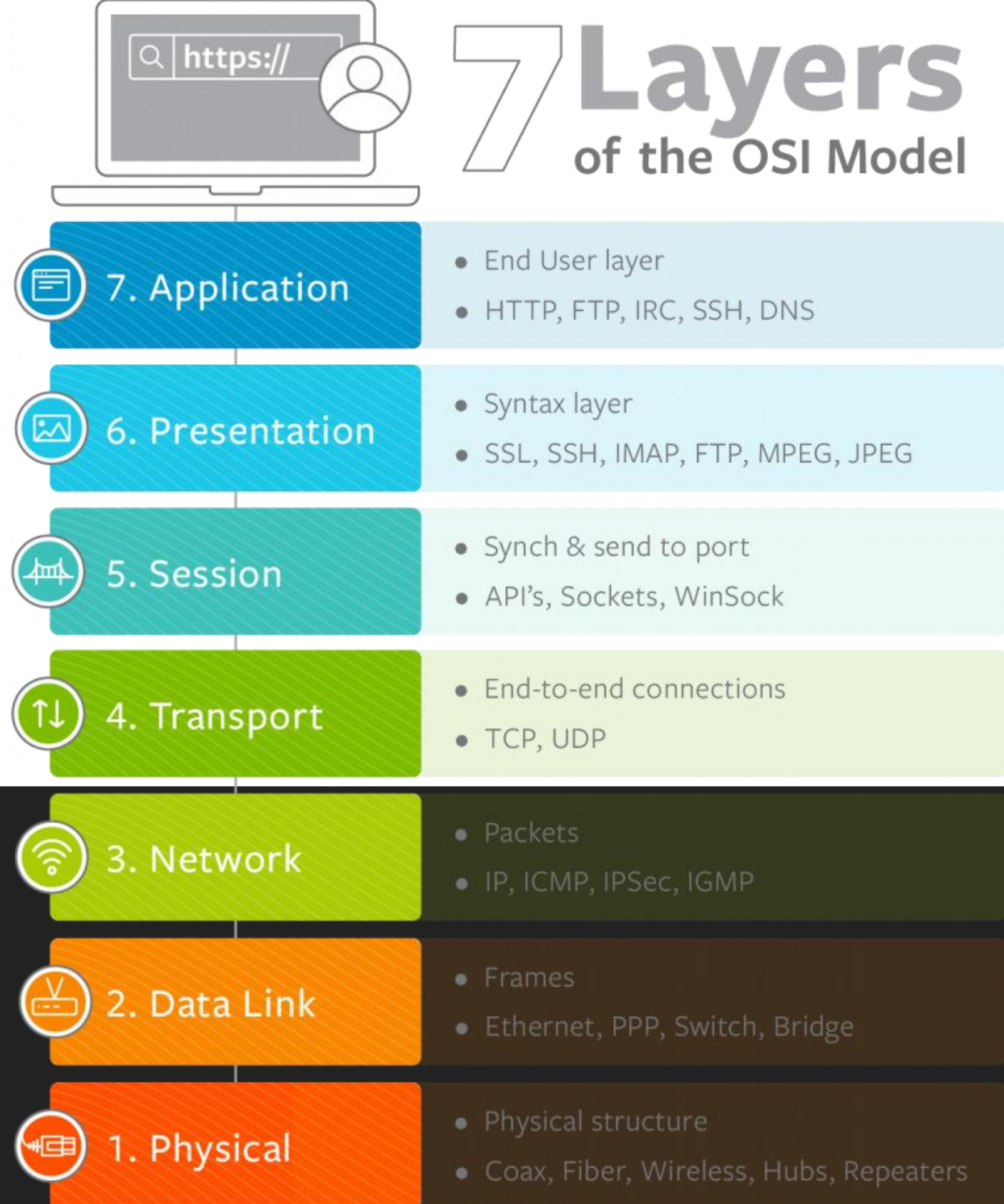
History of Healthcare Standards

Summary Timeline

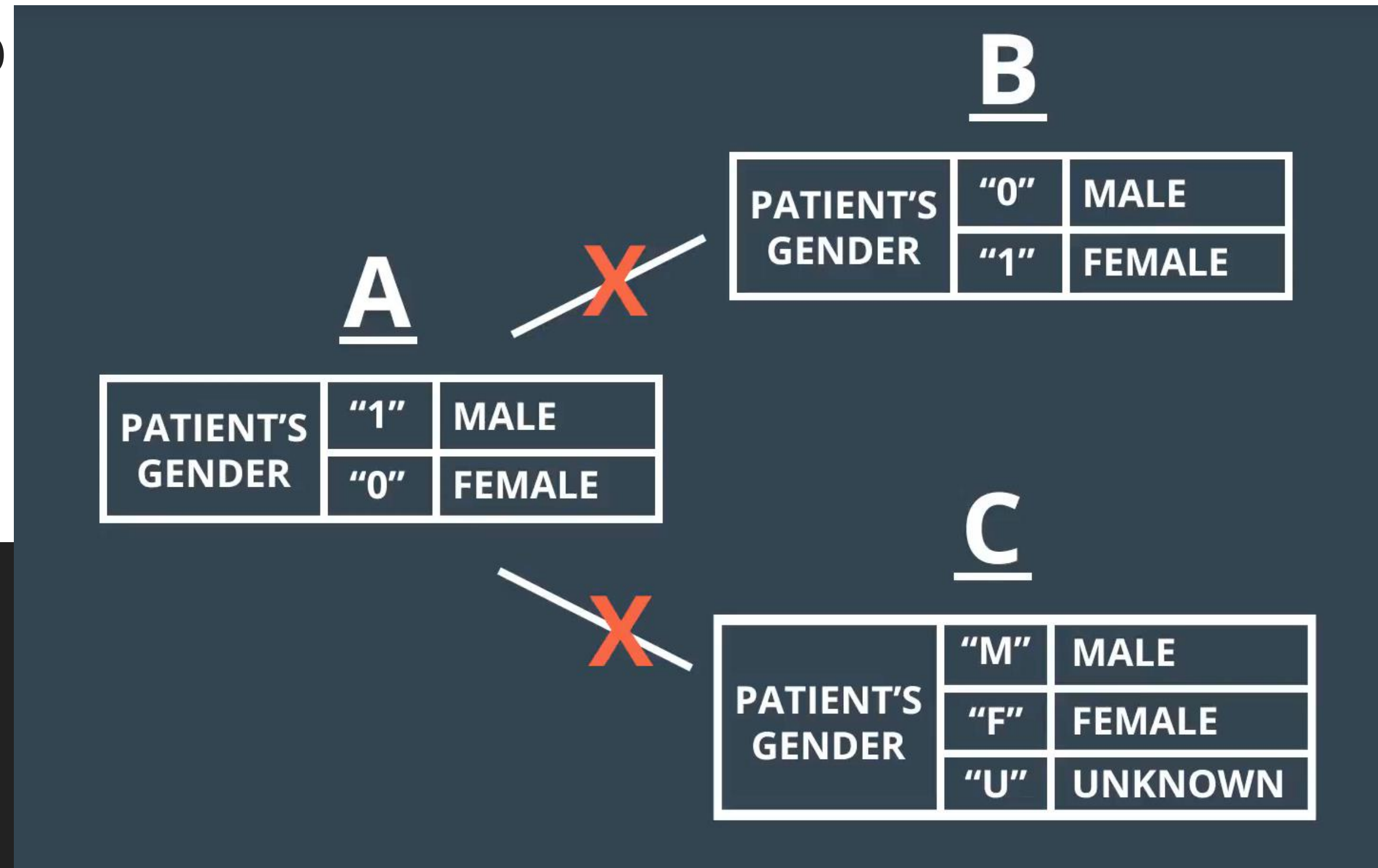




ISO



Why do we need standards ?



