Interoperability of content and systems

using
CEN/tc251 European Standards

Paradigm shifts

Gerard Freriks
v2
Brussel Ride Workshop
8-12-2006

Slides from
Dipak Kalra, GESI and Francois Mennerat
have been used

WoHIT 2006
EHR Standards

Three forthcoming European Standards: EHRcom, HISA, Contsys

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Health Informatics- Service Architecture
HISA
Rationale and Overview

An overview of CONTsys
(Updated 2006-09-02)

System of concepts to support Continuity of Care (EN 13940-1)

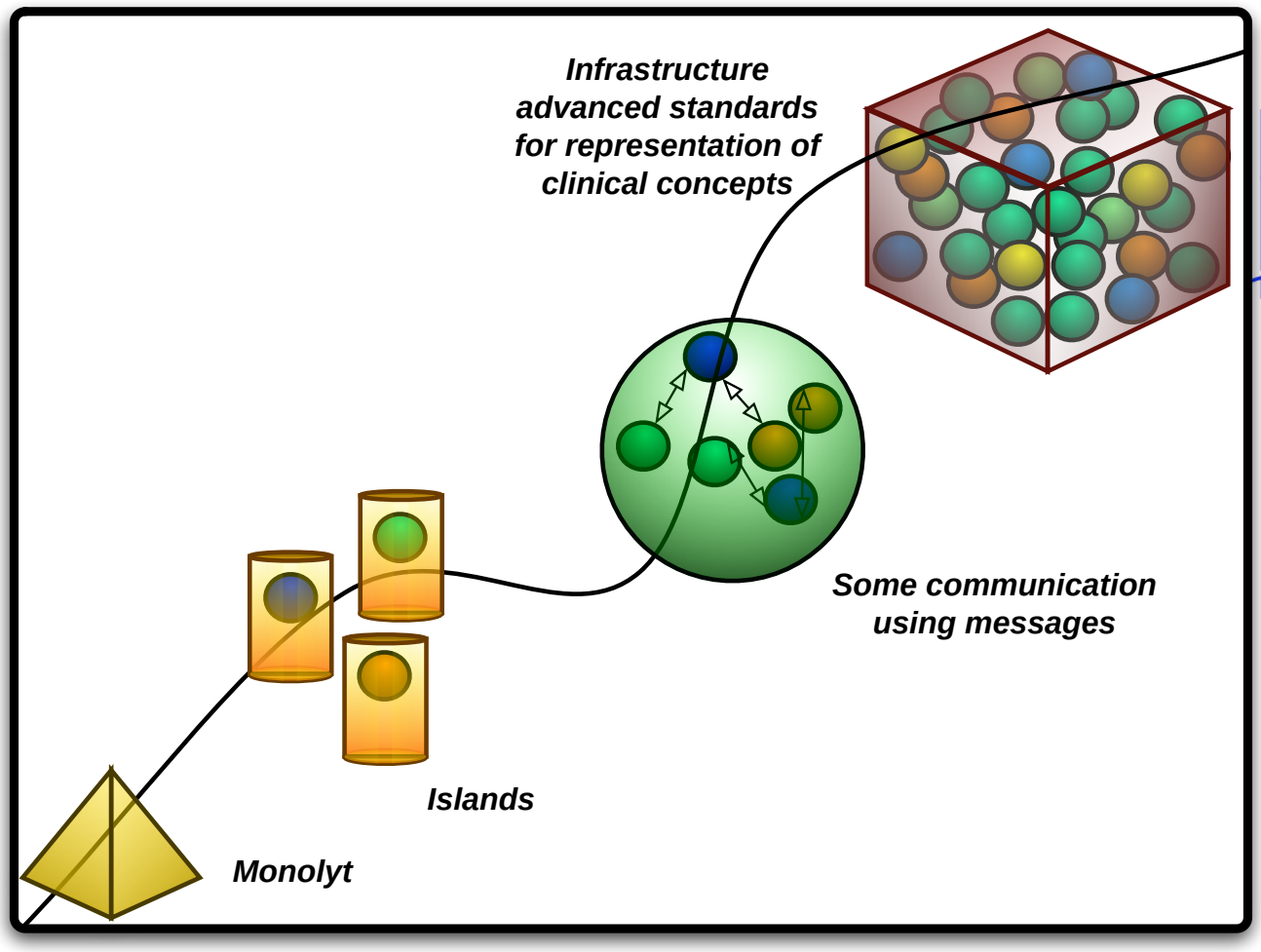
Slides courtesy of François MENNERAT

Topics

- Introduction
- Paradigm shifts
- Standards
  - 13606: EHRcom
    - Electronic Health Record Communications
  - 12967: HISA
    - Health Informatics System Architecture
  - 13940: CONTSYS
    - System of concepts to support Continuity of care — Part 1: Basic concepts
- Conclusions

EuroRec

Introduction



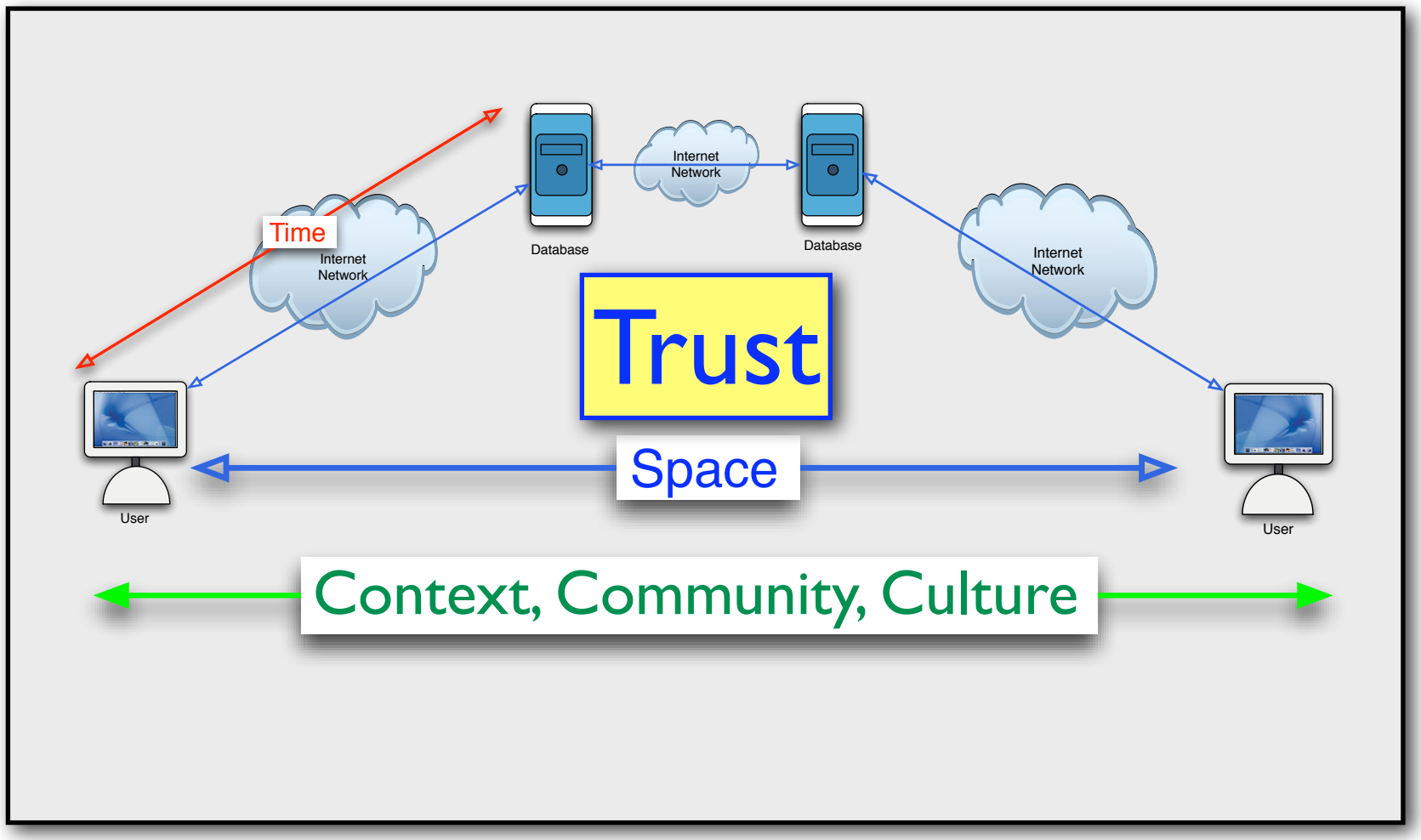
PaleoHITic *MesoHITic* *NeoHITic*

Prototaxic period

First a wider look at the history and where we are going.
In the past the big monolytes,
followed by the mini computers and PC's.
Using messaging (edfact) islands still but capable of exchanging some data with difficulties.
The end goal (Nirwana) is a system of system each having services that, all that are allowed, have access to.

A real plug-and-play world. Nirwana with ubiquitous computing and semantic interoperability. Systems that understand the world.

Introduction



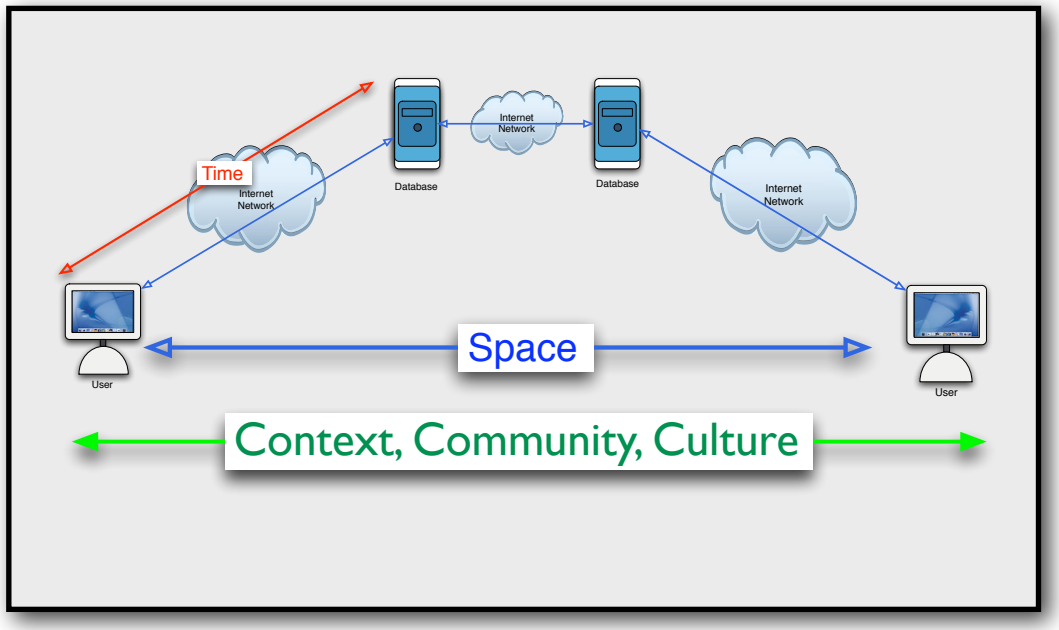
Interoperability means
transport of information over:

Time: Meaning that information stored now must be usable in 25, 50 100 years or longer. This is called real persistance, or archiving.

Space: Over large geographical area's crossing institutional boundaries.

and Context, Communities, and Cultures: a thing where Europa has developed a lot of expertise and forgotten by the Angol-Saxon worlds

Introduction



Without

standards and **standards organisations**

there are

no shared points of reference

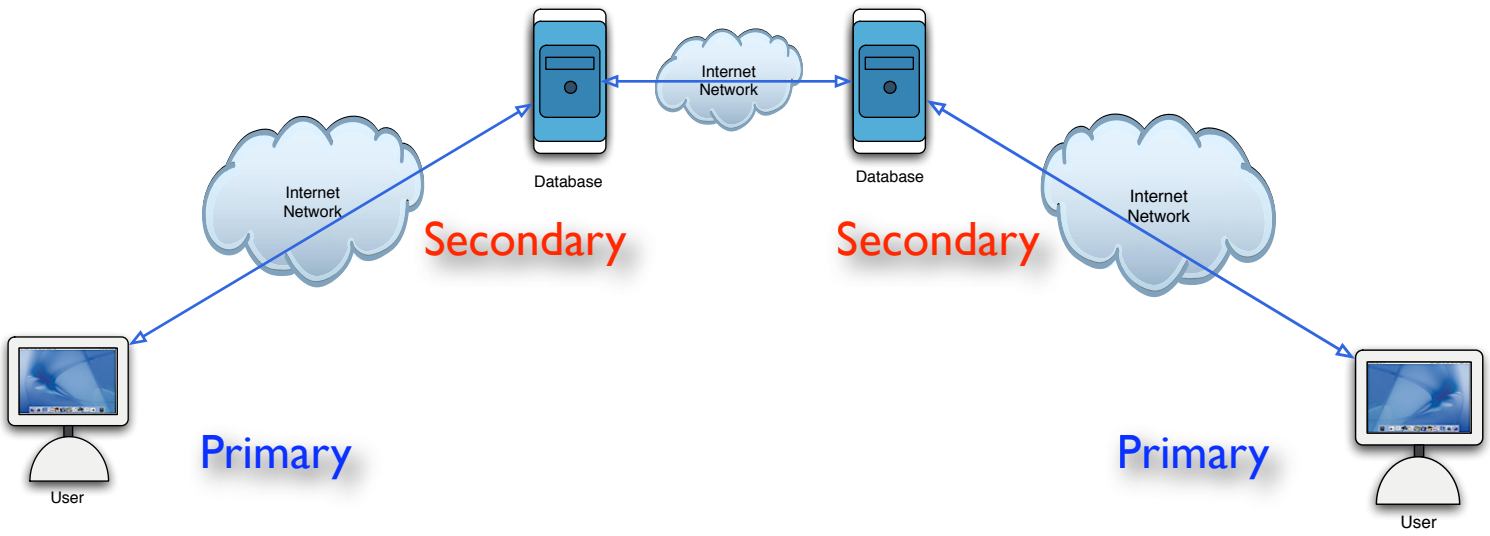
plus

Quality Assurance

In order to have many Shared Points of Reference within and across contexts, communities and cultures we need a lot of trust.

