

# Integrating Standards to Achieve Semantic Interoperability

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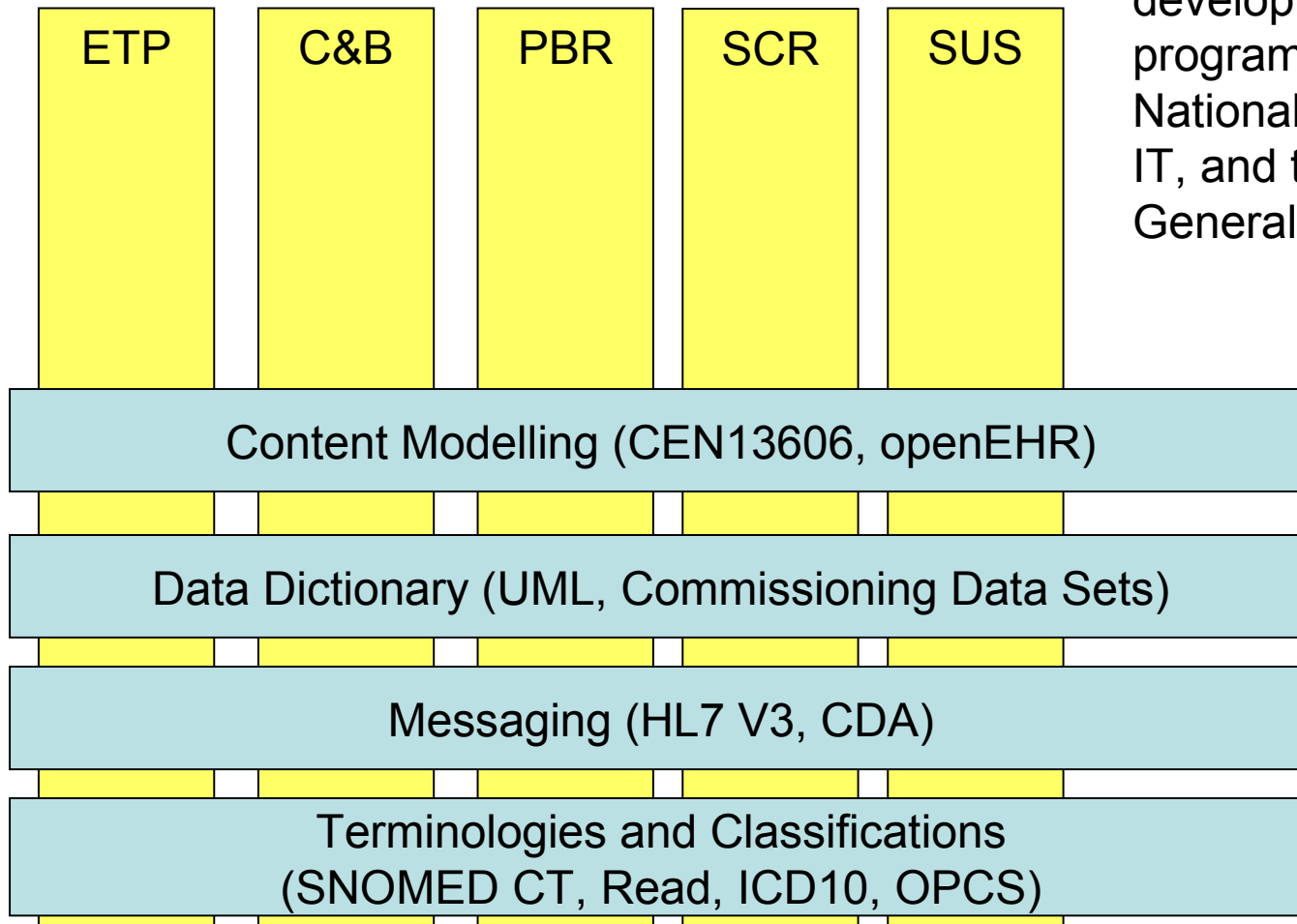
# Data Standards and Products in the National Programme



Connecting for Health

DS&P provide a broad range of services to all development programmes in the National Programme for IT, and to the NHS in General

## Development Programmes



Data Standards And Products Services

## *DS&P Mission*

To develop, maintain and support a comprehensive range of clinically-related data standards that effectively support healthcare within the NHS in an integrated and holistic manner, facilitating the delivery of a full longitudinal healthcare record for patients that can support a diverse set of secondary uses.

# DS&P Products

## Terminologies

- Read
- CTV3
- SNOMED CT
- DM+D

## Classifications

- OPCS
- ICD10
- Cross maps

## Data Dictionary

## Messaging

- HL7 V3 for Spine
- CDA + Templates
- Commissioning Data Sets

## Content Modelling

- Clinical Archetypes (CEN13606)
- Content models for suppliers

# Facts and Figures (March 2008)



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**Choose and Book:** Over seven million (7,656,482) bookings have been made to date. Choose and Book has achieved over 24,000 bookings in a single day.

## **Electronic Prescription Service (EPS)**

Over 72 million (72,680,070) prescription messages have now been transmitted electronically.

6,897 GP practices have had technical upgrades to the new system. 5,450 of these practices are actively operating the Electronic Prescription Service (EPS).

8,138 pharmacy systems have had technical upgrades to the new system and 6,720 are actively operating EPS.

**GP2GP** has now been used for 92,535 medical record transfers.

4,687 GP practices have had technical upgrades to the new system. 3,757 of these practices are now actively operating GP2GP.

**N3:** By 29 February 2008, there have been 29,730 connections to N3 and 100% of existing GP sites who require a connection have had this delivered.

N3 is one of the largest Virtual Private Networks (VPN) in the world.

**PACS:** There are 127 Picture Archiving and Communications System (PACS) from NHS Connecting for Health now live across England.

Over 613 million (613,001,624) images have been stored using PACS from NHS CFH.

PACS has been used for over 24 and a half million (24,521,613) patient studies.

