*open*EHR as the Health Computing Platform for the EHR

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Thomas Beale

What is an Electronic Health Record?

Its NOT the application

Its the

INFORMATION

The EHR Architecture

Problems that an EHR architecture needs to address

- *Semantic interoperability*: how do *different pieces of software* know what the data mean?
- *Patient-centric view*: how to build a patient-centric longitudinal EHR across enterprises?
  - For decision support, Care pathways, Medical research
- *Continual change and complexity*: how to build systems that keep up with reality?

Structure of the semantic interoperability problem

Four levels of organisation of information sharing same semantics:

- The cognitive user interface – flexible approach to data capture and viewing
- The data capture sets for each step – process-oriented, may be *ad hoc*
- Standardised semantics of the data points in data capture sets
- Standardised data representation, enabling interoperability

+ Standardised querying capability
+ Standardised interface to terminology for inferencing

In other words….

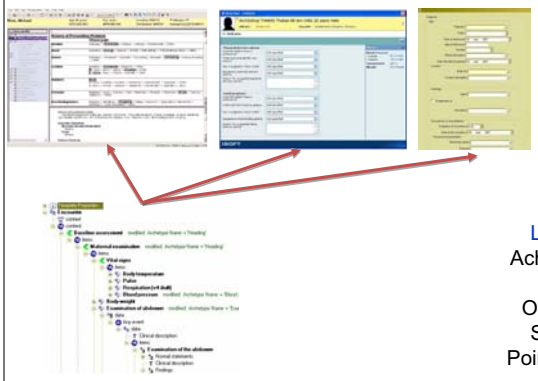
- It is not just about what is 'on the wire' between two systems….
- A message-based approach to semantic interoperability will be largely deficient in the semantics of data capture, definition, re-use and querying.

Navigating the Health Informatics Jungle

openEHR as the Health Computing Platform

- *open*EHR is engineered as an EHR architecture not a messaging solution.
- *open*EHR is engineered for semantic interoperability
- *open*EHR is engineered to provide a solution for the logical record architecture
- *open*EHR is engineered to work and is not just an academic exercise

Information Level 1 & 2



The cognitive User interface: Different ways of Presenting & Capturing the Same information

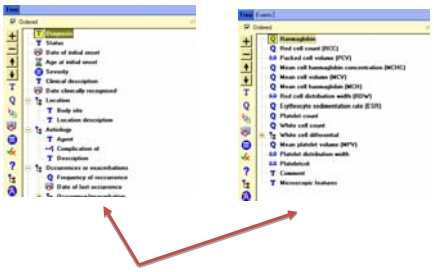
Logical data-sets: Achieved by templates That re-use and Organise underlying Standardised data Points *according to use*

Information Level 2 & 3

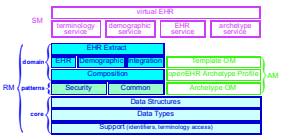
Logical data sets: Templates – using only Selected items from a Number of archetypes

Standardised models of The data: Achieved by archetypes Organised by topic, *Independent of use*

Information Level 3 & 4



Standardised clinical models of the data: Archetypes – all based On same reference model



Standardised technical representation of the data: The reference model – Enables interoperability

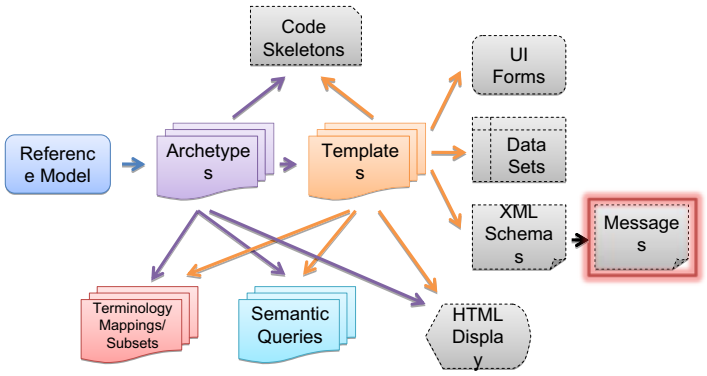
Queries based on archetypes - Archetype Query Language (AQL)

```
SELECT
    o/data[at0001]/events[at0002]/time,
    o/data[at0001]/events[at0002]/data[at0003]/items
    [at0013.1]/value
FROM
    Ehr[uid=@EhrUid] CONTAINS Composition
    c[openEHR-EHR-COMPOSITION.encounter.v1]
    CONTAINS Observation o[openEHR-EHR-
    OBSERVATION.laboratory-lipids.v1]
```

The result…

- Semantic coherence in the application stack (all layers of software know what the data mean)
- A high level of re-use of artefacts – define once, reuse many times
- A single, stable reference model for sharing clinical and related information
- A standardised query language for writing portable queries
- A standardised, re-usable way of connecting to terminology