AND Quality Assurance

Introduction



- Primary Services and applications (e.g. sending/receiving system)

- Secondary (Supporting) services (e.g. Network, PKI, Terminology server, MPI server, Notary services)

Primary ICT services consist of several applications owned by an organisation in the sender or receiving system.

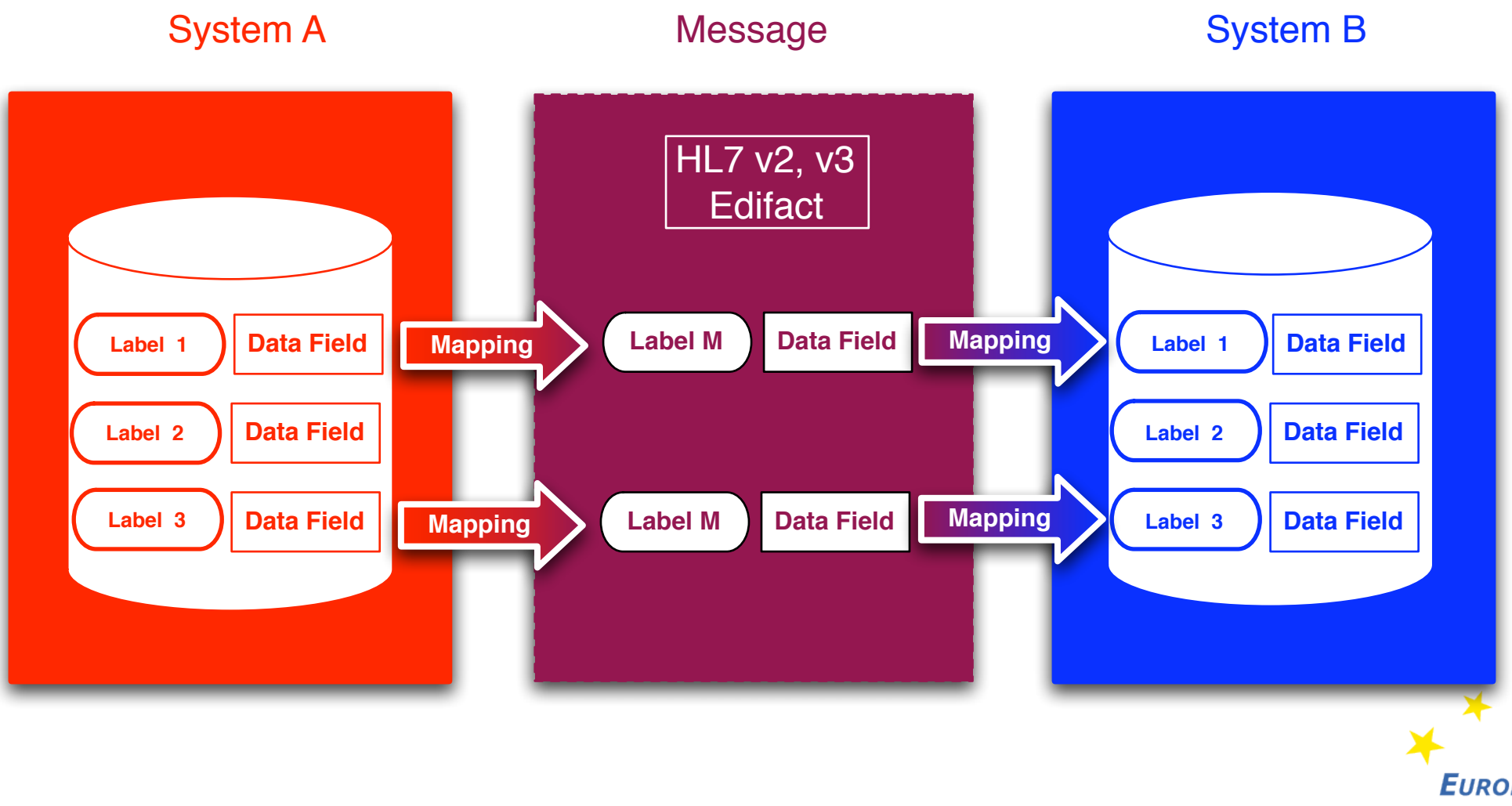
Secondary (third party) ICT services support the primary services.
(e.g. PKI, Master Patient Index File server, Terminology server, Internet, electronic Clearing house)

Paradigm shift
Messages versus Archetypes

- New European standards constitute important **paradigm shifts**.
- They create **scalable** EHR-systems,
- that enable **plug-and-play** semantic interoperability of **data**, **information** and **protocols**.

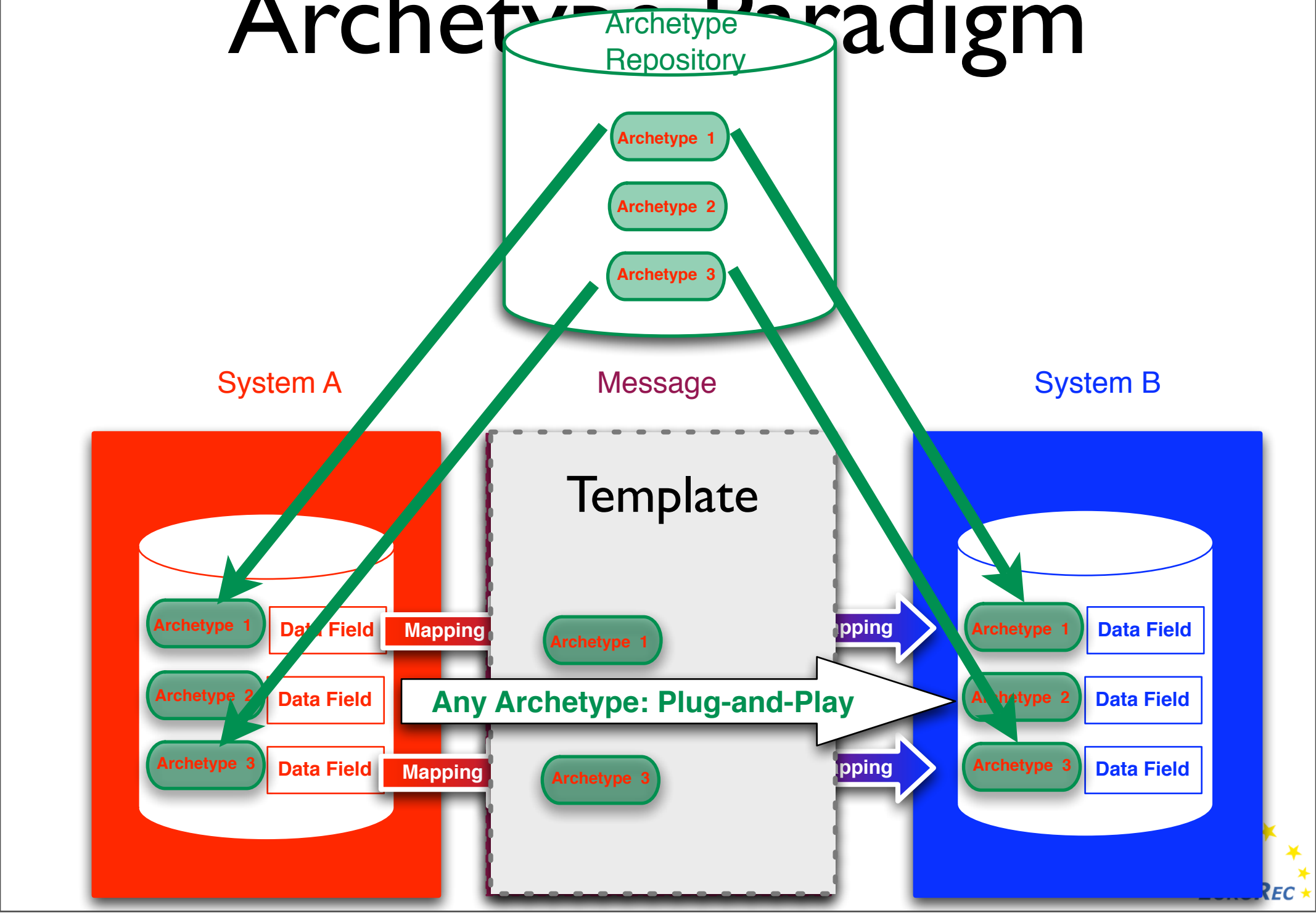
EuroRec

Message Paradigm



1- Systems exchange data via messages
2- System A maps its labels in the database onto those of the Message specification.
3- Each mapping involves writing of software for System A and System B

Archetype Paradigm



1-An archetype repository holds the definitions of the labels of the Databases of System A and System B
2- All information is stored using the labels from the Archetype/Template
3- All data in the data fields together with the Archetypes can be exchanged between systems Plug-and-Play
No reprogramming of System A and System B is necessary

Paradigm shifts

Plug and Play Semantic interoperability

Paradigm	**Old**	**New**
Scalability Flexibility	poor	**good**
Interoperability	Messages (Edifact, HL7 v2, v3)	**Archetypes** (CEN/tc251 EN13606)
System architecture	No	**HISA** (CEN/tc251 EN12967)

EuroRec

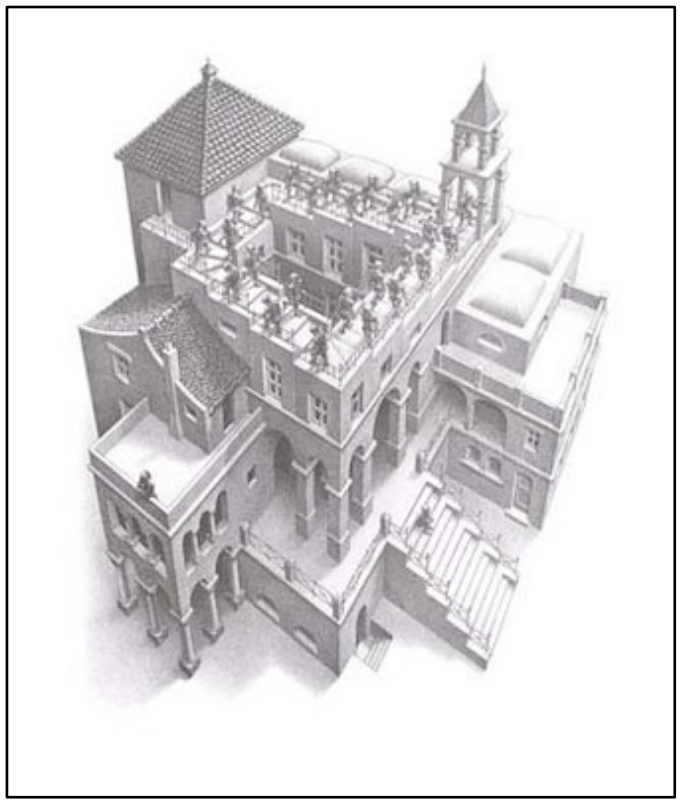
One could observe or conclude that the IT systems of the present are using the OLD paradigm. When we really want or need the sharable EHR (eHealth) systems must implement the new European EHR related standards.

The migration path might use the messages, but in the end all systems have to be rewritten.

Paradigm shifts

Old Paradigm

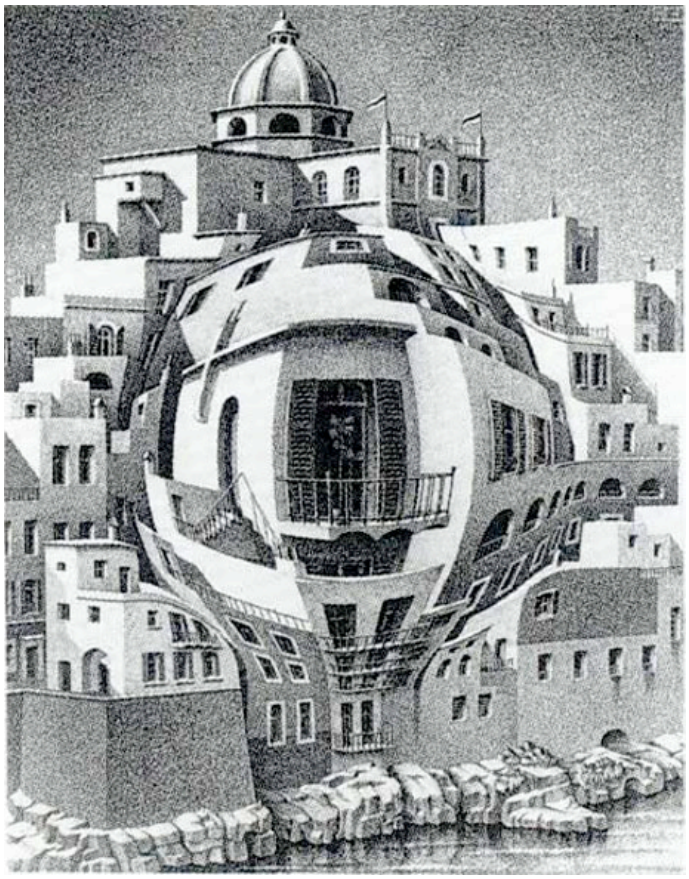
- One static representation
- one size fits all
- complex world constructed



With the new paradigm and the standardised tooling and components communities can build what ever they need.

Suppose the software vendor implements in his system the LEGO blocks.