## **NHS Care Records Service**

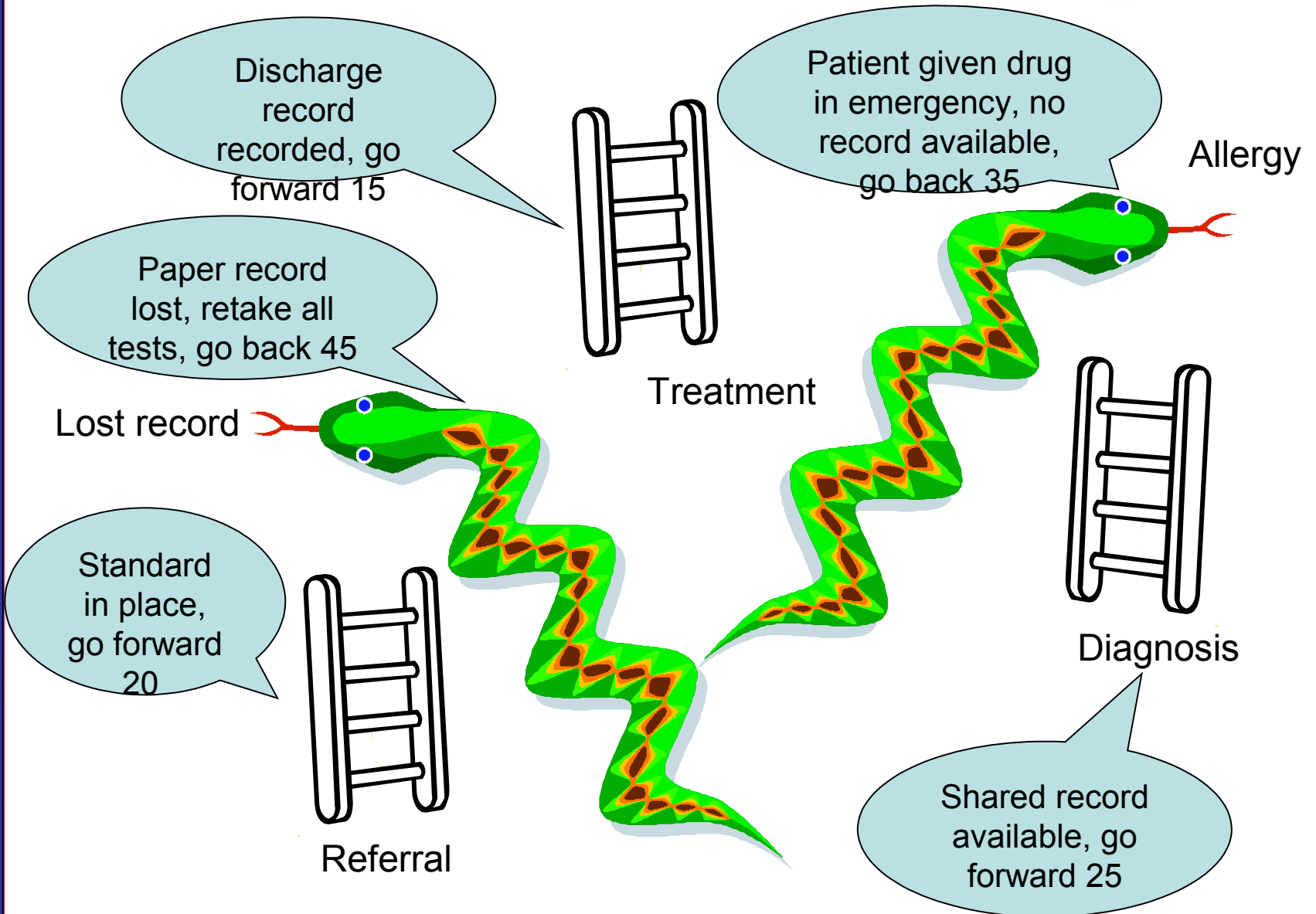
153,188 Summary Care Records have now been uploaded to the Spine.

There are 462,570 Smartcard holders who are registered and approved for access to the Spine.

# The patient journey



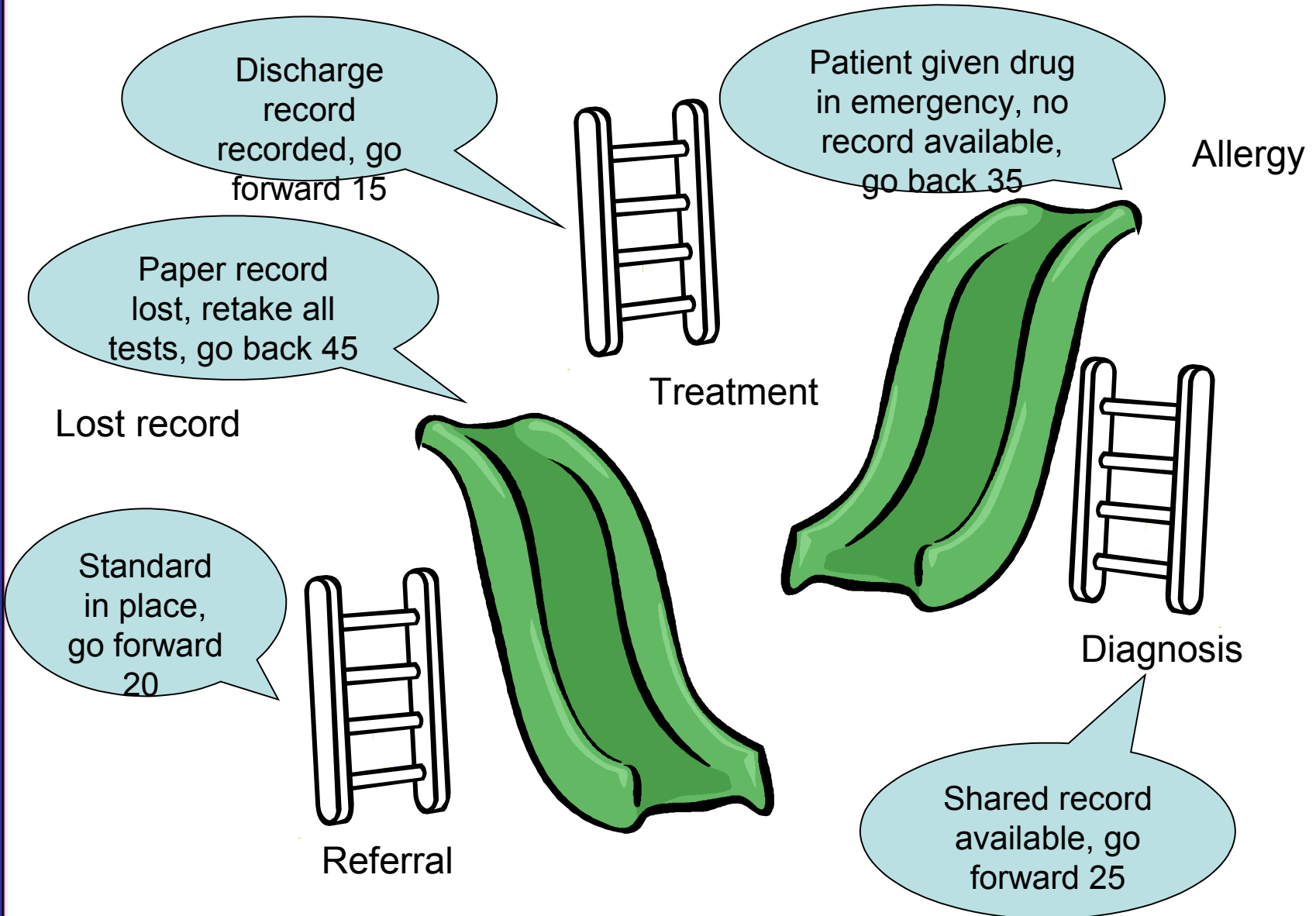
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# The patient journey (North American version)



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# *Killing Snakes*

Single patient identifier

Traceable patient records

Integrated infrastructure

Critical information available everywhere  
instantly

More detailed records accessible

Safe, secure access for clinicians



# *Creating Ladders*

Single demographic service

Summary Care Record

Electronic Prescribing

Electronic Booking

PACS

Locatable Detailed Records

Defined Interchange Standards

Access Control Framework

## *Some of the challenges*

Vendor solutions collect and manage data in very different ways

Most standards are framework standards that need localisation and customisation

No standard is comprehensive, and standards overlap and compete in some areas

There are gaps in the standards

## *How we need to view the problem*

Recognise the end-to-end problem and work to solve it

- What and how you collect data
- What is stored
- What and how it is communicated
- How it is located and retrieved
- How it is searched, aggregated, sifted, ...

