



**SEE REGIONAL E-HEALTH
CONFERENCE 16-18 FEB 2011**

Thomas Beale, Ljubljana, 17 Feb 2011

*open*EHR – what it is in
concrete terms

Intellectual Property

- *Specifications* : 34,832 h (18.5 py)
 - 27 specifications
 - XSDs, UML, tool-based model files
- *Open source software*: 44,000h (23 py)
 - 6 projects on openEHR.org
 - 30? projects worldwide
- *Archetypes* : 13,870h (7.2 py)
 - 270+ archetypes
 - 500+ domain expert CKM users
- TOTAL - 49 person years

E-community

- Website – <http://www.openEHR.org>
- Wiki – <http://www.openEHR.org/wiki>
- Issue trackers – <http://www.openEHR/issues>
- Mailing lists -
<http://www.openehr.org/community/maillinglists.html>
- CKM – <http://www.openEHR.org/knowledge>

Where in use?







Industry

 <p>Cambio⁺ Healthcare Systems</p> <p>(Sweden)</p>	 <p>ethidium[™] HEALTH SYSTEMS</p> <p>(US)</p>
 <p>EXTENSIA SOLUTIONS</p> <p>(Australia)</p>	 <p>meridian HEALTH INFORMATICS</p> <p>(Australia)</p>
 <p>cean informatics</p> <p>(Australia, UK)</p>	 <p>P2D Electronic Health Record</p> <p>(Brazil)</p>
 <p>PatientOS</p> <p>(US)</p>	 <p>Zilics</p>

GOV

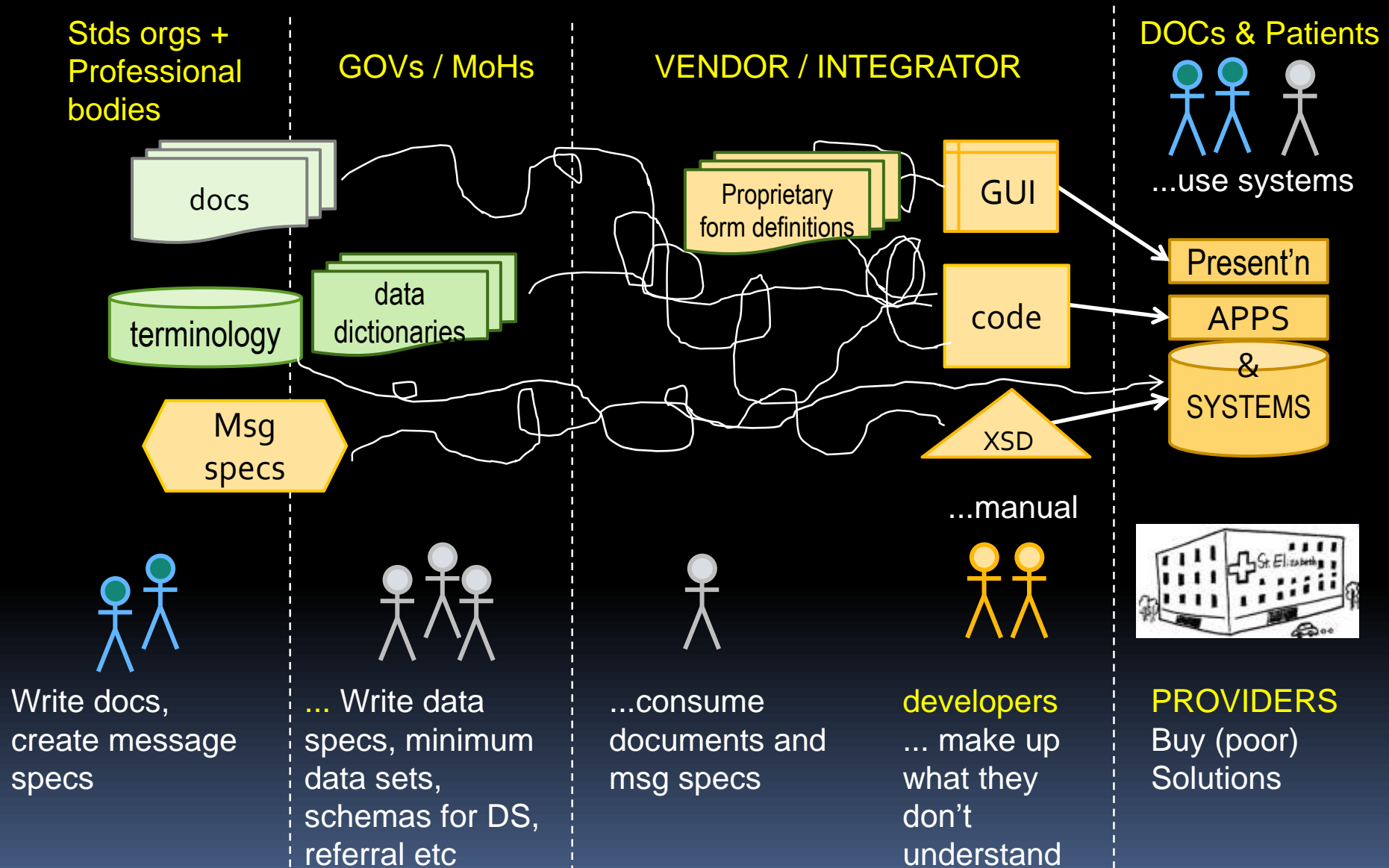
 Australia	NeHTA (National e-Health Transition Authority)
	Queensland Health Victoria Health
 Brazil	Ministry of Health / various govt agencies
	Brazilian Agency for Supplementary Health State University of Rio de Janeiro
 Chile	Ministry of Health
 Denmark	Connected Digital Health in Denmark
	Various Danish regions
 Netherlands	TNO (national research agency)
	Ministry of Health
 Singapore	Ministry of Health
 Slovakia	Ministry of Health
 Slovenia	Ministry of Health
 Sweden	Sveriges Kommuner och Landsting (Swedish Association of Local Authorities and Regions)
 UK	National Health Service (NHS) Connecting for Health (CFH)

Academia

 Brazil	<u>Fluminense Federal University</u>
	<u>Minas Gerais Federal University</u> School of Information Sciences Hospital das Clinicas University of São Paulo <u>Ribeirão Preto School of Medicine</u>
 Germany	University of Heidelberg / Heilbronn University
	 <u>Ehime University</u>
 Spain	University of Alcalá, Madrid <u>Information Engineering Research Uni</u>
	<u>Technical University of Valencia</u> , Biomedical Informatics Group *Faculty of Informatics. <u>Murcia University</u> .
	<u>University of Seville</u>
 Sweden	<u>Medical Informatics group at the Department of Biomedical Engineering.</u> <u>Linköpings universitet, Sweden</u>
 UK	<u>CHIME (Centre for Health Informatics and Multi-professional Education), University College London</u>