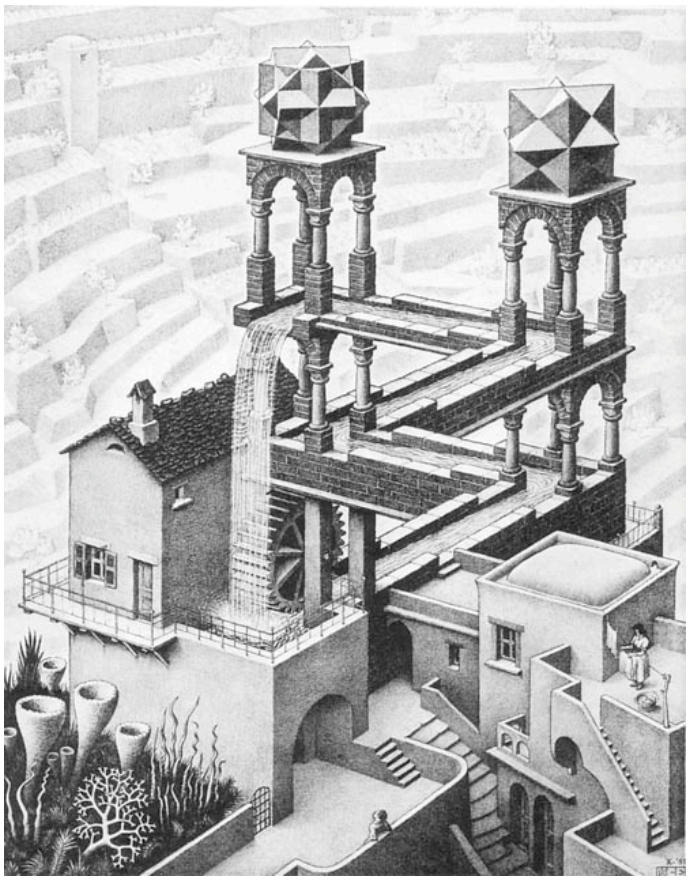
Paradigm shifts



The new Archetype paradigm enables to build any model.
It is not one size fits all.

Suppose the Healthcare community designs Concepts using the LEGO bricks.

Paradigm shifts

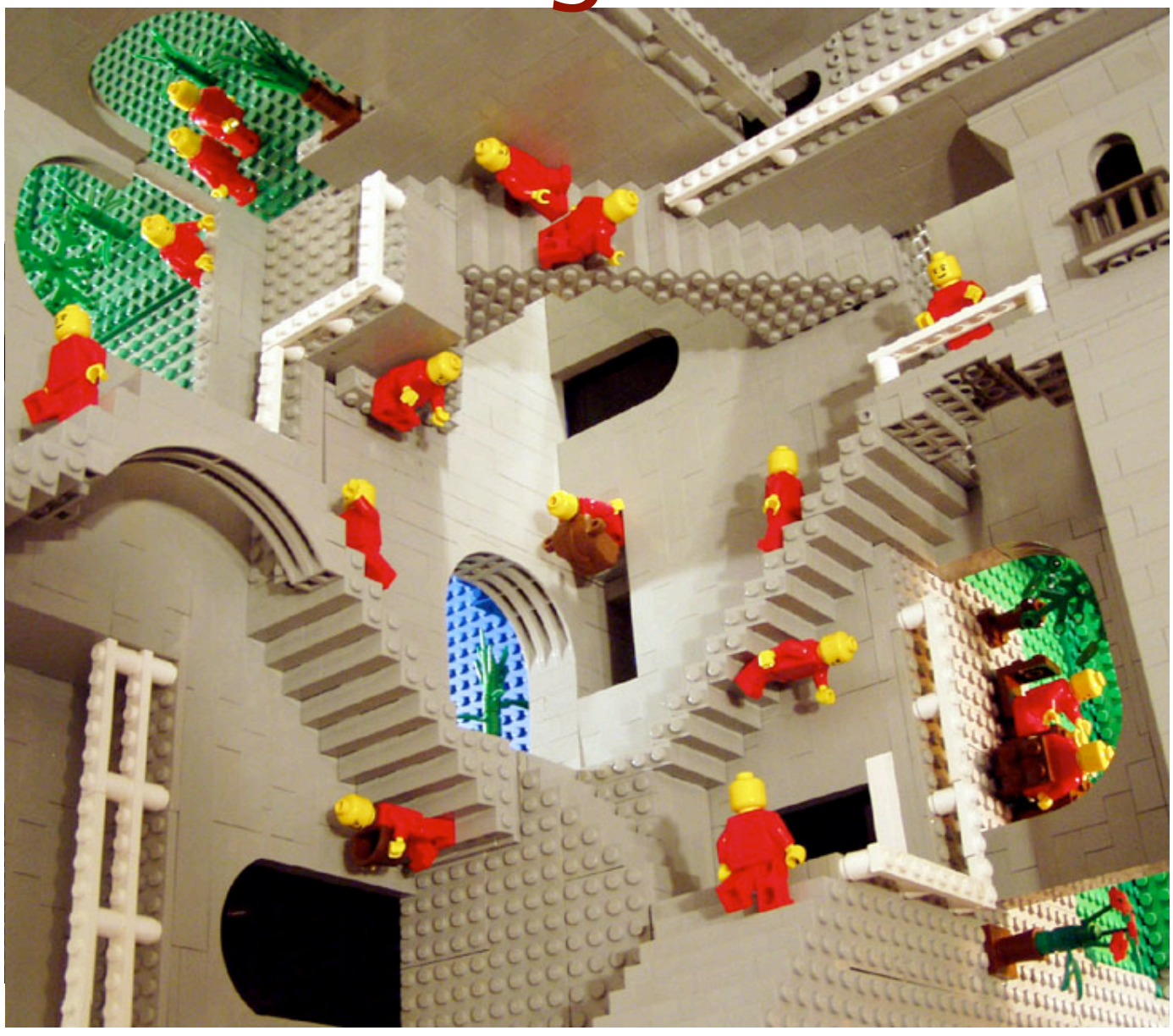


Both the old Message paradigm and the new Archetype Paradigm
make the construction of complex worlds possible.

Vendors know how to use the LEGO-bricks.
Because of this they know how to deal with the concepts the healthcare community is using.
Including the Information Models they have constructed.

The vendors known how to interpret the blue prints the healthcare providers produced.

Paradigm shifts



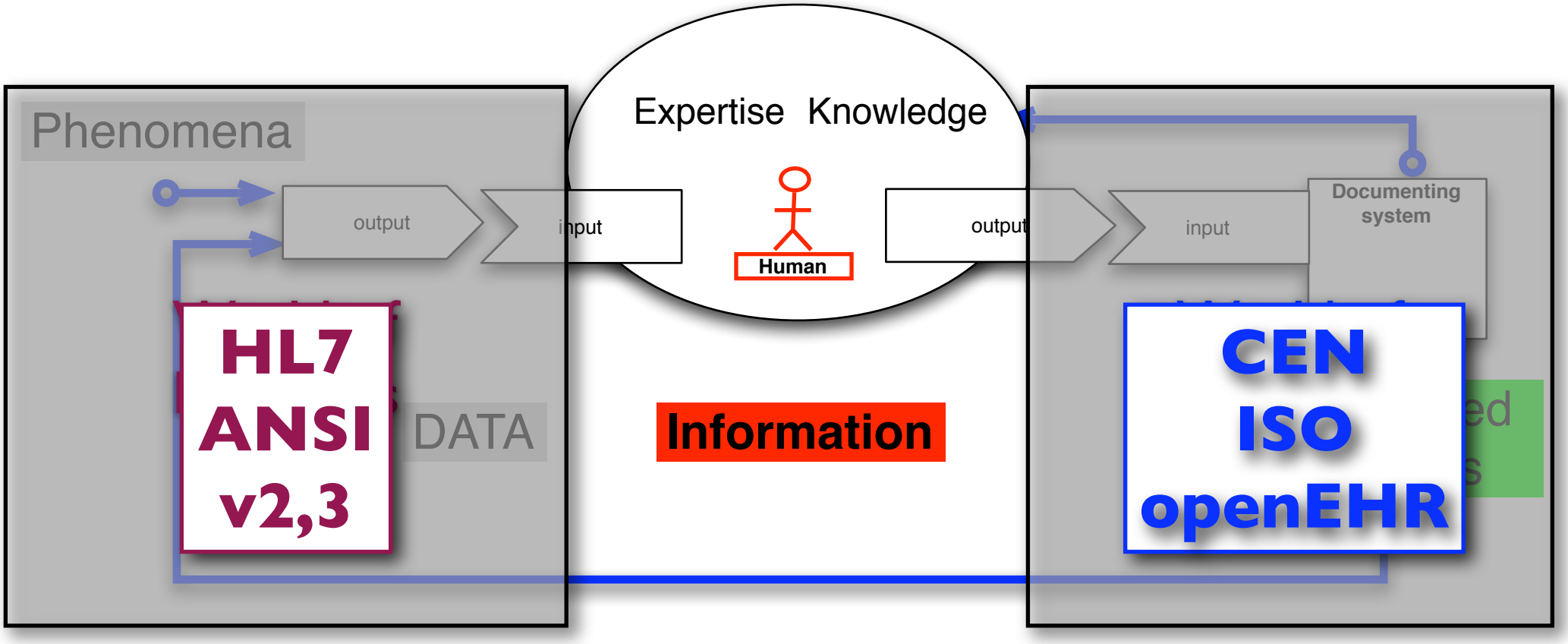
The difference between the old Message and the new Archetype paradigm is that it is the healthcare community that does the building.
And not the IT vendor.

The vendors know how to deal with the LEGO blocks and the CEN EHRcom European standard based Archetypes definitions.
Without the interference by the Software vendor, all possible Information Models can be produced by a community.

THIS IS WHAT MAKES PLUG-and-PLAY possible.

Paradigm shifts

The clinical discours



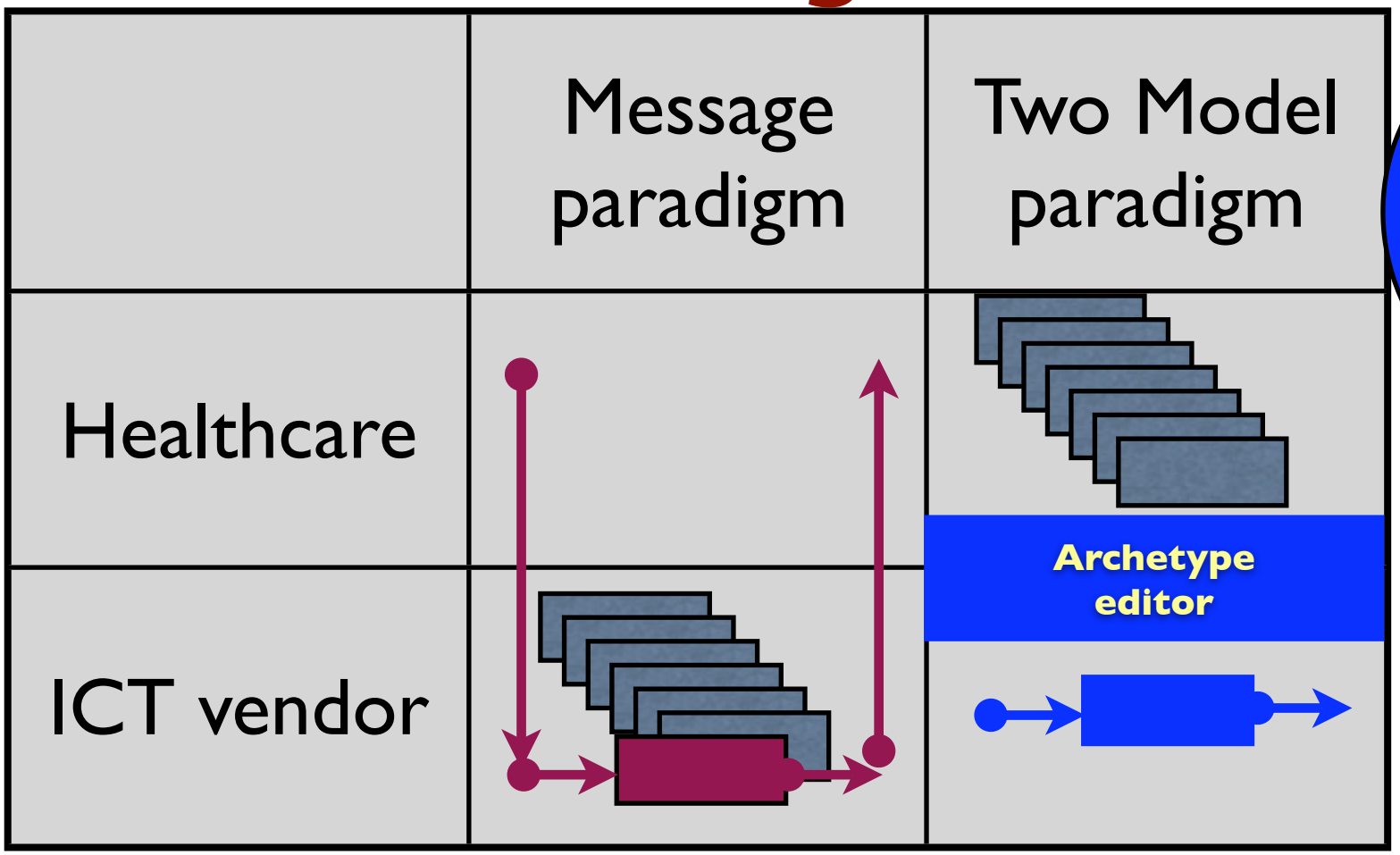
In healthcare the healthcare providers takes in appearances of phenomena as data.
With his expertise and knowledge he interprets the data and makes INFORMATIOn out of it.
The data and the Information he registers in documents.
When seen again by the same person or sent to an other healthcare provider it is read as data.

Messages transport data.
HL7 (and therfore CDISC) is originally conceived as message standard and never as document or EHR standard.
CEN/tc251 with EN13606 the only EHR norm, that is based on a extensive collection of very detailed requirements. ISO/tc215 TR 13803

The EHR norm (EHRcom) is designed to collect clinical statements in a document.
Including versioning, and digital signatures.

openEHR is an open Source community that has produced the implementation specification of the CEN/tc251 EN13606 EHRcom standard.
Plus some more.

Paradigm shifts



EHR requirements based

EHRcom part 2

EHRcom part 1

Ballot package
147 Mb Zipped

Ballot package
6 Mb Zipped

What is the name for the new exciting paradigm thats make splug-and-play interoperability possible? The Two Level Model or Archetype paradigm.

