

**JORNADA INTERNACIONAL: INTEGRACIÓN DE LOS SISTEMAS DE INFORMACIÓN DE SALUD E  
HISTORIA CLÍNICA ELECTRÓNICA**

Oficina de Desarrollo Tecnológico. Ministerio de Salud Perú, Lima , Octubre 14-15, 2015.

## Principios de Interoperabilidad en eSalud

### Estándares y Proyectos Internacionales para Registros de Salud Integrados.

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*Universidad del Cauca, Colombia*

*Fundación HL7 Colombia*

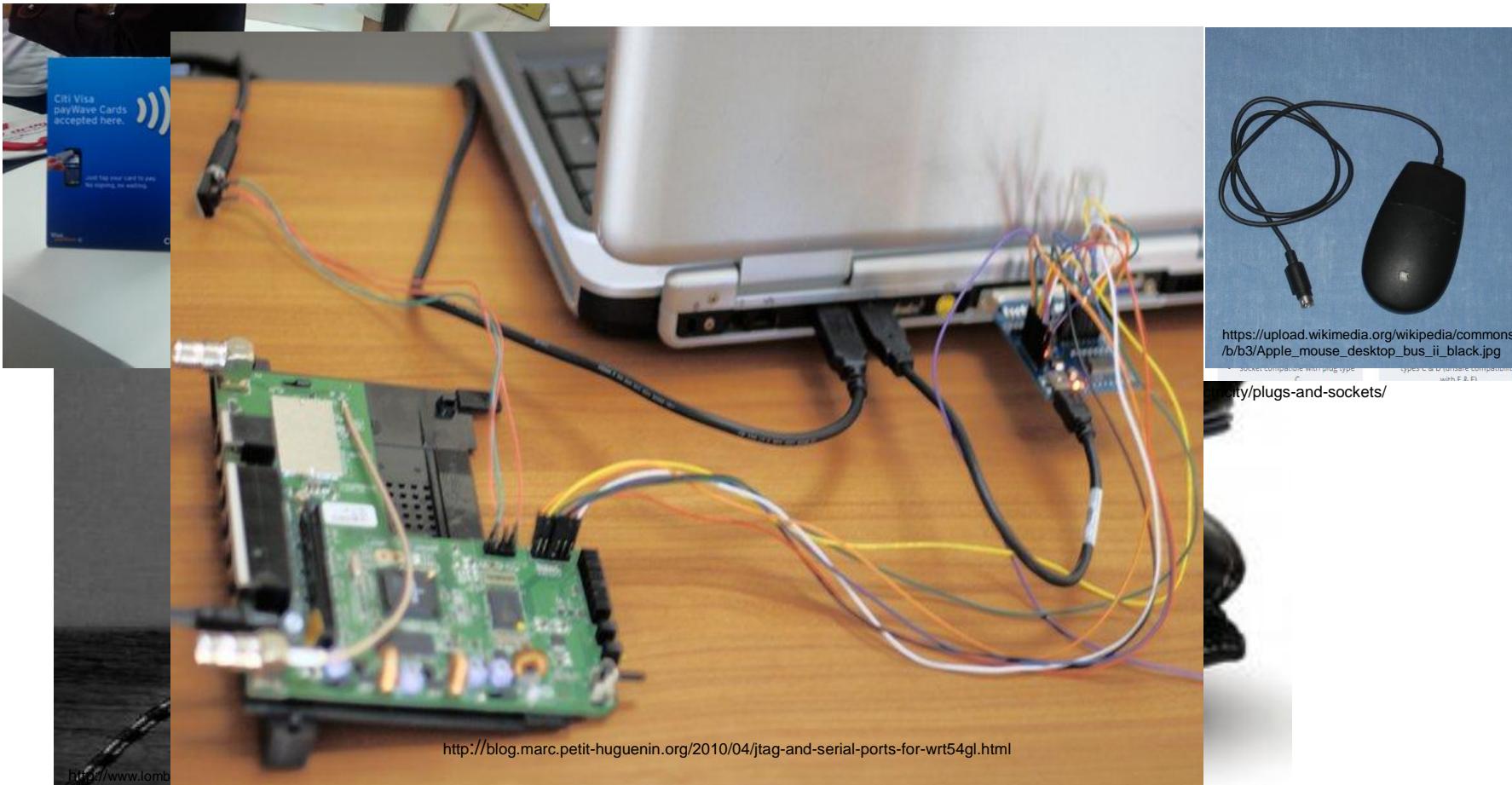
Lima , Octubre 14-15, 2015.



# Contenido

1. Definición y tipos de interoperabilidad
2. Estándares de Interoperabilidad en salud
3. Registros de Salud Integrados
4. Estándares y Proyectos internacionales para Registros de Salud Integrados
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# Definición de Interoperabilidad



# Escenario de Interoperabilidad en Salud

**Lab Exchange**

The collage consists of three panels:

- STAGE 1:** A stack of medical records with colorful tabs.
- STAGE 2:** An ECG strip with a stethoscope resting on it.
- BENEFITS:** A close-up of a healthy meal including an apple, a banana, and a measuring tape.

**When the results came back to her provider, they were typically faxed to the office and then scanned into the EHR. When Alicia has visited her provider, he looked at the results scanned in the system, but needed to open multiple documents to look at her previous results.**

**codes. Showing these changes to a patient lays the foundation for more effective and informed conversations about lifestyle changes.**

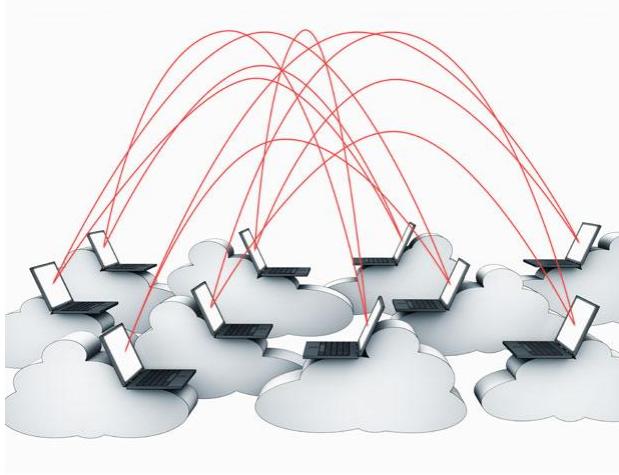
[https://www.healthit.gov/public-course/interoperability-basics-training/HITRC\\_1sn1069/wrap\\_menupage.htm](https://www.healthit.gov/public-course/interoperability-basics-training/HITRC_1sn1069/wrap_menupage.htm)



# ¿Qué es Interoperabilidad?

“La capacidad de dos o más sistemas o componentes para intercambiar información y hacer uso de ella”

IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries”, Standard, New York, 1990.



# ¿Qué es Interoperabilidad?

Interoperabilidad en Registros de Salud Electrónicos (ISO/TR 20514:2005,

Health informatics - Electronic health record - Definition, scope and context)



- “La Capacidad de la Información compartida entre sistemas, de ser entendida al nivel de conceptos de dominio formalmente definidos (de tal forma que la información sea procesada por máquinas en el sistema receptor)”

IMC> 30?

```
</entry>
<entry>
  - <Observation>
    <code displayName="Body mass index"
      codeSystem="2.16.840.1.113883.6.96"
      code="60621009" codeSystemName="SNOMED CT"/>
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    </value>
  </Observation>
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```



Health System A



Health System B



Irish Multiplex Cinemas

# Niveles de Interoperabilidad

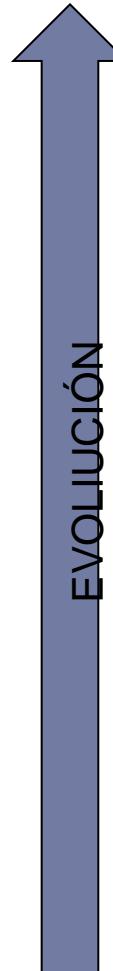
## **Interoperabilidad Organizacional/Servicios/Procesos:**

Interoperabilidad para la acción, va más allá que la interoperabilidad a nivel de sistemas informáticos. Involucra políticas, cultura organizacional, procesos y mecanismos para que haya colaboración a nivel de las organizaciones.  
**Involucra políticas, cultura organizacional, procesos y mecanismos para que haya colaboración a nivel de las organizaciones.**

**Interoperabilidad Semántica:** Implica que los sistemas entiendan la información que están procesando. La inteligencia necesaria para poder entender el mensaje que se está transmitiendo se logra a través del uso de modelos comunes de información, y el uso de terminologías y ontologías médicas. RIM, Mensajes y Doc HL7, CIE-10, SNOMED-CT, CUPS, OBO.

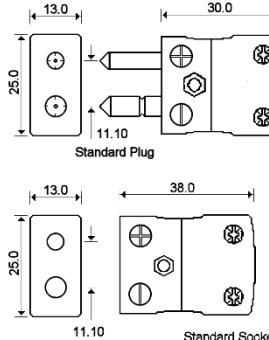
**Interoperabilidad Sintáctica /Estructural:** Intercambio de Datos, Mensajes, Documentos mediante el acuerdo en una estructura y sintaxis.; e.g. EDI, XML, IMAP, Archivos de Texto, Tablas BD, PPT, Web Services, SOAP, RestFul, RDF

**Interoperabilidad Técnica:** Al nivel de señales y protocolos e.g., Interfaces técnicas y de conexión física (USB, Bluetooth, WiFi).



# Qué son los Estándares?

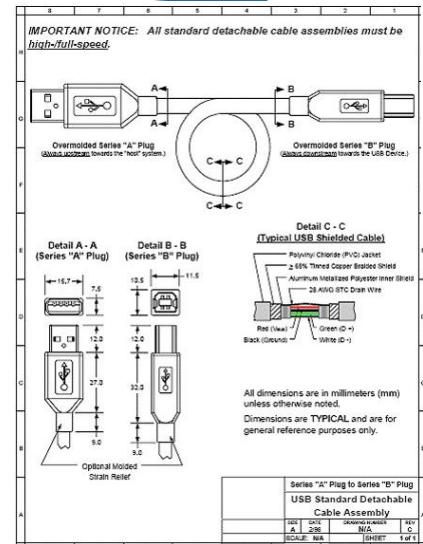
“Es el documento aprobado por **consenso** por un **organismo reconocido**, que proporciona **reglas, pautas y/o características para uso común**, con el objeto de obtener un **óptimo nivel de resultados** en un contexto dado”.  
ISO/IEC Guía 2:1996



- Designed and manufactured under strict ISO EN 9000:2000 disciplines
- Full compliance to IEC & CENELEC specification

<http://www.labfacility.co.uk/pdf/connectors-and-cables.pdf>

Estándares “de Jure”, “por regulación”



NOKIA  
Connecting People



Sony Ericsson

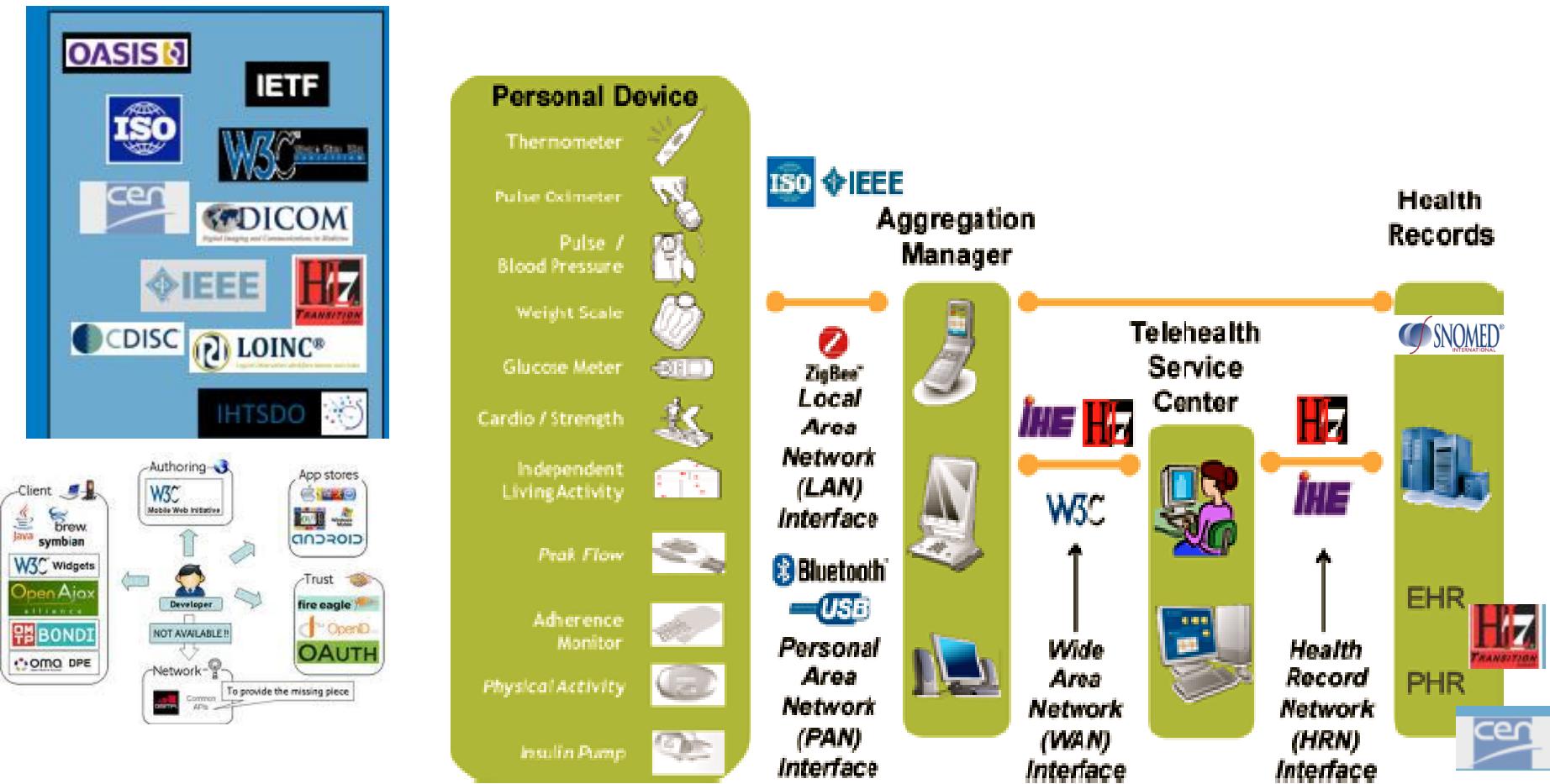


MOTOROLA



Estándares “de Facto” – de hecho Industria

# Estándares en eSalud?



# Rol de los Estándares en Interoperabilidad? → Acuerdos!

## *Interoperabilidad Organizacional/Servicios/Procesos:*

Involucra políticas, cultura organizacional, procesos y mecanismos para que haya colaboración a nivel de las organizaciones. Políticas: Gobierno en Línea, , HCE, Plataforma de Interoperabilidad, Protección de Datos, etc.

## POLITICAS Y NORMAS

*Interoperabilidad Semántica:* modelos comunes de información, y el uso de terminologías y ontologías médicas. Ejemplos de ellas son: Mensajes HL7 v2, Versión 3, CDA, Modelo de Referencia 13606/OpenEHR, los sistemas de codificación como el CIE-10, CIE-9 y terminologías como SNOMED-CT, Ontologías como OBO

## ESTANDARES TECNICOS