What *open*EHR offers - the big picture

Historical Industry Structure



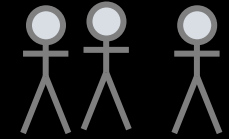
Historical Industry Structure

Std's orgs +
Professional
bodies

GOVs / MoHs

VENDOR / INTEGRATOR

DOCs & Patients



...use systems

Chaotic,

Expensive,

non-computable



Lock-in

Ad hoc



...manual

Poor

interoperability



Write docs,
create message
specs



... Write data
specs, minimum
data sets,
schemas for DS,
referral etc



...consume
documents and
msg specs

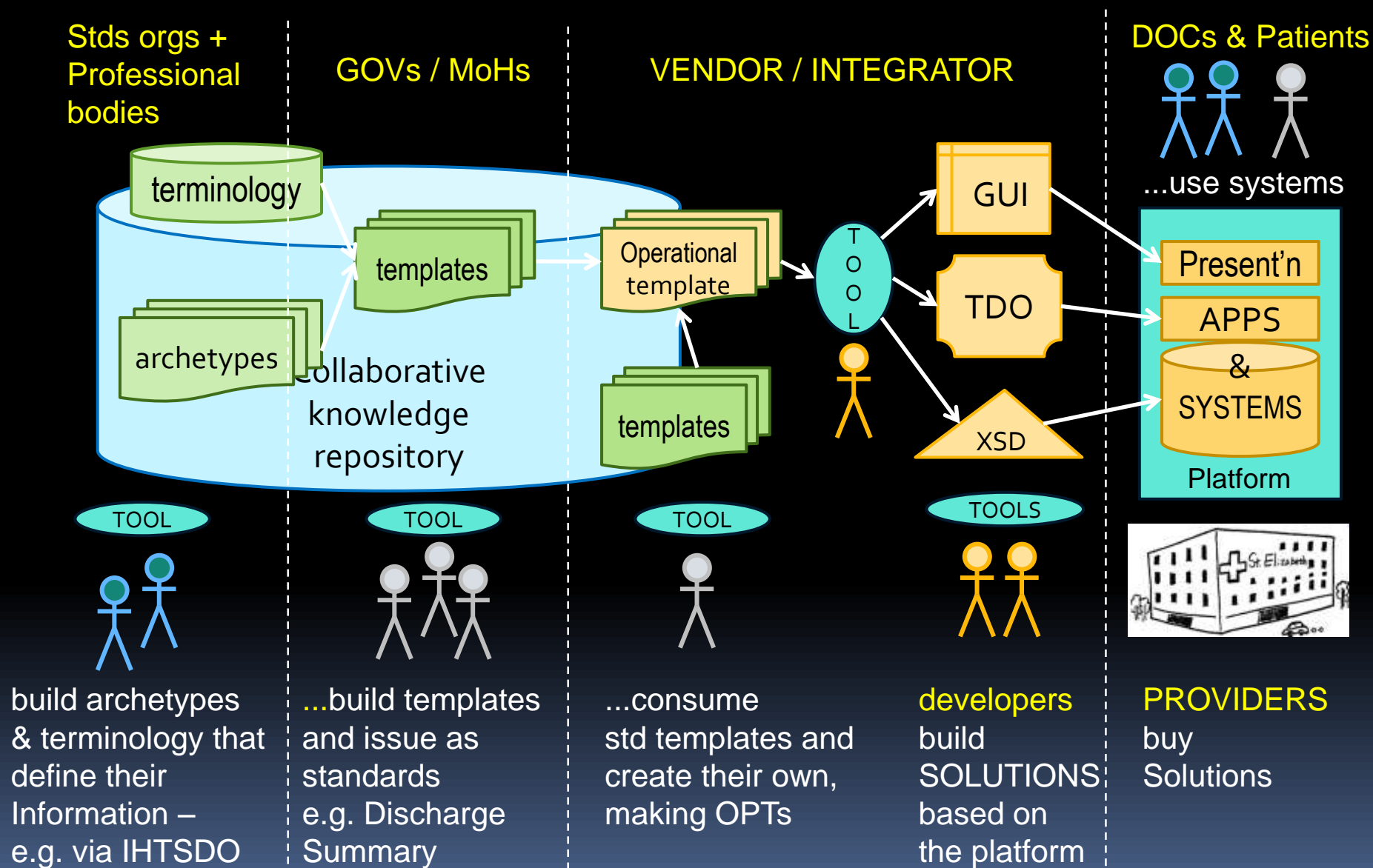


Expensive,
low reuse

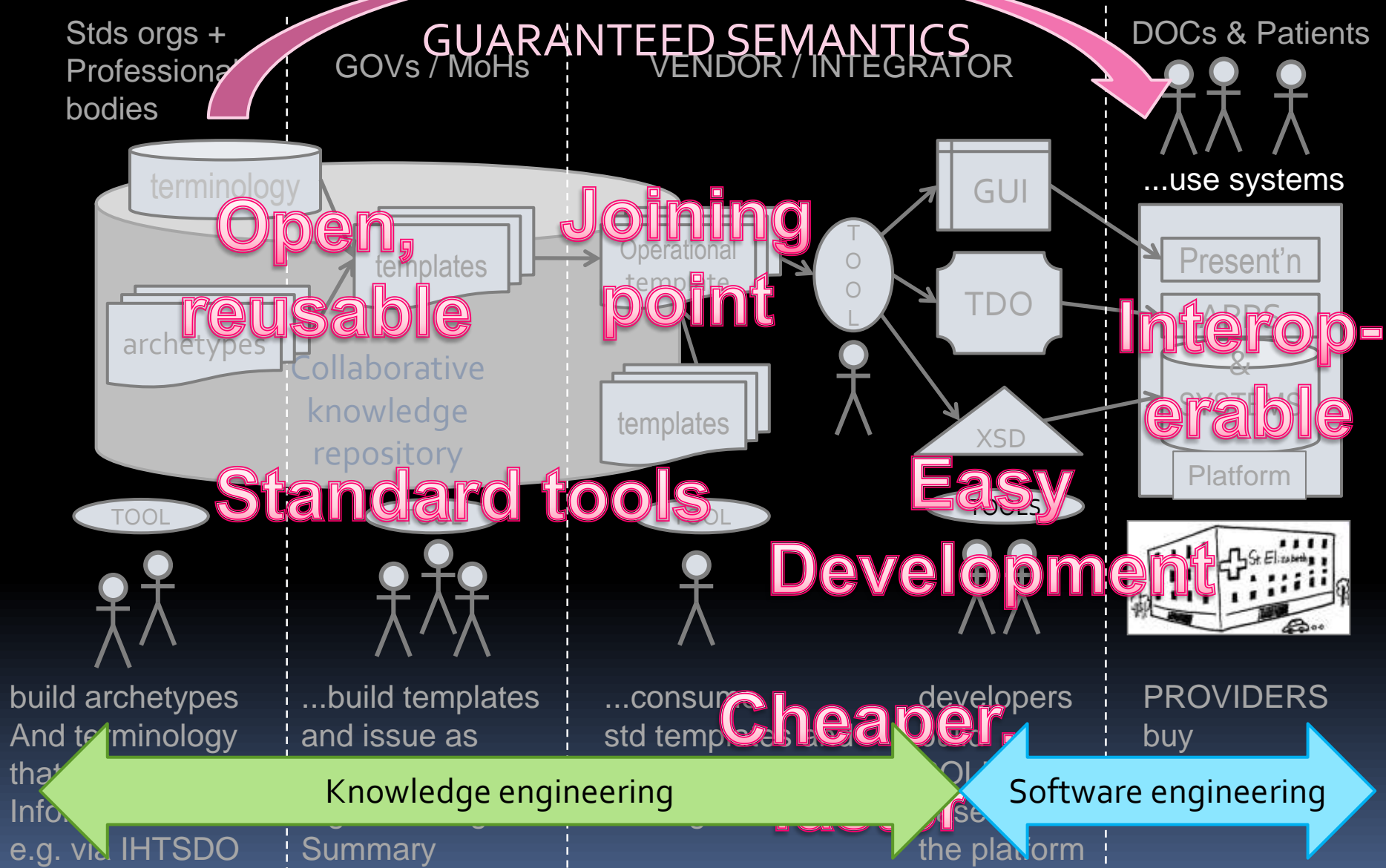
... make up
what they
don't
understand

PROVIDERS
Buy (poor)
Solutions