In the Message paradigm People from healthcare and IT meet in for example HL7.
They define a message specification that all vendors implement.
Hopefully in the same way.
And then the healthcare providers are capable to communicate what has been agreed.

A problem is that healthcare will change all the time. Each time the complete process will have to be followed: specification,publication, implementation.
And since healthcare has 50-100 domains and each with 5-20 messages. Vendors will have a hard time to cope.
An extra problem is that must of the semantics of the message specifications will end up in software written for this specific unique specification.

In the new Paradigm. Vendors implement ONCE one simple specification. This is part one of the CEN/tc251 EHRcom Norm.
Healthcare providers in communities define what they have to store, and exchange using an Archetype Editor (tart 2 of the EHrcom norm,
Observe that semantics are completely decoupled. Any change in the specs of archetypes will not affect the application.

In addition the EHRcom norm is simpler, less voluminous than the)over) complex HL7v3 message spec.

Not Plug-and-play

(No exchange: Information)
No exchange: Knowledge
Not EHR requirements based

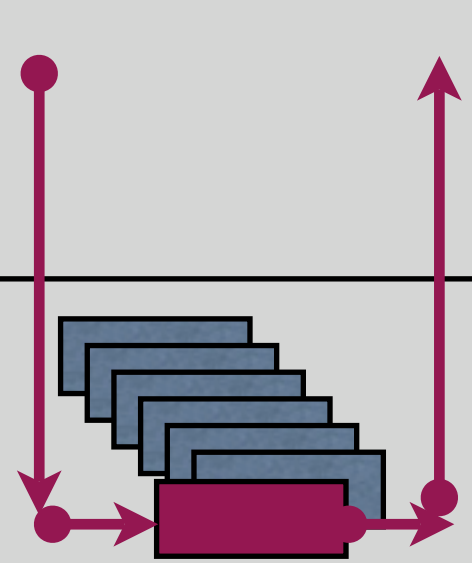
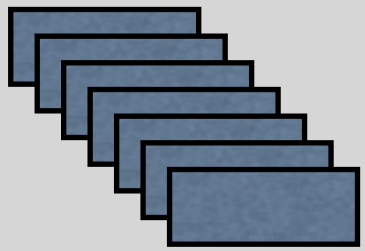
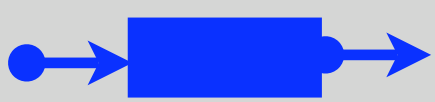
Needs IHE implementation process

Solves primarily problems of IT vendors

Plug-and-play

Exchange: Information
Exchange: Knowledge
EHR requirements based

Doesn't need IHE implementation process
Solves problems of Healthcare community

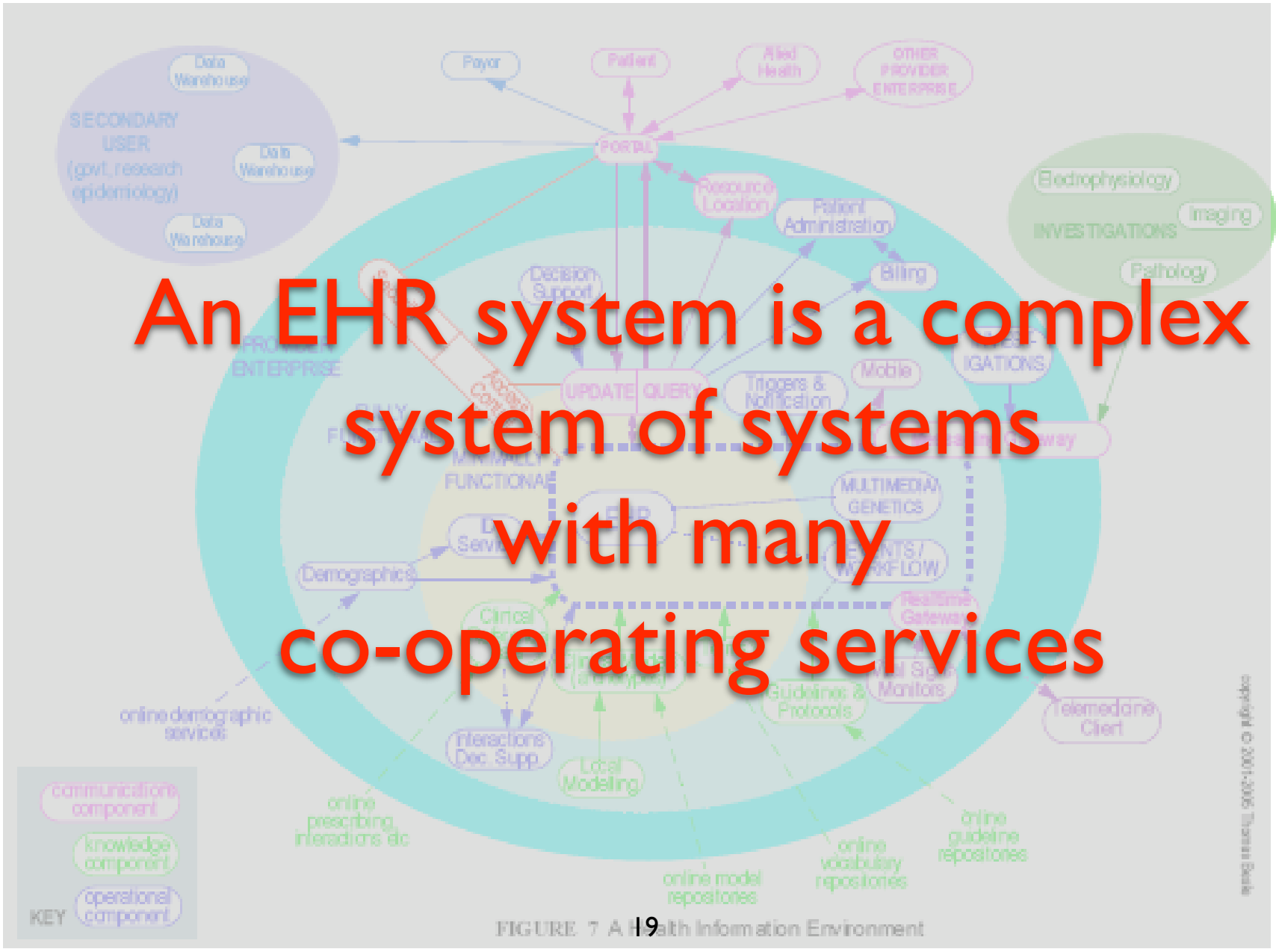
	Message paradigm	Two Model paradigm
Healthcare		
ICT vendor		

In summary.

EHRcom CEN/tc251 EN13606 will play a role in IT of the future.

The separation of knowledge and IT has many advantages.

Paradigm shifts



An EHR system is a complex system of systems with many co-operating services

The next paradigm shift.

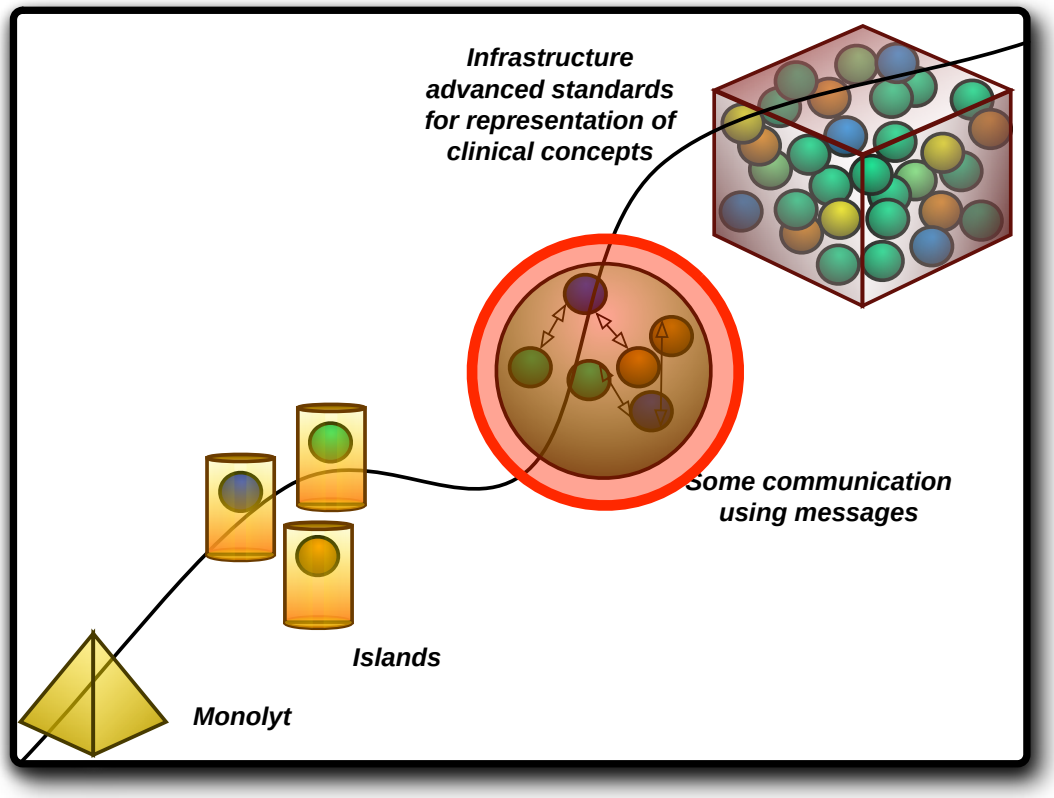
This complex slide is shown to demonstrate that an EHR-system is complex and consists of many services.
It is not hardware and software only.

Services that, when those EHR-systems start to co-operate, need to be accesses and behave in a predicted way.
More integration of systems (and services) will be needed.
This means that transparent systems, federated systems, need to be based on the same standard for a Health Information Services Architecture.

Paradigm shifts

Old paradigm:

IT systems as islands, each its own architecture and messages



PaleoHITic MesoHITic NeoHITic

Prototaxic period

EuroRec

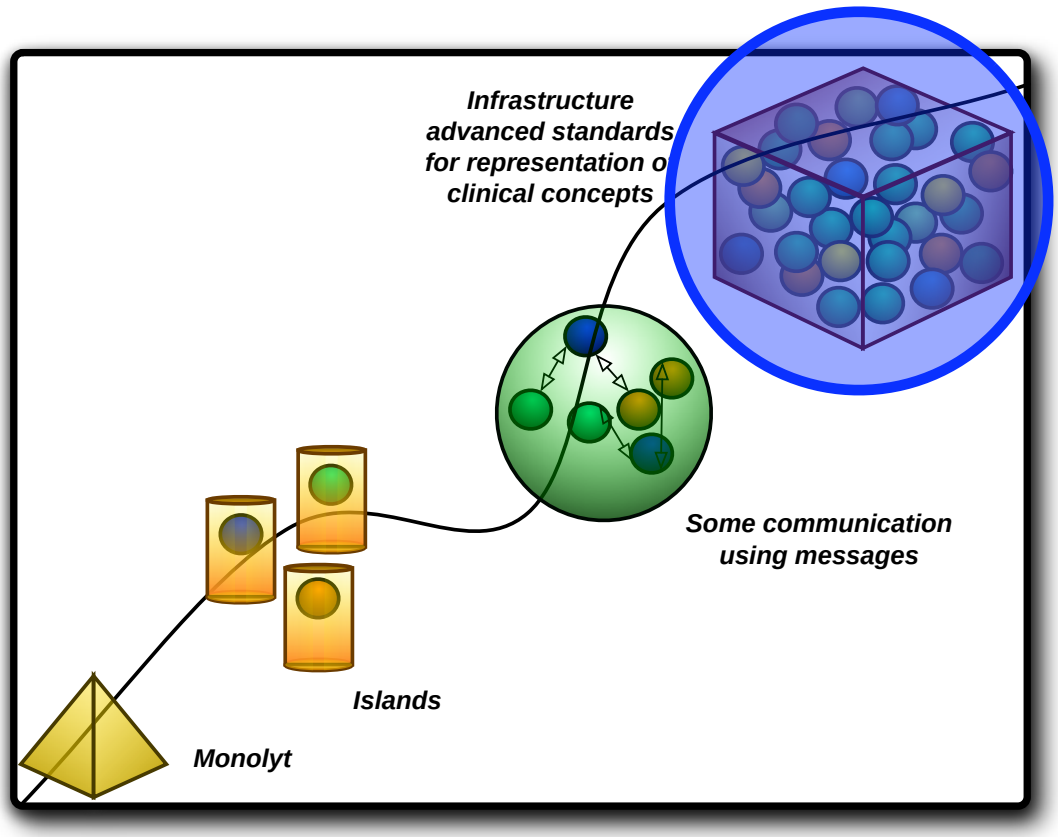
Present systems do not have a common services architecture.
Message standards connect more or less systems.
Completely autonomous systems
It is technology from the 80's.
Messages are not a perfect solution.

Because it makes Plug-and-play difficult or impossible.

Paradigm shifts

New paradigm:

One shared architecture, Interchangeable components



PaleoHITic MesoHITic NeoHITic

Prototaxic period

21

cen health informatics TC 251

HISA

EN12967

Health
Information
Services
Architecture

EUROREC

Systems of the future will have to be based in one common Framework.
One common Architecture.
One common standard for a SERVICES architecture.
Systems will be composed of common service definitions or components.
Components can be exchanged. **best of breed systems** become possible.
But, more importantly, systems get predictable behaviour.
This is needed for IT of the future and **plug-and-play exchange of: DATA, INFORMATION and KNOWLEDGE.**

CEN/tc 251 wg1 has produced an European Norm: Health Information Services Architecture.
It is based on more than 15 years European R&D.

The three standards:

- 13606: EHRcom
  - Electronic Health Record Communications

EHR
Dossier

- 12967: HISA
  - Health Informatics – System Architecture

EHR
System/Services

- 13940: CONTSYS
  - System of concepts to support Continuity of care — Part 1: Basic concepts

Healthcare
providers

One could observe or conclude that the IT systems of the present are using the OLD paradigm.
When we really want or need the sharable EHR (eHealth) systems must implement the new European EHR related standards.

The migration path might use the messages, but in the end all systems have to be rewritten.