```
</entry>
<entry>
- <Observation>
  <code displayName="Body mass index"
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    CT"/>
  <effectiveTime value="200004071430"/>
  - <value xsi:type="RTO_PQ_PQ">
    <numerator value="35.1" unit="kg"/>
    <denominator value="1" unit="m2"/>
  </value>
</Observation>
</entry>
```

*Interoperabilidad Sintáctica /Estructural:* Estandares de Intercambio de Datos, Mensajes, Documentos mediante el acuerdo en una estructura y sintaxis.; e.g. Lenguajes: EDI, XML, e-mail, Archivos de Texto, Tablas BD, PPT

*Interoperabilidad Técnica:* Al nivel de señales y protocolos e.g., Interfaces técnicas y de conexión física (USB, Bluetooth, WiFi).



# Estándares en eSalud para Interoperabilidad de RSE , RSE-i



# Introducción a los RSE

## ► Definición de Registro de Salud Electrónicos

Definición:

“a repository of information regarding the health status of a subject of care, in computer processable form ” ISO/TR 20514. Health informatics — Electronic health record — Definition, scope, and context

“Un repositorio de información relacionada con la salud de un sujeto (paciente) la cual es procesable por medio de computadores” ISO/TR 20514. Health informatics — Electronic health record — Definition, scope, and context.

Sinónimos:

Historia Clínica Electrónica, Registro de Salud Electrónico, Registro Médico Electrónico, Registro de Paciente Electrónico, expediente clínico electrónico, Ficha Clínica.

# Diferencia entre RSE y Sistema Gestión RSE

## EHR

A repository of information regarding the health status of a subject of care, in computer processable form.

An EHR provides the ability to share patient health information between authorized users of the EHR and the primary role of the EHR in supporting continuing, efficient and quality integrated health care.

## EHR system

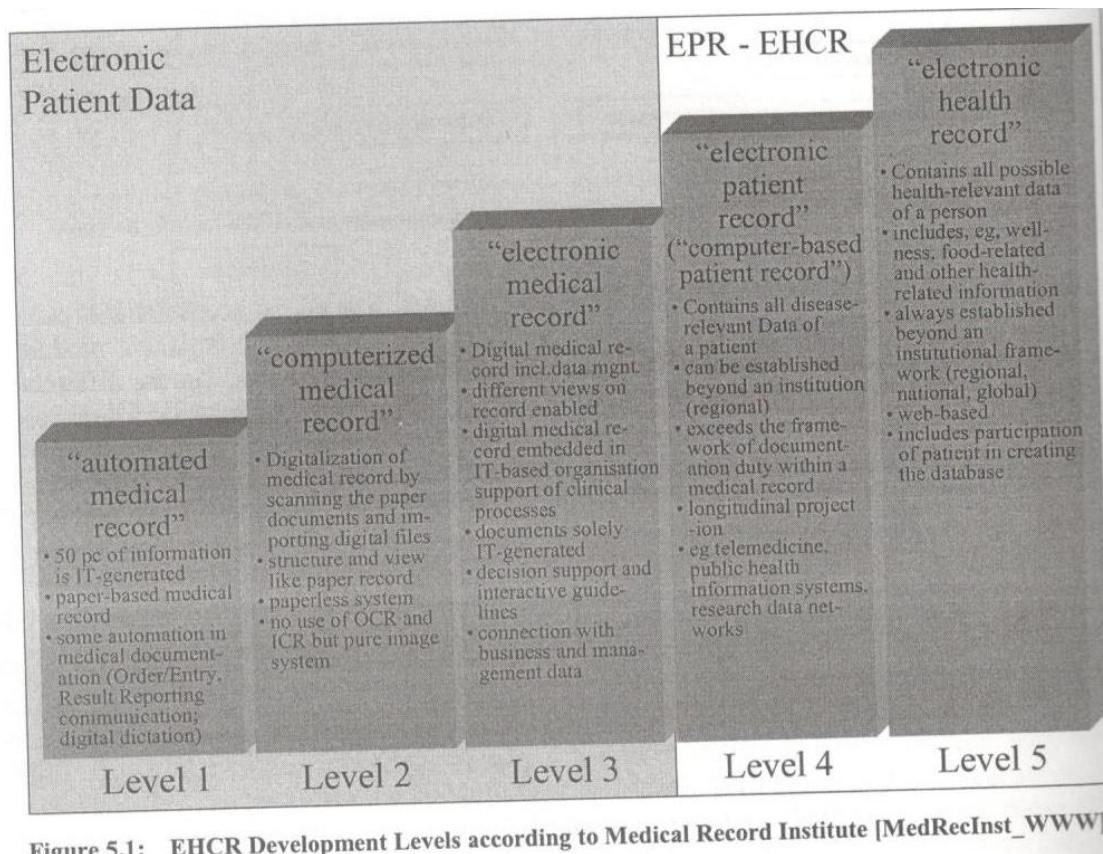
The set of components that form the mechanism by which electronic health records are created, used, stored, and retrieved. It includes people, data, rules and procedures, processing and storage devices, and communication and support facilities.

(ISO/TR 20514:2005, Health informatics - Electronic health record - Definition, scope and context)

# Introducción a los RSE

## ► Diferencias entre los diferentes términos:

- Medical Record, Patient Record, Health Record
- Historia Clínica, Historia Médica, Ficha Clínica, Historia del Paciente, Historia de Salud, etc.



¿Qué nivel haría falta más allá del EHR?

Blobel B. Analysis,Design and Implementation of Secure and Interoperable Distributed Health Information Systems. IOS Press, 2005

# Personal Health Records(Registros SE Personales)

Historia de Salud Personal o Registro de Salud Personal (RSP), en inglés Personal Health Record (PHR); es un repositorio de información que sigue los mismos principios de una RSE, pero en lugar de ser administrado por una institución de atención en salud (por ejemplo una Institución Prestadora de Servicios de Salud - IPS), es controlado y manejado directamente por el paciente o persona interesada en su propia salud.



<http://omowizard.wordpress.com/2010/04/07/defining-the-phr/>

# Arquitecturas de RSE-i



# ¿Porqué Arquitecturas?



# Porqué son Importantes?

Definición: “La organización fundamental de un sistema, que comprende sus componentes, sus relaciones entre componentes y el ambiente, y los principios que gobiernan su diseño y evolución” [ANSI/IEEE 1471-2000]

- ▶ Modelos Arquitectónicos: Modelos que simplifican la complejidad del sistema.
- ▶ Facilita la comunicación entre los interesados (stakeholders)
- ▶ Facilita su implementación (costos), mantenimiento
- ▶ Atributos: Basadas en Servicios, Reuso, Flexibilidad, Seguridad, Interoperabilidad, etc.

# Arquitecturas de RSE-i

## EHR architecture

A model of the generic features necessary in any electronic healthcare record in order that the record may be communicable, complete, a useful and effective ethico-legal record of care, and may retain integrity across systems, countries, and time.

In general, a **system's architecture** defines its components, their functionalities and relationships

(ISO/TR 20514:2005, Health informatics - Electronic health record - Definition, scope and context)