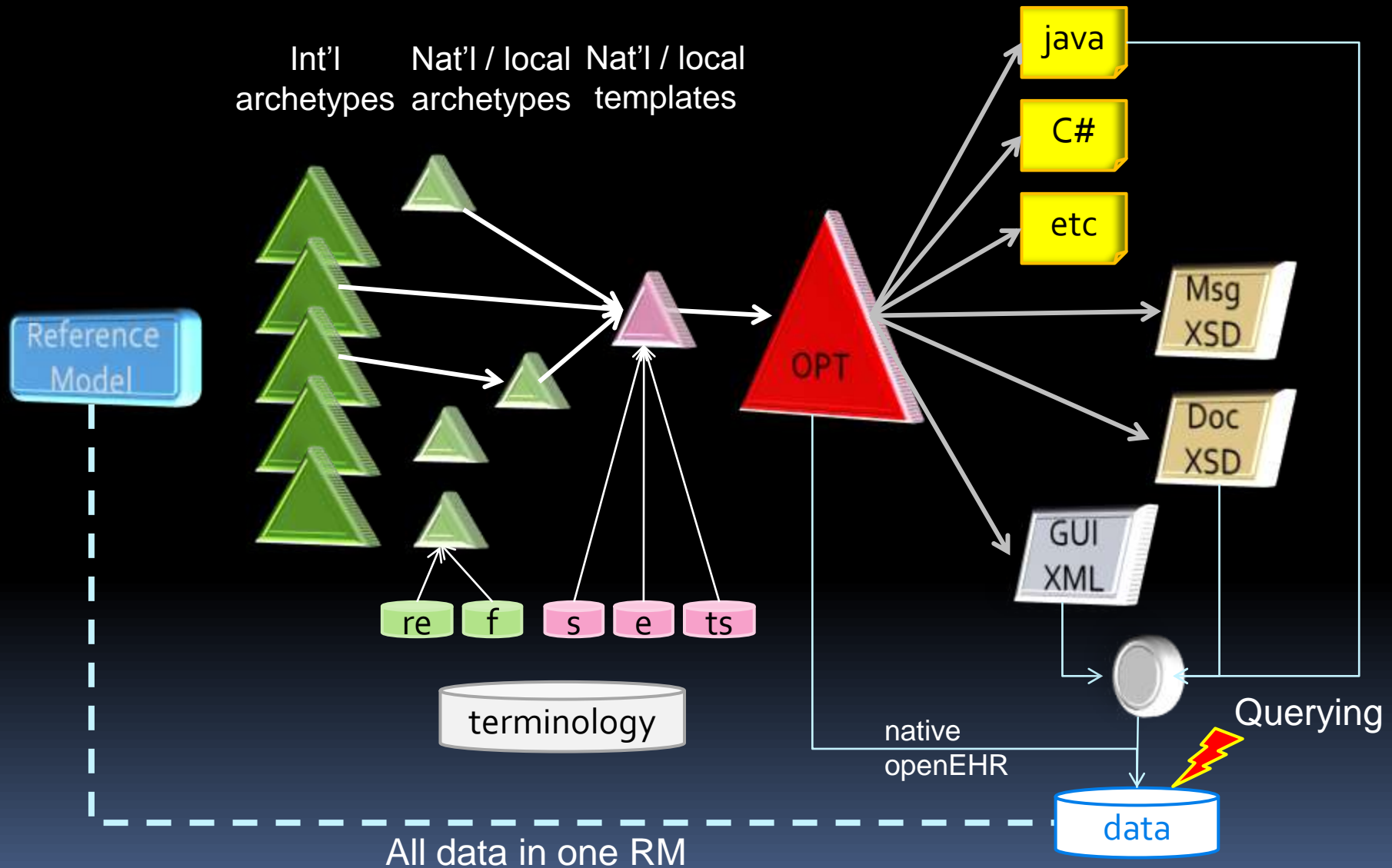
openEHR approach



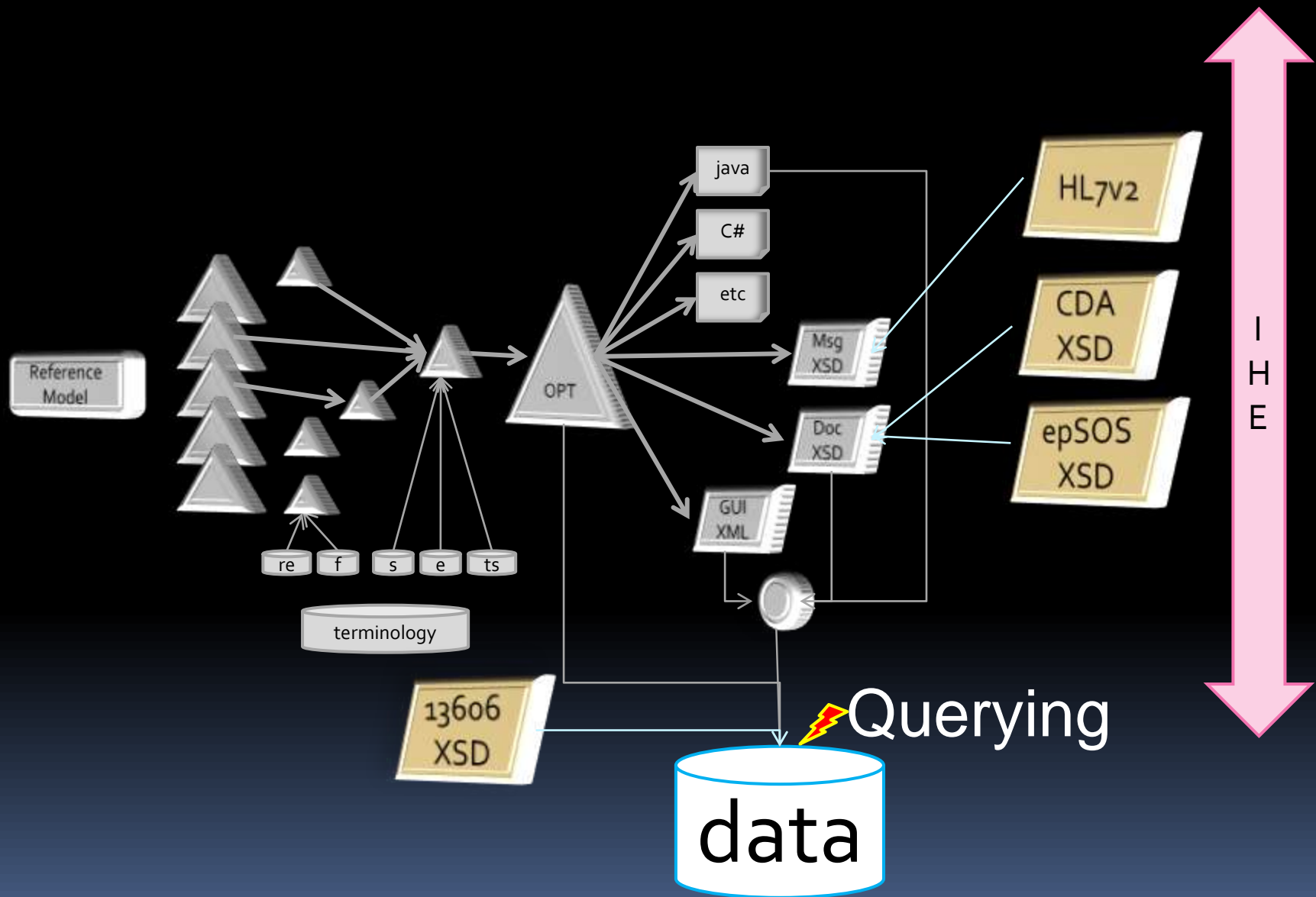
openEHR approach



Tool-based standards



Tool-based standards



The key....

- Is the operational template (OPT) – this is the joining point between the semantic specifications and deployable software artefacts that can be used by normal developers

Key Outcomes

- Normal developers can engage – *openEHR* + Snomed become economic and ~quick
- Semantic connection exists between definitions and implementations
 - → now we know what the meaning of data are, and DS and BI can work...
- No semantic framework → no 'serious' computing with the data

Key Outcomes