Evolution of standards



CLASSIFICATIONS

- medical diagnosis
- laboratory tests
- medications

RELATIONSHIPS

- ontologies (loinc, ICD)
- semantic interoperability

MESSAGING

- ordering
- admitting ADT

Evolution of standards



DOCUMENTS

- images
- Clinical documents
- C-CDA

WORKFLOWS

- SDF
- XDW

TECHNOLOGY

- EDI/X12
- XML/SOAP
- JSON/REST

Key Data Standards



ICD-10

International classification of diseases

NDC

national drug code

CPT

Current procedural terminology

SNOMED

Systematized nomenclature for medicine

LOINC

logical observation identifiers names and codes

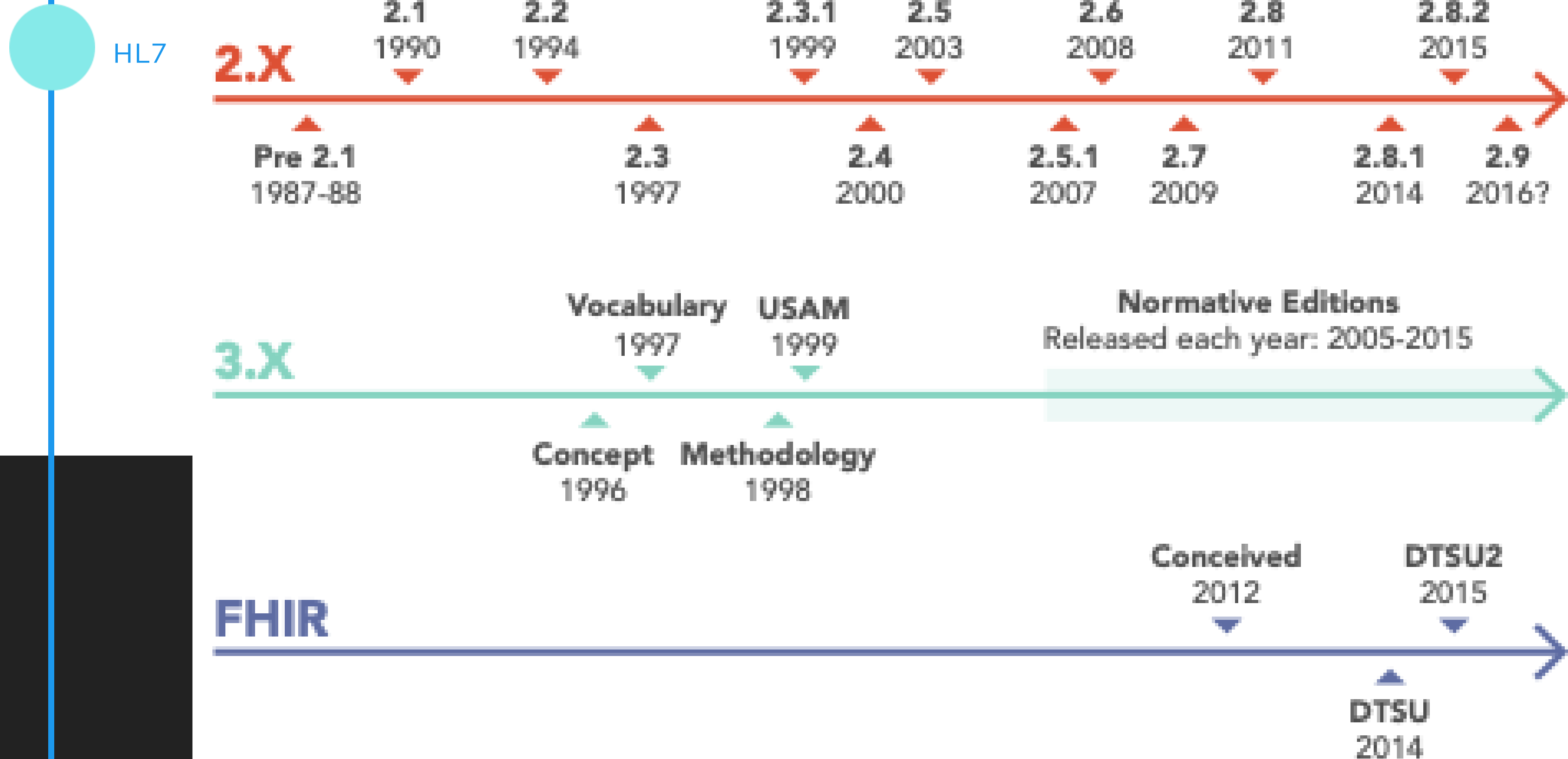
Admit a Patient – Trigger Event 01

```
MH*\SYS01*SND01*PW*SYS08*SYS08PW19870821*1409*ADT*MSG0005*P*19-870801*  
N<cr>  
AT*01*19870821*1401<cr>  
PID*PATIID1234*BLGN04567<cr>  
PTI*JONES\WILLIAM\A\III*M*19500204*C*P*M*FATERH*JONES\WILLIAM-  
\A\JR*4155551212*415545122134<cr>  
PT2*I*1W\3002\1*19870821*1401**DR912**SURG**1CD01***AD<cr>  
ADR*12 W MAIN STREET**GREENSBORO*NC*99012<cr>  
MT*271*X04<cr>
```

Patient William A. Jones, III was admitted on August, 21, 1987 at 2:01 p.m. by doctor DR919 for surgery SURG. He was given Room 3002, bed 1 in department 1W. The admitting diagnosis code was 1C\01. Because this was a new admit, the event date and time are the same as the admit date and time.

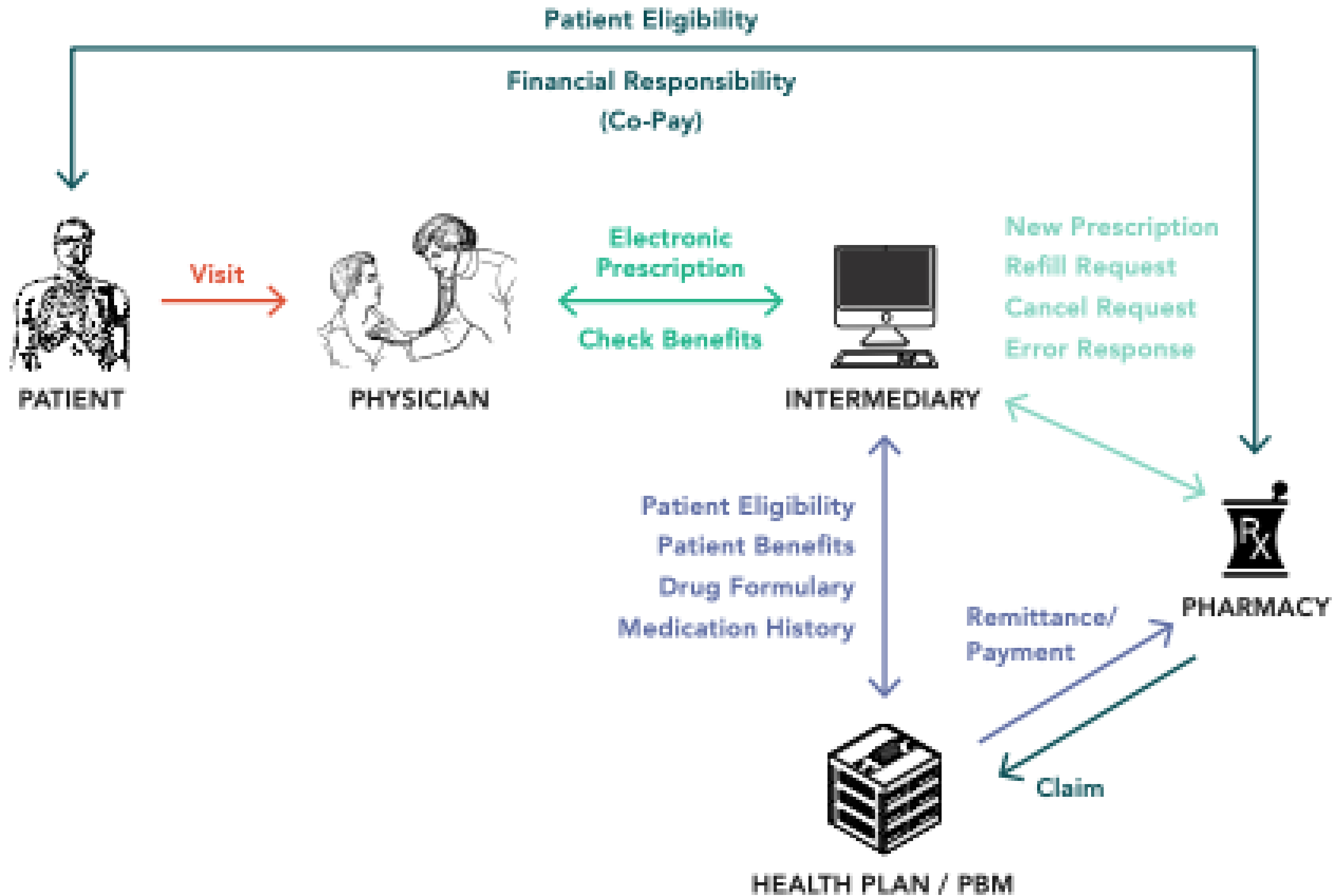
The message was sent from system SYS01 to system SYS08 on the same dates as the admission took place but eight minutes after the admit. The standard version date of the sending system is August 1, 1987. No Acknowledgement was requested.