# Introducción a los RSE Integrados

## ▶ Tipos de RSE

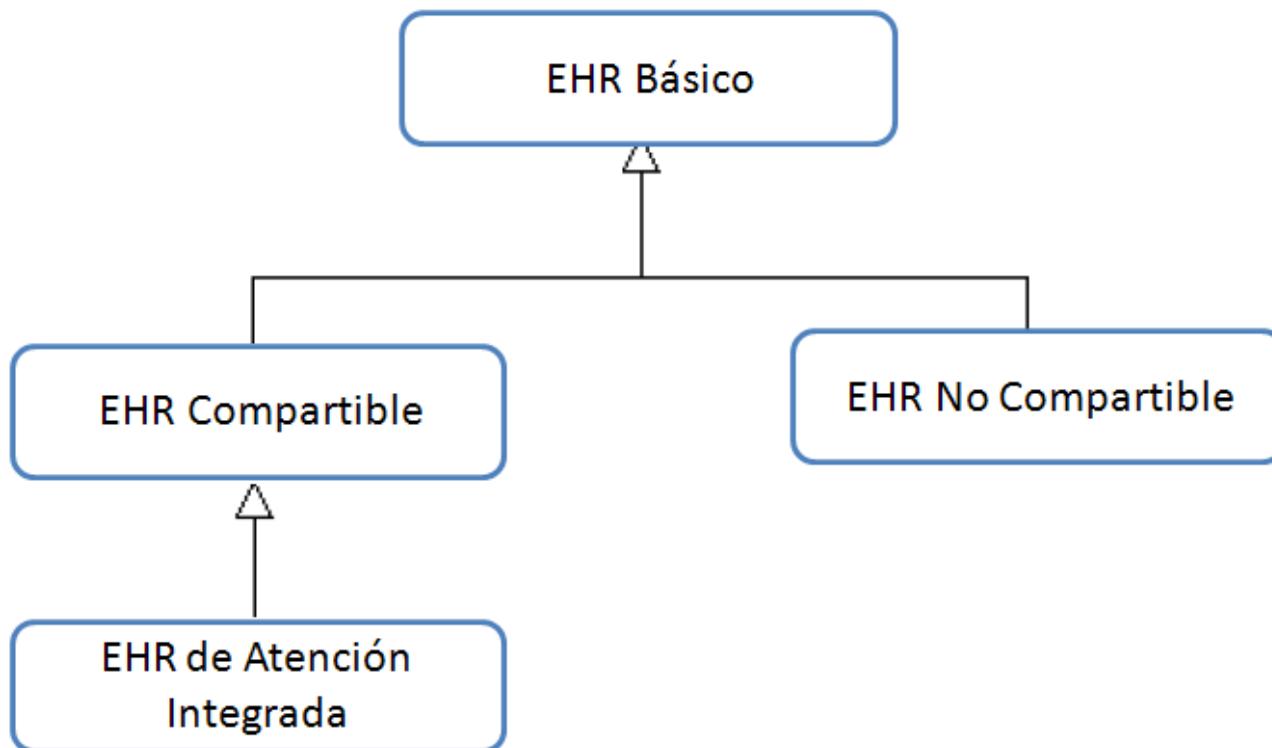
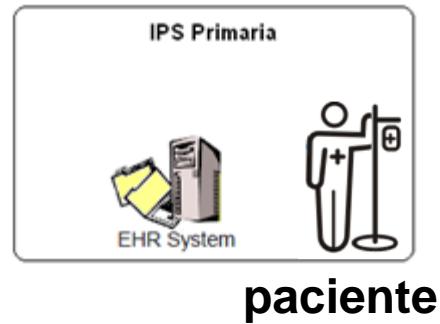
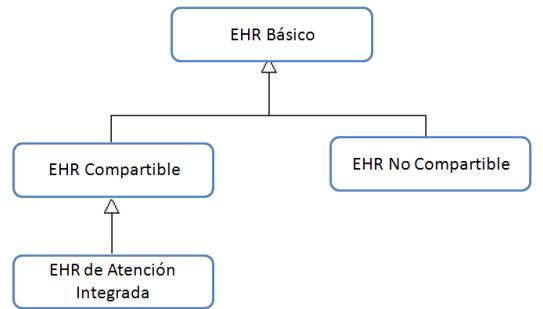
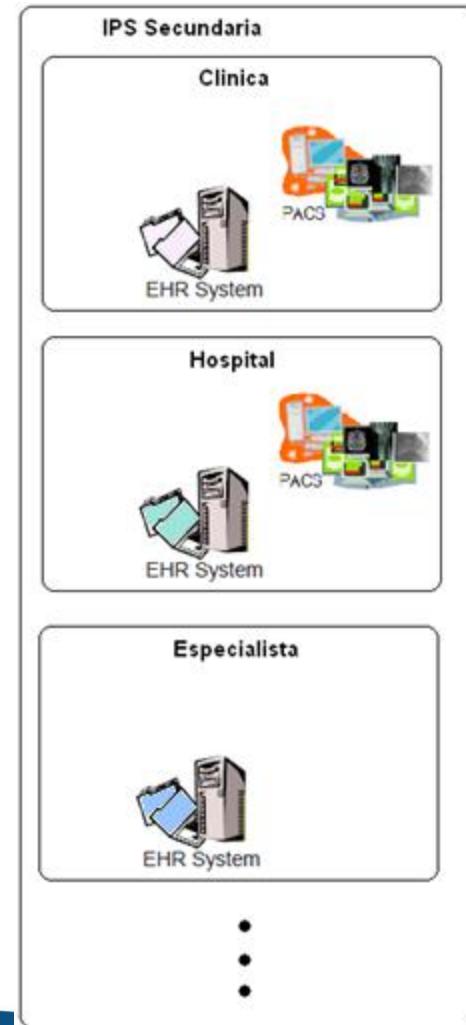


Figura 2.2. Especialización de un EHR Básico [ISO ISO/TR 20514. ].

# Ventajas del RSE Integrado



## RSE Distribuida



# Requisitos para Interoperabilidad de RSE [ISO ISO/TR 20514].

- ▶ **Un modelo de referencia para el RSE**
- ▶ **Un conjunto estandarizado de modelos para conceptos específicos del dominio.** Por ejemplo arquetipos o plantillas, para conceptos específicos del dominio: información clínica, demográfica, etc.
- ▶ **Terminologías estandarizadas.** Terminologías que soporten los arquetipos y plantillas. Estas terminologías deberían estar asociadas a vocabularios controlados.
- ▶ **Un conjuntos de modelos de interfaces de servicios.** Servicios como demográficos, terminologías, control de acceso y seguridad.

# Estándares en eSalud para Interoperabilidad de RSE (Lopez, 2009)(Blobel, 2010)

MODELOS DE REFERENCIA	ISO EN 13606 Part I (ISO 13606-1 2007), openEHR Reference Model HL7 Reference Information Model (RIM), HL7 CDA Release 2 (HL7 Inc 2005)
MODELOS PARA CONCEPTOS	openEHR archetypes (Beale 2007), ISO/13606 Part 2 (EN 13606-2 2007), HL7 templates (HL7 Inc 2007b), Common Message Element Types (CMETs);
TERMINOLOGIAS, VOCABULARIOS	Logical Observation Identifiers Names and Codes (LOINC 2007), SNOMED-CT, International Classification of Diseases (ICD) (WHO 2007b), Unified Medical Language System® (UMLS 2008), Open Biomedical Ontologies (OBO 2008), Data Types, HL7 Vocabulary;
ESPECIFICACIÓN DE SERVICIOS	OMG Healthcare Domain Task Force (HDTF) services (OMG 2007a), HL7 Service Oriented Architecture (SOA) service specifications, FHIR
ARQUITECTURAS DE REFERENCIA	CEN EN 12967 (CEN EN 12967-1, 2, 3 2007), Generic Component Model (GCM) as basis for standards such as ISO 22600 (ISO TS ), ISO CD TS 13606-4 (CEN EN ), SAIF.

# Modelos de Referencia

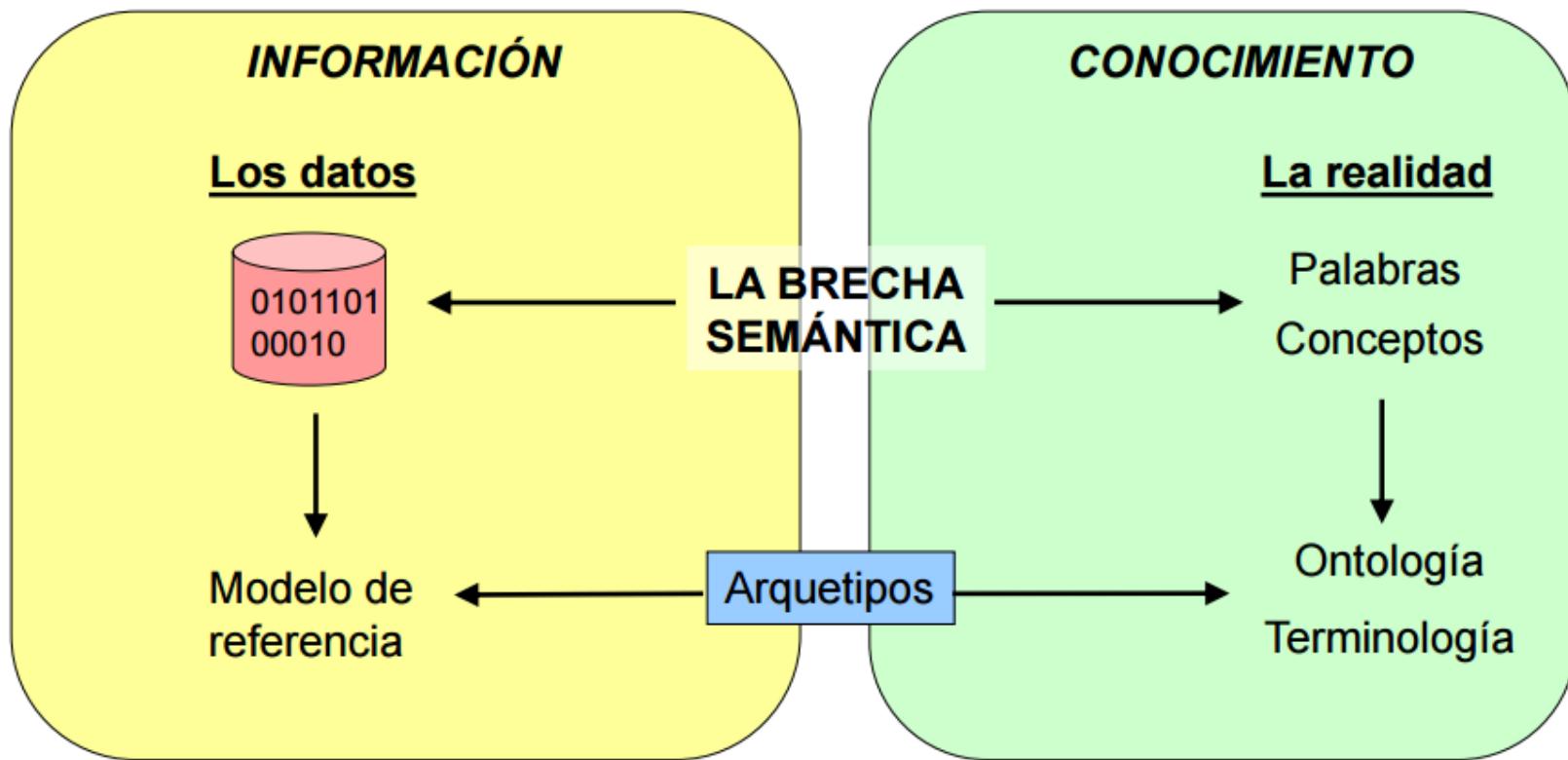
## Estándar CEN 13606

La norma CEN EN 13606 para la comunicación de la Historia Clínica Electrónica ha sido desarrollada por el Comité Técnico 251 del CEN → ISO 2008.

Está compuesta por 5 partes:

- **Parte 1: Modelo de Referencia**
- **Parte 2: Modelo de Arquetipos**
- Parte 3: Lista de términos
- Parte 4: Seguridad
- Parte 5: Especificación de interfaces

# Estándar CEN 13606



Diapositiva tomada de: Taller UNE-EN 13606 Introducción a la norma UNE-EN 13606 David Moner Cano

# Estándar CEN 13606

- **Información:** Juan García tiene una presión arterial de 150/100 mmHg a fecha 15 de enero de 2007.
- **Conocimiento:** La medida de la presión arterial tiene dos valores: sistólica y diastólica. Se miden en mmHg. Los rangos normales de presión arterial son entre 90/60 mmHg (en recién nacidos) hasta 135/85 mmHg, con un valor promedio de 120/80 mmHg.

Ejemplo tomado de: Taller UNE-EN 13606 Introducción a la norma UNE-EN 13606 David Moner Cano

# Estándar CEN 13606

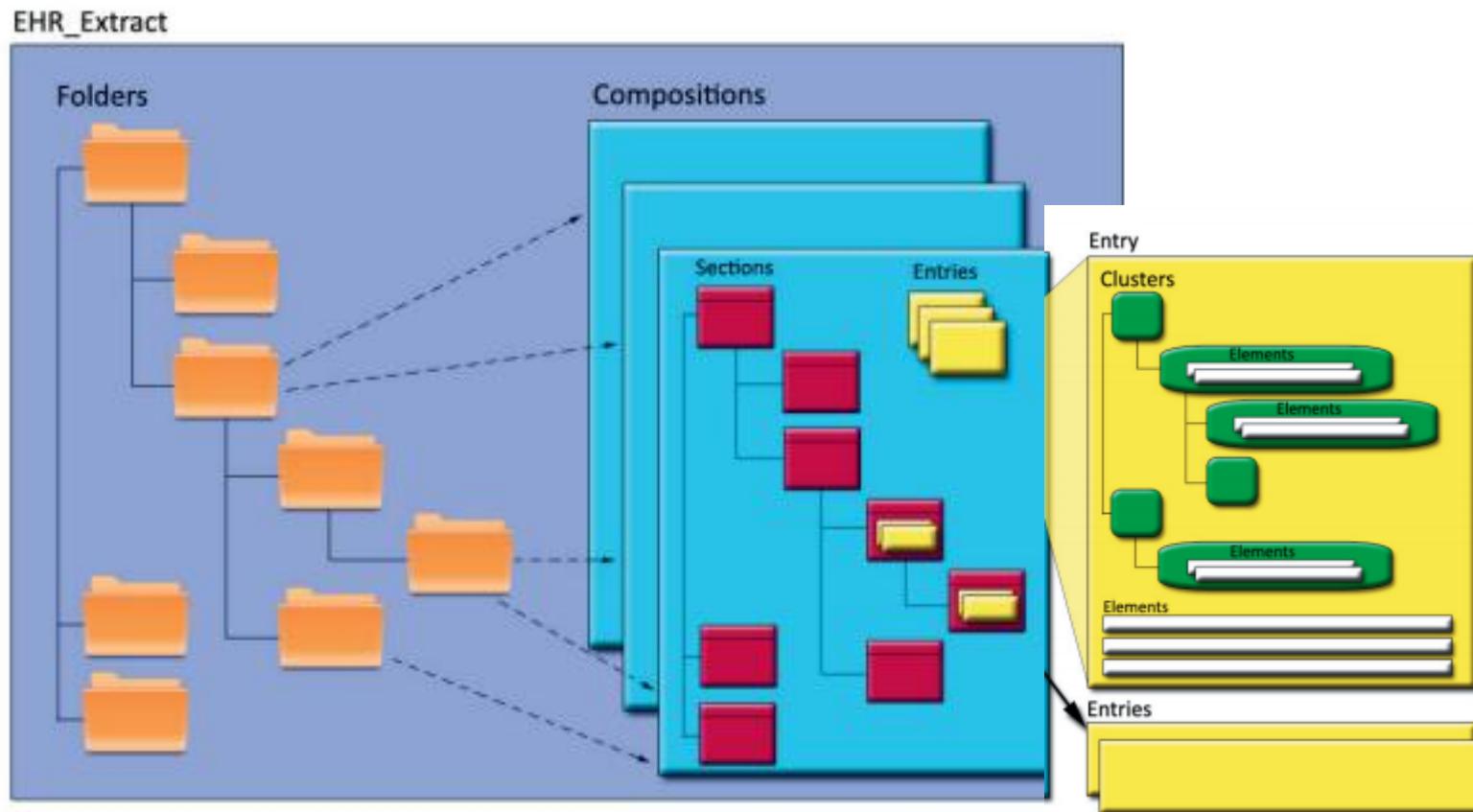
- Un **modelo de referencia** proporciona las piezas y la estructura básica necesaria para representar cualquier información clínica.
- Un **arquetipo** representa las instrucciones sobre cómo combinar las piezas del modelo de referencia para construir una estructura de datos con un significado clínico específico.



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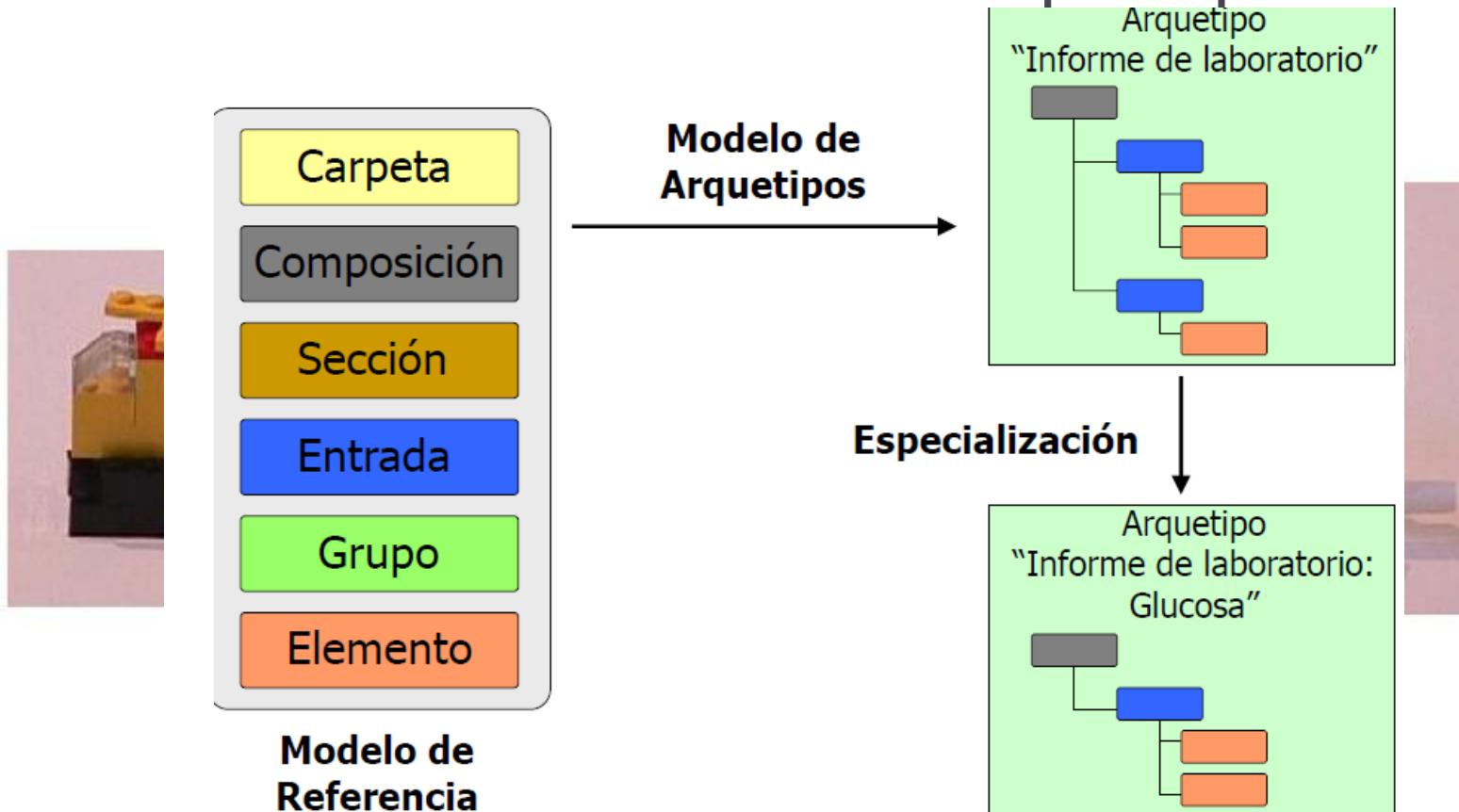
Diapositiva tomada de: Taller UNE-EN 13606 Introducción a la norma UNE-EN 13606 David Moner Cano

# Estándar CEN 13606 –Parte 1



Fuente: **Manual práctico de interoperabilidad semántica para entornos sanitarios basada en arquetipos**  
<http://gesdoc.isciii.es/gesdoccontroller?action=download&id=29/11/2013-45c9ee530c>

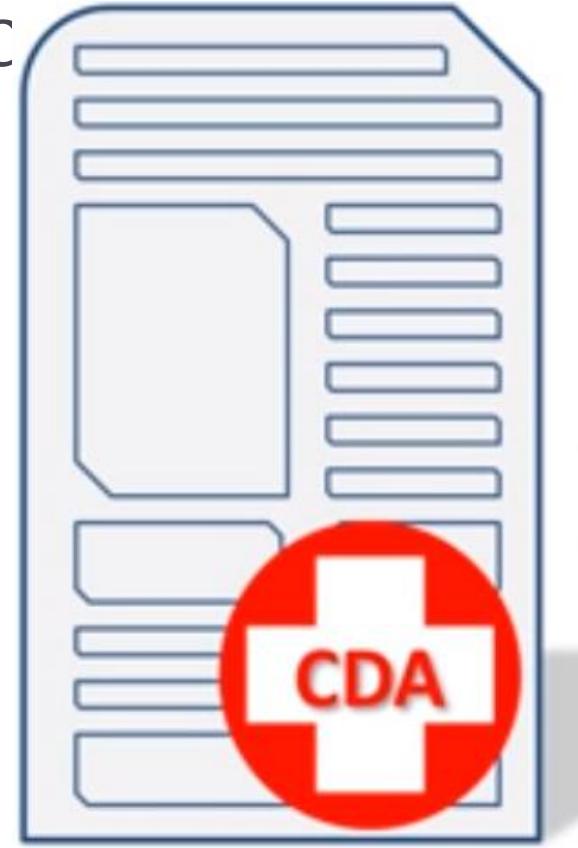
# Estándar CEN 13606- Parte 2 Arquetipos



Diapositiva tomada de: Taller UNE-EN 13606 Introducción a la norma UNE-EN 13606 David Moner Cano

# CDA- Clinical Document Arc

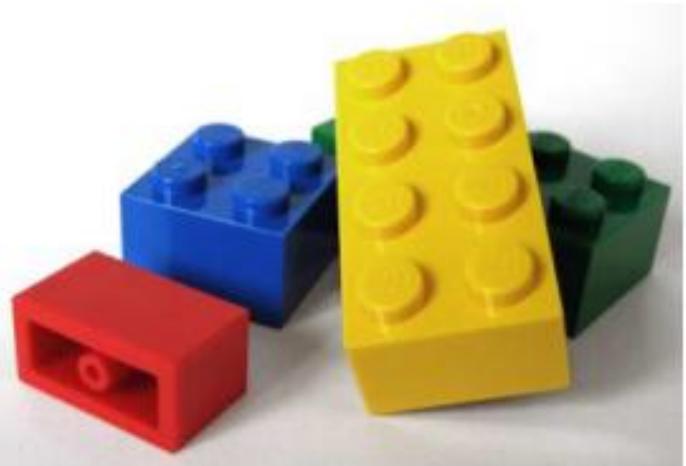
- ▶ CDA es uno de los estándares HL7 más importantes
- ▶ Provee un lenguaje de marcado, para la creación de documentos clínicos electrónicos.
- ▶ Soportado en el Lenguaje XML
- ▶ Su presentación se hace mediante HTML



Fuente original :  