- Concrete standards like HL7 message definitions, CDA schemas, standard UI formats are DOWNSTREAM generations and/or mappings of operational templates
- *openEHR* is a framework for connecting standards with semantics

Key Outcomes

- This changes the whole standards game
- *openEHR integrates semantically* with CEN 13606, HL7 CDA, ASTM CCR and other data standards, and allows them to be connected to the knowledge base rather than manually built
- *openEHR* can implement IHE key profiles like PIX, PDQ and others, adding semantics

Status

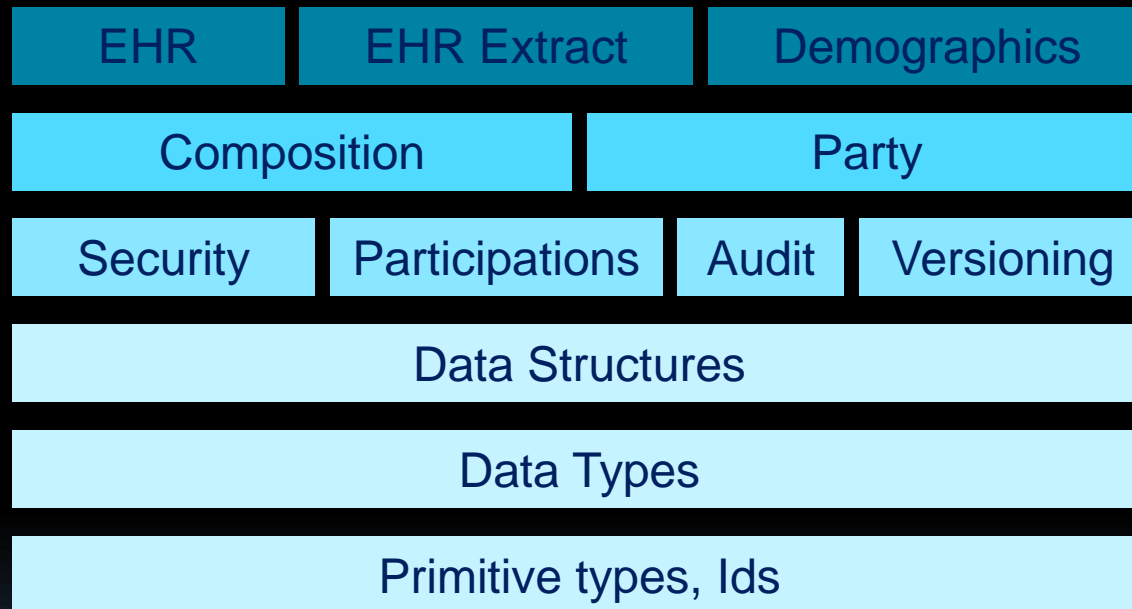
- Currently board-level talks between HL7 and *openEHR* on detailed clinical models (DCMs) & archetypes