Rigorously adapt the standards stack, and make it work

Rigorously enforce the standards

## *Some new snakes to beware of*

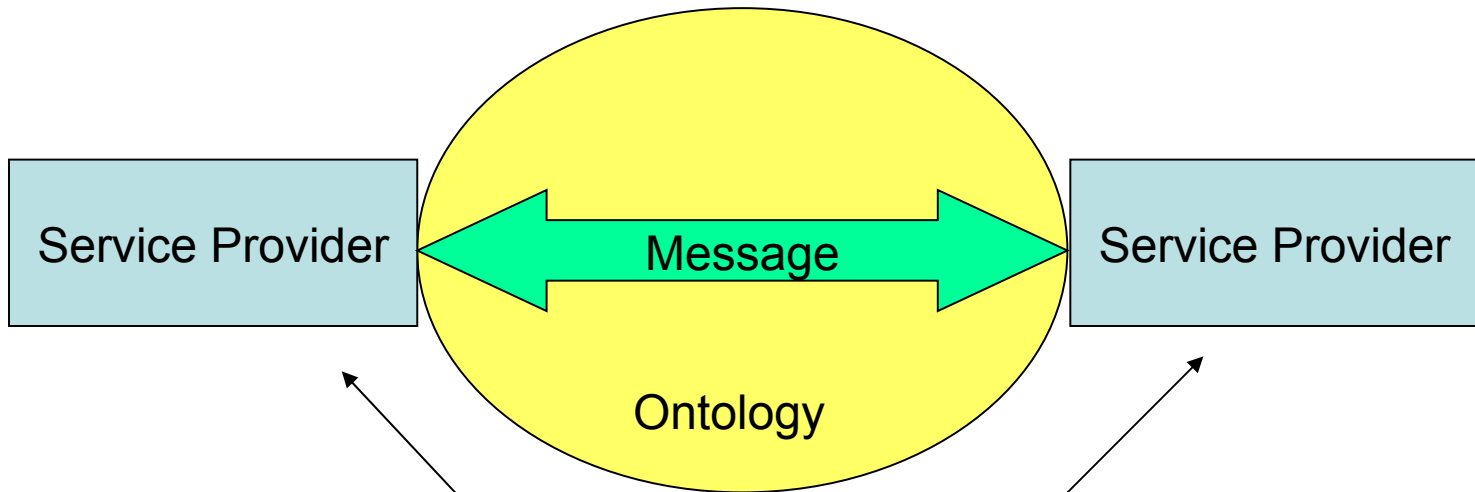
Incompatible standards are worse than no standards

Overlapping standards can generate confusion

Two standards-compliant solutions may not actually interoperate!

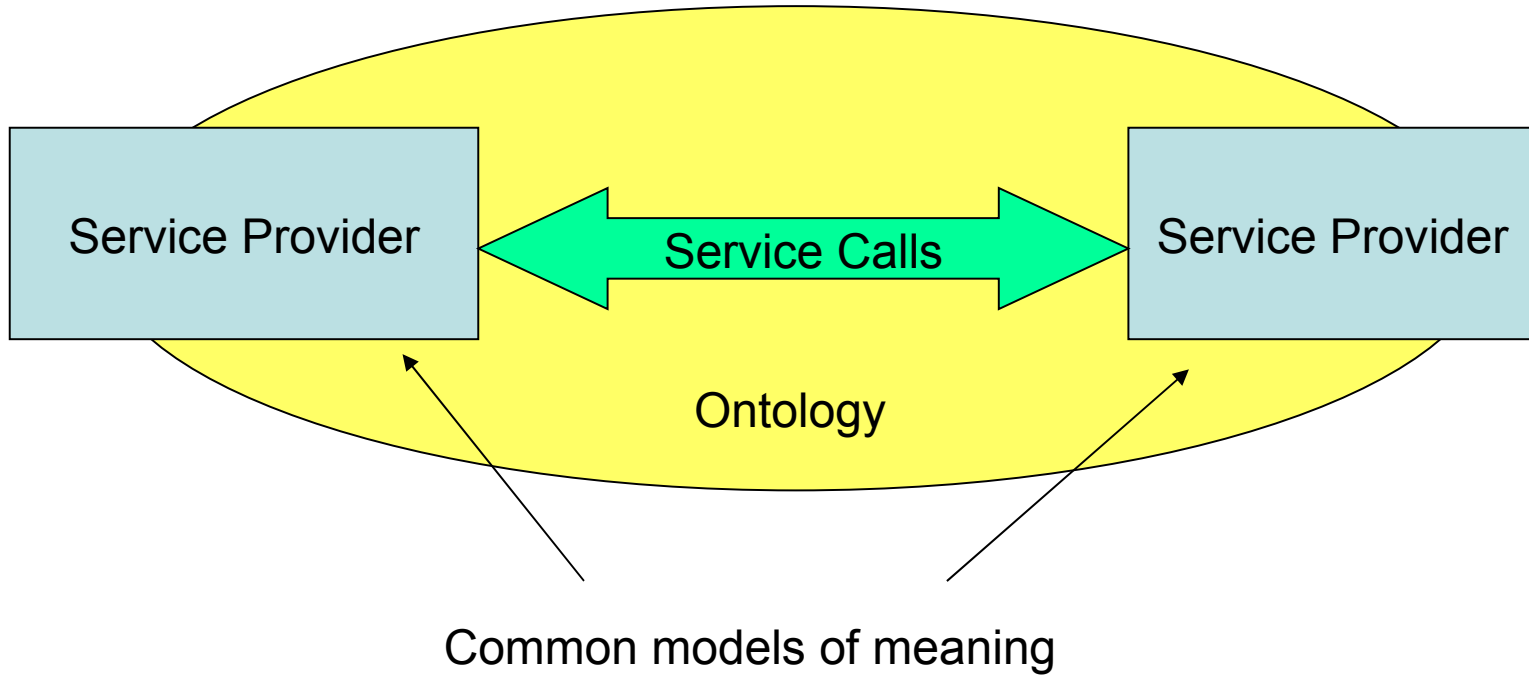
Message-centric solutions to interoperability hide problems until late in the life cycle