<http://www.healthit.gov/policy-researchers-implementers/consolidated-cda-overview>

# Introducción a CDAs

**CDA defines the structure of building blocks which can be used to contain a multitude of healthcare data elements that can be captured, stored, accessed, displayed and transmitted electronically for use and reuse in many formats**



**CDA *DOES NOT* specify how documents are transported, simply how critical data elements should be encoded for exchange and interoperability**

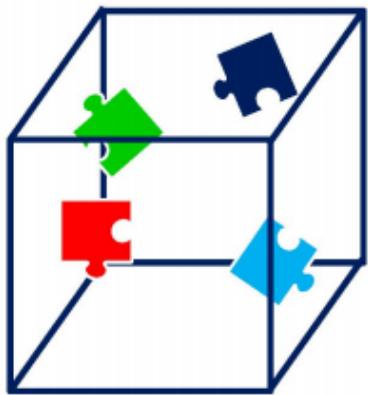
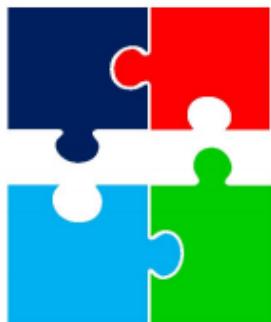
**CDA can contain both structured and unstructured information**

# Introducción a CDAs

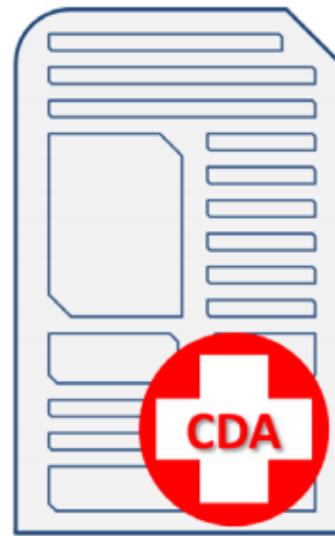
CDA defines building blocks which can be used to contain healthcare data elements that can be captured, stored, accessed, displayed and transmitted electronically for use and reuse in many formats

Sets of these CDA standardized building blocks can be arranged for whatever needs exist

Arranging (or constraining) the CDA elements in defined ways using IGs and templates produces clinical documents



This approach offers tremendous flexibility; it allows for the creation of a comprehensive variety of clinical documents which share common design patterns and use a single base standard



e.g. a *Discharge Summary* and an *Op Note* both draw from the same CDA schema but are scoped for different use cases

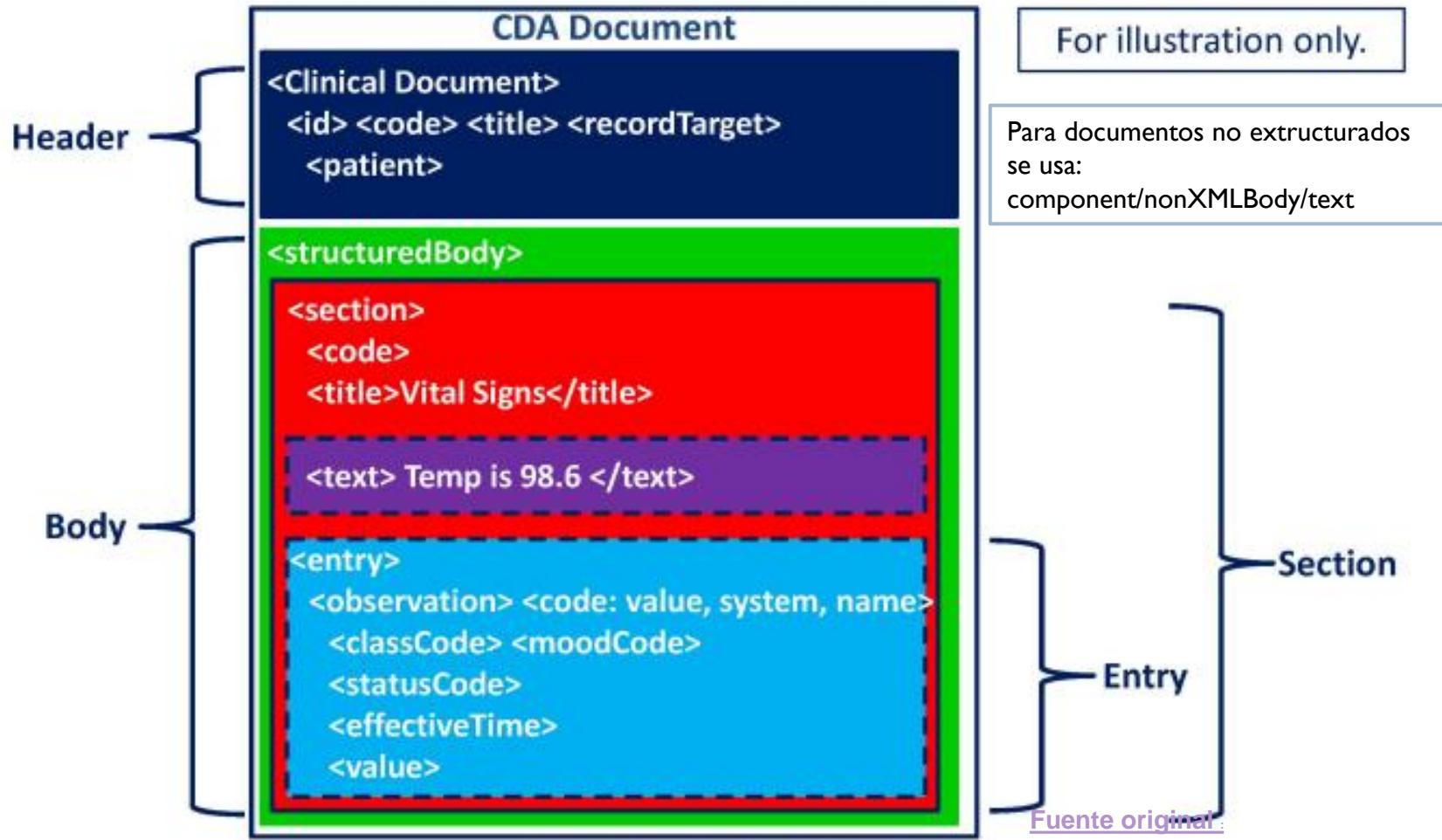
Fuente original:

<http://www.healthit.gov/policy-researchers-implementers/consolidated-cda-overview>

# Guías de Implementación

- ▶ La estructura de un documento CDA es consistente con la estructura de cualquier otro documento CDA.
- ▶ Esto lo garantizan los arquitectos de sistemas, siempre que cumplan con las reglas establecidas en la guía de implementación de un cda.
- ▶ A nivel de una organización, o un país, debería haber una entidad que se encargue de certificar que los documentos hayan sido construidos siguiendo las reglas establecidas por las guías de implementación de HL7 CDA.

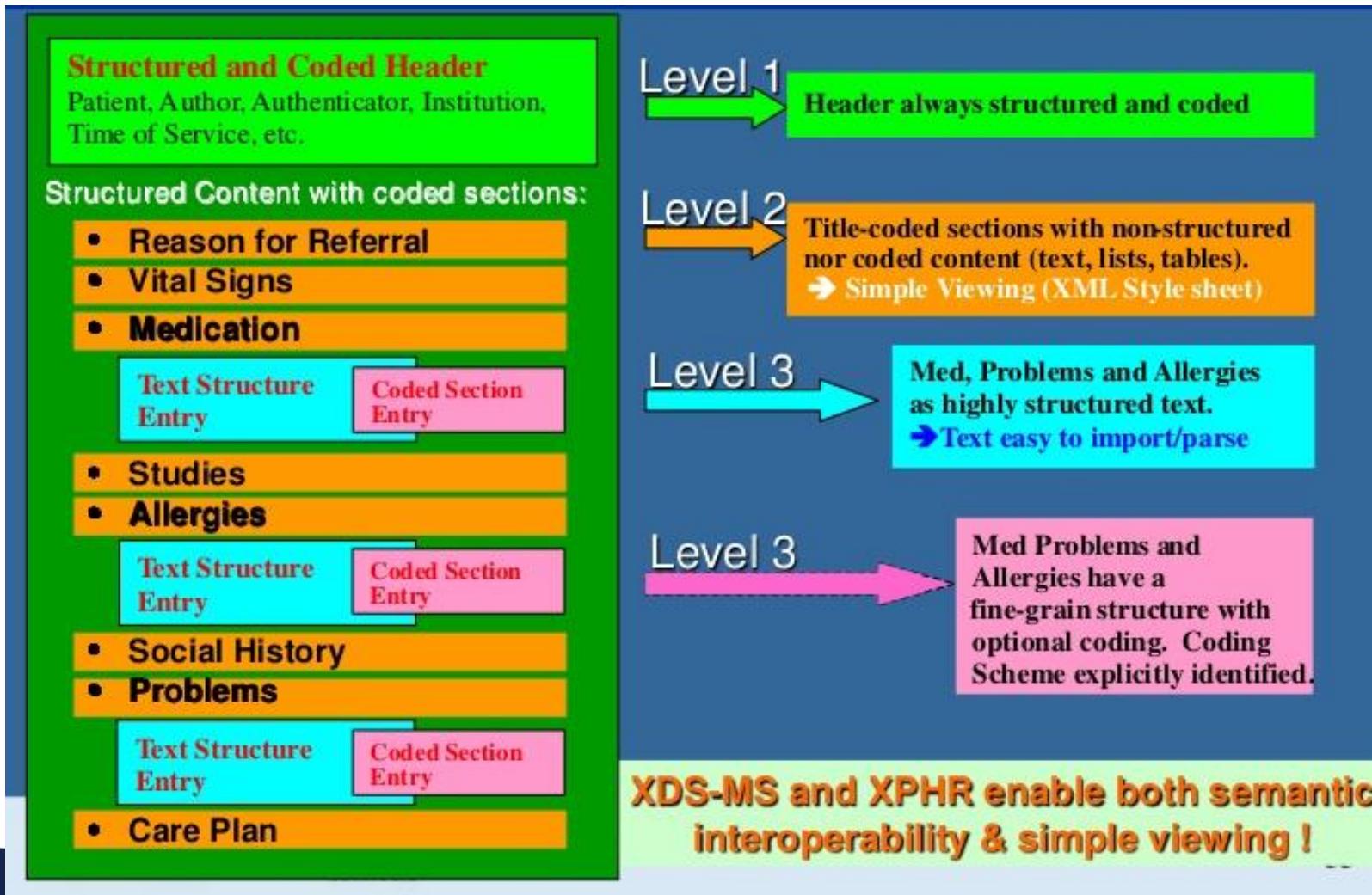
# Introducción a CDAs



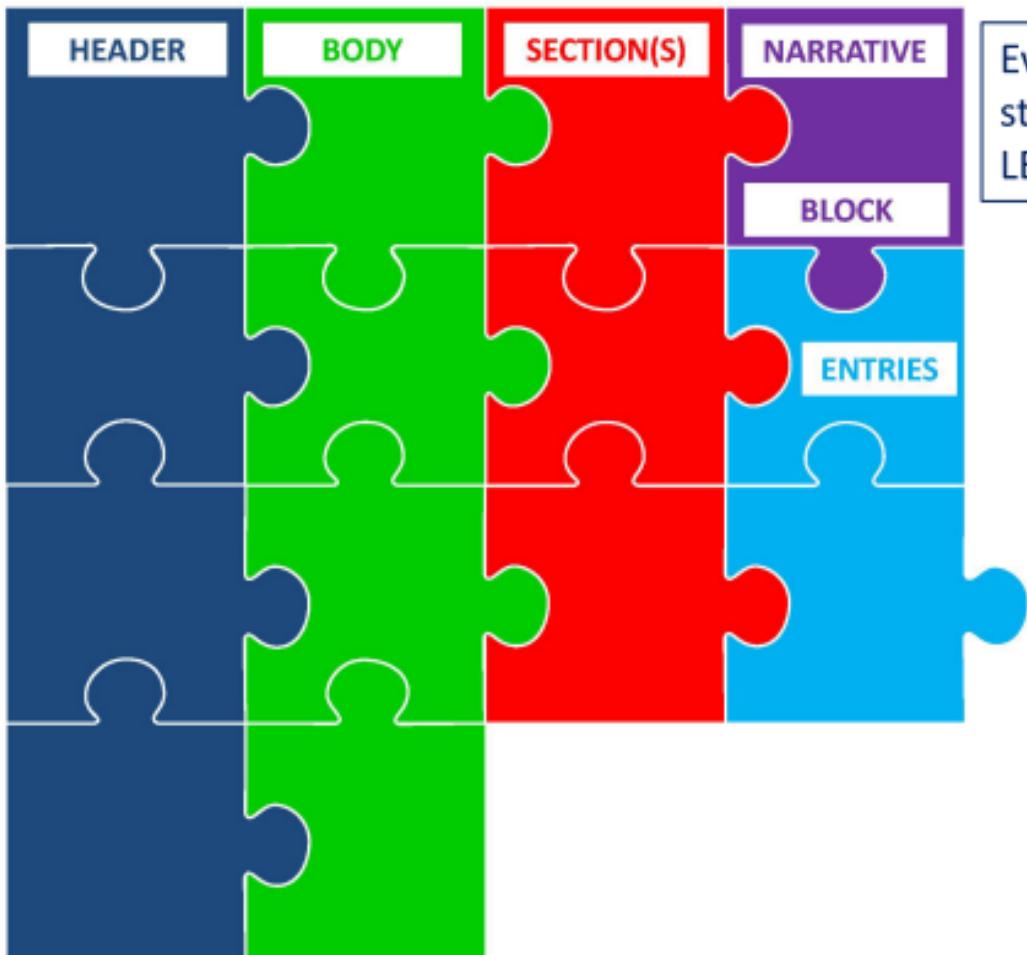
Fuente original:

<http://www.healthit.gov/policy-researchers-implementers/consolidated-cda-overview>

# Escalabilidad de los CDA



# Introducción a CDAs



Every CDA document with a structured XML body must have AT LEAST a **Header AND one Section**

XML enables both human and machine readability.

The XML structure for a CDA document nests data in the following way:

- » Header
- » Body
- » » Section(s)
- » » » Narrative Block
- » » » Entry(s)

Fuente original:

<http://www.healthit.gov/policy-researchers-implementers/consolidated-cda-overview>

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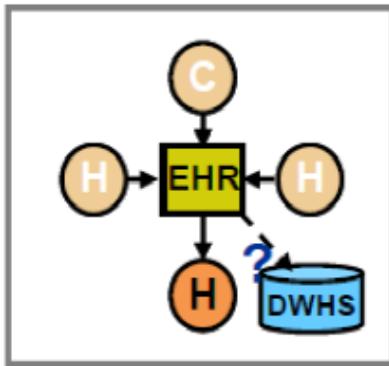
# Comparación CDA -13606/OpenEHR

Approach Components	GEHR/ openEHR	HL7 EHR/ CDA
Business modelling	Archetypes	Clinical Templates
Knowledge representation	GEHR parts	HL7 CDA Structure
Identification	Header (contains also ext. metadata)	Header
Content	Body	Body
References	Terminology	Embedded terminology Extl. refs
Substructures	Blocks	Entries
Language	ADL	XML

# Proyectos Nacionales de RSE-i

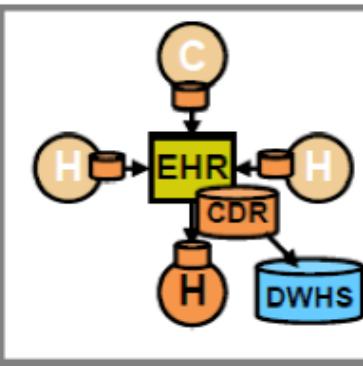


# Modelos Arquitectónicos Comunes



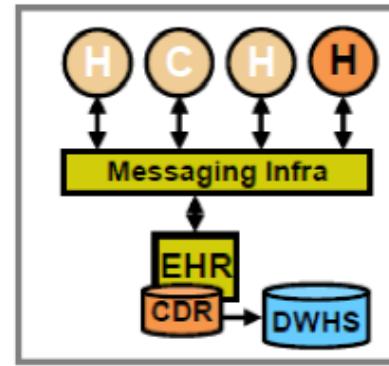
## #1 Fully Federated

- Patient data resides with source facility
- Data remains in the source systems
- EHR is a process which pulls patient data from carer systems
  - Real time: Google or Napster models
  - Batch extracts
- DWHS not clear



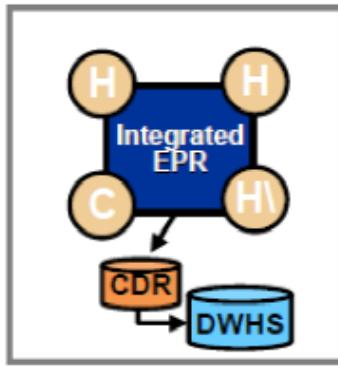
## #2 Federated

- Patient data resides with source facility
- Patient data consolidated in facility CDR
- EHR is a process which pulls from local CDRs for updates to central CDR as needed (e.g., dbMotion)
- DWHS works off CDR



## #3 Service Oriented

- Patient data sent to EHR by message at end of care event
- Local systems message enabled
- EHR is a process which manages flow of messages
- CDR holds care events within patient 'record'

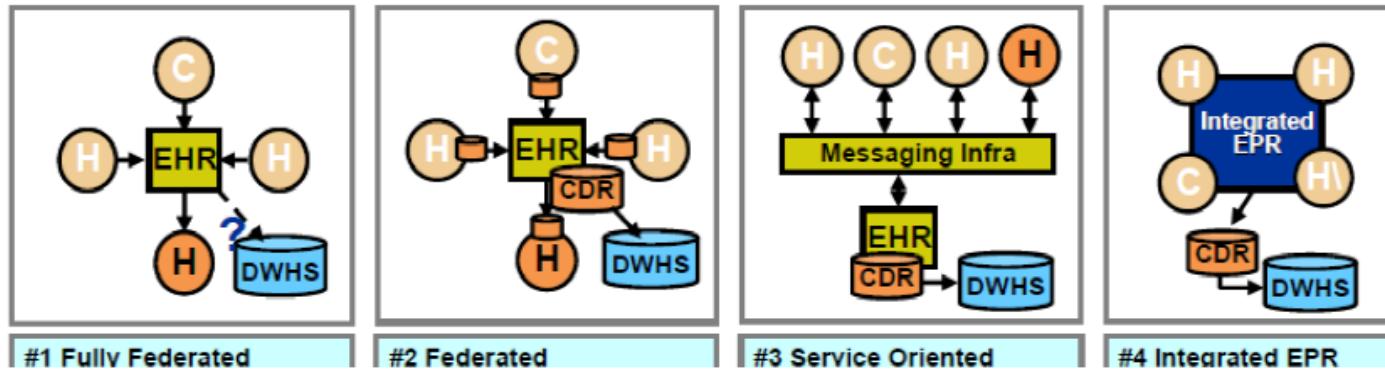


## #4 Integrated EPR

- Single integrated hospital system
- Embedded EHR capabilities

# Modelos Arquitectónicos Comunes

EHR Approaches after HIMSS



#1 Fully Federated