The openEHR Platform

Three dimensions

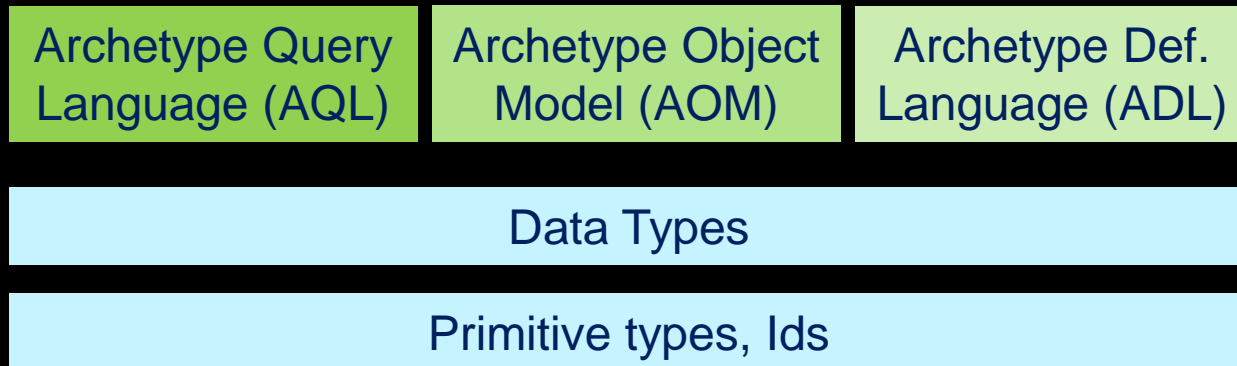
- Data - information models
- Knowledge - content formalism & query lang
- Services – how to connect components

The data architecture



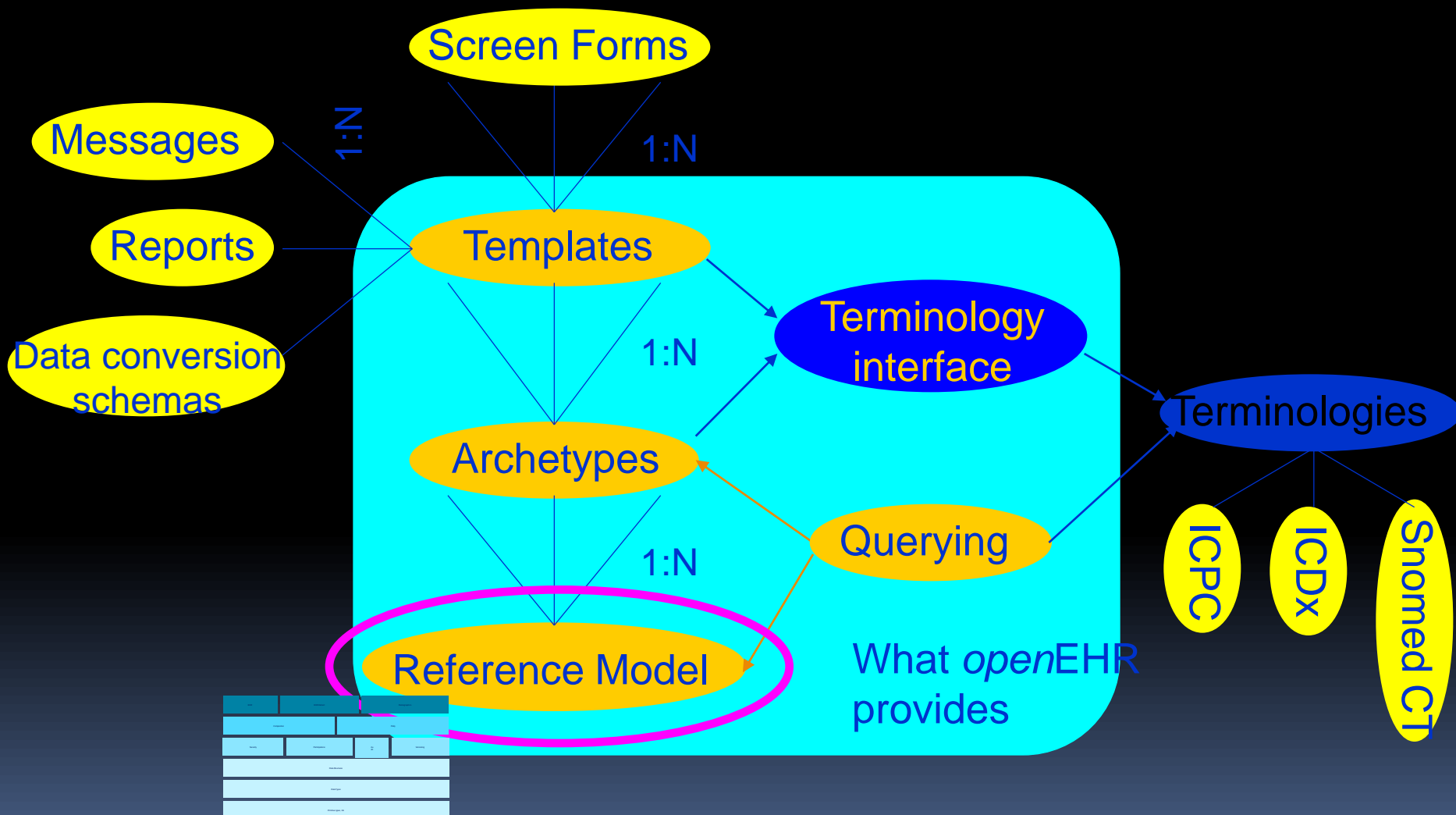
<http://www.openehr.org/releases/1.0.2/roadmap.html>