# Clinical Interoperability today

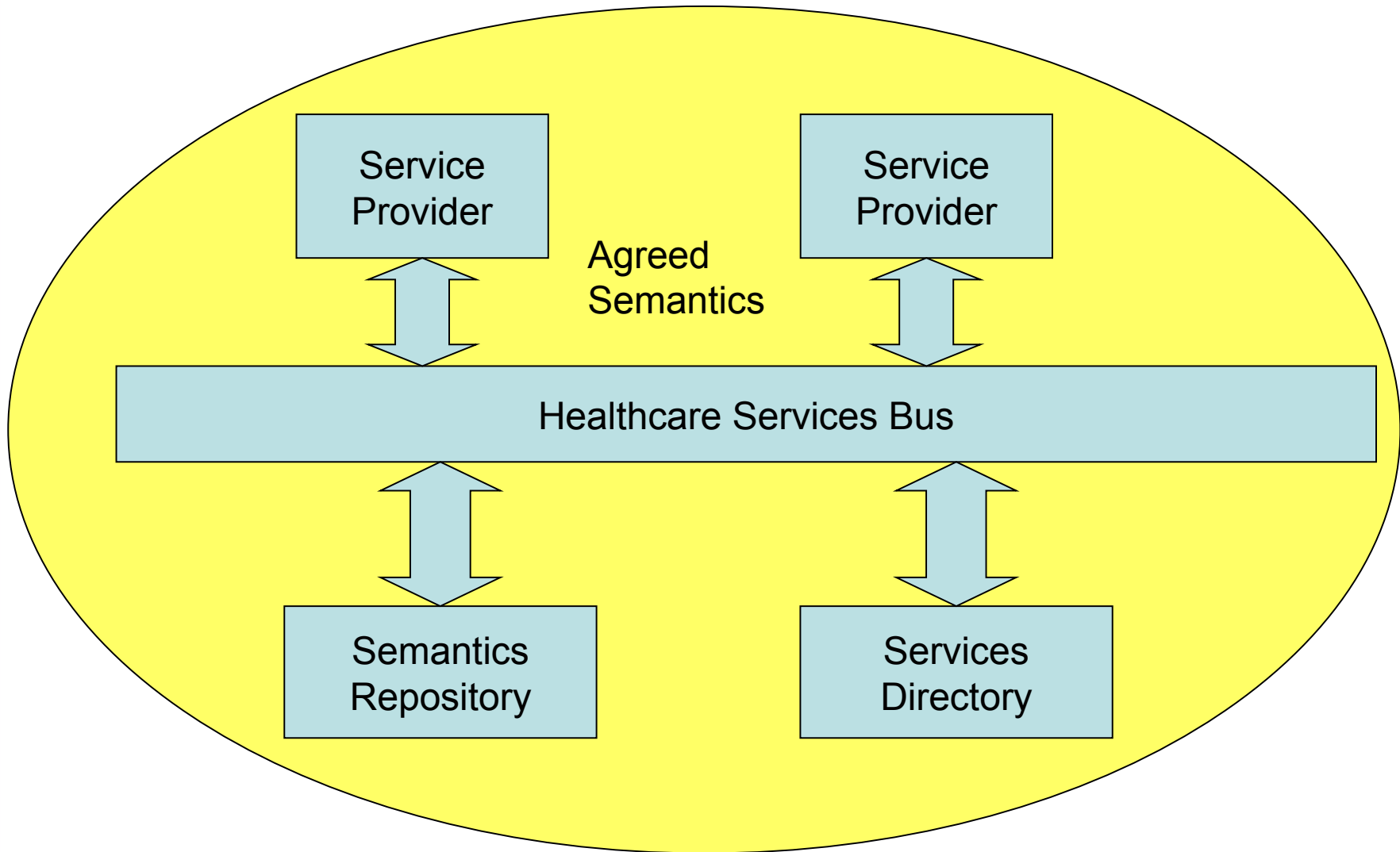


No common model of meaning

# Clinical Interoperability tomorrow



# Technical Architecture for Semantic Interoperability



# How Does SOA fit?

SOA adds

- Discoverability / searchability
- Adaptability
- Dynamic configuration

SOA has the challenges

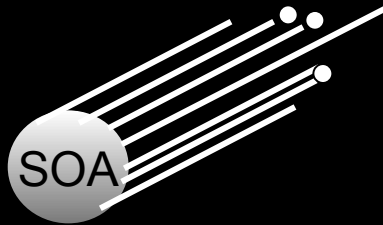
- Semantics of the process
- What it ships is not neutral – the semantics of the data are important



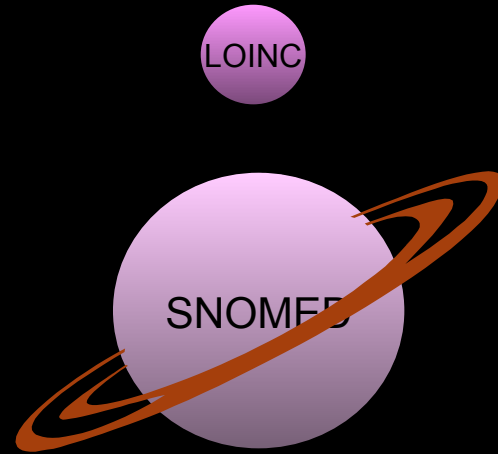
# The Standards Solar System



UML



SOA

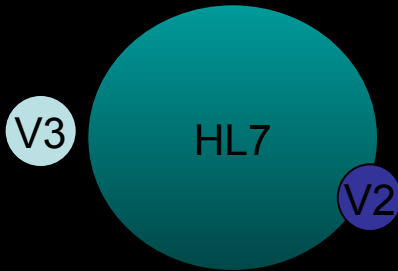


SNOMED

LOINC



ICD10



HL7

V3

V2



openEHR



IHE



ISO Data Types

# *Copernican Standards*

We need to rethink our “physics”

No individual standard is the centre of the universe

No SDO can manage all the standards

The EHR should be the centre of the standards universe

The EHR needs to be thought of in terms of

- Data structure
- Location and retrieval
- Access and audit
- Clinical safety

# *The new physics for the EHR*

Collect once, use many times

Operational not managerial collection

We need a model of re-use that reflects clinical practice and that is supported by standards

Transformations can be dangerous – they reduce quality

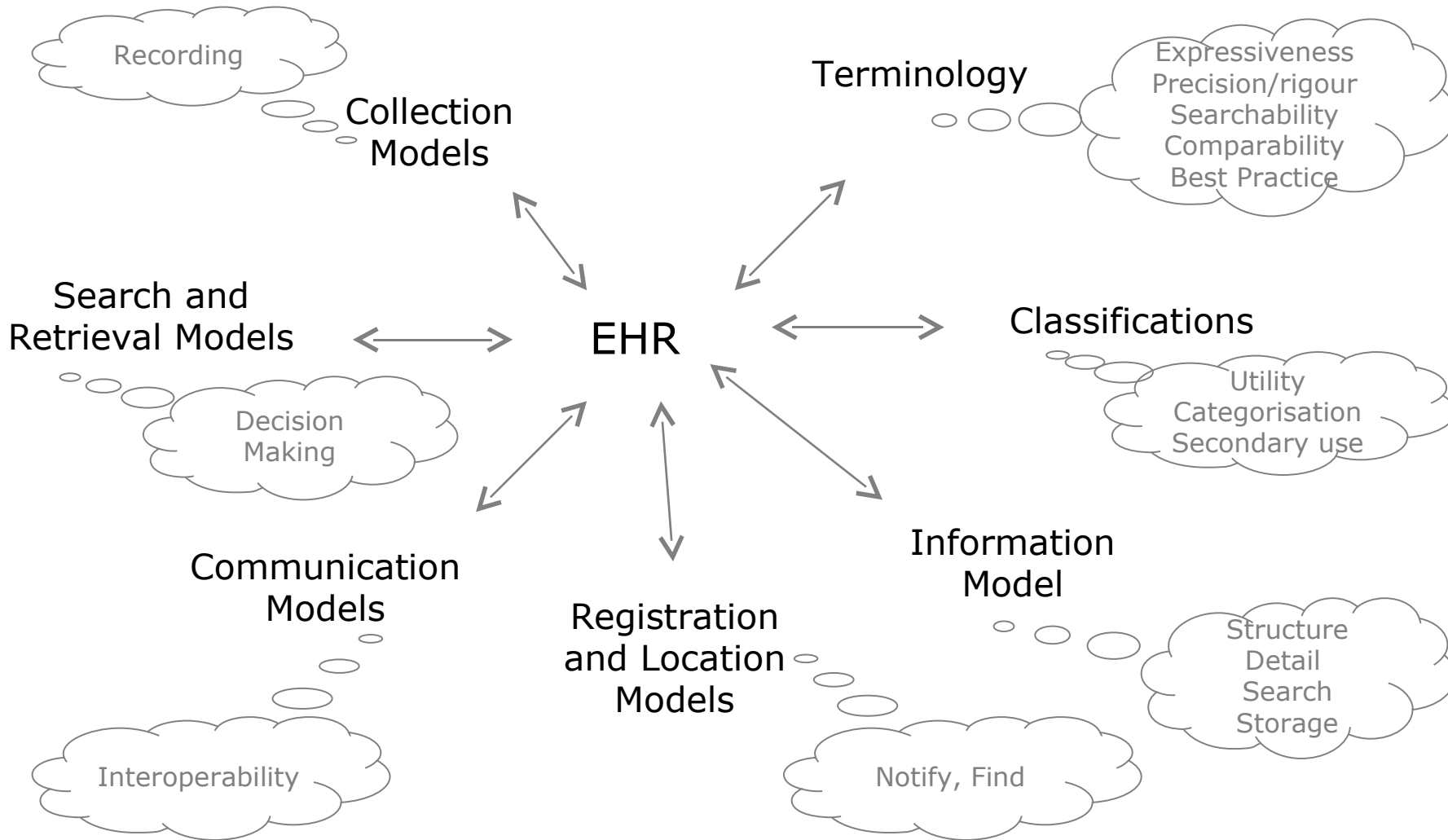
Replication is problematic – how do you rectify data that has been distributed widely?