#2 Federated

#3 Service Oriented

#4 Integrated EPR

Wales

The Netherlands

Germany

Denmark

England

Canada

New Zealand

# Algunos Ejemplos de Programas Nacionales

England:	National Programme for IT (NPfIT)
Australia:	HealthConnect, NEHTA
Canada:	Infoway, EHRS Blueprint
USA:	National Health Information Infrastructure (NHII), EHRVA Meaningful Use (MU)
Germany:	gematik, bIT4health, eGK, eGA
Taiwan:	National Health Information Exchange Platform
France:	DMP (Dossier Medical Personnel)
The Netherlands:	AORTA
Wales:	IHR/LLR within the “Informing Healthcare Program” (IHC)

... and probably 60+ other countries

# Ejemplos de Presupuestos

- **Health Infoway ( Canada)**

Since its inception in 2001, Infoway has received \$2.1 billion from the federal government

Canada Health Infoway reports that as of March 31, 2013, the core elements of an electronic health record are in place for more than half of the Canadian population (55.4%)

- 77 per cent of primary care physicians are now using electronic medical records

- **Health Connect (Australia)**

- NEHTA has received \$160 AUD million in funding. All pts have EMR anytime

- **Ctr. for Interoperable EHR (Korea )**

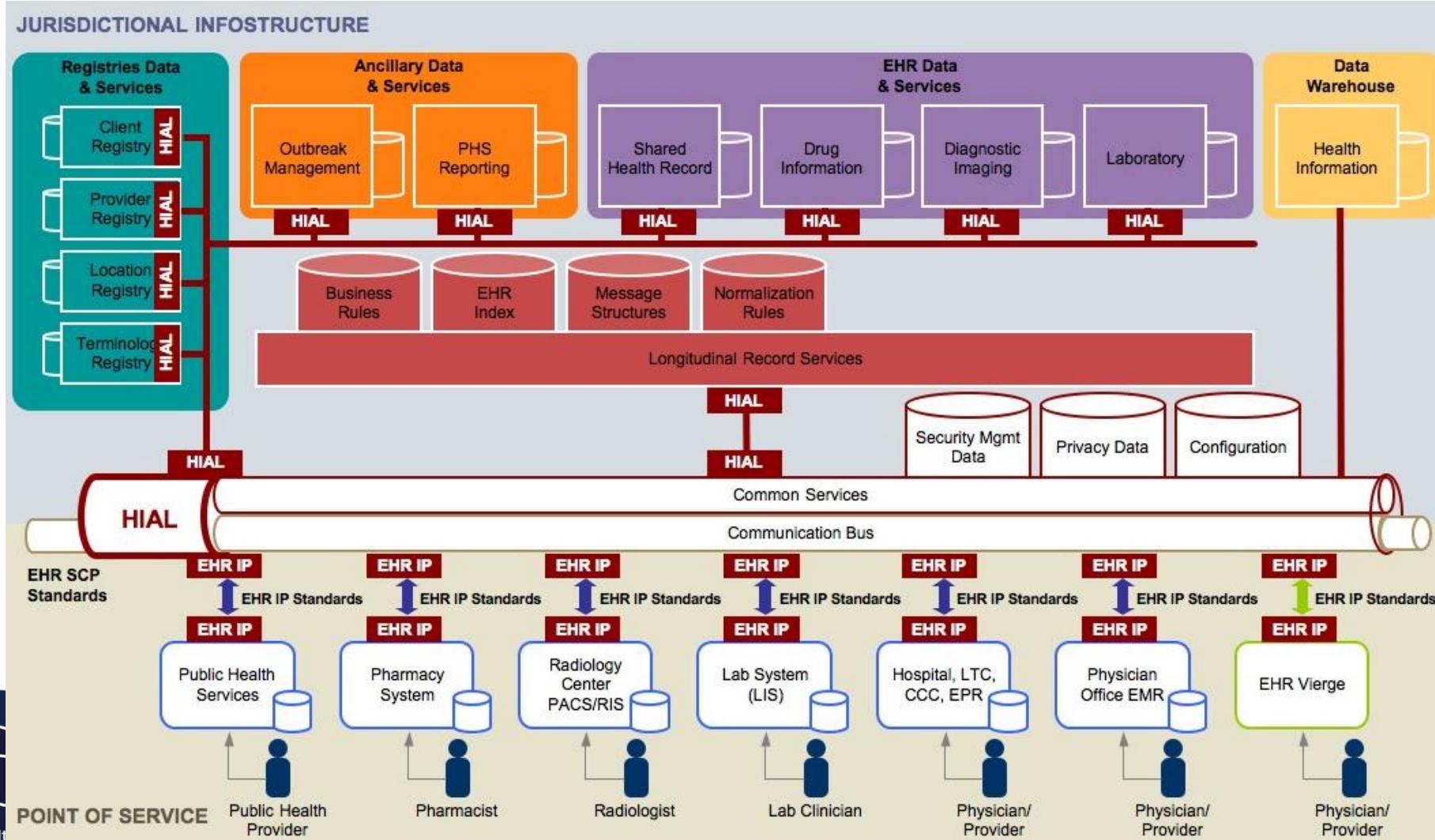
- 1.1 bill. USD by 2010 for universal EMR

# Ejemplos de Presupuestos

- National Program for IT ( UK)
  - The National Programme for IT (NPfIT) was initiated in 2003 and was originally budgeted to be £6.0 billion over 10 years, but the National Audit Office estimates the figure to be £12.4bn over 10 years and other officials have been recently quoted in papers as estimating the figure to be close to £20.0 billion. Objective: IT infrastructure for safe and efficient health information transfer
- National Health Information Infrastructure ( USA)
  - 86.5 mill. USD 2005, 125mill. USD 2006 for universal EMR. Within ARRA, more 40 billion US \$ will be spent to provide a PHR to every American.

# Proyectos Internacionales

## Canadá- Infraestructura de EHR

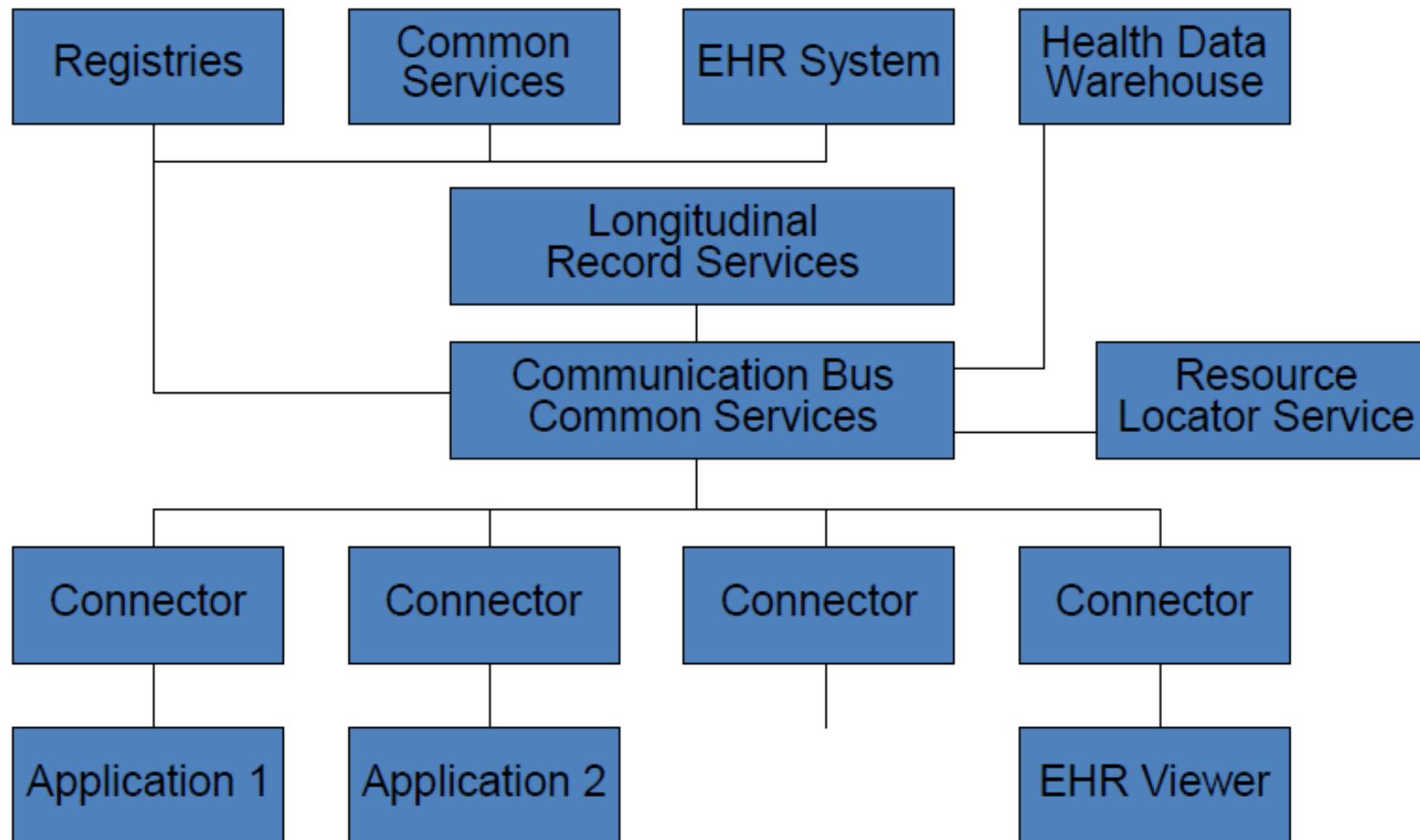


# German Approach

There are two streams in the German EHR approach:

- An architecture-centric, intelligent, adaptive solution specifications based on international standards and partially borrowed from the Canadian EHR-S Blueprint, launched by the Federal Ministry for Economy and realized by the eHCC
- A set of pilots more or less independent from international standards and international experiences, launched by the Federal Ministry for Health and realized by different hospital trusts, Fraunhofer Institutes and others

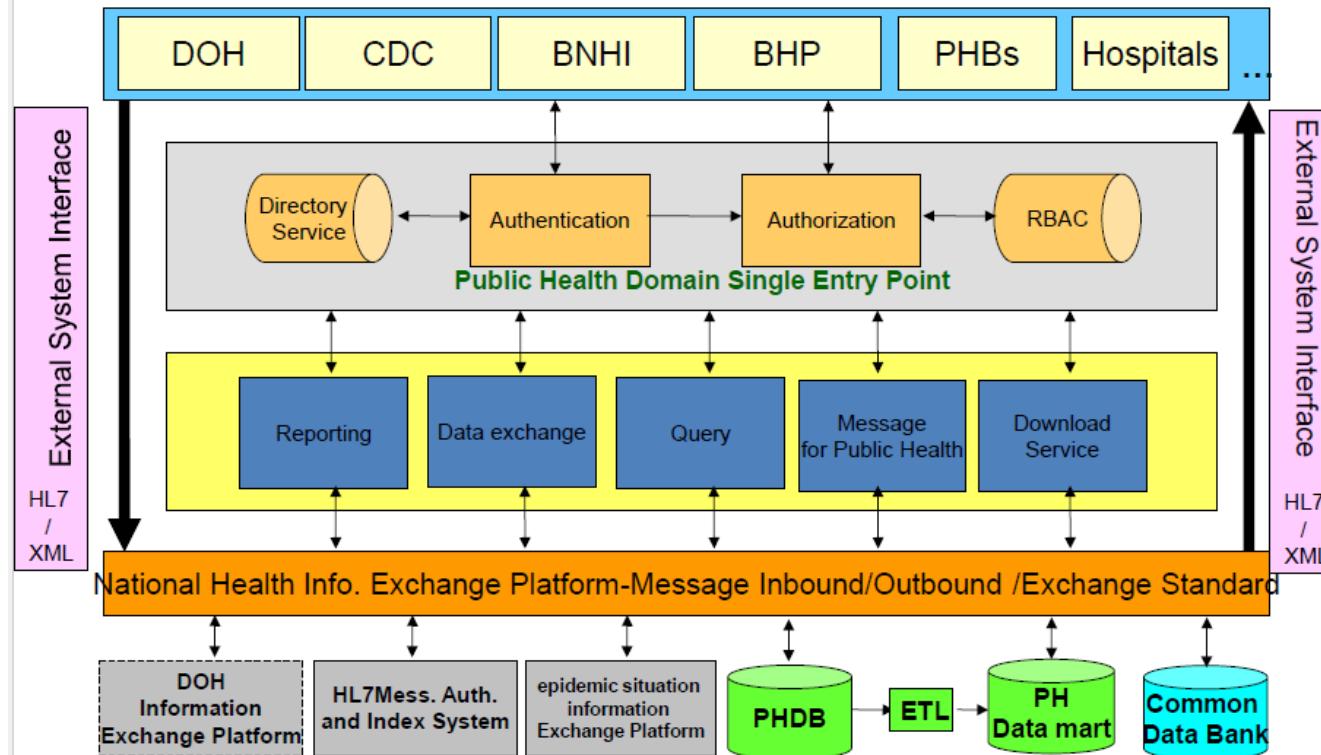
# The German EHR Architecture



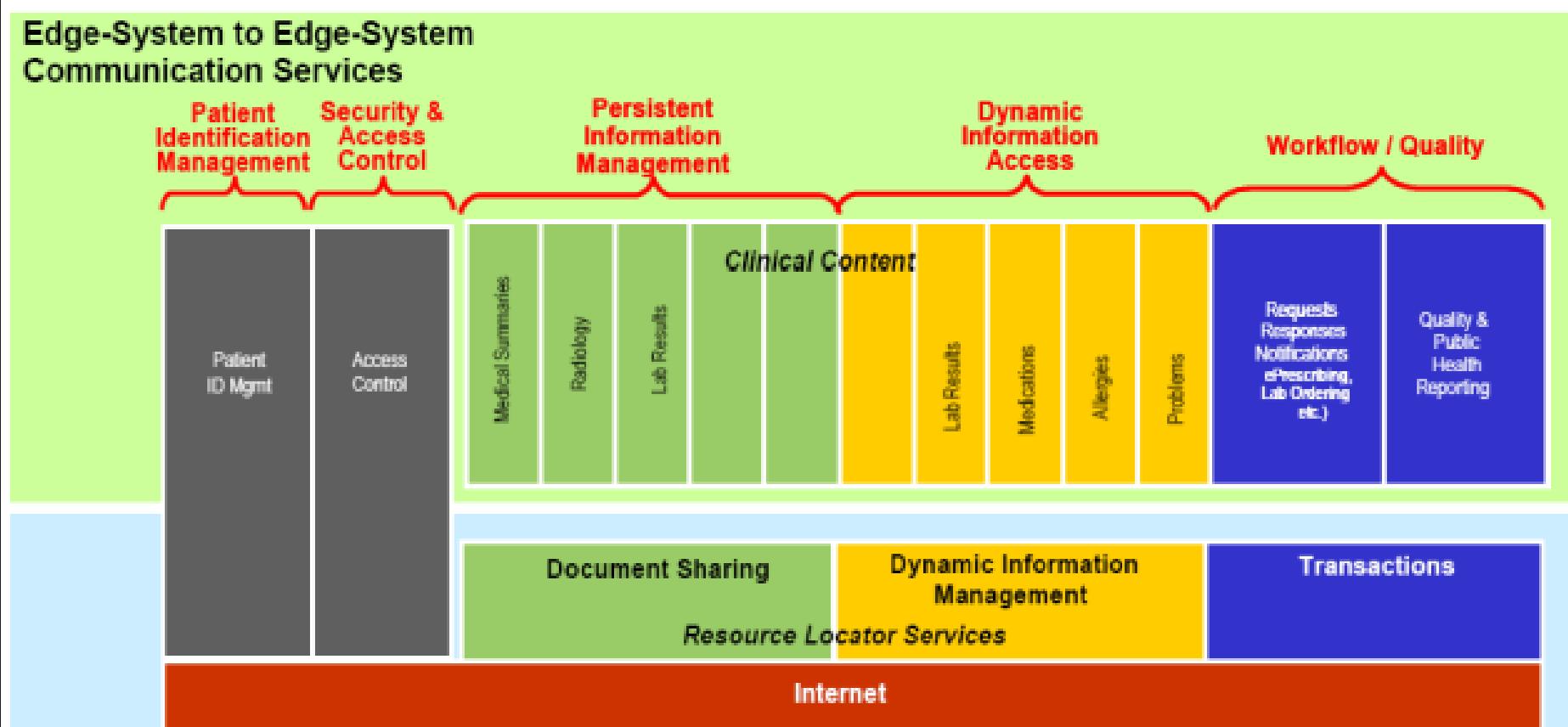
# Proyecto Taiwan

## Web Portal for Health Administration and Public Health Services in Taiwan

after Kwok



# Arquitectura USA NHIN



US Department of Health and Human Services  
-American Health Information Community (AHIC).  
-Healthcare Information Technology Standards Panel (HITSP)  
- The Public Health Data Standards Consortium (PHDSC)



# MU -USA

**Exchange Requirements (Building Blocks)**

**DEFINITIONS**

Vocabulary and Code Sets:

Standardized terms to describe clinical problems, procedures and other clinical information coded for easy comprehension.

**EXAMPLES**

**Vocabulary/Code Sets**

The following Vocabulary and Code Sets have been added to MU Stage 2:  
Preferred Language (ISO 639-2), Smoking Status (SNOMED CT – value set),  
Medication Allergies (RxNorm), Encounter Diagnosis (ICDEE-10-CM or  
SNOMED CT).

[https://www.healthit.gov/public-course/interoperability-basics-training/HITRC\\_1sn1069/wrap\\_menupage.htm](https://www.healthit.gov/public-course/interoperability-basics-training/HITRC_1sn1069/wrap_menupage.htm)



# MU -USA

**Exchange Requirements (Building Blocks)**

**DEFINITIONS**

Content Structure:

Message format specific to the digital environment. When information is exchanged, this defines the information contained in the message, and the structure of the information to be exchanged. Examples include HL7 Clinical Document Architecture (CDA), Release 2.0, Normative Edition + Implementation specifications. Implementation Guide for Ambulatory Healthcare Provider Reporting to Central Cancer Registries, HL7 Clinical Document Architecture (CDA).