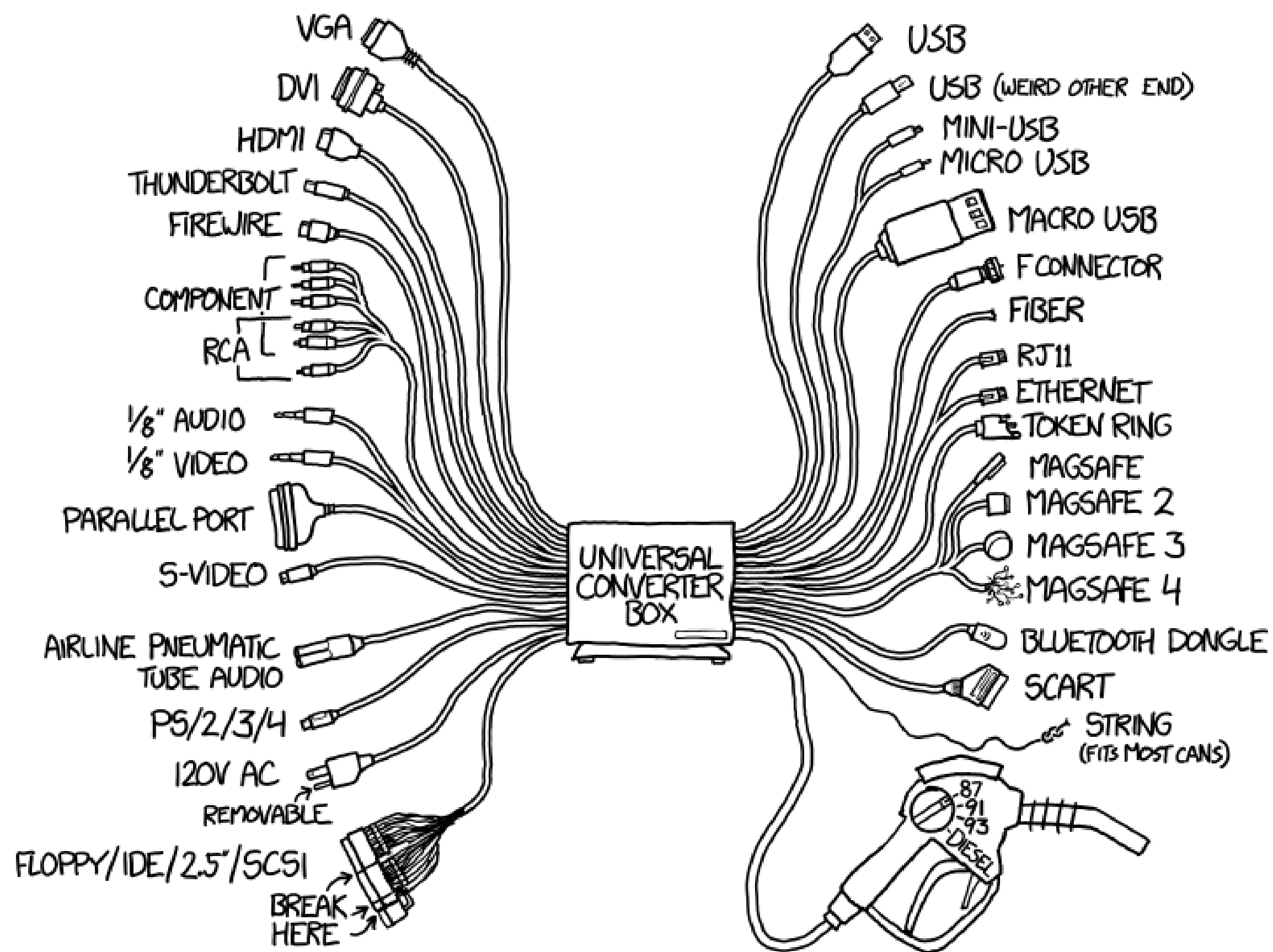
HL7 – Timeline



NCPDP

NCPDP

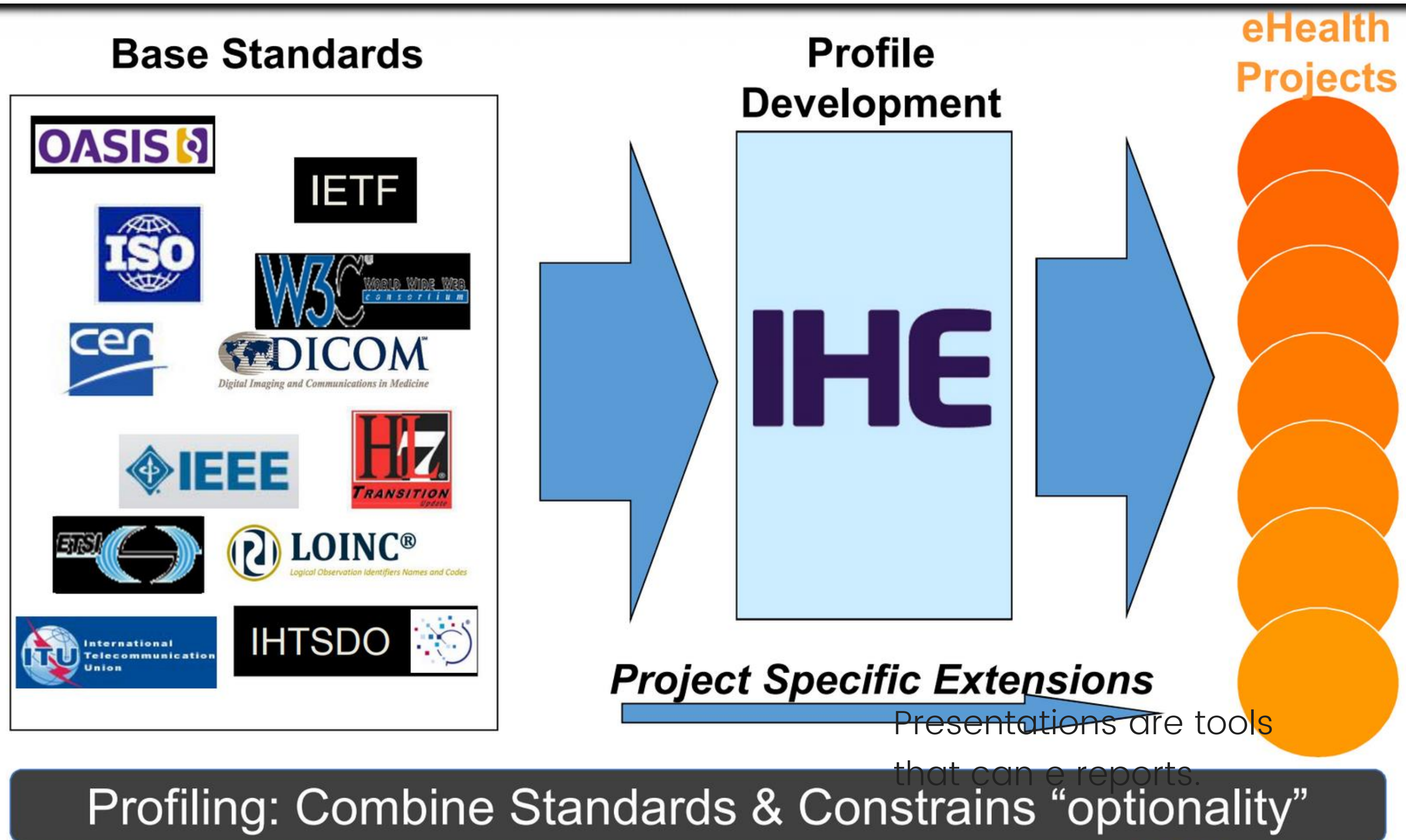




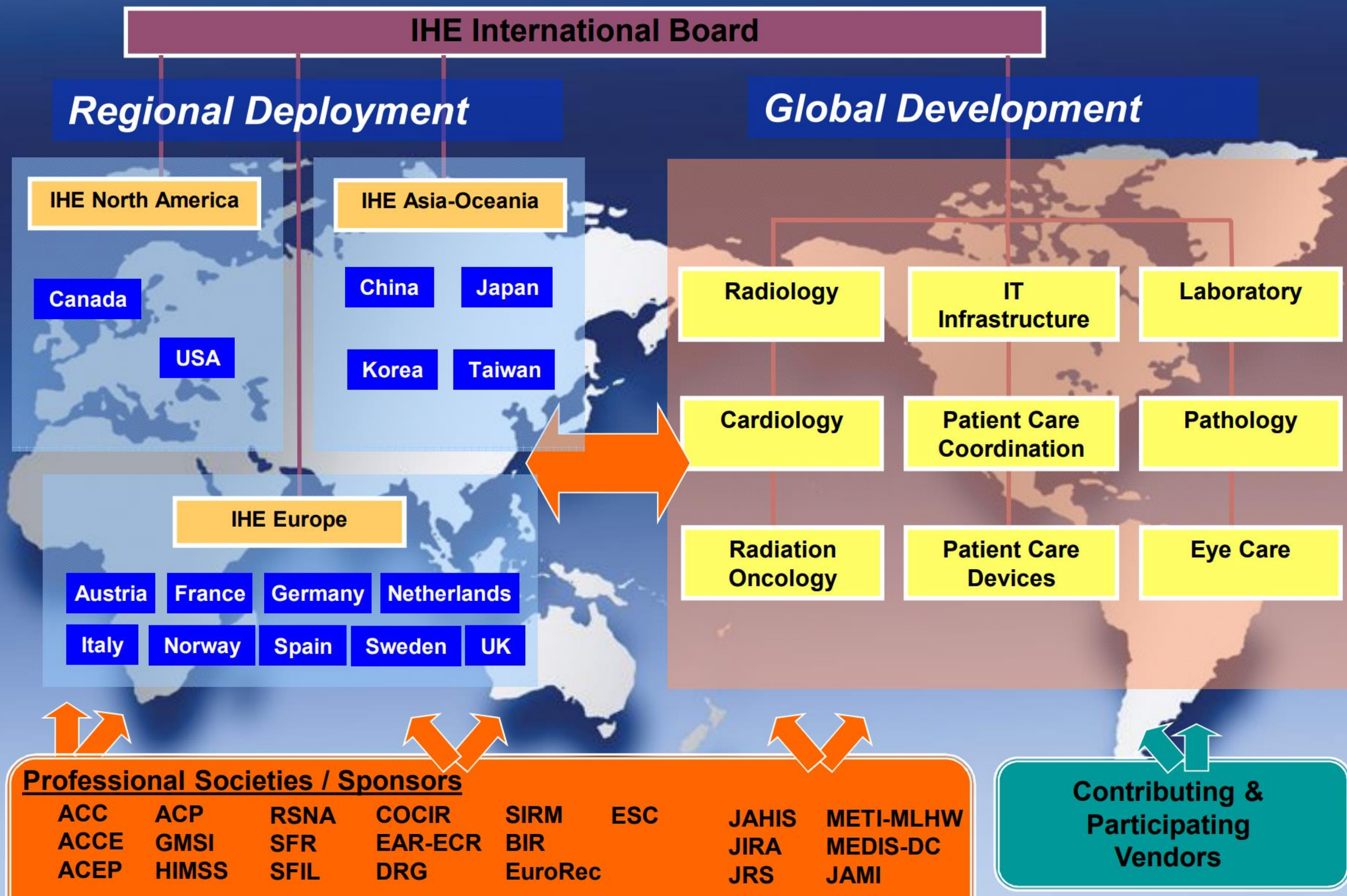
THE PROBLEM:

Too many solutions !