The semantic architecture

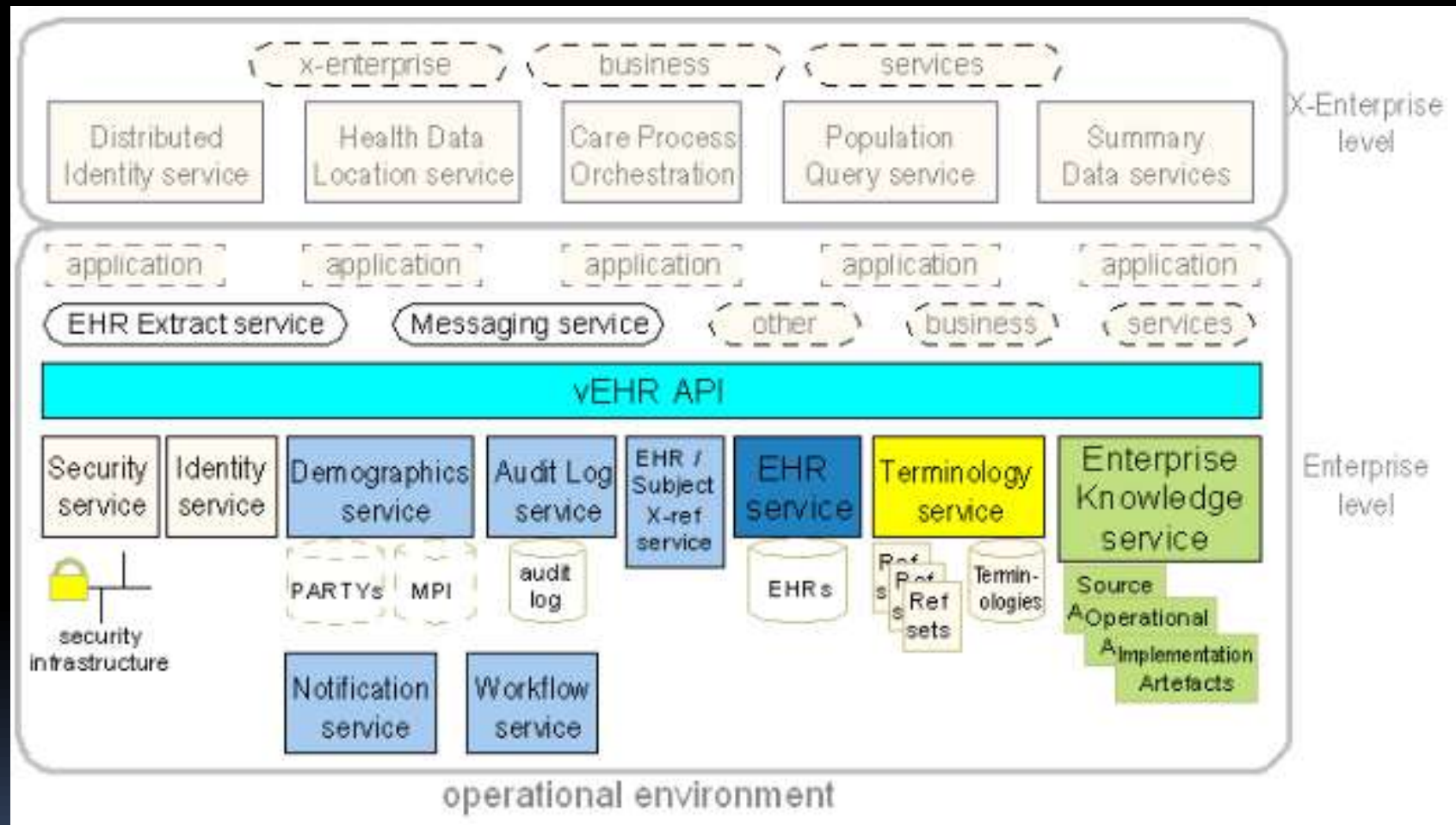


<http://www.openehr.org/releases/1.0.2/roadmap.html>

The Semantic architecture



The services architecture



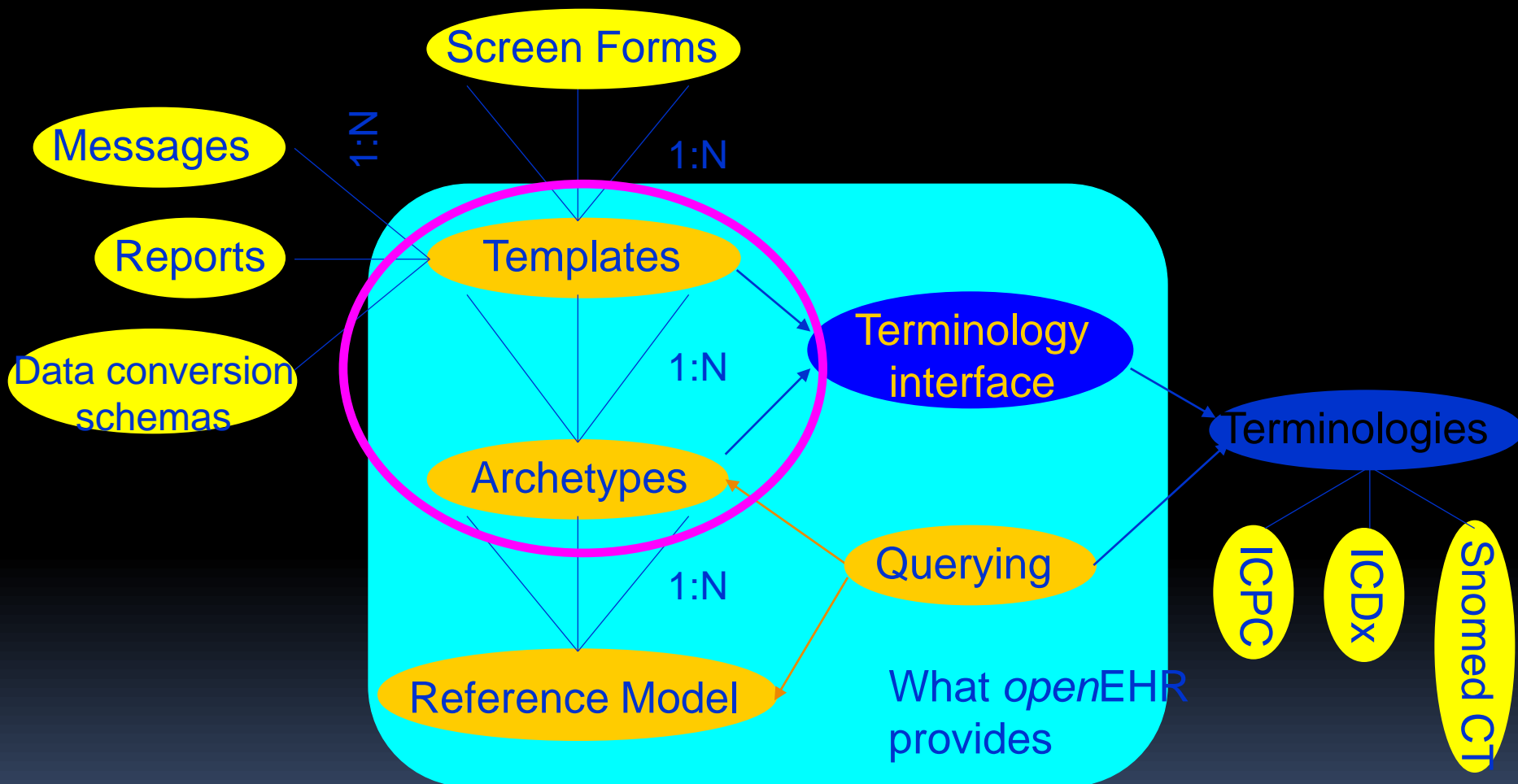
<http://www.openehr.org/wiki/display/spec/openEHR+Service+Model>

On Services...