**EXAMPLES**

**Content Structure**

For MU Stage 2, the Content Structure building block has been updated to include formatting for:

- Summary Record: HL7 Implementation Guide for Clinical Document Architecture (CDA®) Release 2: IHE Health Story Consolidation (Consolidated CDA), the use of the "unstructured document" document level template is prohibited
- Lab Exchange: HL7 Version 2.5.1 Implementation Guide: S&I Framework Lab Results Interface
- Lab Reporting to Public Health: HL7 Version 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1 (US Realm)
- Cancer Registry Reporting: CDA R2 + IG

[https://www.healthit.gov/public-course/interoperability-basics-training/HITRC\\_1sn1069/wrap\\_menupage.htm](https://www.healthit.gov/public-course/interoperability-basics-training/HITRC_1sn1069/wrap_menupage.htm)

# MU -USA

Menu Interoperability Path to Meaningful Use Stage 2 1 of 10 EXIT

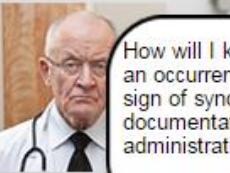
**MU Stage 2's Effect on Transitions of Care and Lab Exchange**

PROVIDER	MU STAGE 1	MU STAGE 2
 How do I transition the care of my patients to other providers?	I had to create summary documents as part of the transition of care for my patients. I could either send them directly to the receiving provider or send them with the patient, but they had to include the required data elements of problem list, medication list, and medication allergies.	I still need to provide a summary document as part of the transition of care, however I need to pay more attention to the data captured during an encounter. The summary must include, at a minimum, the three required data elements (medications, medication allergies, problems) and must be sent electronically (for 10% of transitions) through the CEHRT. New content standards have been introduced, for both the export and the import (consumption) of information into the CEHRT. These additional requirements will impose workflow changes.
 How do hospitals provide structured electronic lab results to ambulatory providers?	We didn't have to worry about this requirement in the first stage. We implemented a lab interface in preparation for future use, but the local interface we use to connect to an Eligible Provider (EP) isn't reliable.	We will need to upgrade our system. Since the content standards are new, and we've used our own local lab test codes with our in house lab system, the requirement to use Logical Observation Identifiers, Names and Codes (LOINC) and Systemized Nomenclature of Medicine (SNOMED) codes for lab tests and test results may be a challenge to both our system and our technicians. This change will require significant mapping of our internal codes to LOINC. It's possible that we will have to call in a third party to do this mapping for us.

[https://www.healthit.gov/public-course/interoperability-basics-training/HITRC\\_1sn1069/wrap\\_menupage.htm](https://www.healthit.gov/public-course/interoperability-basics-training/HITRC_1sn1069/wrap_menupage.htm)

# MU -USA

**MU Stage 2's Effect on Patient Engagement and Public Health**

PROVIDER	MU STAGE 1	MU STAGE 2
 How do I encourage my patients to take responsibility for their health care?	 My partners and I were able to provide patients with either paper or an electronic copy of their health information easily enough. We had custom USB flash drives created and would download their summary onto the drive, but only when the patient requested a copy.	 In order to increase my patients' knowledge regarding their own health care, my partners and I have teamed up with a local IT firm to create a patient portal. The IT firm is in the process of getting their system certified for MU Stage 2. From there, our patients can view online, download, and transmit their health information within 4 business days of the information being available to us. Based on potential workflow issues from using a 3rd party portal, such as HealthVault, we decided to invest the money into developing our own portal. The really tough part now is getting our patients to take advantage of the portal feature.