Information needs to be available soon after it is collected

Information needs to be discoverable

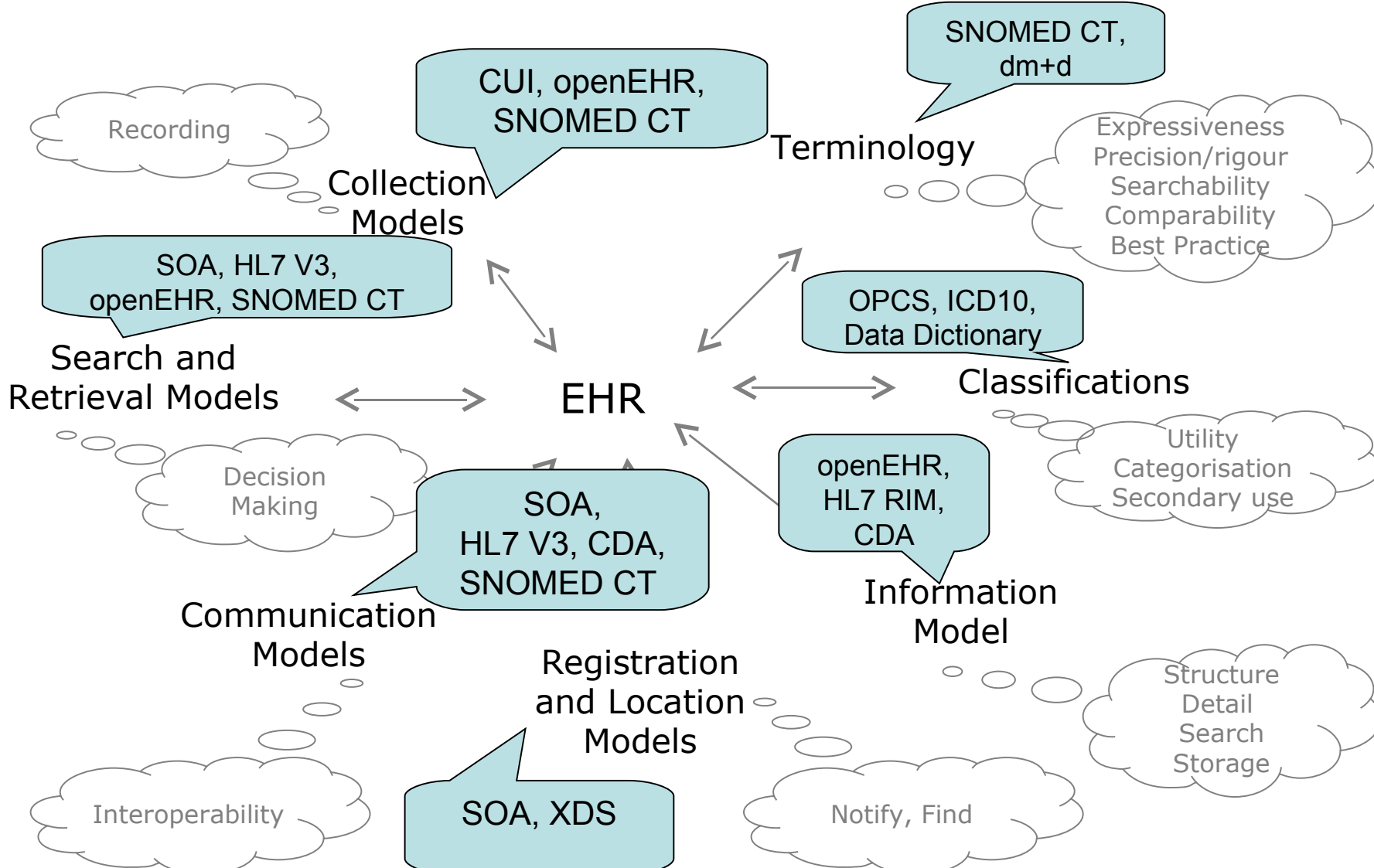
Information needs to be searchable and comparable