With the horse and wagon one can transport goods from A to B.
But they have almost nothing in common with the modern container paradigm as used in worldwide transportation.

The three standards:

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CEN/ISO 13606: EHR Communications standard

- A means to exchange part or all of a patient's EHR
  - between heterogeneous systems
  - within a network of distributed EHR systems
  - Plug-and-Play
- Meets published EHR requirements
  - 14 years of R&D and 2 past CEN EHR standards
- Due for publication during 2006-7 (five part standard)
  - Information model, archetype model, archetypes, security, message models
- May be used alongside other standards

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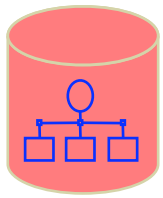
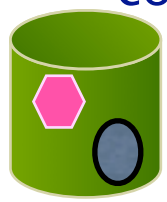
Systems feeding or accessing the

Clinical trials, functional genomics, public health databases



EHR repositories

Decision support, knowledge management and analysis components

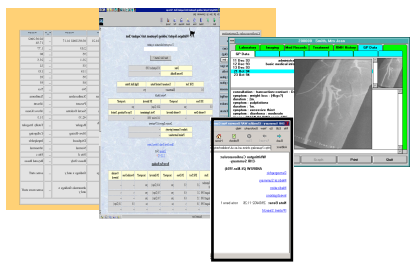


Personnel registers, security services

EHR interoperability

Mobile devices

Clinical devices, instruments



Clinical applications

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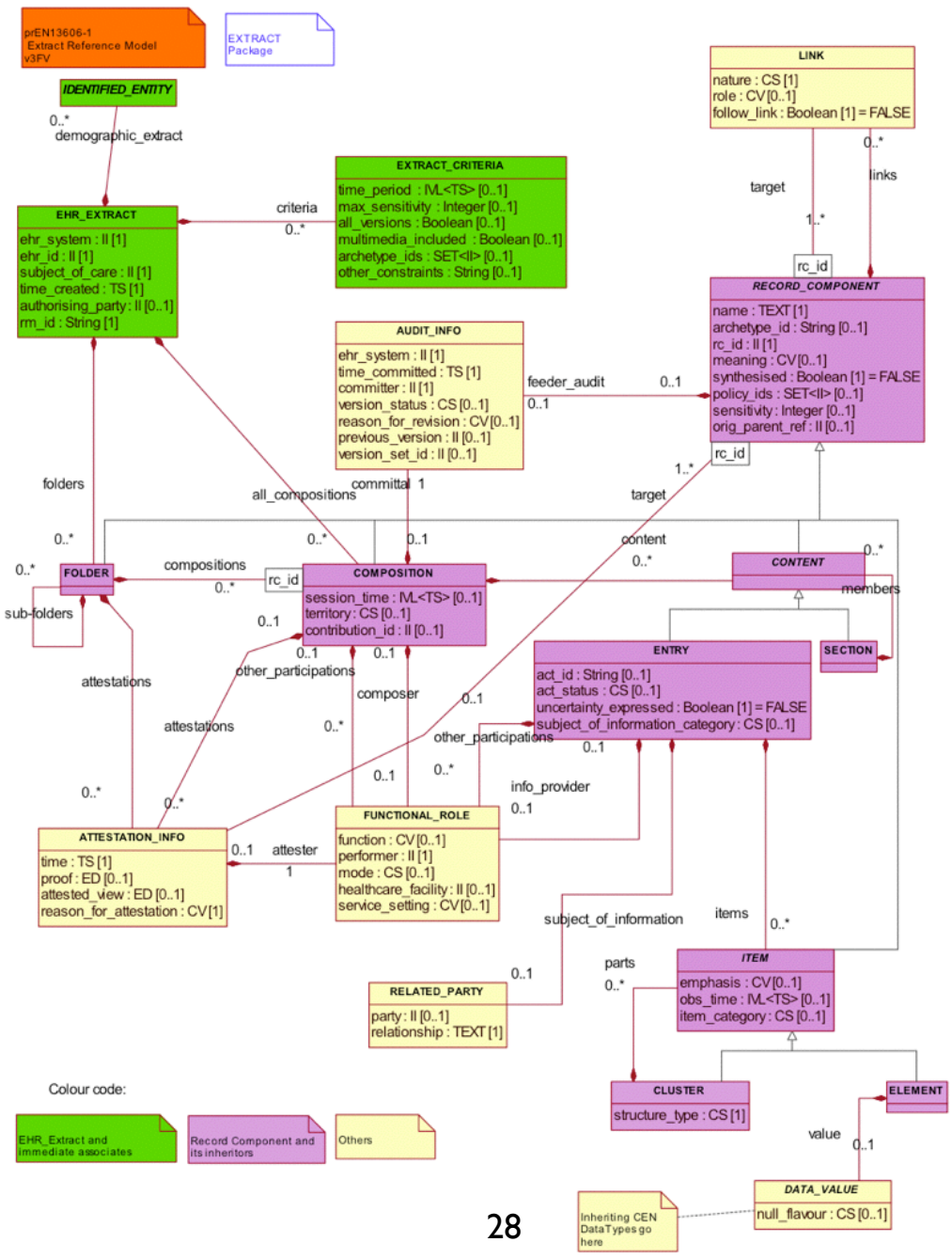
Parts of EN 13606 (EHRcom)

- Part 1: Reference Model
  - comprehensive, generic model for communicating part or all of an EHR
- Part 2: Archetype Specification
  - constraint-based approach for defining clinical "business objects" that are built from the Reference Model – adopted from openEHR
- Part 3: Reference Archetypes and Term Lists
  - initial set of archetypes mapping to other relevant standards
  - micro-vocabularies for the Part 1 model
- Part 4: Security
  - measures to support access control, consent and auditability of EHR communications
- Part 5: Exchange Models

Generic hierarchy of the EHR

EHR Extract	Part or all of the electronic health record for one person, being communicated
Folders	High-level organisation of the EHR e.g. per episode, per clinical speciality
Compositions	Set of entries comprising a clinical care session or document e.g. test result, letter
Sections	Headings reflecting the flow of information gathering, or organising data for readability
Entries	Clinical "statements" about Observations, Evaluations, and Instructions
Clusters	Multipart entries, tables,time series, e.g. test batteries, blood pressure, blood count
Elements	Element entries: leaf nodes with values e.g. reason for encounter, body weight
Data values	Date types for instance values e.g. coded terms, measurements with units

13606 Reference Model (CEN final vote)



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Harmonisation with other standards and Open Source

- CEN/tc251 EN 13606 EHRcom
  Is developed jointly with Standards Australia.
  and will become an Australian Standard soon

- OpenEHR is an active open source community (>600 members, 60 countries) that produced:
  - an open source implementation of EHRcom
  - Archetype editors (.Net and Java)
  - plus extra features that enable it to be implemented inside systems

- OpenEHR is the result of co-operation between the major contributors to EHRcom:
  - University College of London
  - OceanInformatics (from Australia)
  - (www.OpenEHR.org)

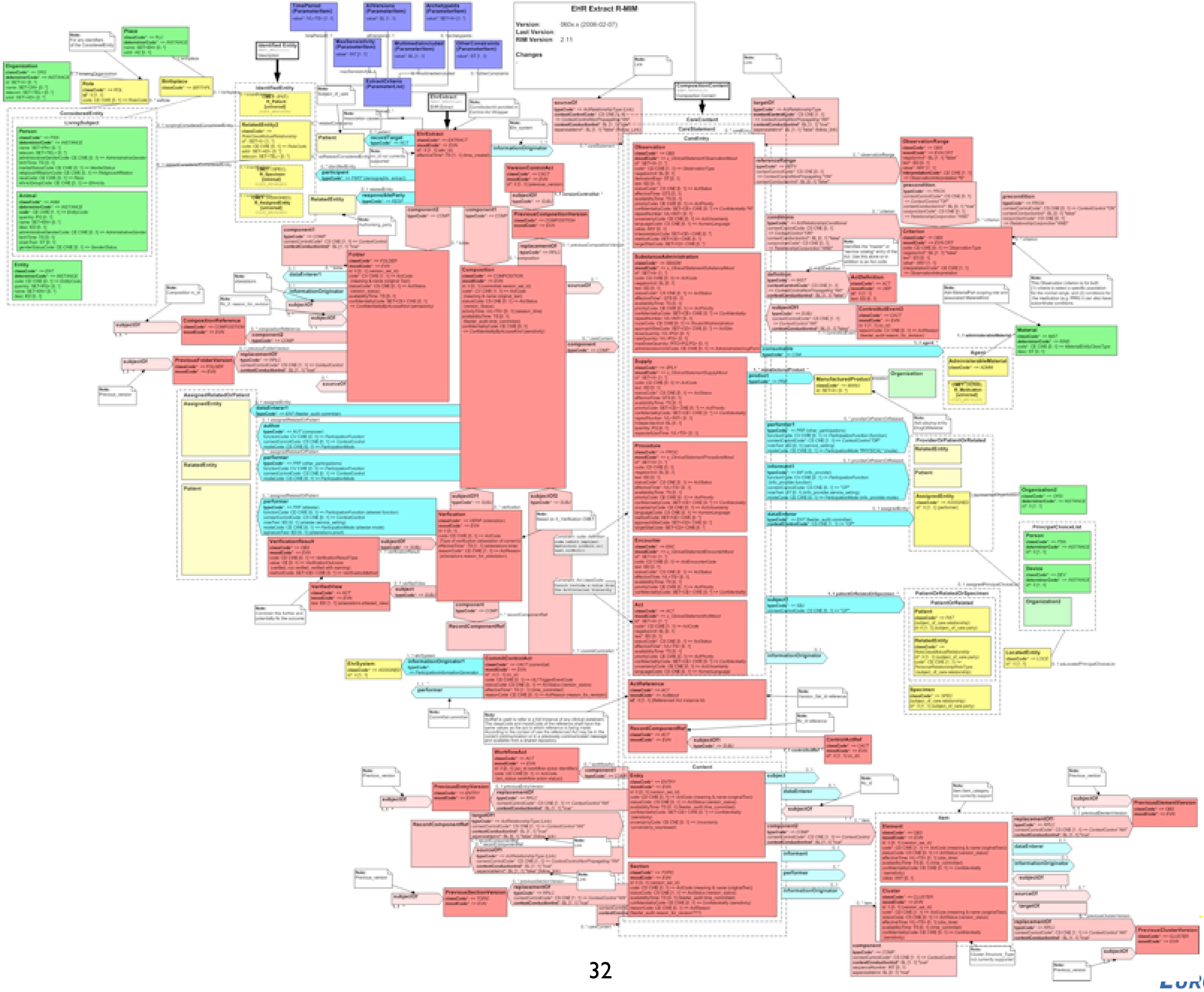
Harmonisation with other standards

- ISO
  - ISO TS 18308 (EHR requirements) adopted as the official requirements basis by 13606
  - 13606 has been related to concepts defined in ISO DTR 20514 (EHR Definition and scope)
  - Access control approach maps to ISO TS 22260 (Privilege Management and Access Control)

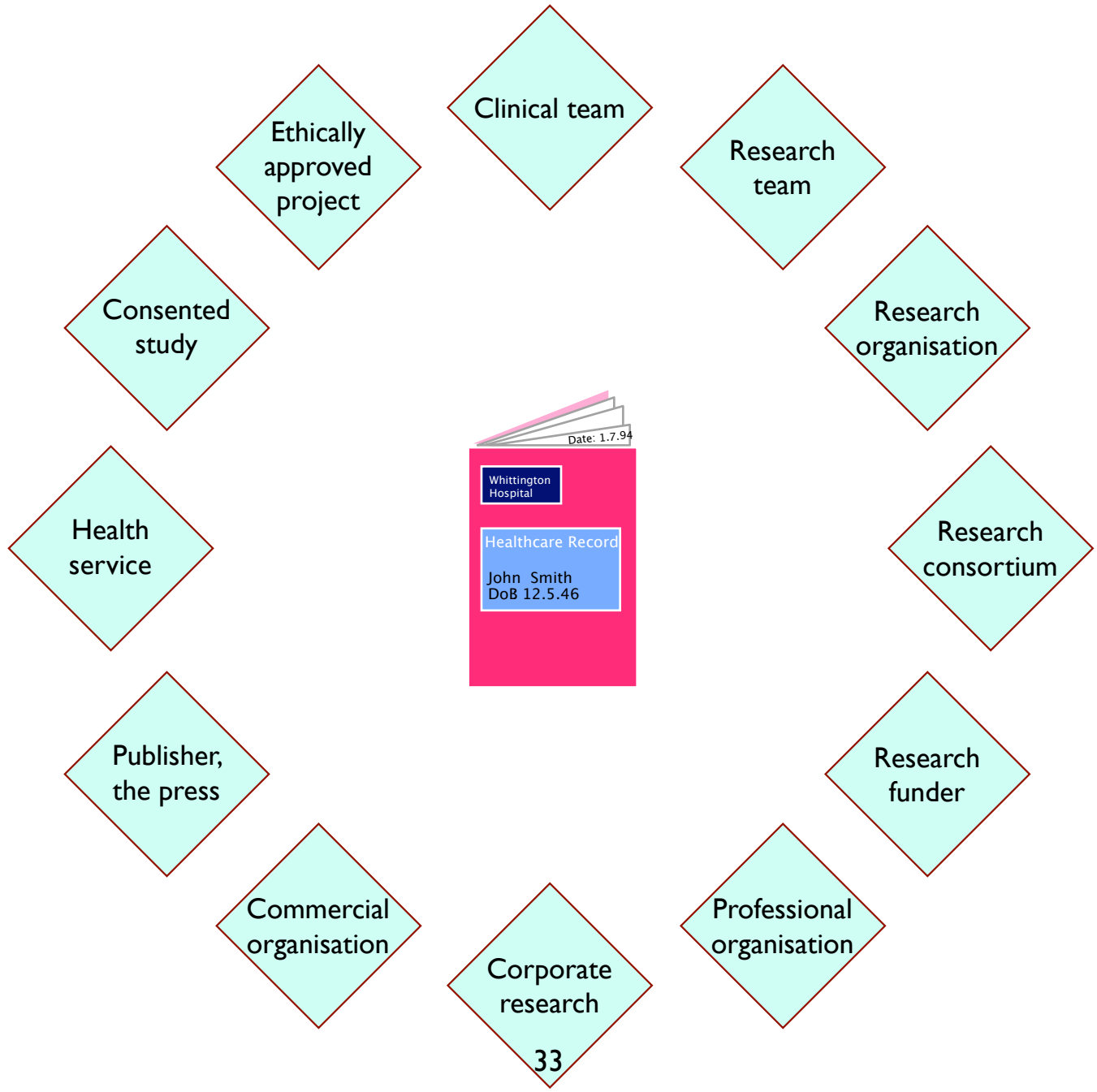
- CEN
  - Cross mapping to HISA and CONTSYS draft standards
  - Uses CEN data types (sub-set of HL7)
  - Cross working group activities on information models,