 How will I know when there is an occurrence that could be a sign of syndromic situations or documentation of vaccine administration?	 I only needed to send a test immunization message to my local public health agency, and rely primarily on Eligible Hospitals (EHs) to know when and how to submit syndromic surveillance data. Information on how to transmit public health data to Public Health Agencies has come to me in a myriad of ways, which has been confusing at times.	 The industry seems to have settled on HL7 2.5.1 as the main content standard for all stakeholders involved in health care notifications, such as immunizations and syndromic surveillance. Immunization information requires use of Vaccine Administered (CVX) codes, but immunization registries typically have larger data sets than just the immunization code, so the challenge will be for the EHR to accurately capture and send that information to PHAs.

[https://www.healthit.gov/public-course/interoperability-basics-training/HITRC\\_1sn1069/wrap\\_menupage.htm](https://www.healthit.gov/public-course/interoperability-basics-training/HITRC_1sn1069/wrap_menupage.htm)

## English EHR Architecture

- England's EHR - the Spine - acts as a central Summary Record (CDA-based, ebXML) consists of the Spine Directory, Demographics Services, the Summary Care Record and adapters and is not an EHR. It contains only a small percentage of the information held in primary and secondary care systems.
- The English envisioned EHR contains a new network infrastructure as well as national applications that will utilize the EHR (e.g., electronic transfer of prescriptions, electronic outpatient scheduling).
- The EHR portion (the Care Record Service) includes three components:
  - Personal Demographics Service (PDS),
  - Summary Care Record (patient's clinical information, such as allergies and adverse reactions to medicine),
  - Secondary Uses Service (SUS), which uses data from patient records to provide anonymized and pseudonymized business reports and statistics for research, planning and public health delivery.

# English EHR Architecture (after Department of Health)

- The NHS turns between detailed information models on the one hand and extended terminology to include information models.
- The result is the Logical Record Architecture (LRA) for Health and Social Care in England.
  - A generic model designed to work with the SNOMED CT terminology
  - Domain models, derived directly from the Generic Model and terminology, designed to meet specified uses
  - A catalogue of the requirements/uses for data, whether for direct care of patients or secondary uses, including analysis

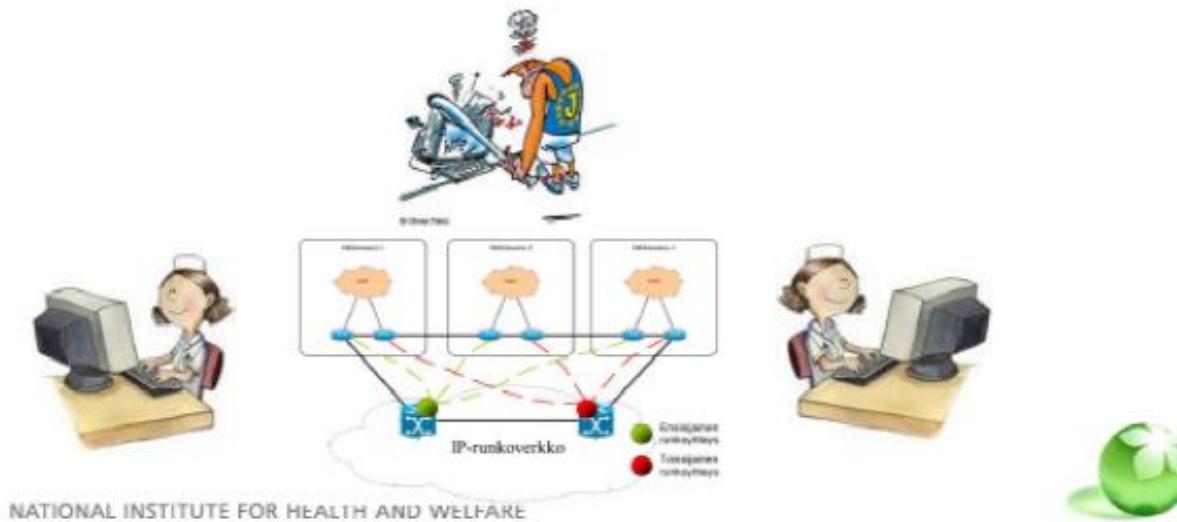
# LRA Core Components (after Department of Health)

- SNOMED CT terminology  
Description Logic
- BS/ISO/EN13606 Electronic Health Record for Communications object model
- HL7 Data Types (ISO)
- UCUM Units of Measure

# Proyec

## The Finnish eHealth System (after Hyppönen)

- Electronic health/ social care records (EPR)
- Electronic exchange of HC/SC information (HIE)
- Electronic health services for patients



# Austrian ELGA Project

(after Sauermann, changed)

Medical reports to be designed in CDA format:

- Discharge summary
- laboratory and radiology reports
- data segments for medication

CDA level 2, partly 3

First trials in 2008

International standards mandated

Approach:

Preparation of a process choreography, accompanying measures,  
preparation of test beds

„Picking up“ all involved parties for realizing a joint, coordinated process

# European Union Projects

- **epSOS**
  - The epSOS large scale pilot has provided the first go at a professional summary of a patient's health record to be shared across borders in the EU
  - The eHealth Network has taken it upon itself to draft a document:  
“GUIDELINES ON MINIMUM/NONEXHAUSTIVE PATIENT SUMMARY DATASET FOR ELECTRONIC EXCHANGE IN ACCORDANCE WITH THE CROSS-BORDER DIRECTIVE 2011/24/EU
  - Release 1 was adopted on 19 november 2013
- **ANTILOPE**
  - The scope of ANTILOPE is the adoption and take up of standards and profiles for eHealth Interoperability. The project is coming to a successful conclusion on 'profile & standards adoption'.
- **TRILLIUM BRIDGE**
  - The Trillium Bridge project works on US/EU patient summary interchange, gap analyses , etc. It has set out to find ways to communicate these patient summaries across the Atlantic – leading to an analysis and mapping of the US HL7 CDA R2 spec with the epSOS work