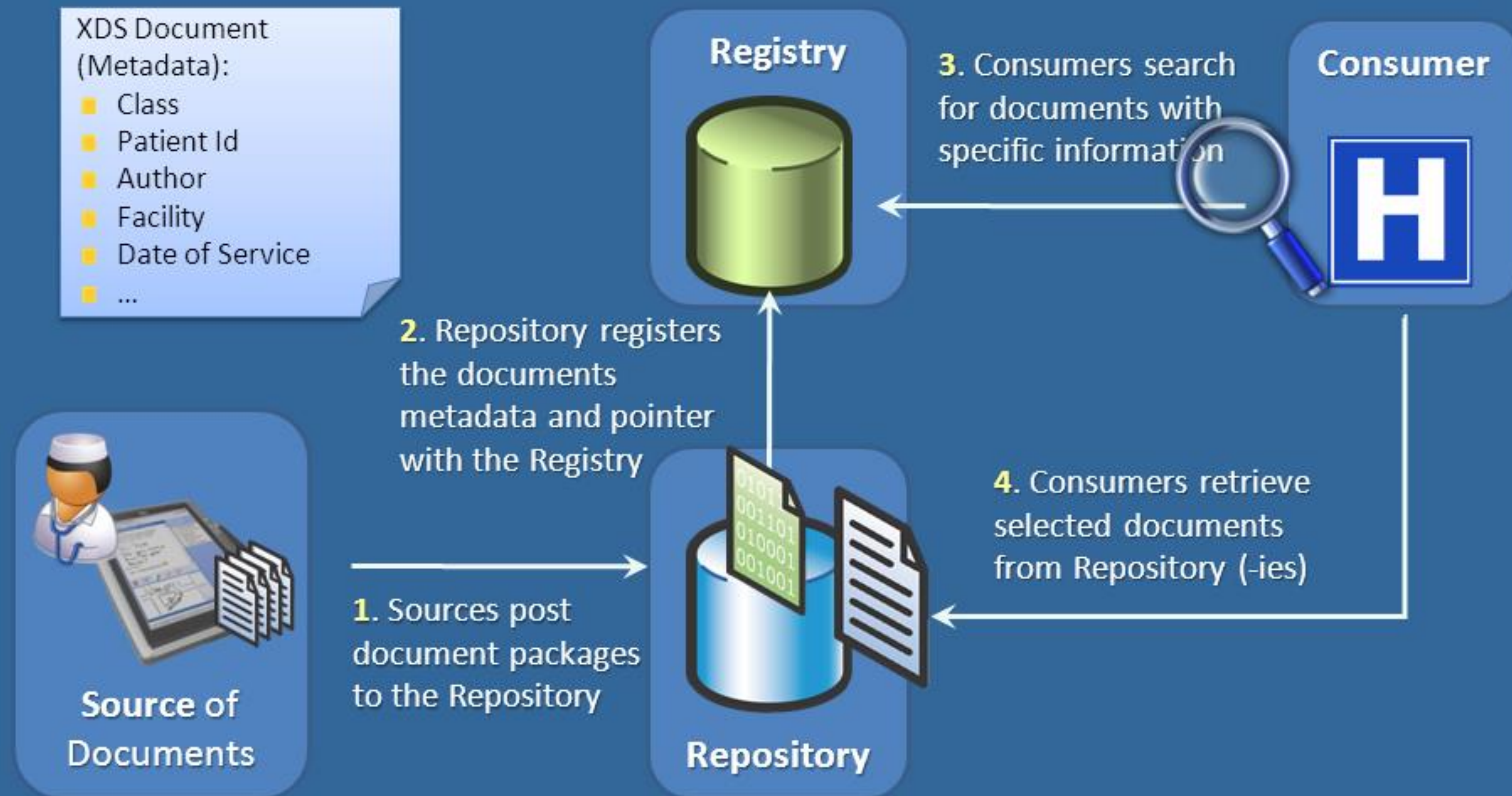
IHE Technical Framework



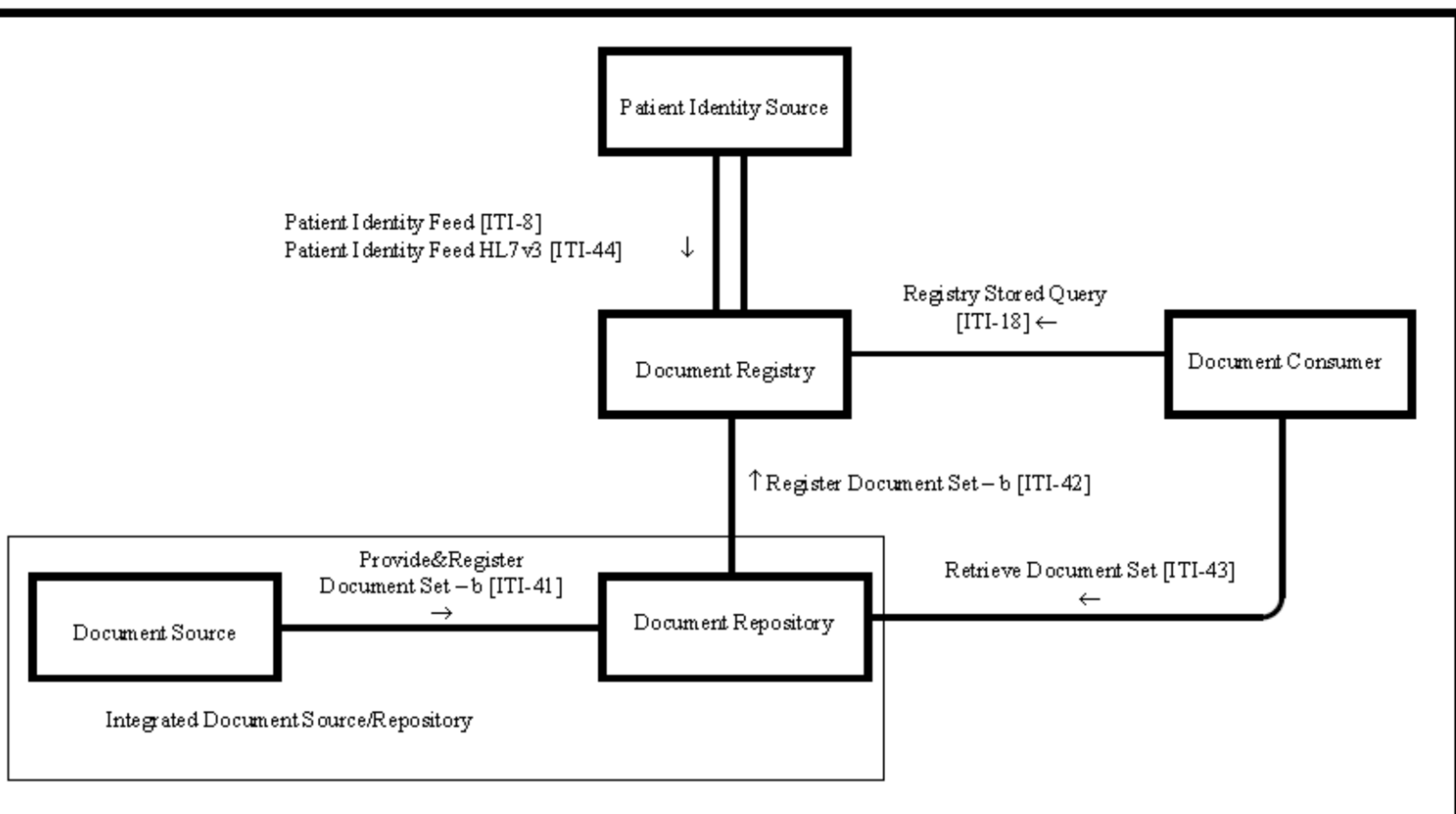
IHE Organizational Structure