Harmonisation with other standards

- HL7
  - Meets the Infrastructure requirements of the EHR Functional Model
  - An 13606-1 conformant R-MIM has been designed
  - Detailed cross-mapping to Clinical Document Architecture
  - Working together on a joint CEN/HL7 archetype specification
  - Contributing to the Clinical Statement model design
  - An HL7 13606 Implementation Guide will be developed
- IHE


EHR Extract R-MIM

Potential users of EHR data



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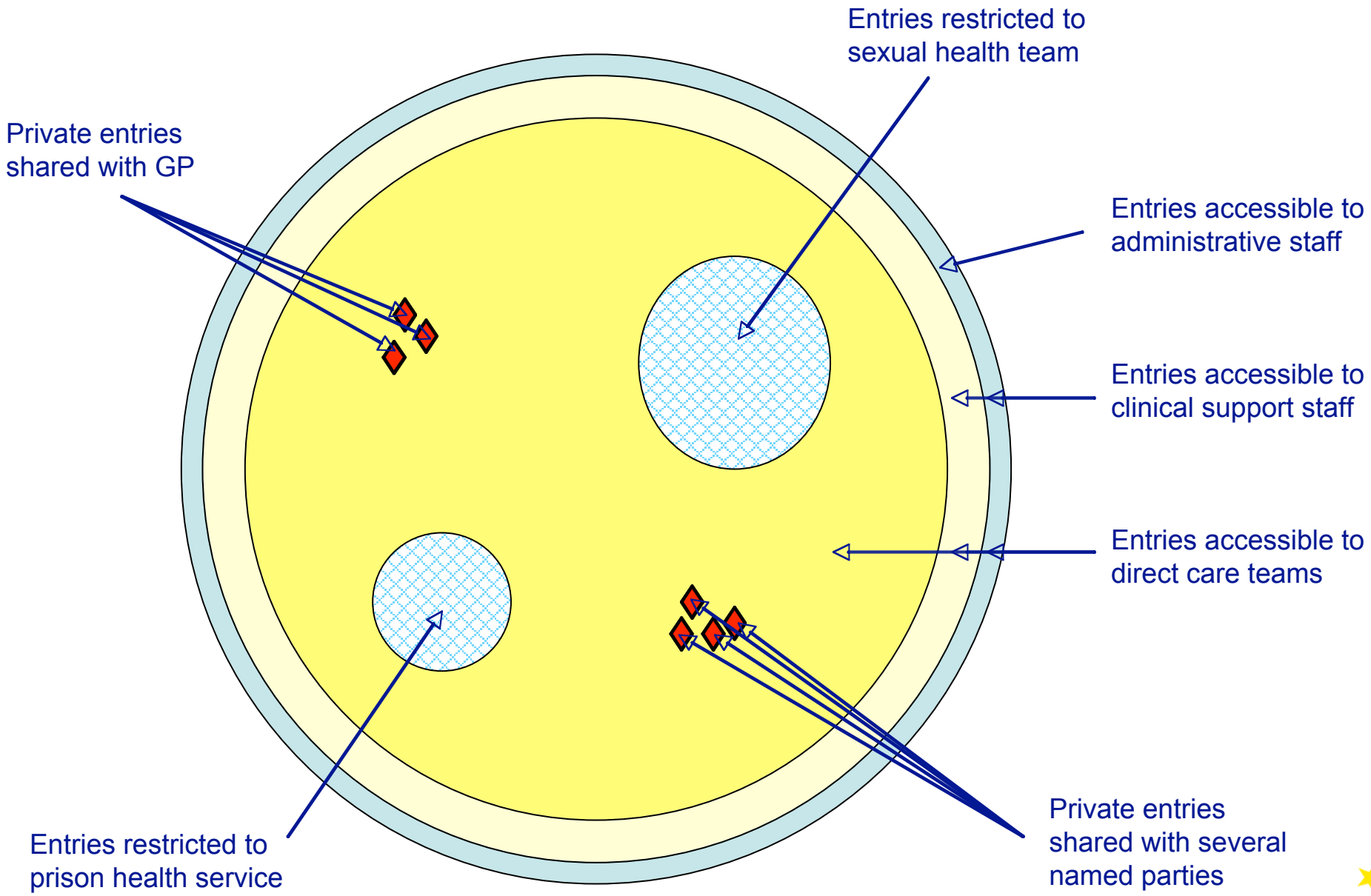
Policies for EHR access need to specify:

- Which institutions should normally have access
- If certain teams or specialities should have privileged access
- If particular users should be excluded, or given wide access
- If consent has been granted for teaching, specific research or generic research

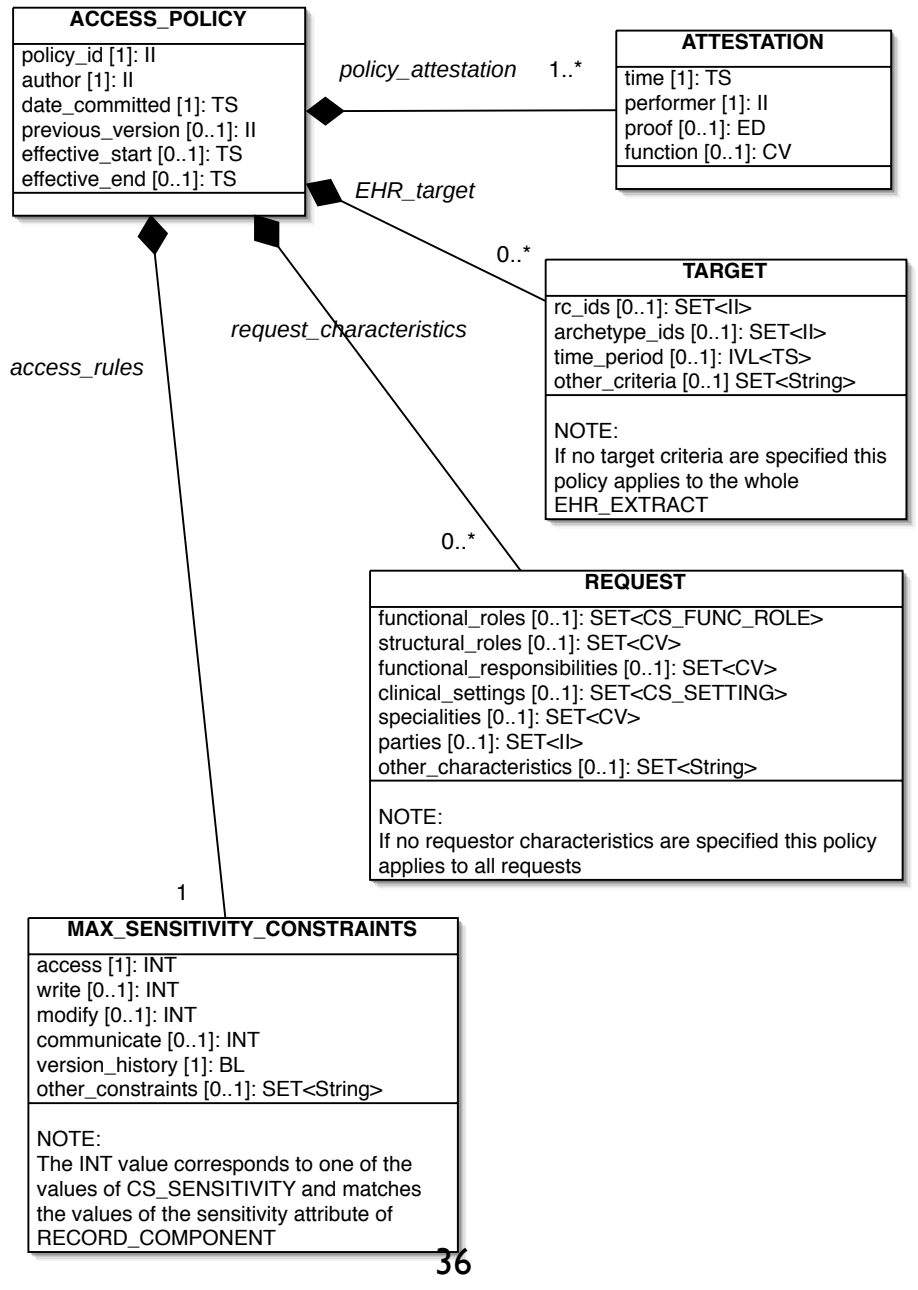
EHR communication needs to ensure that such consent specifications are represented

13606 Part 4: The sensitivity of EHR



EuroRec

Communicating EHR access



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Health Informatics- Service Architecture
HISA
Rationale and Overview

What is HISA?

A standard defining a "**Healthcare Informatics Service Architecture**" identifying:

- **the general principles of the service architecture, to secure openness and vendor-independence:**
  a) information must be separated from specific applications and accessible through services
  b) services logic must be independent from technological issues (i.e. multiple technologies and mechanisms must be possible for accessing the same services)

- **the fundamental elements of a comprehensive information model capable of supporting the whole healthcare organisation**

- **the fundamental characteristics of a set of services for managing common information and for performing common business logic**

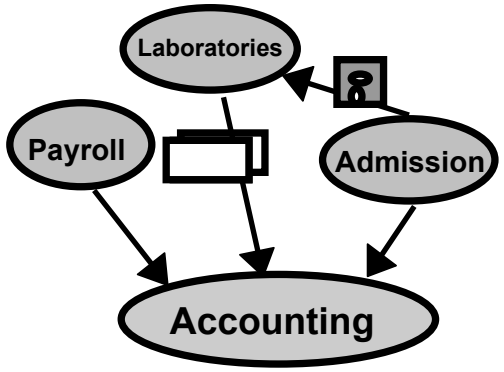
The Architecture

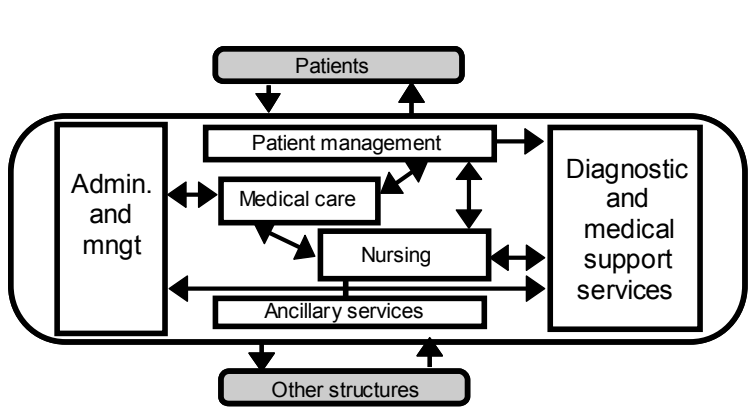
"**Architecture**" identifies the components of the system, the interfaces between them and presents a way to assemble these into one functioning system meeting the needs and concerns of all stakeholders.

Implementation of healthcare information systems is:

- not just about installing computers, but rather is concerned with
- organizing things guaranteeing openness, interoperability, modularity and vendor independence, safeguarding the healthcare centre's investments and systems

These latter are strongly recommended by CEN TC251 and all standardization bodies.





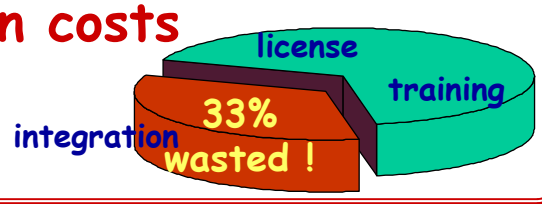
- **Information represents a common fundamental asset of the whole healthcare organisation**. The same data is necessary for supporting different sectors, users and types of activities for different purposes and from different viewpoints:
  - clinical
  - organisational
  - managerial

- **Commonalities can be identified in the healthcare business logic**, to be implemented/maintained once and made available throughout the organisation

Modularity and openness of the system architecture is a fundamental issue to:

- reduce the 'integration' costs
- avoid monopolistic situation of individual suppliers
- facilitate the co-operation and inter-working of different applications

Almost 1/3 of the development/acquisition costs of each system relate to the '*integration*' with other applications



Rationale:

The healthcare organisation

Other healthcare centres and organisations

Emergency
- Shifts
- Activities performed - Resources used
- Requests of materials and of external services

Patients

Ambulatories
- Book - Admit - Collect payments
- Waiting lists
- Calculate tariffs and indicators
- Activities performed - Resources
- Requests of materials and external services

ADT
- Waiting lists
- Level of availability in the units
- Admission - Discharging
- Transfers
- Interactions with other centres over the territory
- Billing

Wards
- Local waiting lists
- Admission - Discharging - Transfers
- Requests of material and external services
- Therapies
- Vital parameters
- Nursing and medical support
- Bed management

patients | activities

unified management of common data

health data | resources (*)

coding criteria

authorisations

Summary of performed activities (patients, organisation,resources)

Direction
- Periodical analyses costs/revenues
- Indicators of effectiveness, activity and costs
- Activities of the individual sectors
- Highlighting of alerts and special situations
- Budgeting and objectives fixing
- Analytic accounting

Operating theatre
Consultants
Radiotherapy
Laboratories
Radiology
- Booking - Waiting lists
- Internal planning
- Activities performed
- Requests of materials and external services
- Reporting

Food
Pharmacy
Warehouse
- Management of requests
- Distribution
- Stocks
- External orders

Personnel

Accounting

Economic information (costs, profits/losses)

resources (*): units, equipments, personnel materials, drugs,

A set of units, performing individually specific activities, but sharing a common set of fundamental data

The HISA Standard
Some history and how it has been used

- 1st version of HISA approved in 1997 as prENV 12967-1
- HISA-compliant products exist and are on the market!
- Since its approval it has been used in both industrial and research projects by:
  - **Healthcare centres,** as a basis for:
    - Defining a strategy for the creation, evolution, and migration of their healthcare information system architecture
    - Preparing tenders and/or purchasing interoperable systems, verifying conformance
    - Preparing the framework for an open EHR
  - **HIS Developers,** as a reference for providing state of art systems:
    - Building interoperable systems
    - Evolving existing systems
- In general it provides a general roadmap for an open and interoperable environment
- The HISA Revision will release a new three-part HISA 12967 EN standard. It is now going in for CEN Enquiry.