# Standards in the context of an EHR

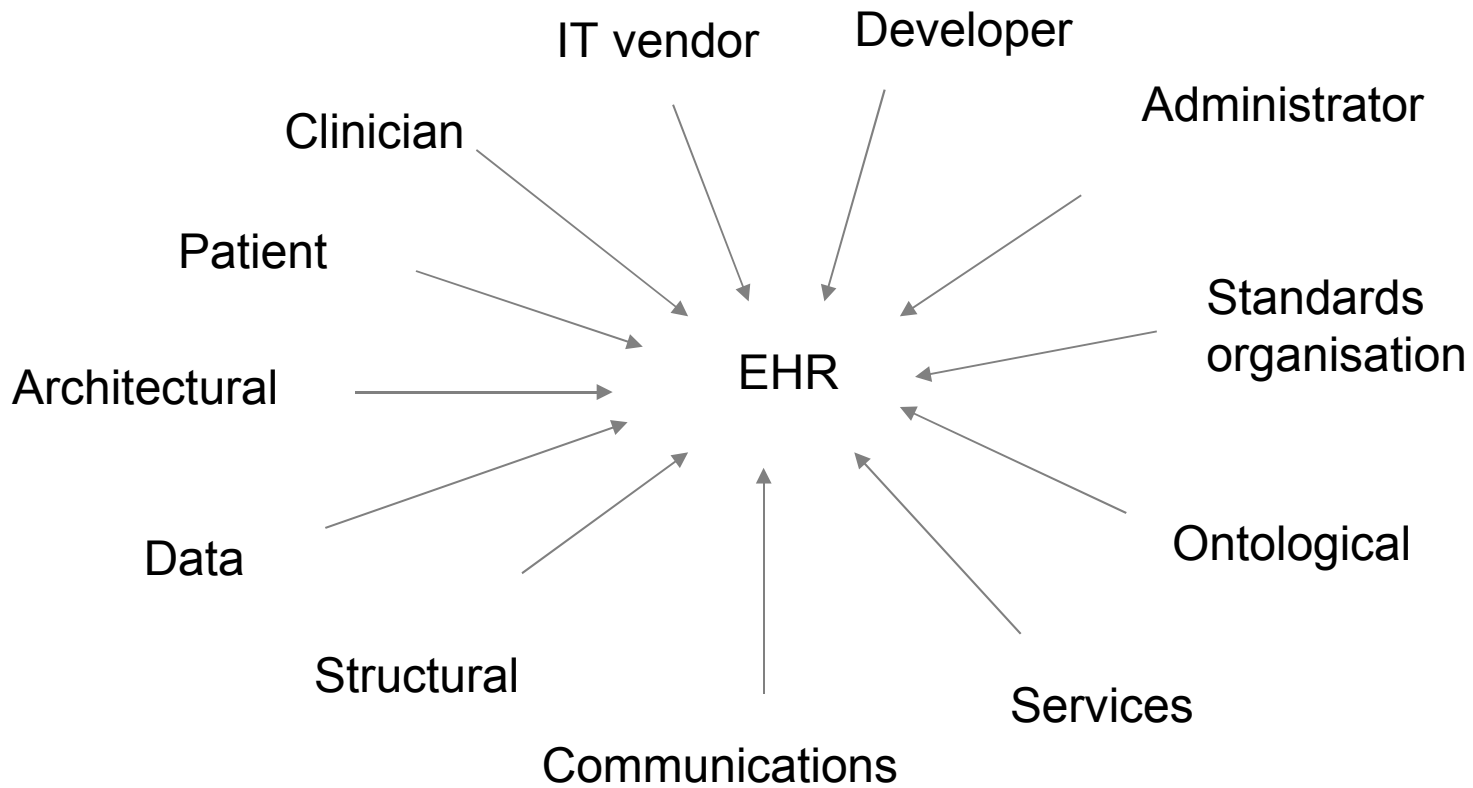


# Standards in the context of an EHR

Data Standards and Products



# Perspectives on the EHR

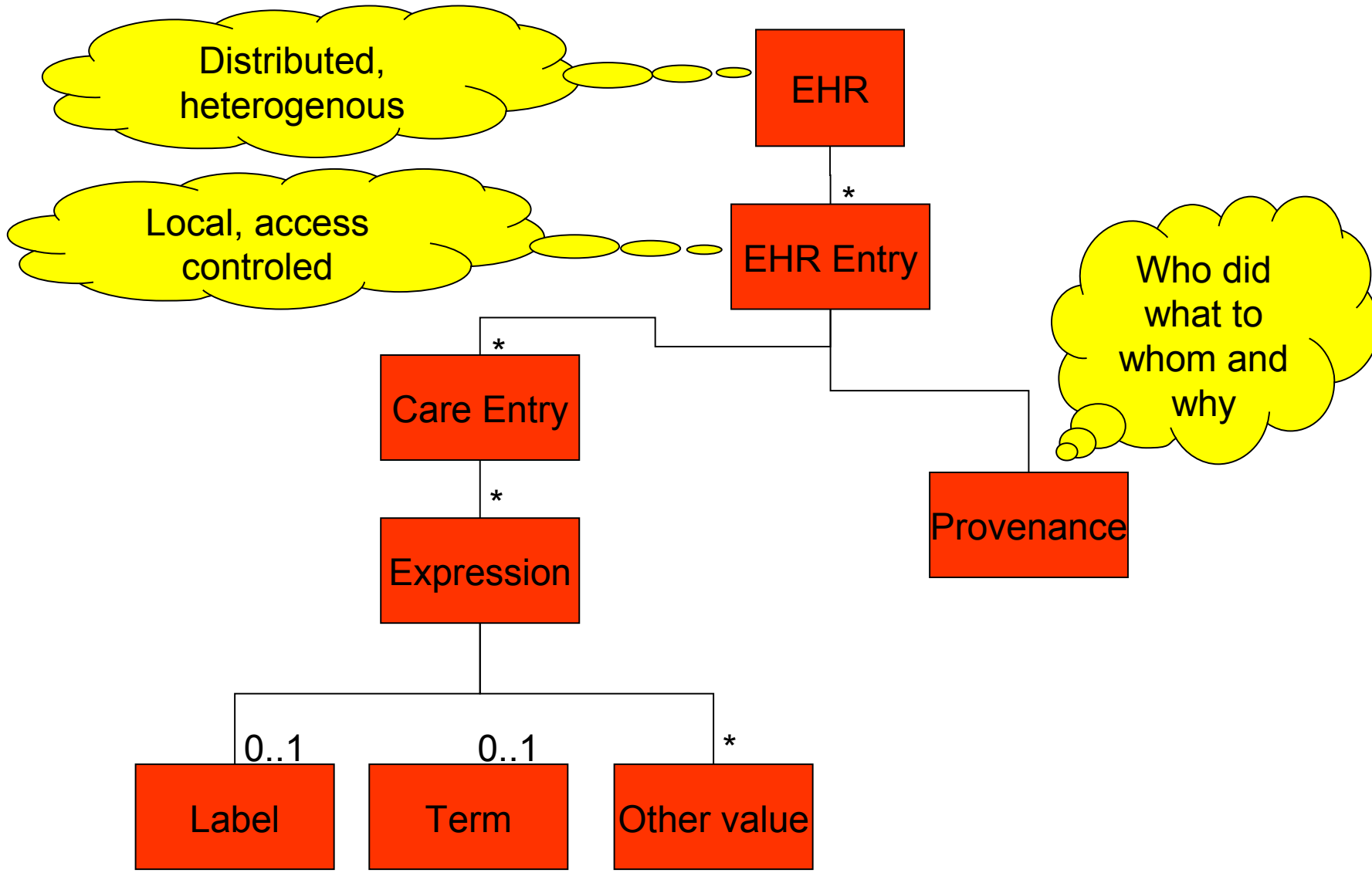


# EHR Logical Record Architecture



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Data Standards and Products



# EHR Logical Record Architecture

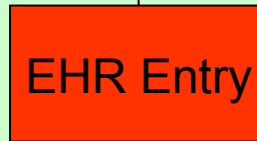


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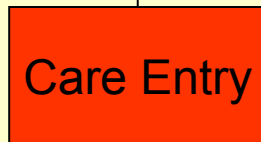
## Logical Systems Architecture