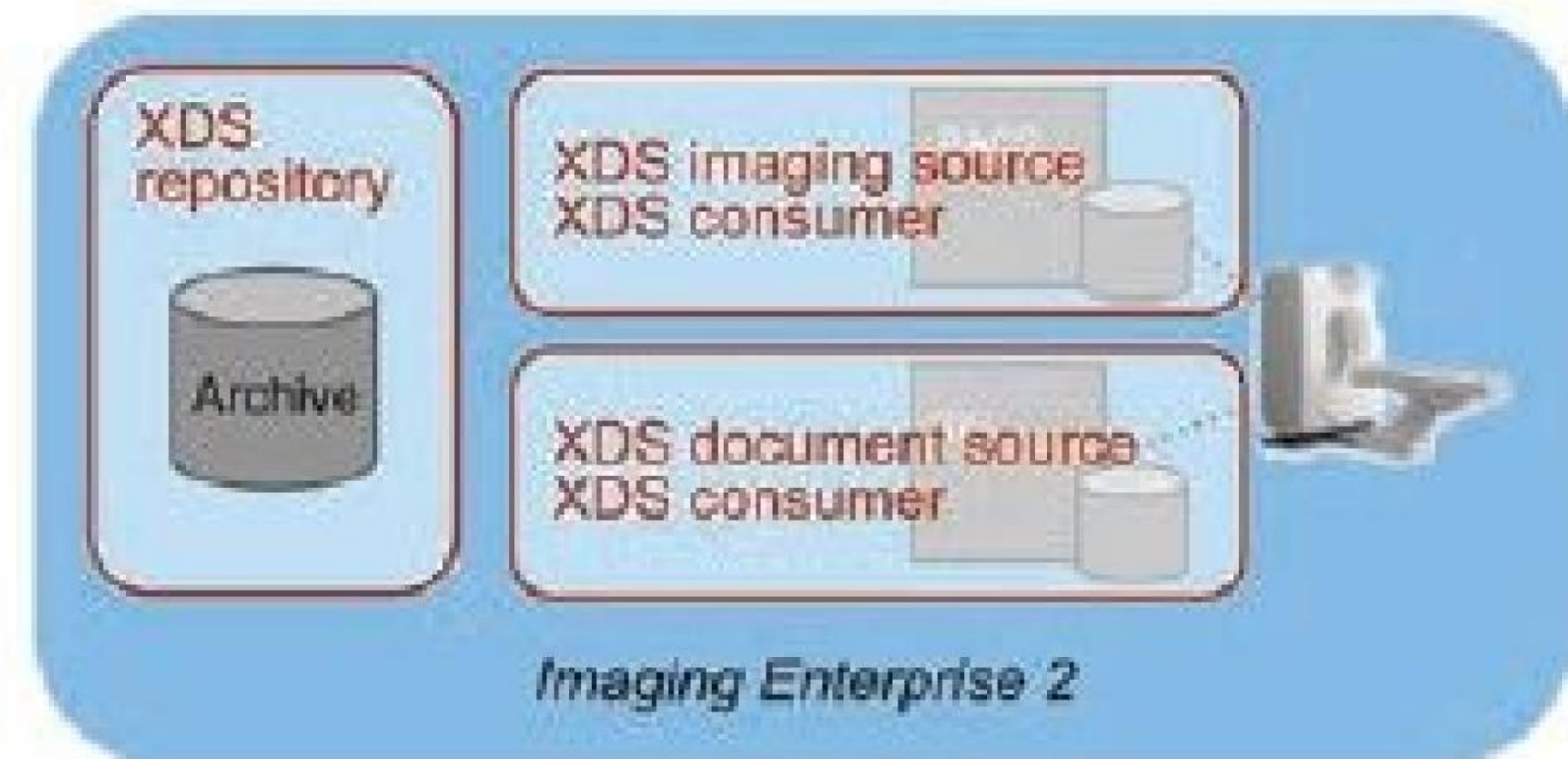
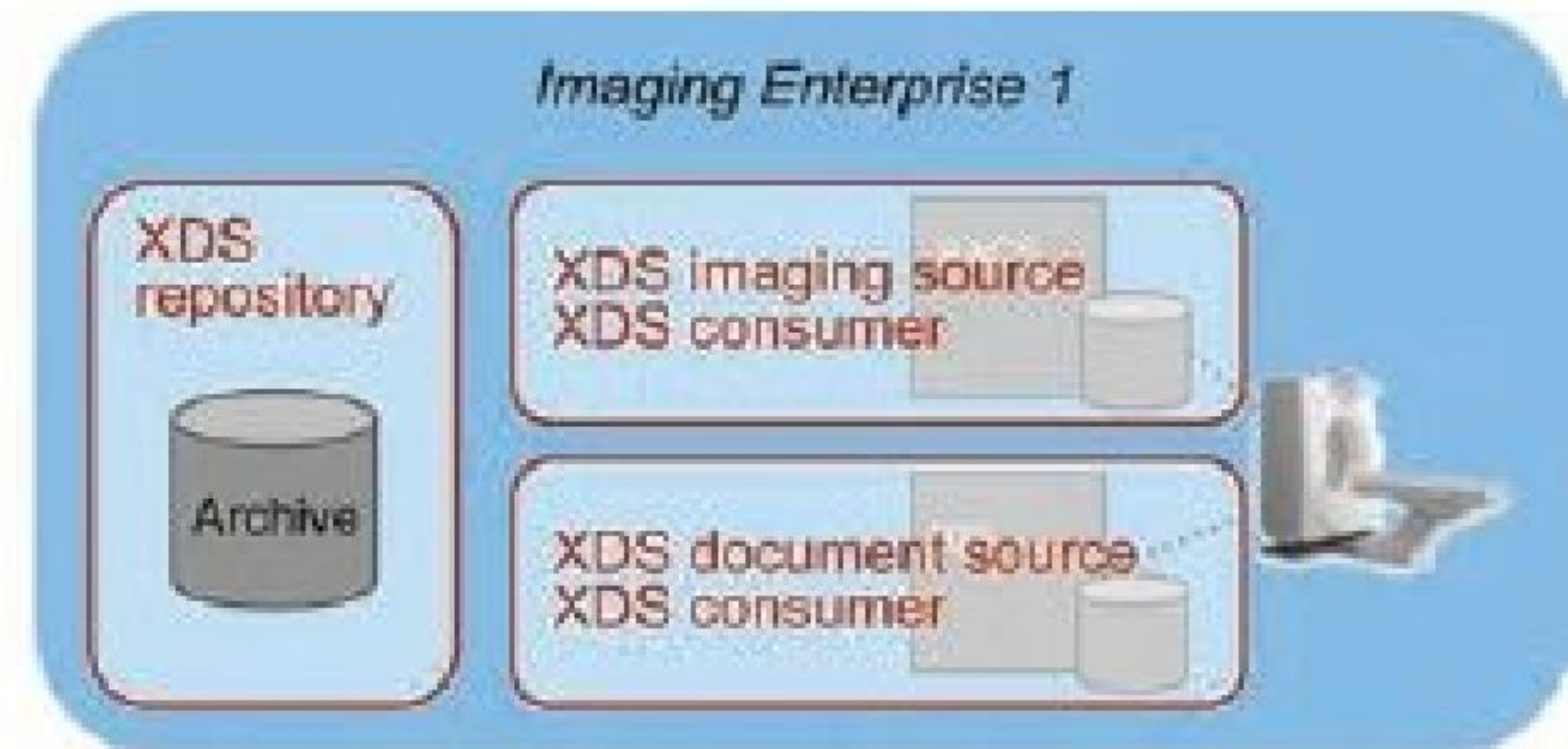
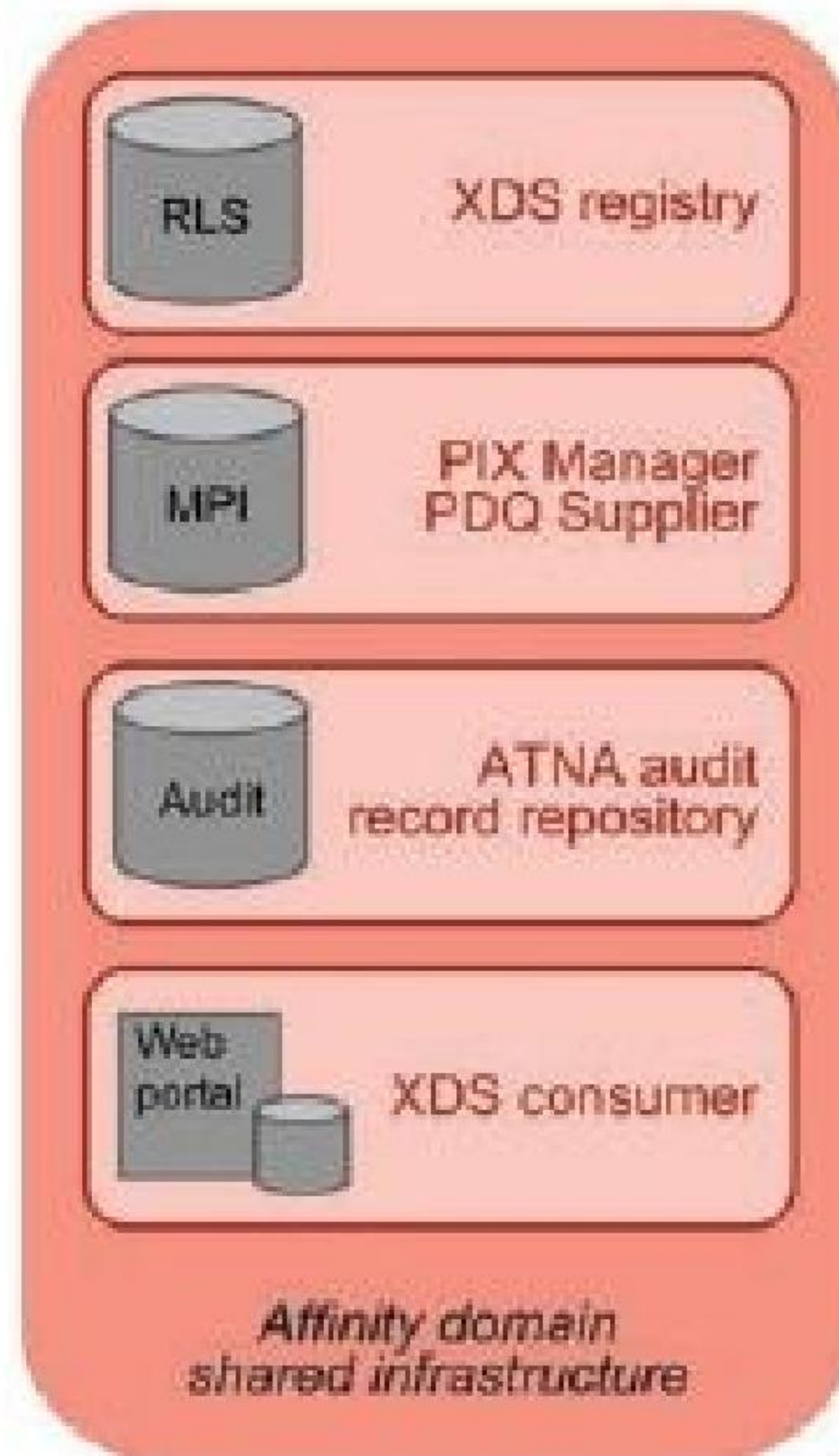
XDS Flow and Interactions