# INSTITUCIONES

## INFRAESTRUCTURA

### Historia Clínica Electrónica

**26%** de los afiliados a los prestadores integrales de salud tiene ingresada electrónicamente su HCE.



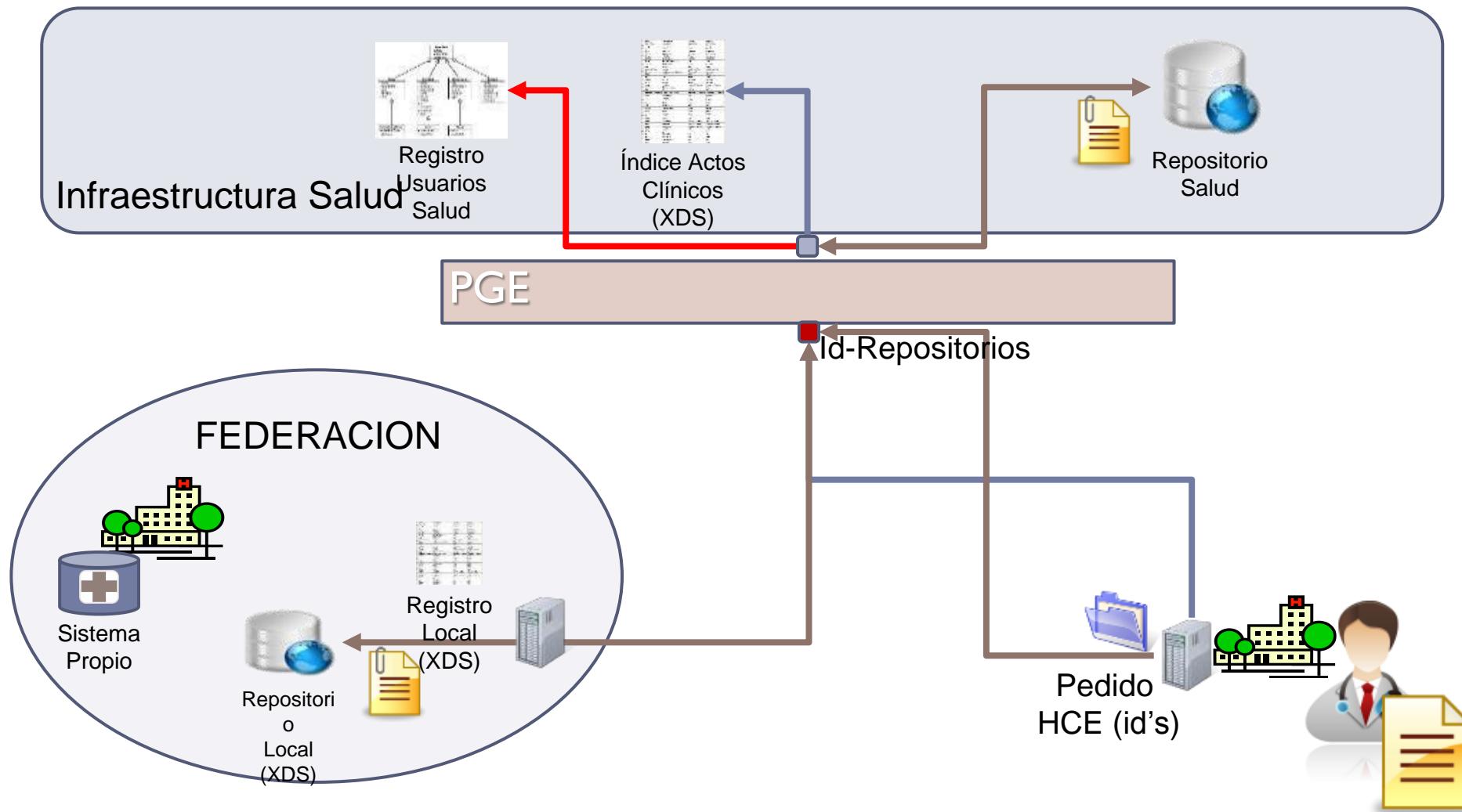
**6 de cada 10** prestadores de salud tiene implementada algún sistema de HCE

**5%** de los establecimientos de salud tiene todos los registros en forma electrónica

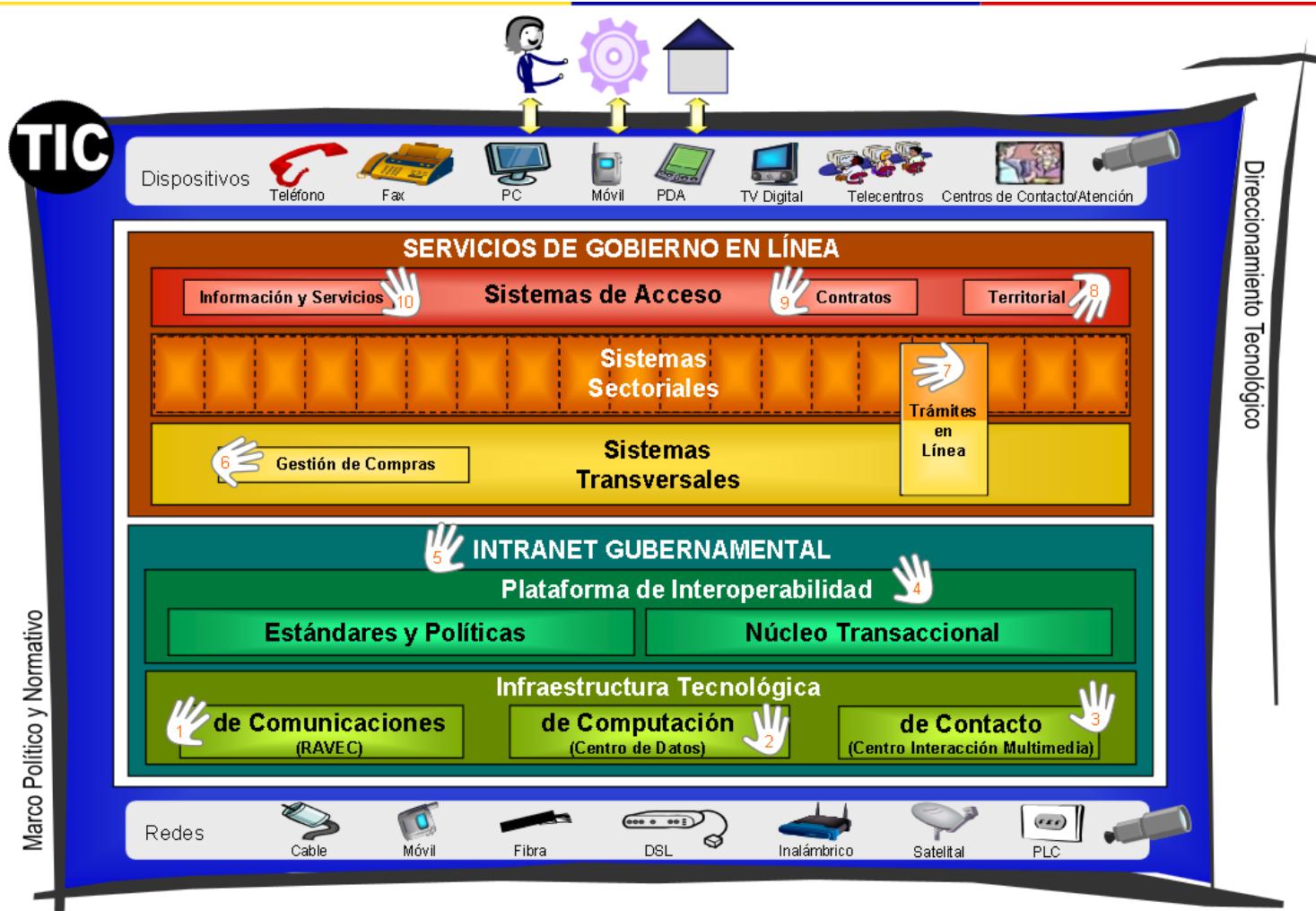
### Usuarios en diferentes tipos de instituciones

Afiliaciones	Usuarios con datos en HCE*	% HCE
IAMC	1.920.276	<b>29%</b>
RIEPS	1.482.000	<b>17%</b>
Seguros	164.325	<b>77%</b>
<b>Total</b>	<b>3.566.601</b>	<b>26%</b>

\* Están incluidas todas aquellas personas que tienen algún dato cargado en la HCE de la institución a la que está afiliado.



# Estrategia de Gobierno en Línea



Fuente: [http://www.cepal.org/socinfo/agenda/6/29576/Mar%C3%ADa\\_Isabel\\_Mej%C3%ADa.pdf](http://www.cepal.org/socinfo/agenda/6/29576/Mar%C3%ADa_Isabel_Mej%C3%ADa.pdf)

# Estrategia de Gobierno en Línea

## Plataforma de Interoperabilidad

Ministerio de  
Comunicaciones  
República de Colombia



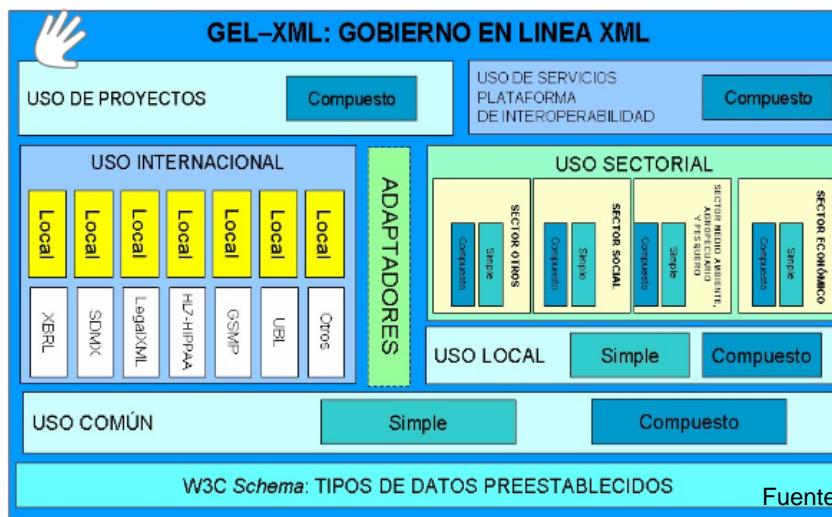
Es el conjunto de herramientas necesarias para que los sistemas de información del Estado conversen entre sí, así como soluciones que facilitan el desarrollo de los servicios de Gobierno En Línea:

### Implementados

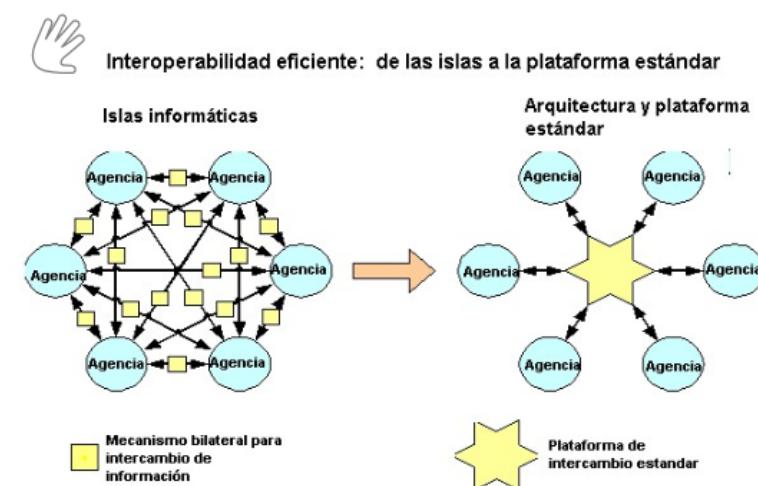
- Certificados y Firmas Digitales
- Pago Electrónico Población Bancarizada
- Estampado de Tiempo
- Lenguaje común para el intercambio de información entre aplicaciones (GEL XML)
- Enrutador que procesa la información al controlar y regular la interoperabilidad.

### En desarrollo

- Autenticación del Ciudadano, Notificación Electrónica, Pago Electrónico (no Bancarizada), GEL POINT



Fuente: [http://www.cepal.org/socinfo/agenda/6/29576/Mar%C3%ADa\\_Isabel\\_Mej%C3%ADa.pdf](http://www.cepal.org/socinfo/agenda/6/29576/Mar%C3%ADa_Isabel_Mej%C3%ADa.pdf)



# Estrategia de Gobierno en Línea

## Automatización de Trámites

Este componente tiene por objeto simplificar la interacción de los ciudadanos con el Estado en su propósito de obtener un bien y/o servicio de la administración pública, de manera unificada y respondiendo a sus necesidades. Para esto, se concentra en:

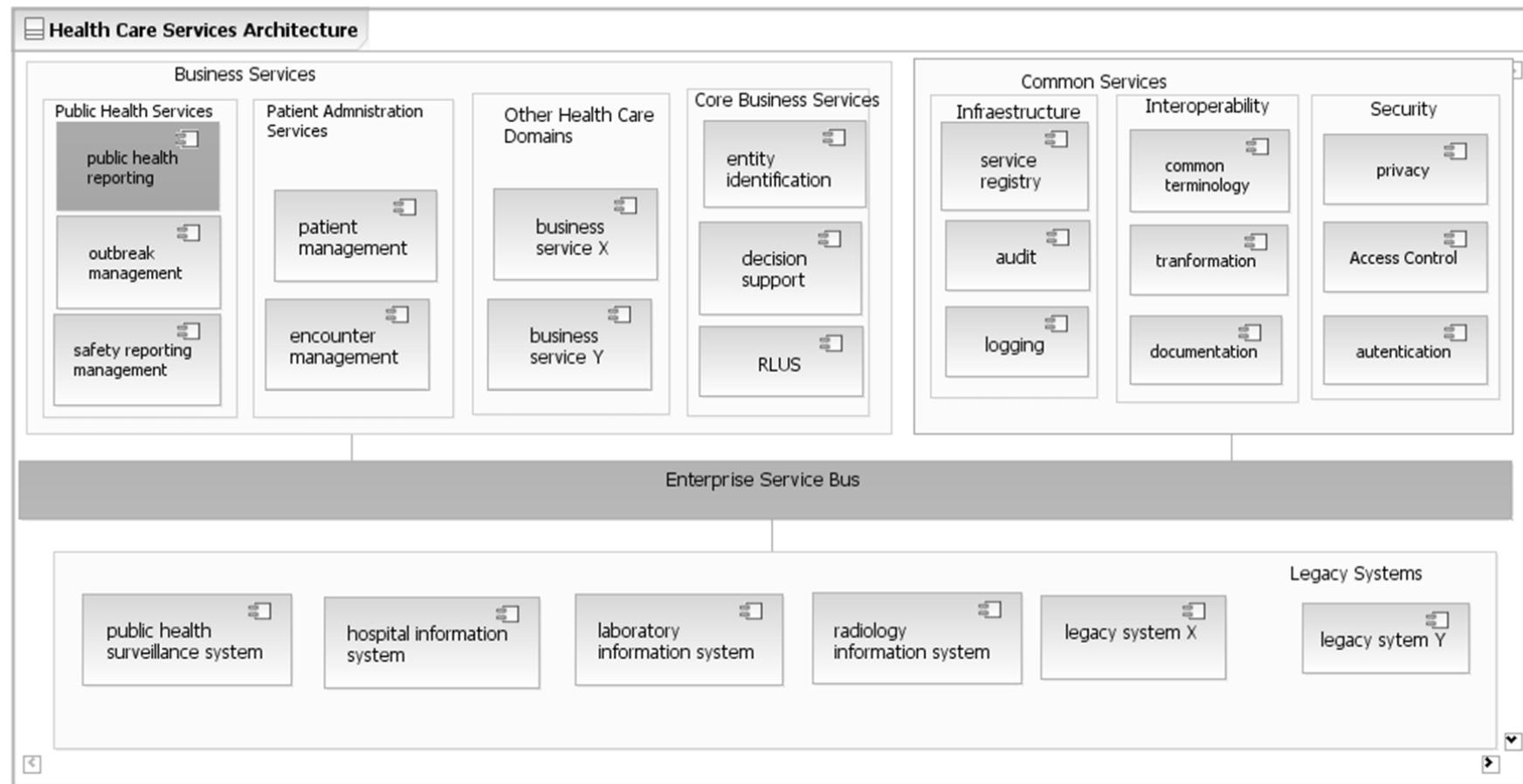
- Trámites Tipo, replicables
- Trámites Verticales
- Cadenas de Trámites



- Comercio
- Protección Social
- Transversal
- Empleo
- Bienestar

Ej.: Integra 18 Entidades Públicas de múltiples sectores administrativos que proveen trámites de comercio exterior para ofrecer, en un solo punto y con un solo paso, 98 trámites para que las empresas gestionen sus autorizaciones, permisos, certificaciones o visto buenos previos que exigen las diferentes entidades para importaciones y exportaciones.

# Arquitectura de Referencia EHR -Colombia





# Conclusiones

- ▶ **Interoperabilidad** puede definirse como la colaboración entre sistemas para cumplir un objetivo común, que involucra el intercambio de datos, información y/o conocimiento para el uso de la misma (acción).
- ▶ Estándares son documento aprobado por **consenso** por un **organismo reconocido**, que proporciona **reglas, pautas y/o características para uso común**
- ▶ **Beneficios:** Mejora Eficiencia (paciente, profesional en salud, administrador \$), Facilita implementación (reuso, flexibilidad ...)
- ▶ **Requisitos para interoperabilidad:**
  - ▶ Identificar las necesidades, niveles de interoperabilidad, escalabilidad, abierto, seguridad...
  - ▶ Diseñar la arquitectura del sistema cumpliendo esos requisitos

# Conclusiones

- ▶ La alternativa más viable para proyectos de interoperabilidad es la definición de políticas, y la adopción de estándares técnicos
- ▶ Existen varios estándares técnicos, arquitecturas que pueden usarse en proyectos nacionales de Interoperabilidad.
- ▶ Antes de definir estándares técnicos, lo más importante es definir políticas y mecanismos de gobernabilidad, al final lo importante es consenso.
- ▶ Los gobiernos, de la mano de los SDO deben liderar estas iniciativas.
- ▶ Las políticas son diferentes en cada país.

# Gracias por su atención!



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