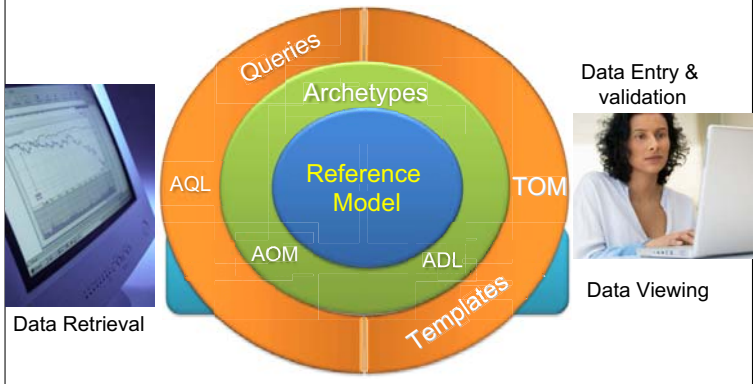
The *open*EHR artefact ecosystem



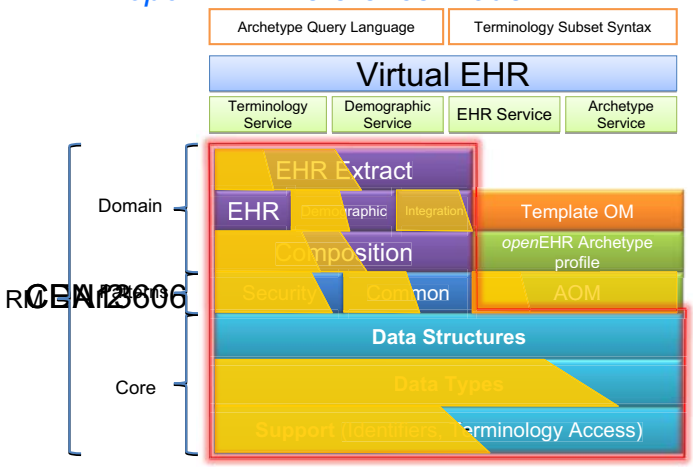
openEHR + Terminology

- Terminologies such as SNOMED CT don't solve the interoperability problem
- Archetypes and Templates work well with Terminologies
- Terminologies important for capturing concepts that need to be queried or shared - subsets
- Place of terminology is for inferencing and connecting concepts in an ontology of reality

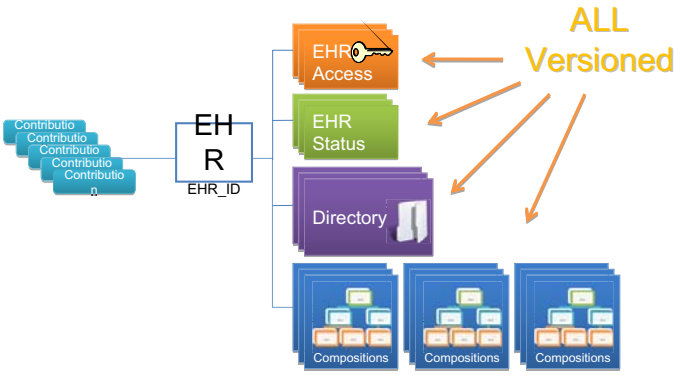
*open*EHR Health Information Platform



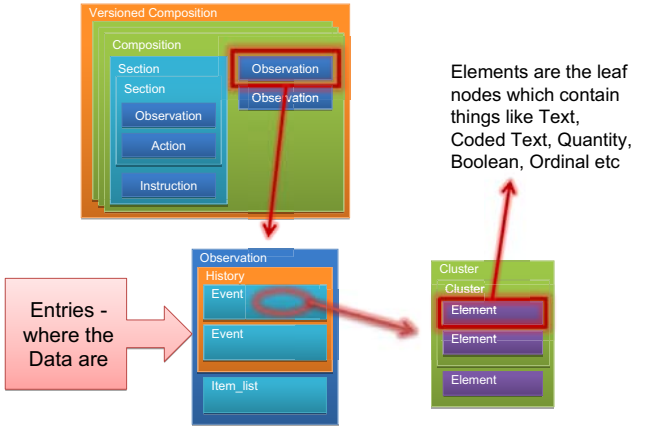
*open*EHR Reference Model



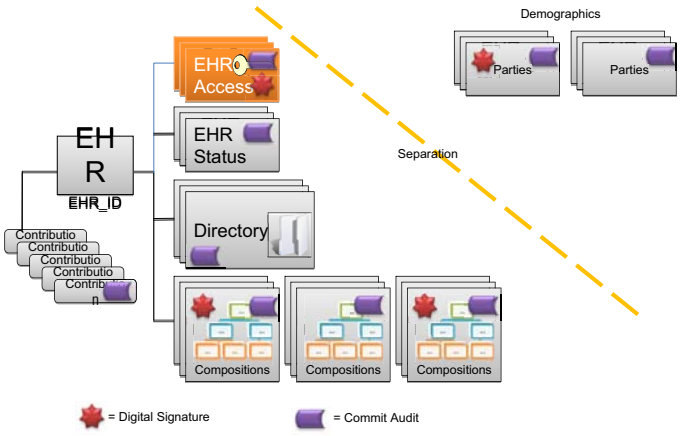
The reference model – structure of one EHR



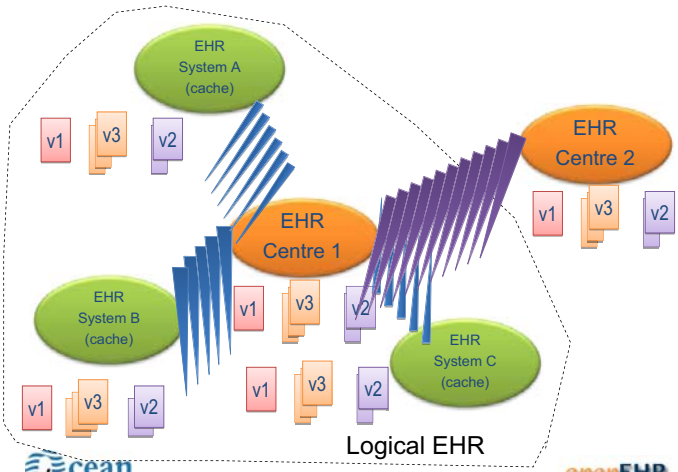
Structure of one Composition



Security Features



Distributed versioning



A Universal EHR

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