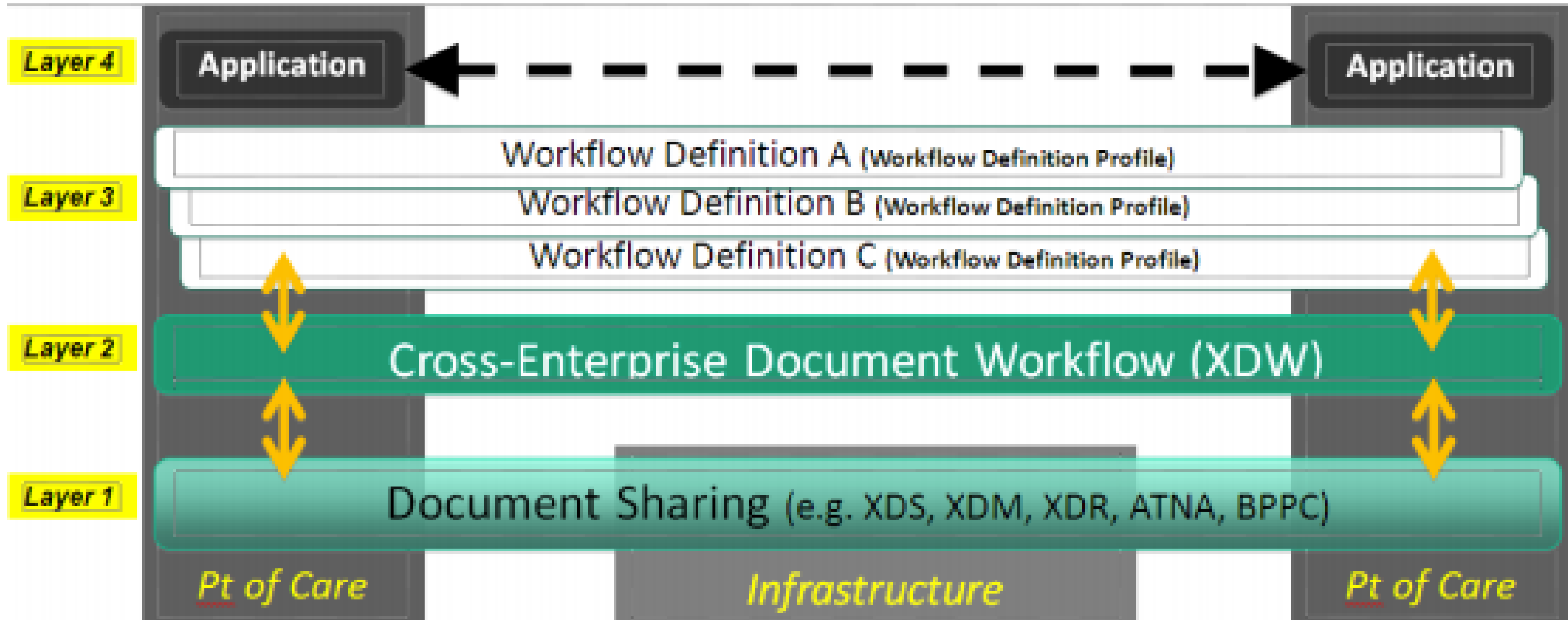
XDS Flow and Interactions



XDS Flow and Interactions



XDW Workflow Architecture

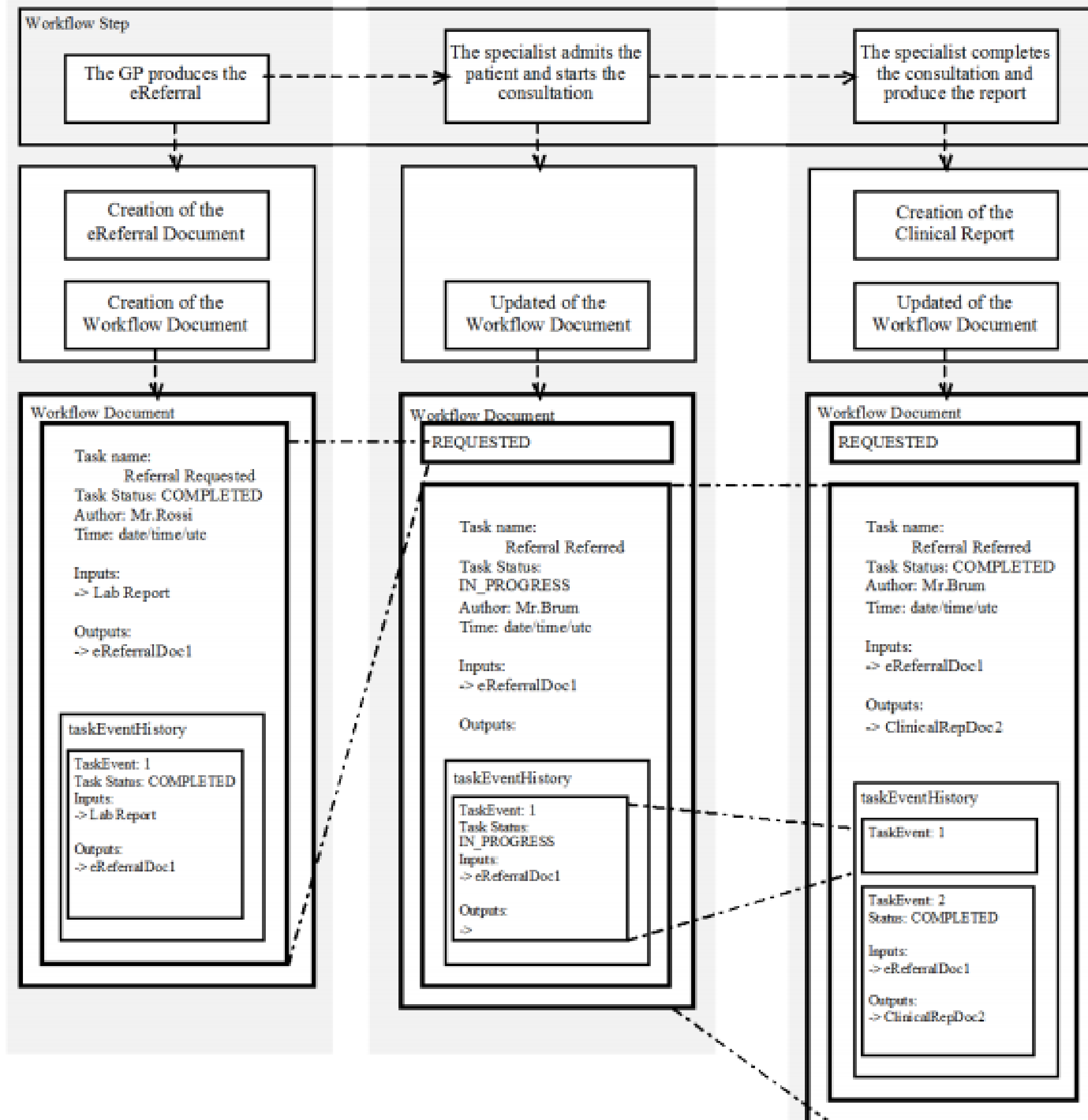


The workflow Management Document

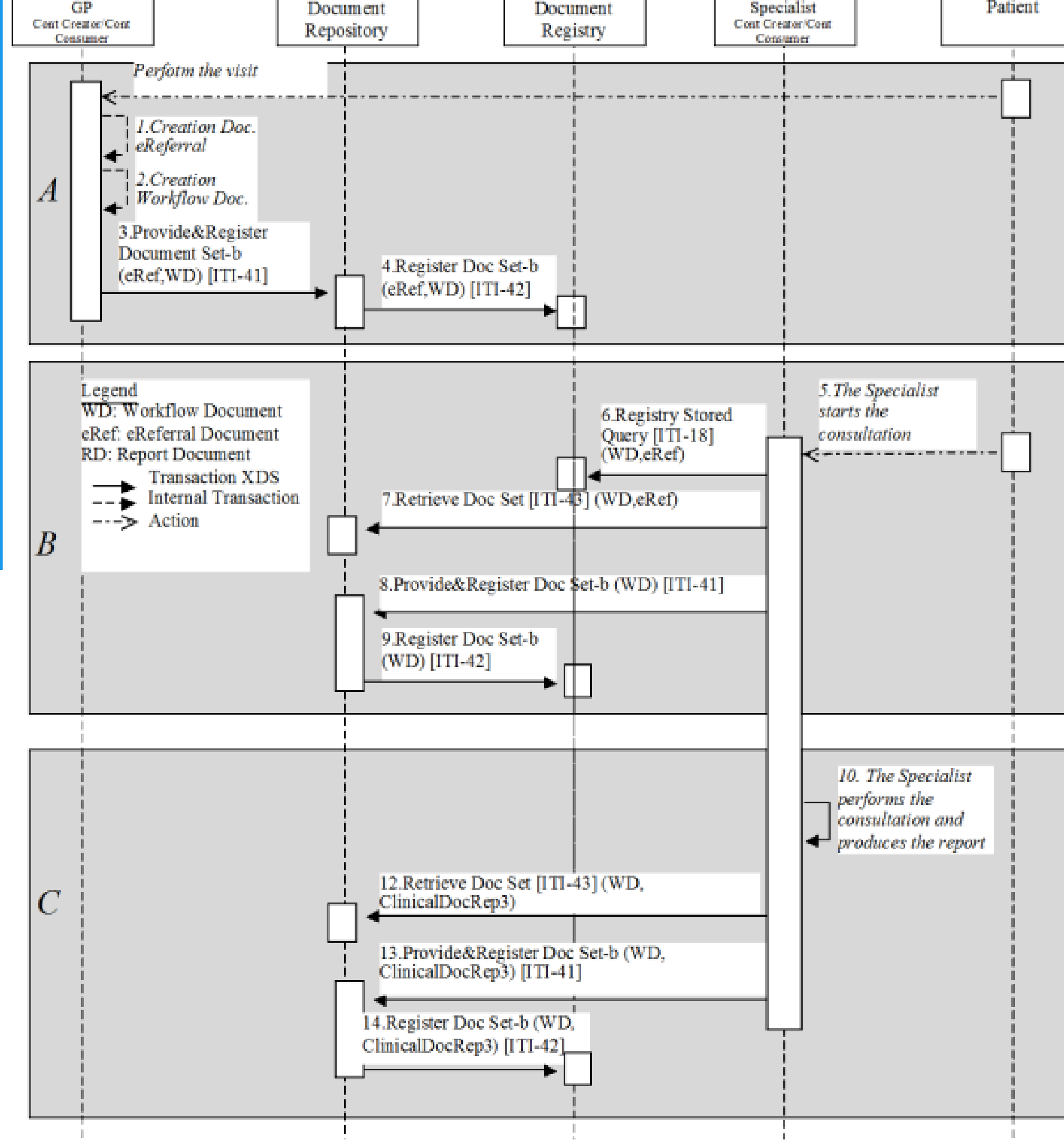
A. REFERRAL

B. SPECIALIST

C. REPORT



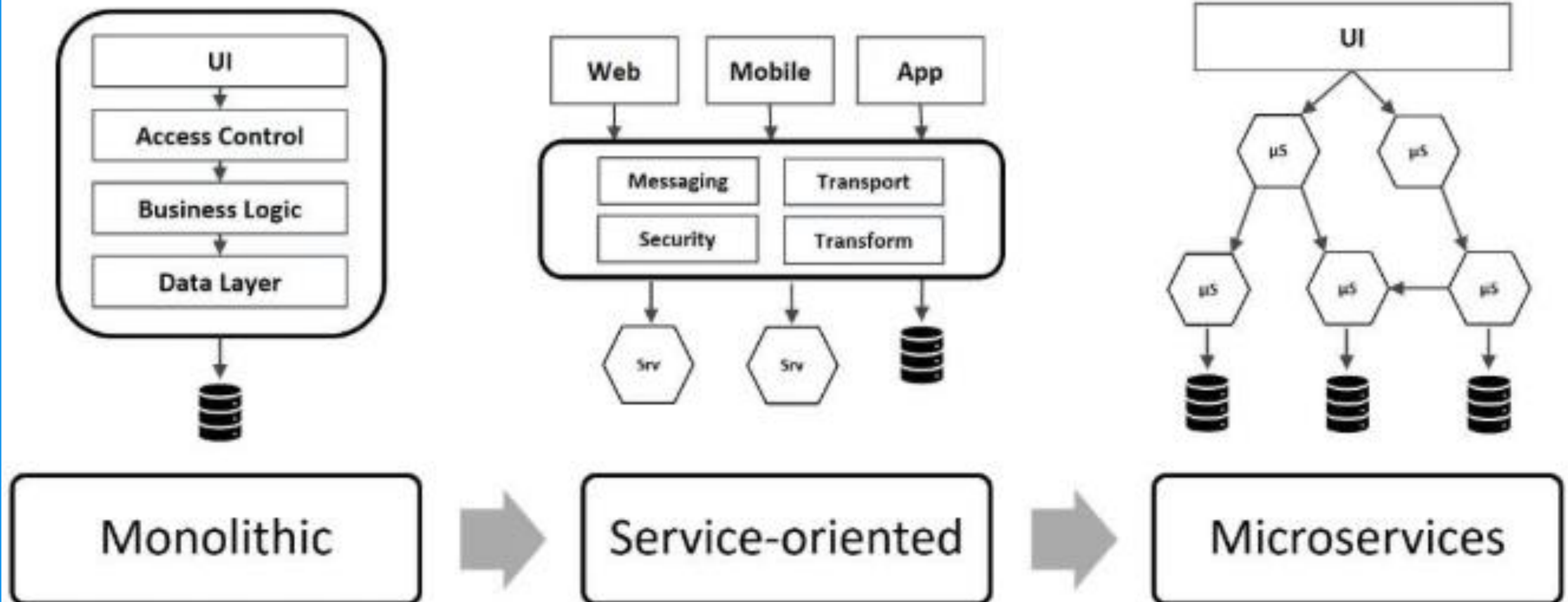
BASIC PROCESS FLOW



HL7 FHIR



Evolution of Software Architectures



HL7 FHIR



- F – Fast (to implement)
- H – Health
 - That's why we're here
- I – Interoperable
- R – Resources
 - Building blocks – more on these to follow