- Does not seek to replicate IHE, HSSP
- Will take architectural inspiration from Microsoft Connected Health Framework (CHF)

Clinical content modelling – building archetypes and templates

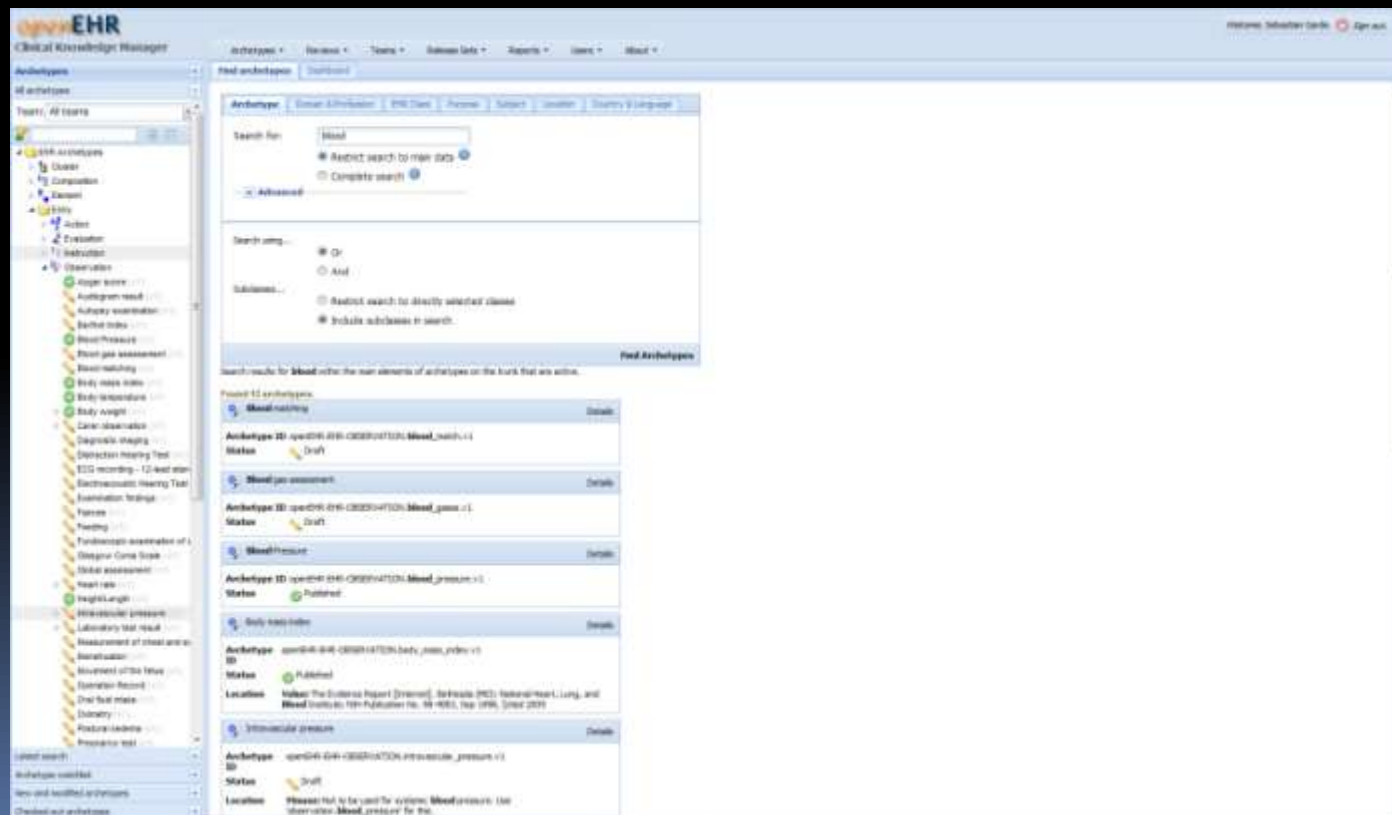
Semantic architecture



- Where do we manage the content models & terminology ref sets?
- Needs:
 - Governance
 - Methodology
 - Identification
 - Sharing and release rules
 - etc

Clinical Knowledge Manager

- A tool for involving clinicians in defining clinical content based on archetypes, templates, and termsets

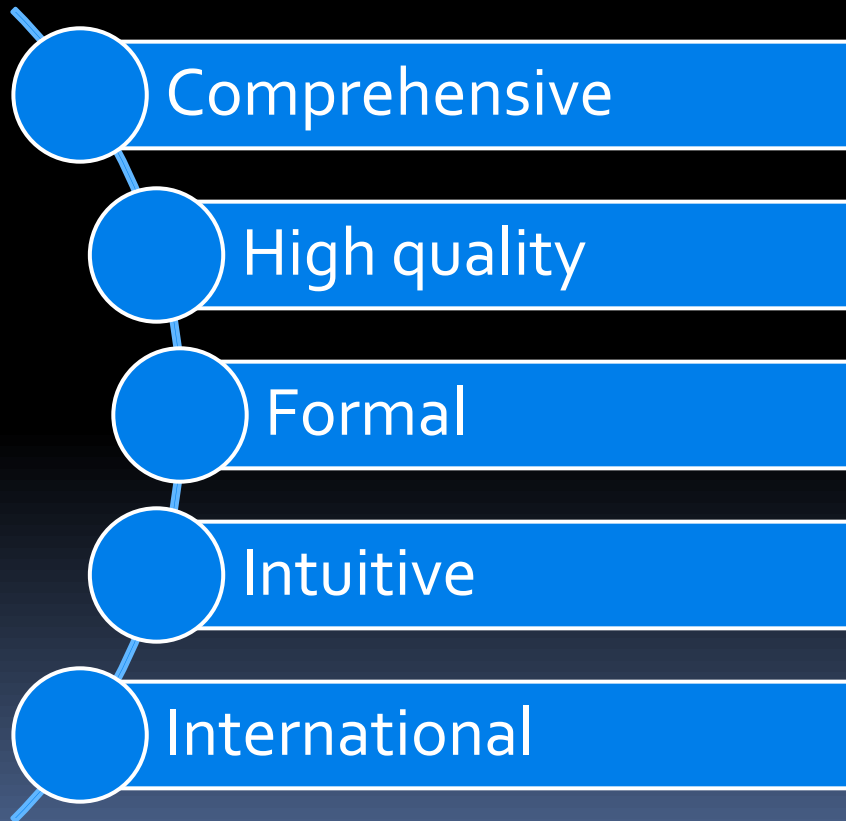


Why a Clinical Knowledge Manager?