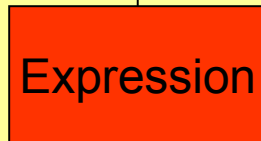
## Logical Record Architecture



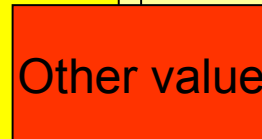
## Template



## Archetype



## Terminology



0..1

0..1

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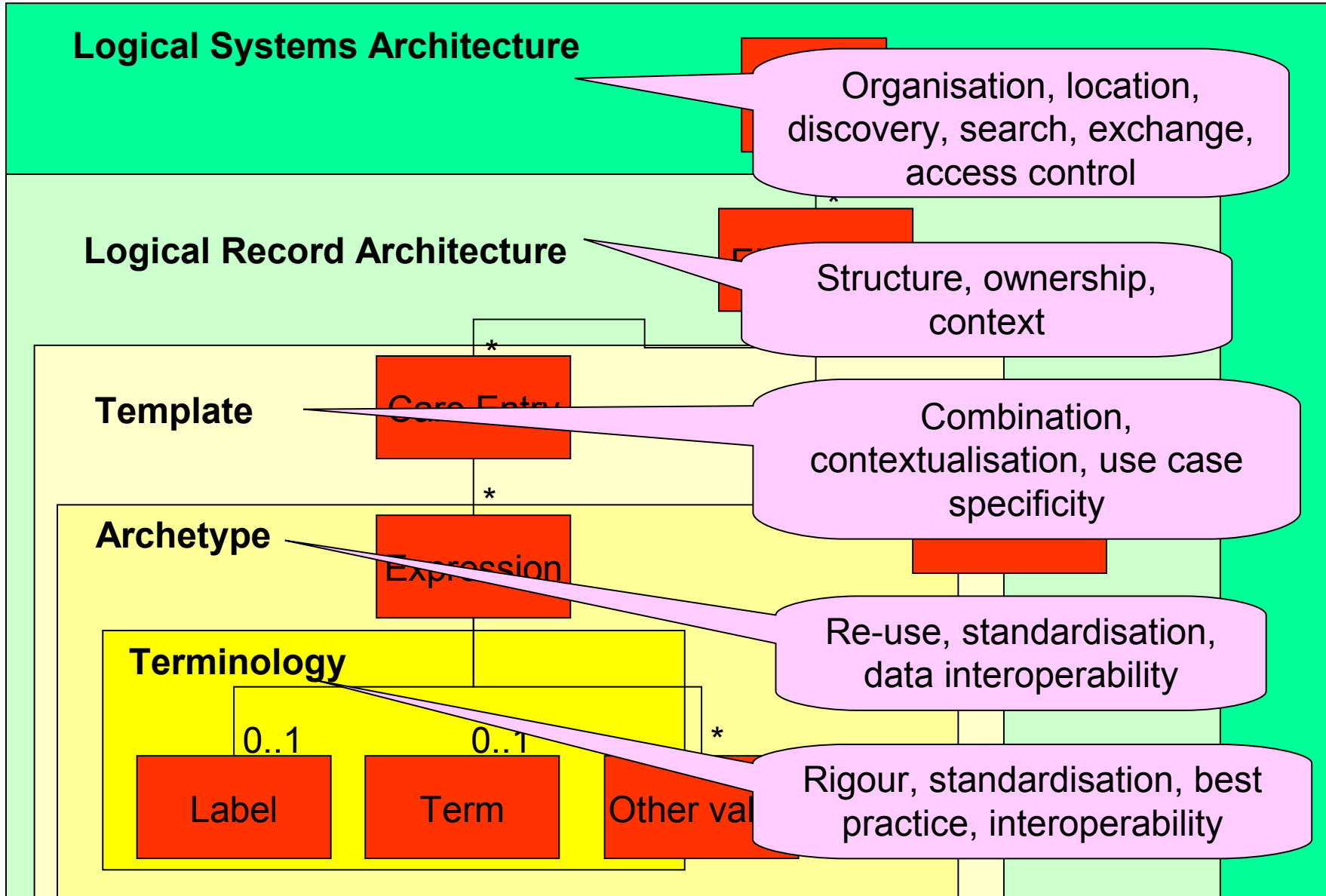


# EHR Logical Record Architecture



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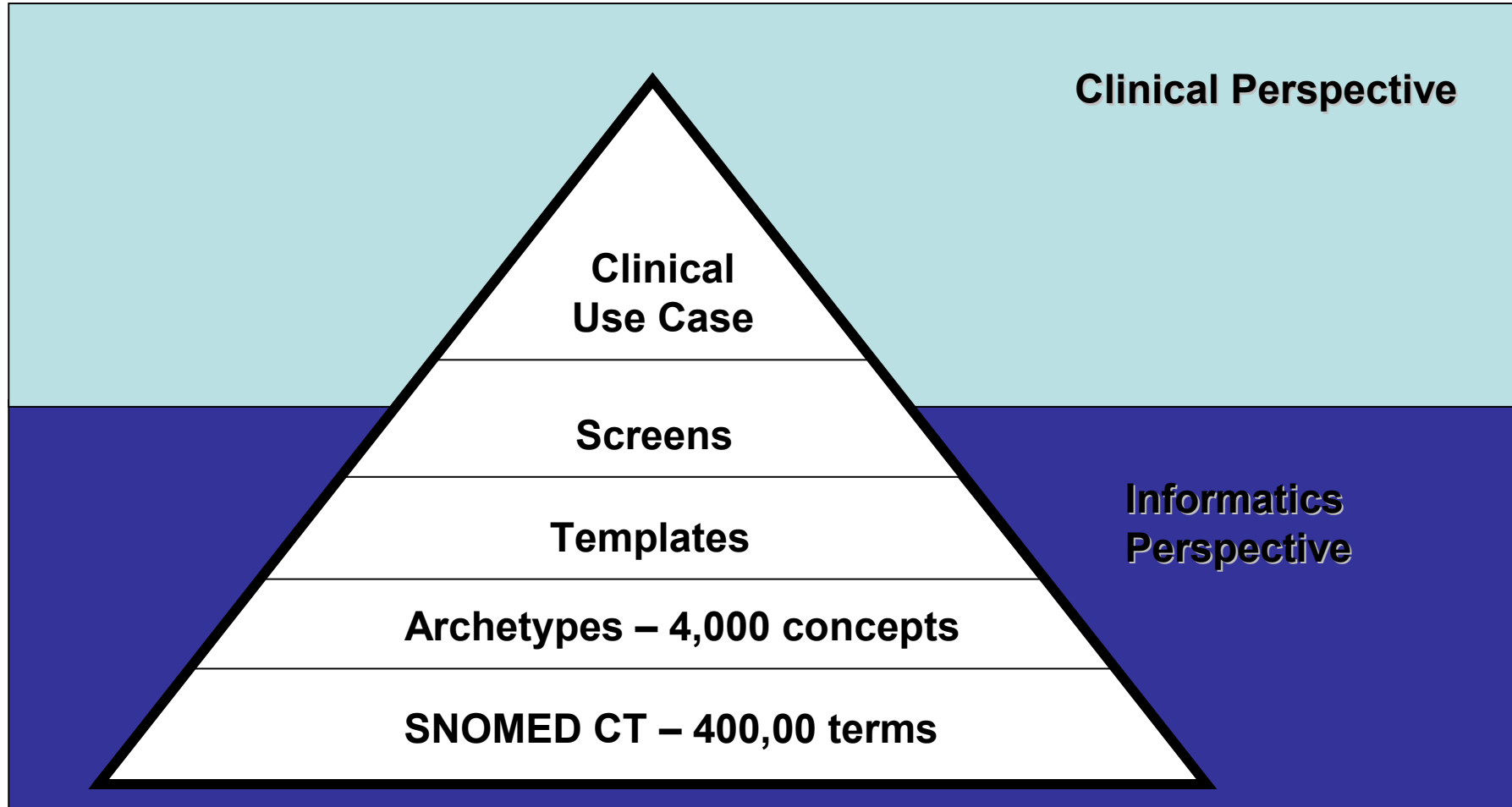
Data Standards and Products