HL7 FHIR



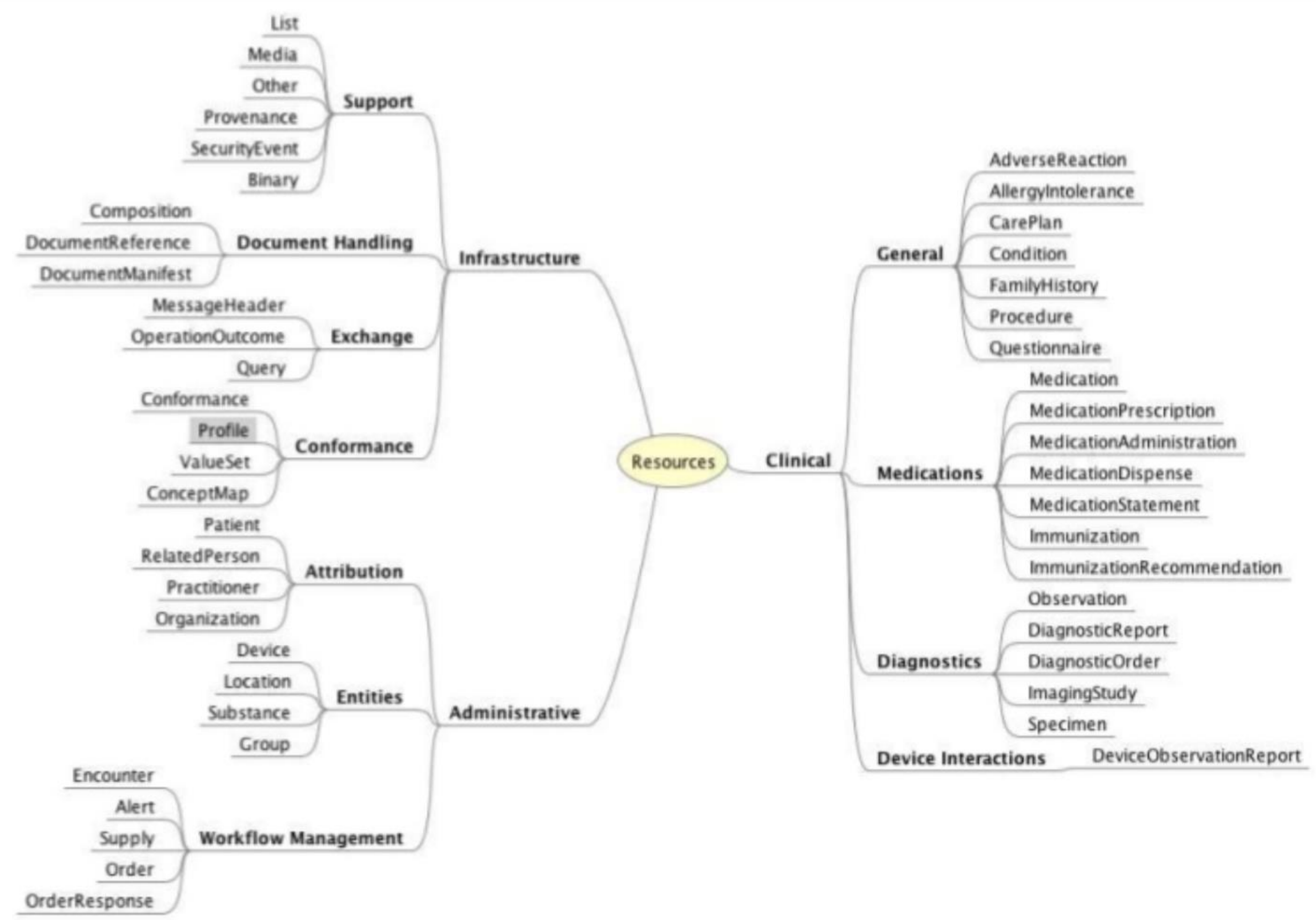
- **Shift in healthcare**
patient in control, sharing data across organizations
- **Shift from off-line to on-line**
shift from PC to tablet, from web to app, from desktop to cloud
- **Shift towards data transparency**
FHIR acts as an 'open API' to access data in these silo-like EHR's.
- **Shift towards analytics**
FHIR uses data structures that allow one to easily slice and dice the data for analytics.

What is a FHIR 'Resource'?

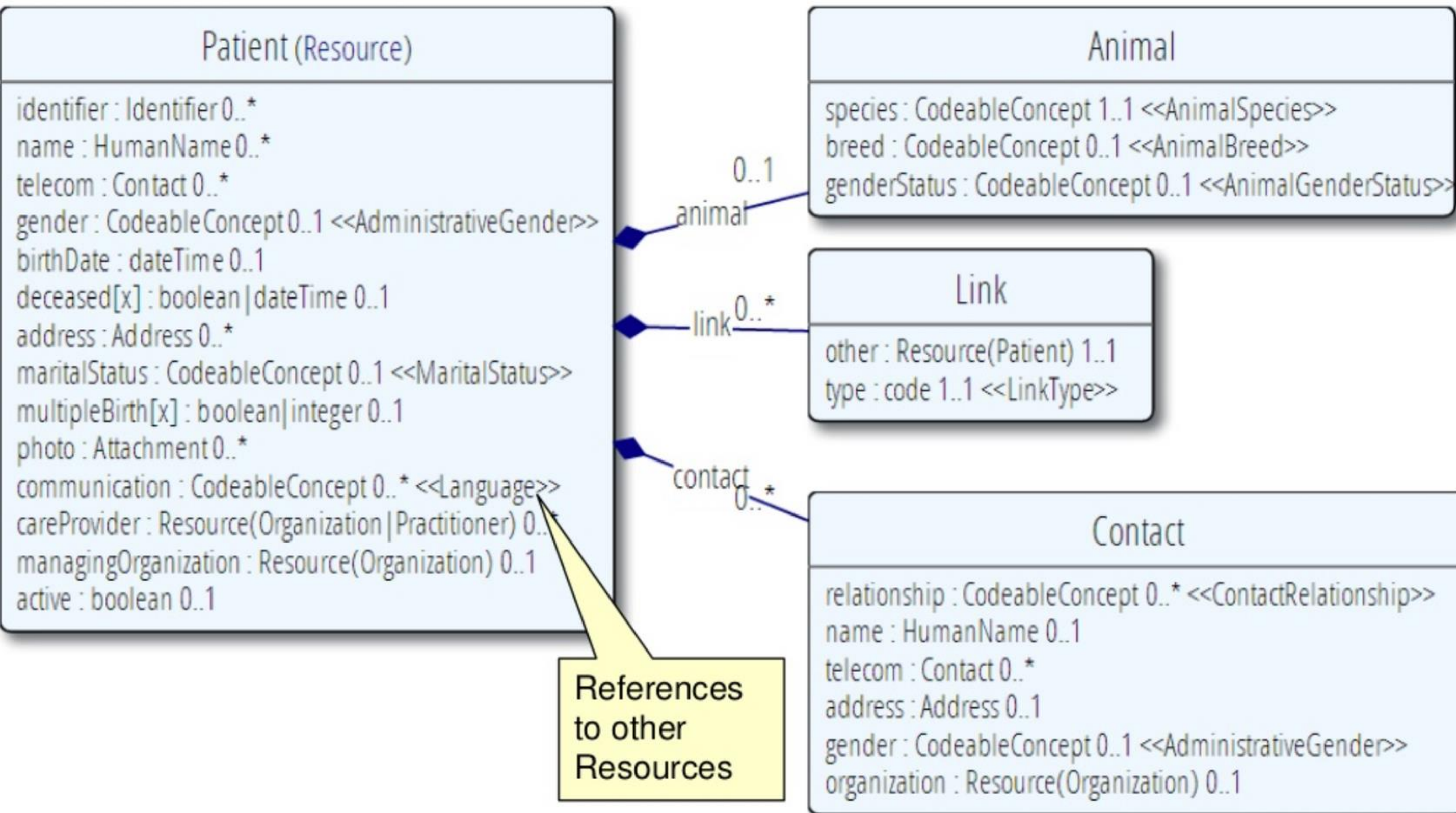


- Small, discrete concepts that can be maintained independently
 - Akin to HL7v2 segments, DICOM IEs.
- Resources are smallest units of transaction
- Built-in extension mechanism
 - Elements used by 80% of implementers are part of the base resource.
 - All other elements are handled as extensions
- Resources have a 'textual description'

FHIR Resources



Example – Patient Resource



FHIR

```
<Patient xmlns="http://hl7.org/fhir">
  <extension>
    <url value="http://www.goodhealth.org/consent/trials"/>
    <valueCode value="renal"/>
  </extension>
  <text>
    <status value="generated"/>
    <div xmlns="http://www.w3.org/1999/xhtml">
      <p>Henry LEVIN the 7th, DOB 24-Sept 1932</p>
      <p>MRN: 123456</p>
    </div>
  </text>
  <active value="true"/>
  <identifier>
    <use value="usual"/>
    <label value="MRN"/>
    <system value="http://www.goodhealth.org/identifiers/mrn"/>
    <id value="123456"/>
  </identifier>
  <details>
    <name>
      <family value="Levin"/>
      <given value="Henry"/>
      <suffix value="The 7th"/>
    </name>
    <gender>
      <system value="http://www.hl7.org/v2/0001"/>
      <code value="M"/>
    </gender>
    <birthDate value="1932-09-24"/>
  </details>
  <provider>
    <type value="Organization"/>
    <url value="../organization/@1"/>
    <display value="Good Health Clinic"/>
  </provider>
</Patient>
```