Used in practice!
A couple of HISA Relevant Experiences

- **Catholic University of the Sacred Heart (UCSC)-Policlinico "A. Gemelli", Roma**
  A HISA-based open, multi-vendor and modular architecture built up in several years

- **Copenhagen Hospital Corporation (H:S)**
  In 2002 tender for a HISA-compliant Integration Platform to serve as a basis for a common EHR, a medication module, H:S portal, for future application development tenders, etc.

- These HISA-based architectures comprise usage of other complementary standards:
  - Message exchange using HL7 and EDIFACT for example
  - Information exchange with Diagnostic Imaging Equipment using DICOM
  - XML, and more

Organisation of the standard
Readability

A multi-part standard, organised through three mutually complementary documents to facilitate readability and manageability by the intended Audiences

- **HISA Enterprise viewpoint**
  Overall methodological and architectural framework, conformance criteria, fundamental organisational processes of the healthcare organisations

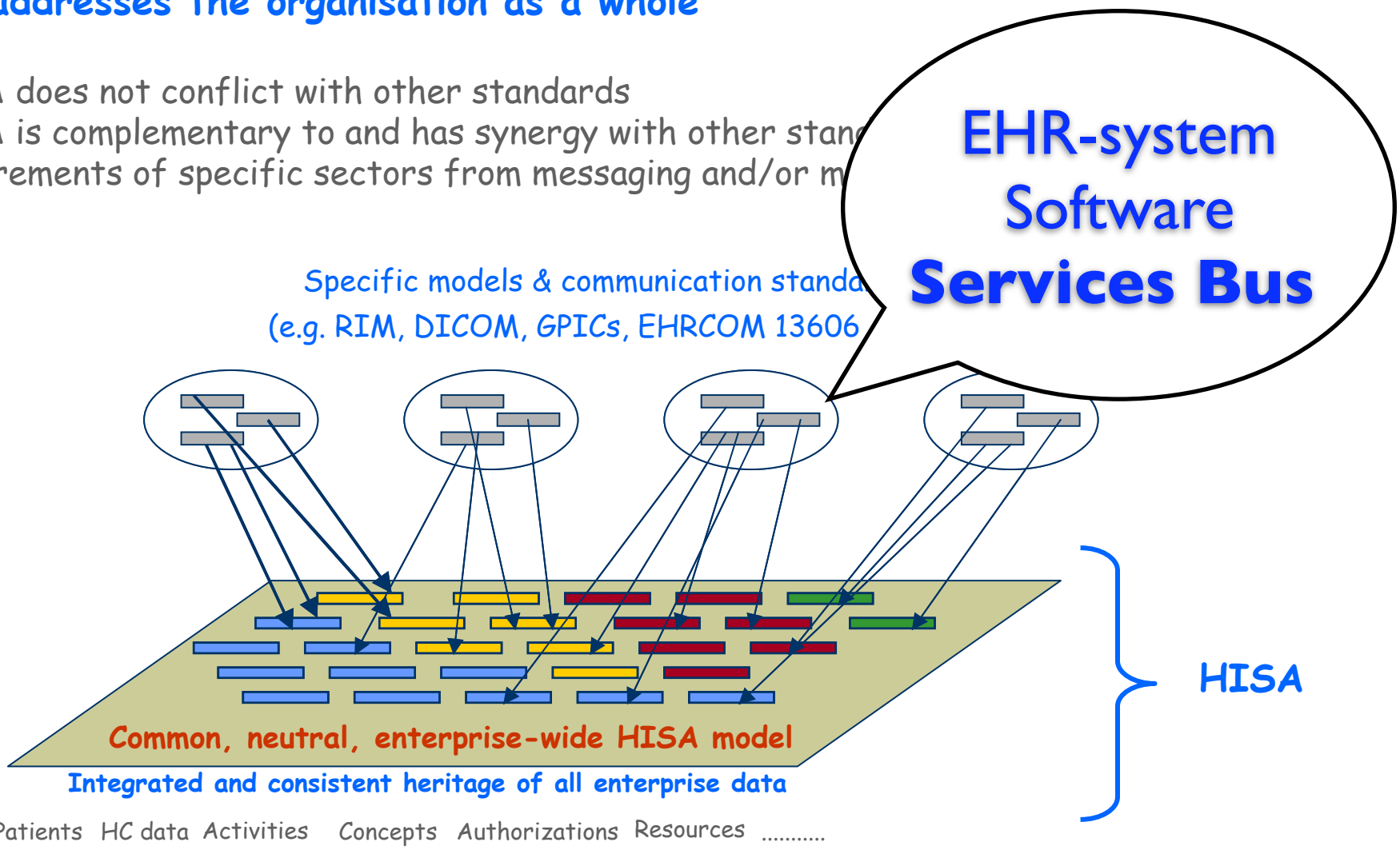
- **HISA Information viewpoint**
  Specification of the information model supporting the architecture to integrate the common information and make them available in the system

- **HISA computational viewpoint**
  Specification of the (fundamental) services to be provided by the architecture to allow manipulation of elementary data and to execute common business logic

Positioning & complementarity

HISA addresses the organisation as a whole

- HISA does not conflict with other standards
- HISA is complementary to and has synergy with other stand
  requirements of specific sectors from messaging and/or m



In a bit more detail HISA and…

- **HISA and EHRCOM 13606**

  HISA provides a specification on how to develop healthcare information systems capable of:
  - Handling the elementary clinical information required in the EHRCOM extract
  - Handling the knowledge-base information required
  - Providing services that manage such information,

  allowing to build up the actual components of the extract and to transmit/receive EHR information

- **HISA and HL7**

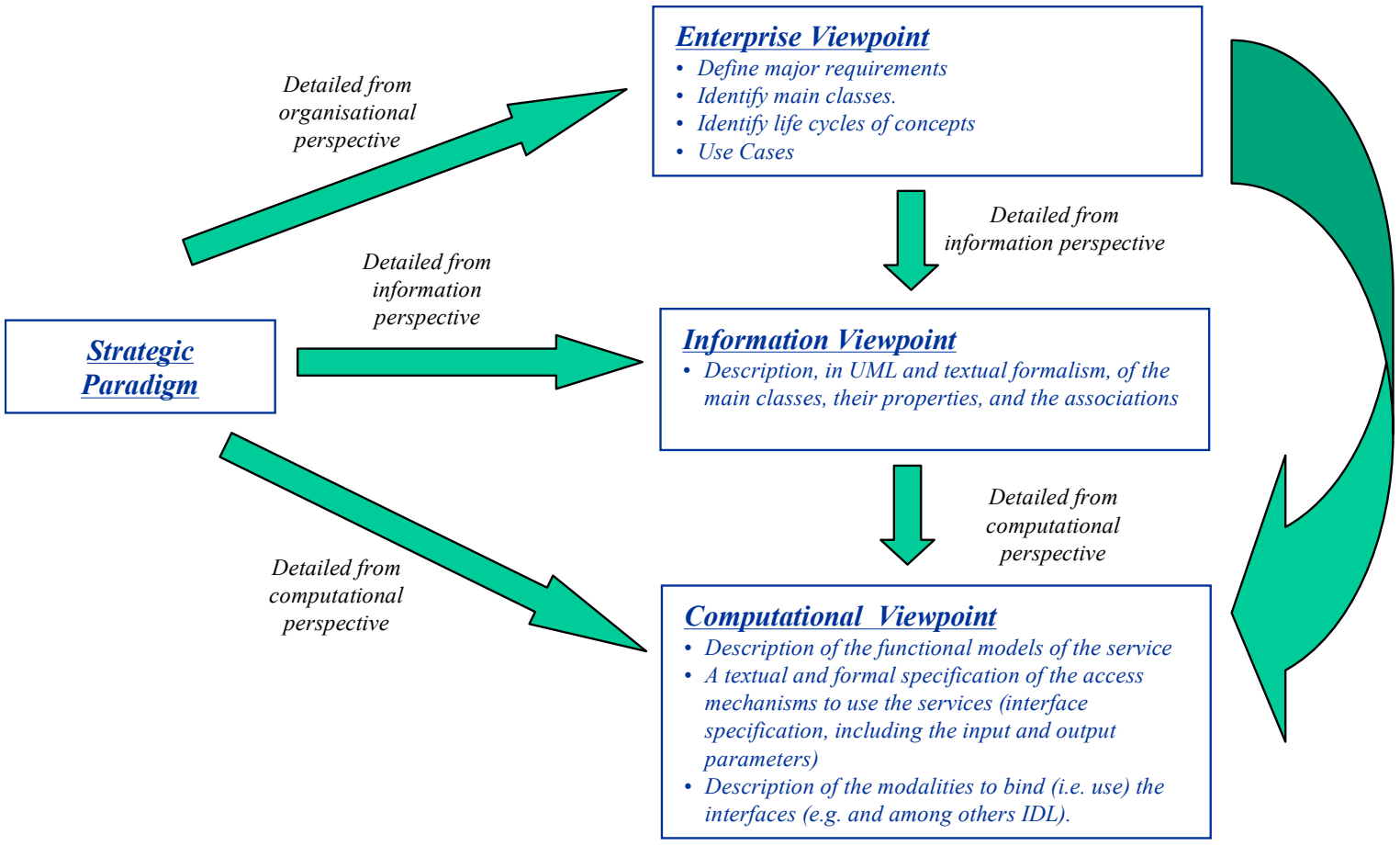
  HISA provides a specification on how to develop healthcare information systems capable of:
  - Handling the elementary clinical information required for HL7 messages
  - Handling the knowledge-base information required
  - Providing services that manage such information,

  allowing to build up the actual components of the messages and to transmit/receive them.

  Moreover, within the CEN/HL7 harmonization activities a *mapping between RIM and HISA* has been made by HL7 members.

HISA methodology

The architecture is specified through three viewpoints



The essential users' activities common to the whole organisation to be supported by the middleware, in terms of information managed and organizational processes.

1- Three major organizational workflows

Subject of Care workflow

users' activities related to the management of the personal and statistic information regarding subjects of care and to the management of encounters of the Subject of Care with the organisation itself, including the interactions with the funding organisations.

Activity management workflow

users' activities related to the management of the different types of activities that are executed in the organisation during their whole life-cycle, including –but not limited to- the aspects related to the initial requesting, the booking, the planning, the execution and the reporting.

Clinical information workflow

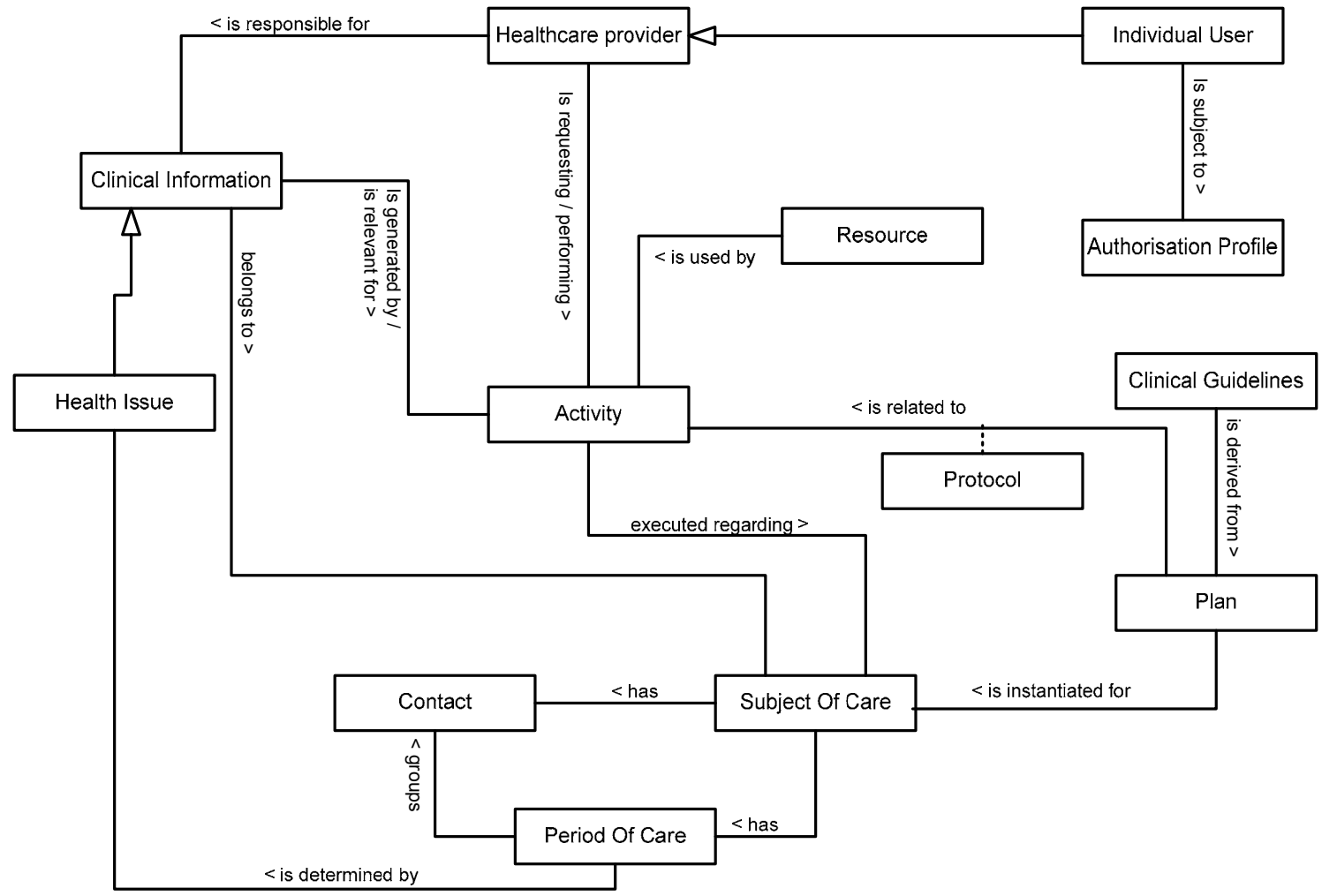
users' activities related to the management of the clinical data, including –but not limited to- the aspects relating to their collection and validation as well as the aggregation and structuring of the elementary data according to the specific requirements of the different disciplines and users.