# Supporting Clinical Use Cases

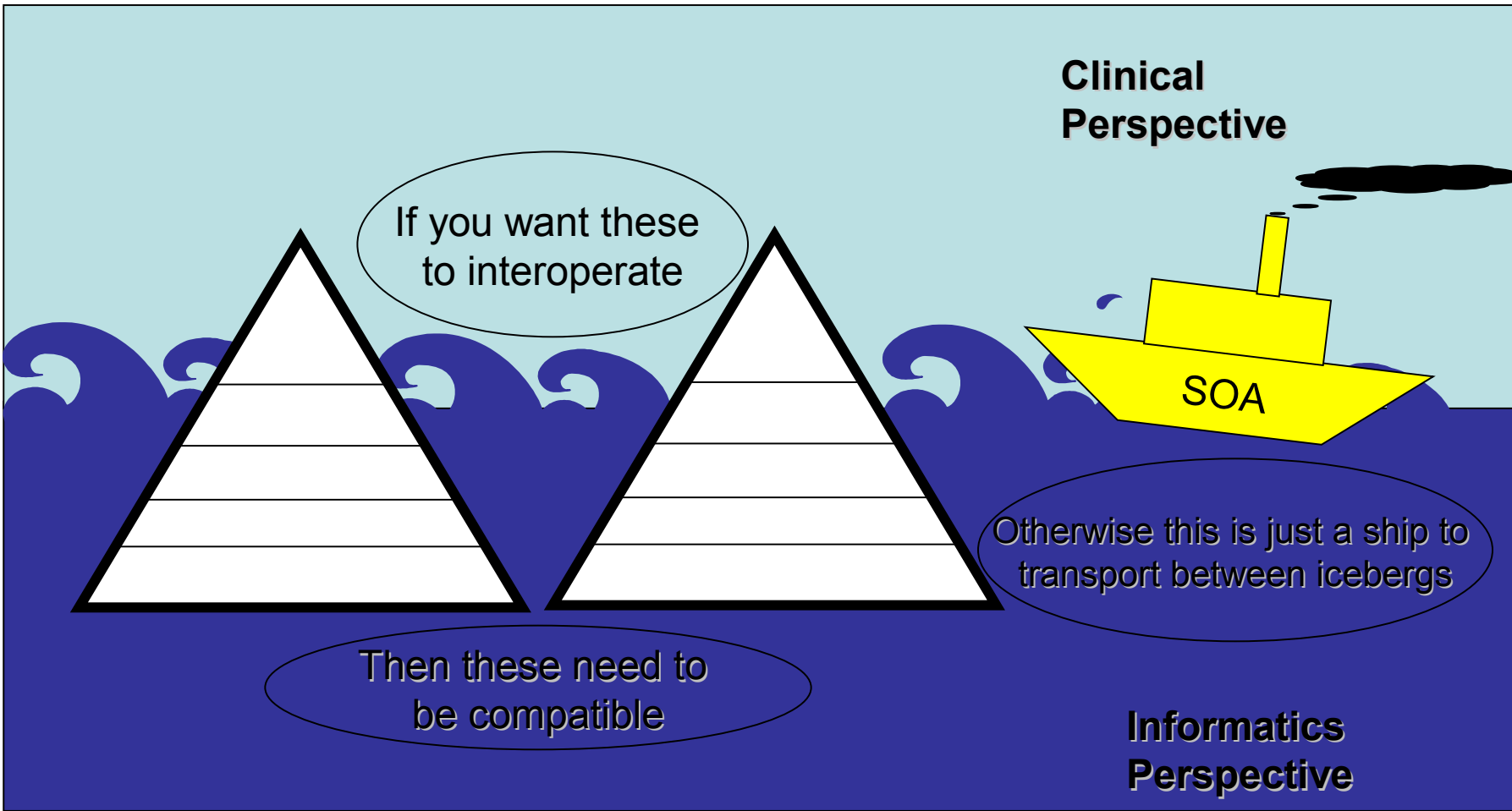
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Data Standards and Products



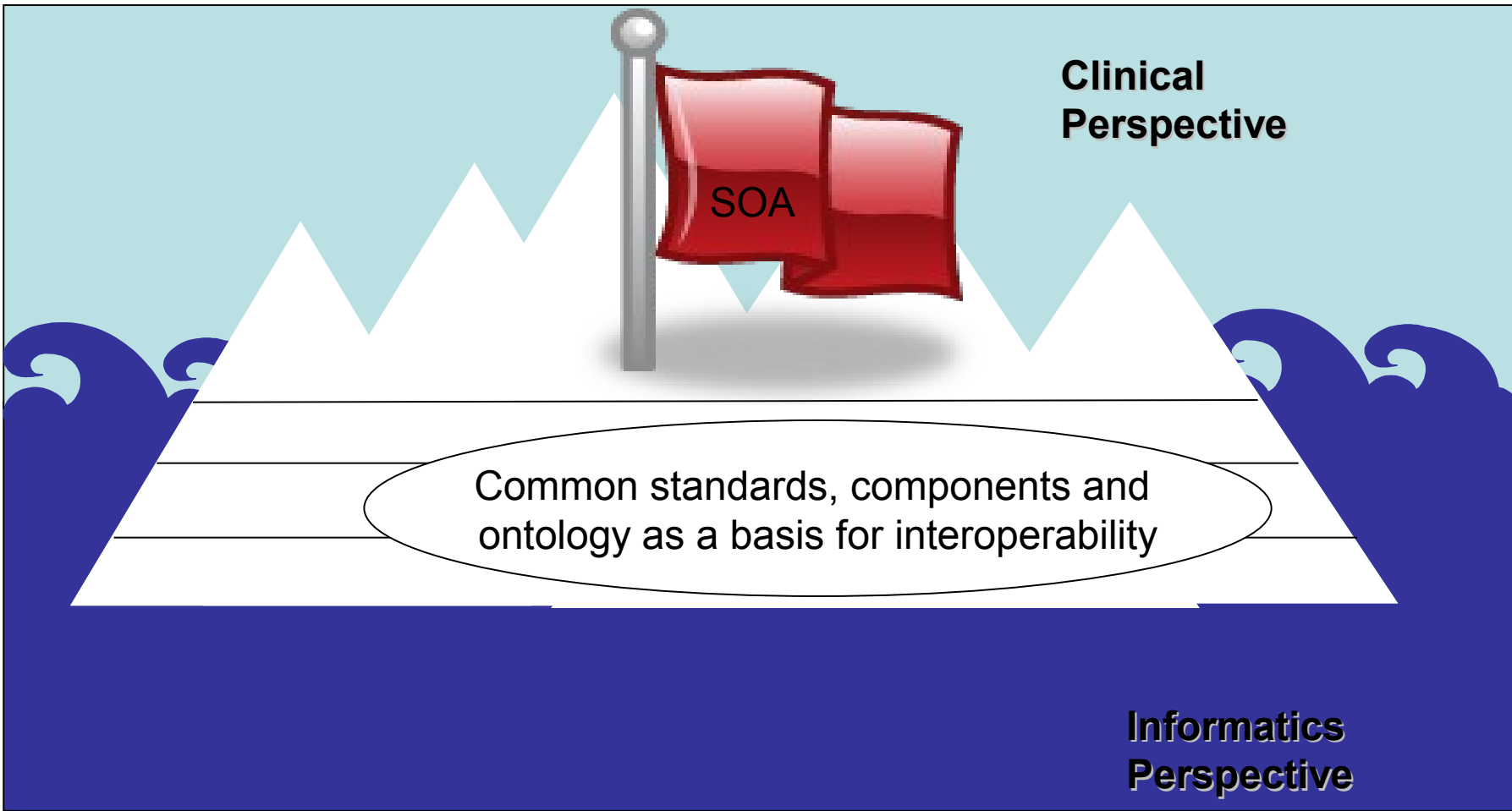
# Interoperable Clinical Use Cases

Data Standards and Products



# Interoperable Clinical Use Cases

Data Standards and Products



Clinical Perspective

SOA

Common standards, components and ontology as a basis for interoperability

Informatics Perspective

# Conclusion

There is no one quick fix

Harmonisation and interoperability of standards is key

Holistic, end-to-end design and use of standards is essential

Standards cannot be used like glue to fit together incompatible parts, the parts have to standardise too

SOA provides an important set of tools in the standards arena, but alone cannot solve interoperability

Clinical buy-in is an imperative, but do not expect clinicians to understand the informatics