Extension with
reference to its definition

Human Readable
Summary

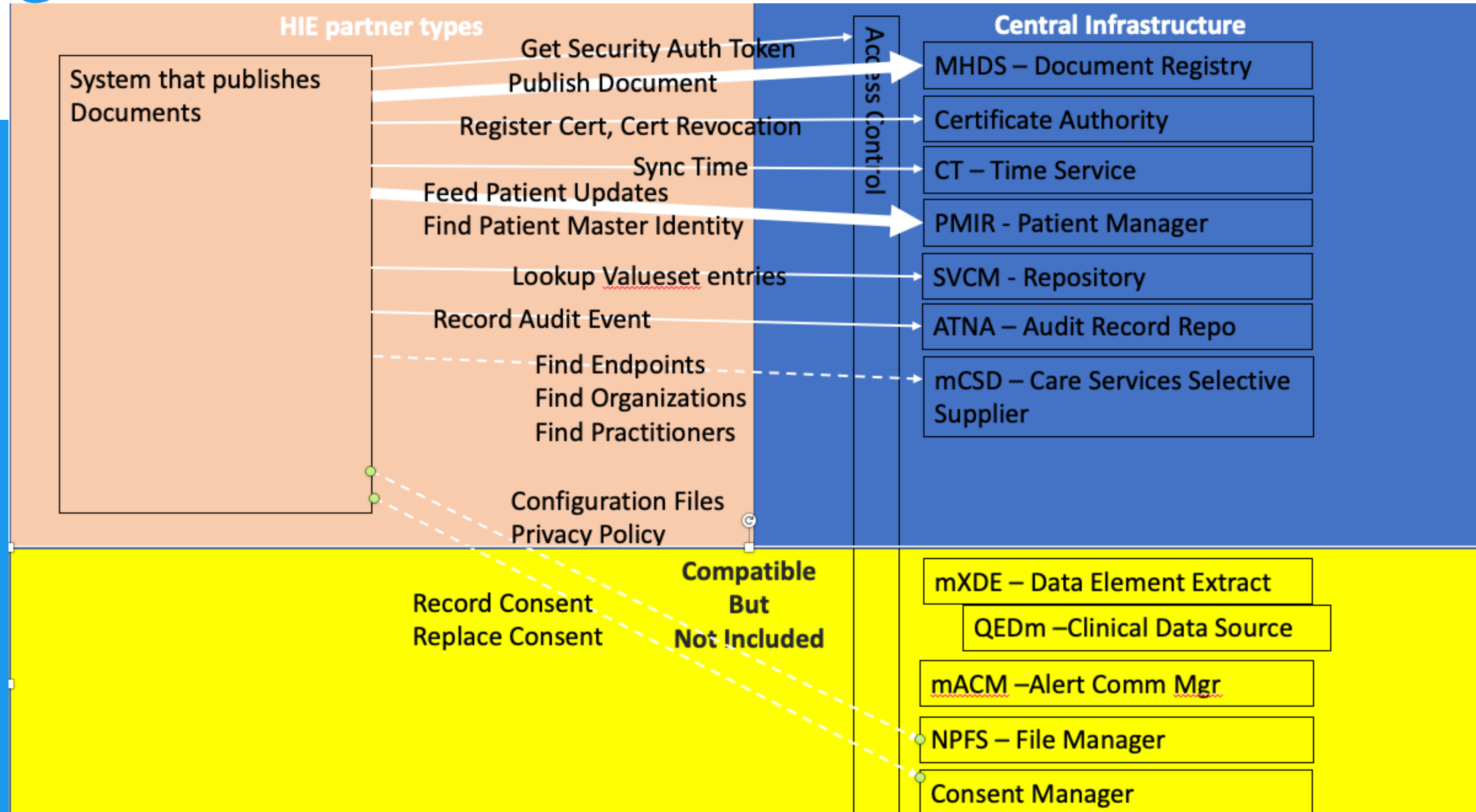
Standard Data
Content:

- MRN
- Name
- Gender
- Date of Birth
- Provider

Future



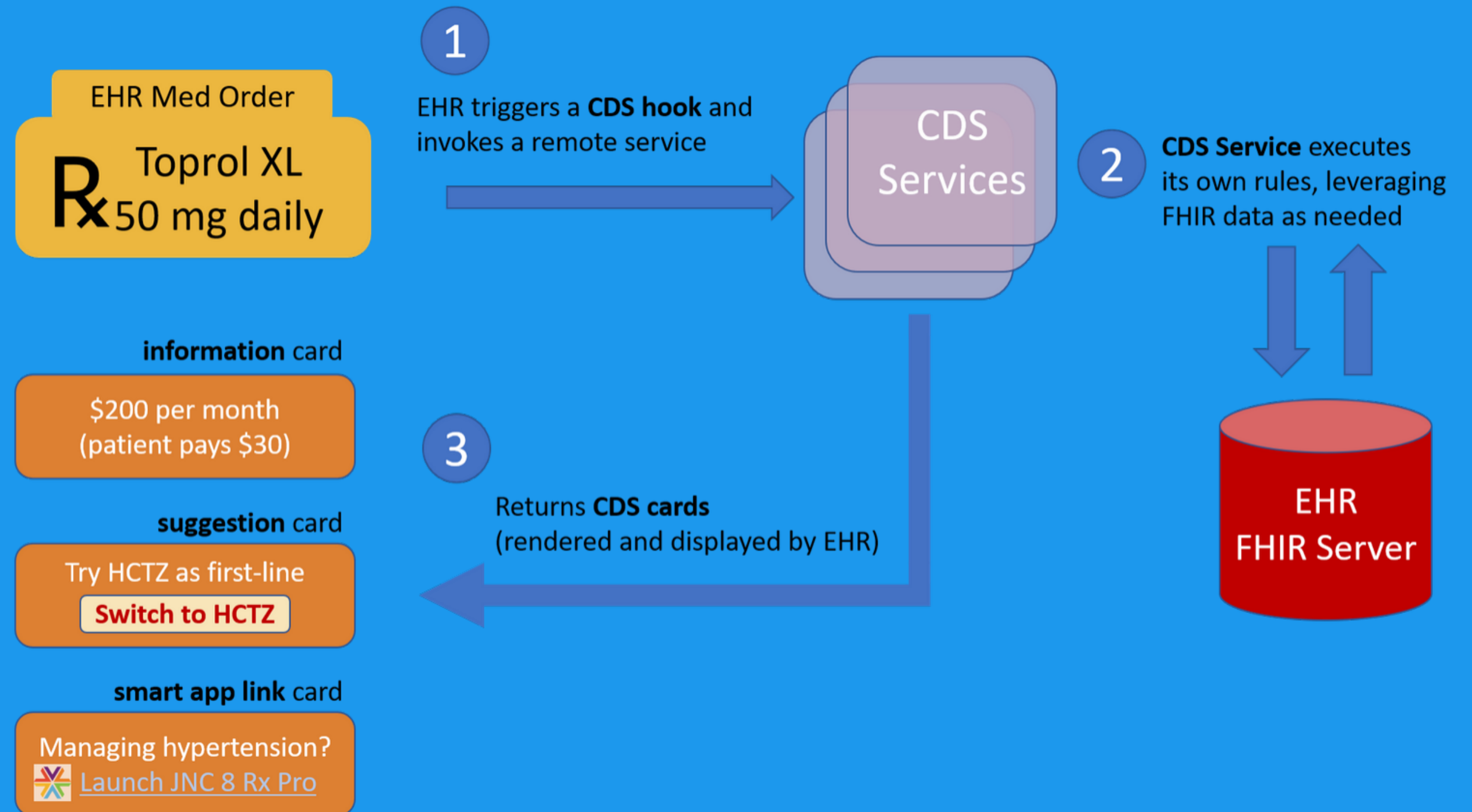
MHDS



Future



CDS HOOKS



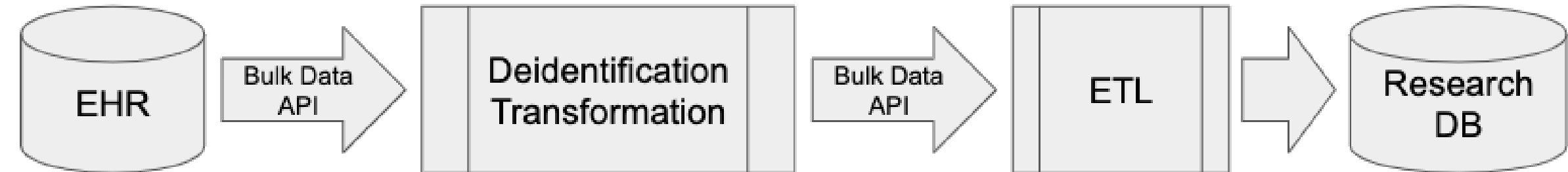
Future



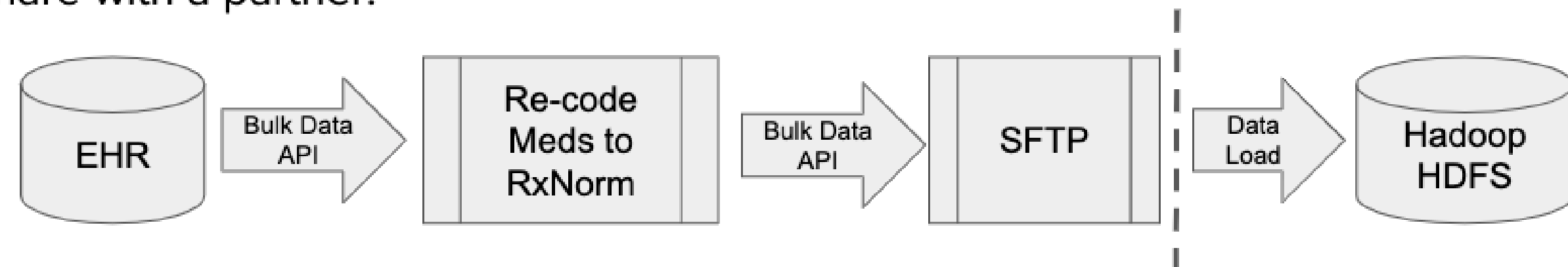
Pipelines can support many scenarios

FHIR BULK
DATA API

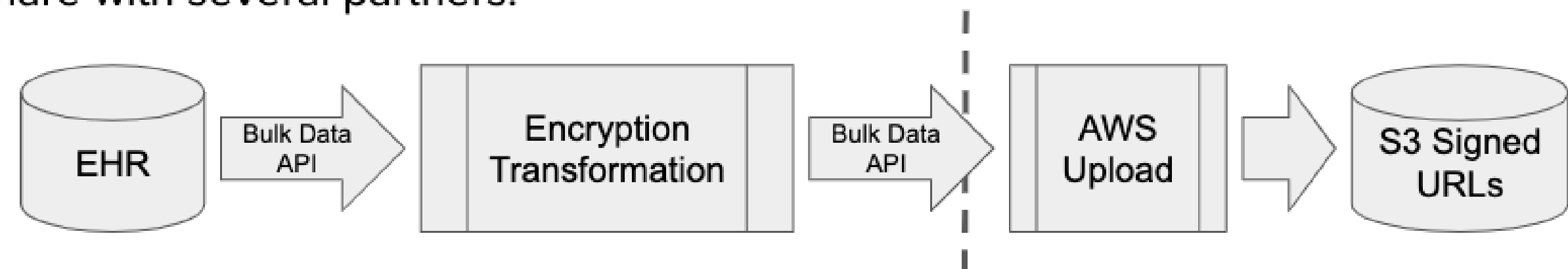
Create a deidentified view for researchers:



Share with a partner:



Share with several partners:



Contact Us



DANIEL BEREZEANU

EMAIL ADDRESS

dan@interop.it