Specifies the minimum information model to be implemented by the middleware to accommodate and integrate all information relevant for the healthcare enterprise to support the requirements identified in the Enterprise viewpoint

Objects	Enterprise process
Subject of care objects	Subject of Care Workflow
Activity management objects	Activities management workflow
Clinical information objects	Clinical Information Workflow
Organisation, users and authorisation objects	Management of authorisations
Resources objects	Management of resources
Classification objects	Management of dictionaries and coding
Messaging objects	Interactions with other systems

HISA specification
Enterprise viewpoint

The EV contains use-cases, the identification of the basic clusters of objects, the overall model.



Information viewpoint
Organisation of the document

7 The Reference Information models

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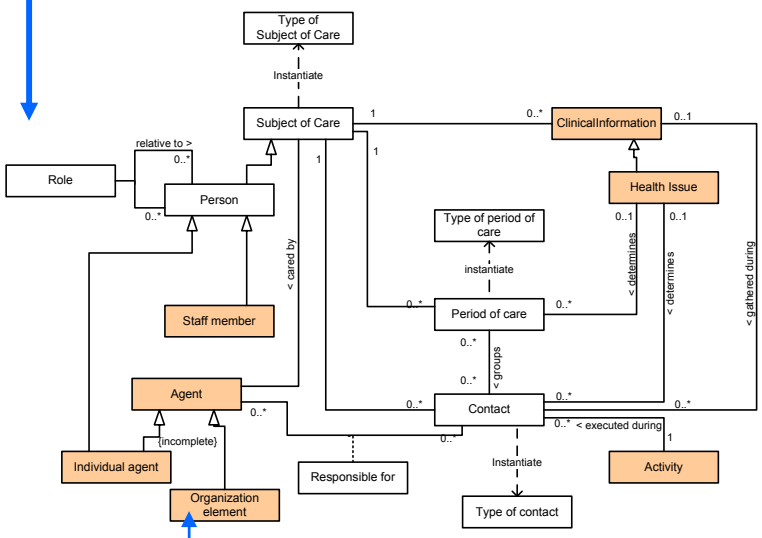
7.2 Subject of Care Objects

7.2.1 Scope (textual)

7.2.2 UML information model

7.2.3 Specification of the individual classes



Classes defined in the model of other groups of information objects

References to other standards

7.2.3.5 Class: Contact

Class identifier:	**Contact**
Description	*Situation on the uninterrupted course of which one health care provider performs health care services for a subject of care* (CONTSYS – modified)
Related terms	Contact: *Situation on the uninterrupted course of which one health care provider performs health care services for a subject of care, and/ or accesses his or her health care record* (CONTSYS) Encounter: *Situation on the uninterrupted course of which one health care professional delivers health care services to a subject of care, accesses his or her health care record, and updates it* (CONTSYS) Contact element: *Part of a contact that specifically addresses one and only one health issue* (CONTSYS) Care encounter: *A specialisation of ClinicalInformationComplex containing a set of information about a patient care encounter that has happened or is planned, cancelled, postponed, etc. (GPIC)* Related care encounter: *Set of information concerning a care encounter that is related to some other activity* (GPIC)
Notes	*1) The Contact is an administrative placeholder for managing the set of health issues recorded, activities performed, resources used, subject of care and health care providers involved, etc. during the period of time the Contact lasts.* *2) Healthcare information systems may be implemented without using the Contact as an administrative container. Thus, all associations from this class to other classes are modelled with multiplicities 0..1 or * at the Contact class end. However, if the Contact class is implemented, the associations should have multiplicities 1 or 1..* at this end.*
Examples	*An ambulatory visit, an in-patient stay, a day-hospital stay, telemedical supervision, telephone advisory, etc.*

Associated classes	**Type of Association**	**Multiplicity**
SubjectOfCare *Subject of care to whom the contact relates*	Binary association	1
PeriodOfCare *Period of care in which the contact is clustered*	Binary association	0..*
Activity *Activity(ies) performed in the interest of the patient during the contact*	Binary association	0..*
Clinical Information *Clinical information on the Subject of Care that are gathered during the contact*	Binary association	0..*
Health Issue *Health issue of the Subject of Care that is determining the contact*	Binary association	0..*
Agent *Agent(s) responsible –at various levels- for the Contact during its various phases*	Binary association Through association class "Responsible for"	1..*

Attributes	**Type**	**Description**
id	Identifier	Unique identifier for the Contact
startTime	DateTime	Date and time when the contact is started (or is planned to start, depending on the lifecycle status)
endTime	DateTime	Date and time when the contact is ended (or is planned to end, depending on the lifecycle status)
startReason	String	Reason for the initiation of the contact
endReason	String	Reason for terminating the contact
Status	String	Status of the contact; described –at least- through values: "Planned", "Active", "Terminated", "Annulled"

Each object of the model conforms to a common structure, allowing:

- Versioning
- Auditing
- Recording changes in the individual attributes
- Relating an indefinite number of multimedia data
- Relating an indefinite number of (e.g. clinical and organizational) rules to be adopted when operating with the instance
- Relating an indefinite number of classifications to the whole instance and/or to individual attributes

Computational viewpoint
Derived directly from the information model

7 The Reference Information models

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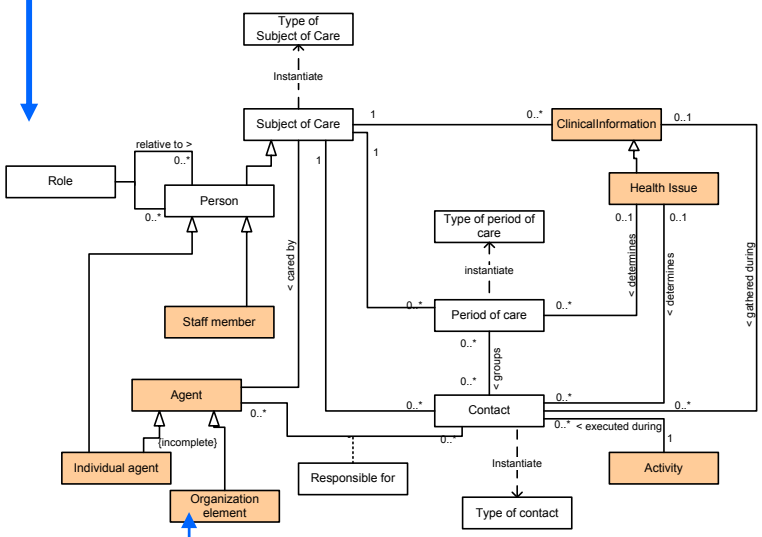
7.2 Subject of Care Objects

7.2.1 Scope
(textual)

7.2.2 UML information model

7.2.3 Specification of the individual classes



Classes defined in the model of other groups of information objects

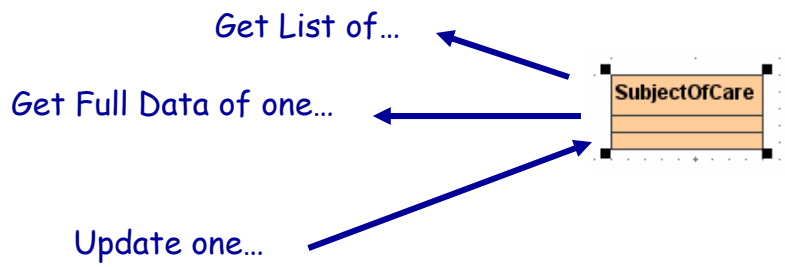
- For each cluster there will be a set of computational objects providing interfaces allowing the management of the common information and business logic relevant to the organization.
- Two types of computational objects per cluster:
  - Computational objects deriving directly from the corresponding information object (i.e. one computational object per information object)
  - Higher-level computational objects providing interfaces achieving higher-level complex business logic on multiple information objects.

Examples…

"Basic" computational objects providing:

Interfaces to methods allowing the ***basic*** *access and manipulation of each instance* of the information model

→ secure the openness of the system

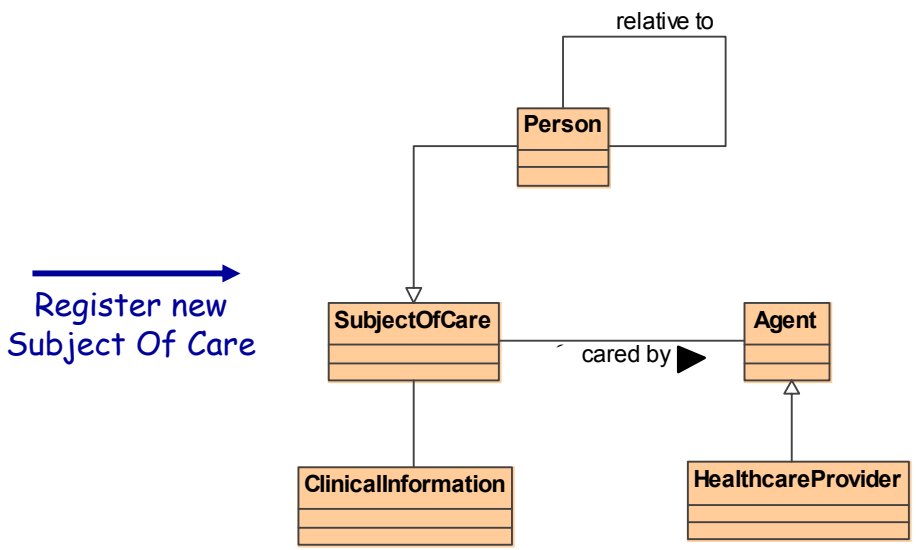


"Complex" computational objects providing:

Interfaces to methods implementing more ***complex*** *business transactions* (e.g. patient life cycle, activities, HCR manipulation, etc.)

→ simplify and ensure consistency of developments

→ make common fundamental procedures of the organisation



Conclusions: HISA provides prescriptive norms on Healthcare Service Architecture

A standard defining a "**Healthcare Informatics Service Architecture**" identifying:

- **the general principles of the service architecture, to secure openness and vendor-independence:**
  a) information must be separated from specific applications and accessible through services
  b) services logic must be independent from technological issues (i.e. multiple technologies and mechanisms must be possible for accessing the same services)

- **the fundamental elements of a comprehensive information model capable of supporting the whole healthcare organisation**

- **the fundamental characteristics of a set of services for managing common information and for performing common business logic**

The three standards:

- 13606: EHRcom
  - Electronic Health Record Communications
- 12967: HISA
  - Health Informatics – System Architecture
- 13940: CONTSYS
  - System of concepts to support Continuity of care — Part 1: Basic concepts

An overview of CONTsys

(Updated 2006-09-02)

System of concepts to support Continuity of Care (EN 13940-1)

Slides courtesy of François MENNERAT

Continuity of care

- implies the management of health information in at least two different perspectives:
  - local management of information about the subject of care, at the site of care provision
  - information interchange between health care providers:
    - information (and data) about the patient
    - information about the current process of health care
    - and how its different related tasks are performed
      - their degree of achievement, and in general their status

CONTsys

- CEN – Comité Européen de Normalisation (European Standardisation Committee)
- Technical Committee TC 251 "Health Informatics"

- EN 13940-1 "Health Informatics – System of concepts to support continuity of care – Part 1: Basic concepts"
  to be published in 2006

CONTsys

- Work initiated in 1998
- Pre-standard (ENV) published in 2000
- "Full" standard (revised)
  to be published end 2006
- Work on "Part 2: Workflow" started

CONTsys

- 58 basic concepts
- each one described with
  - definitions and notes
  - direct relationships
  - multiplicity
  - attributes
  - other features or related entities
    - (identified, not described)
  - UML concept modelling

CONTsys

- Who ? Actors
- Why ? Health issues and their management
- When ? Time-related concepts
- What ? Concepts related to activity, use of clinical knowledge, and decision support
- How ? [1] Concepts related to responsibility
- [2] Health Data Management

Actors' roles and relationships

- Patient's personal involvement
- Health care providers and their "effectors" (health care professionals)
- Third parties

Health issues and their management

- Health issue
- Health issue thread

Time-related concepts

- Time frames within which
  - interactions between health care actors take place
  - and health issues in a subject of care are treated
- Contacts
  - Record management
  - Encounter
- Periods of care
- Episodes of care

Decision support, use of clinical knowledge, and activity

- Health care activities
- Clinical guidelines and Protocols
- Programmes of care and Care plans

Responsibility and information flows within the clinical process

- Health mandates
  - Demand mandate
  - Care mandate
  - Mandate to export personal data
  - Continuity facilitator mandate
- Health mandate notifications

Health data management and computerised records

- Ratification and pending ratification of clinical data
- Sharable and non sharable data

Conclusions

- CEN/tc251 has produced a series of innovative successful important standards:
  - EN13606 EHRcom
  - EN12967 HISA
  - EN13940 ContSys
- Enabling:
  - plug-and-play
  - semantic and system interoperability
- That might become:
  - an **European success story**
    like the GSM standard for mobile telephony

Thank you

EuroRec