- “Large e-health programs are often severely hampered by ill-defined user requirements, low levels of stakeholder engagement, slow solution adoption rates among providers, and an unwillingness to invest the often large amounts of capital required.”
- Bartlett, Chris et al. Optimising E-Health Value: Using an Investment Model to Build a Foundation for Program Success. Perspective, Booz & Company 2010.

Why a Clinical Knowledge Manager?

Instead of defining clinical concepts again and again, do it right *once*.



Without:
Impossible to exchange information in a semantically safe way – no matter how well done anything (e.g. DSS) that works with this information is.

CKM Core Principles

„Right“ separation of technical and clinical aspects to successfully involve clinicians in

- Informal Discussions
- Formal Reviewing (content, terminology binding, translations)
- Sharing
- Publishing
- Revision/Version Management
- Release and Dependency Management

CKM Approach

- Web 2.0 approach
 - Easier to engage clinicians: Can now use 5 mins or 1 hour of an expensive specialised clinician's time; before, they lost hours on physical meetings
- Implementation is growing as we learn
 - Can respond quickly to changing needs, evolving methodology
- More than a tool
 - Engage and manage the community

CKM Users

- International *openEHR* CKM instance
 - > 630 users
 - From 64 countries
- National programs with an instance of CKM
 - Australia: Nehta
 - Sweden: SKL

Key Messages

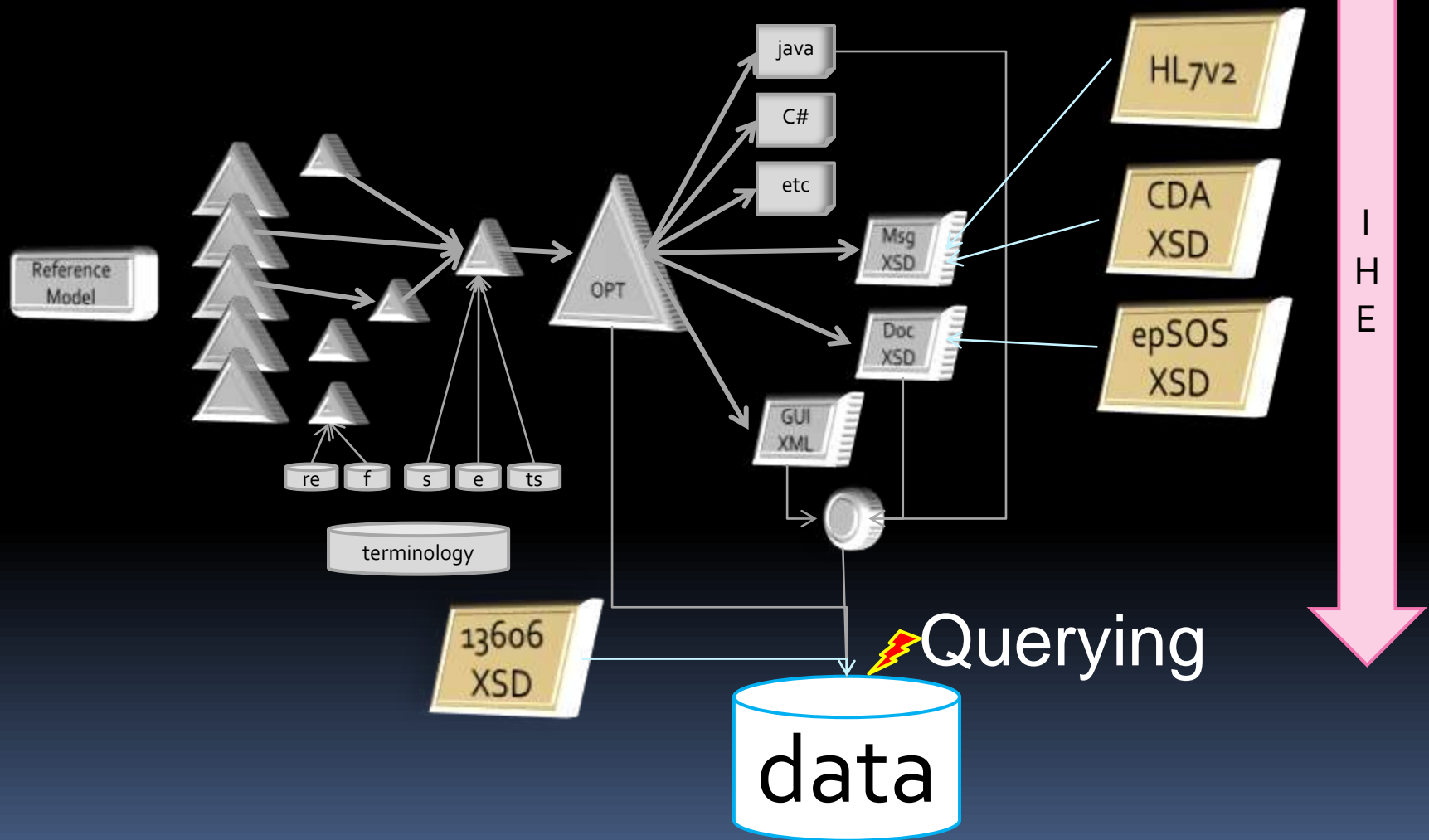
- Knowledge Management is crucial
 - High-quality archetypes with high-quality clinical content
 - Semantically interchangeable between clinical systems; also the basis for decision support
 - Key to success: how to engage with clinicians and capture their knowledge
- CKM - <http://www.openehr.org/knowledge>

Strategic significance of *openEHR*

What openEHR offers...

- An *integrated, self-consistent health computing platform*
- An open, *scalable content modelling formalism* that works (ADL/AOM) and allows clinical professionals to engage directly
- A 4-level architecture that *maximises reuse*
- A *portable querying language* (AQL) that enables decision support & BI to talk to EHR
- A framework for *integrating data standards*
- Growing worldwide use
- <http://www.openEHR.org>

Integration and Computability for standards



Strategy

- In the short term, an IHE / CDA / HL7v2 / epSOS framework will serve to share data
- 2-5 year time-frame:
 - A *semantic framework* needed to make the data computable
 - A proper *services architecture* is needed to support incremental deployment and adaptable system building
- Otherwise we risk tera-bytes of unusable data...