

Interoperability projects in Europe

Lessons learnt from IHE-Europe

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IHE Services Director



The Challenge



What if you had a cell phone plan that only allowed you to call other customers of your carrier?

That's the situation for most healthcare providers today, when they join a data sharing network.

EUROPEAN INTEROPERABILITY TIMELINE

EU Directives

1980 1990 2000 2010 2020

1985 – 1992
CADDIA Programme,
INSIS Programme

1995 – 1999
Interchange of Data between
Administrations (IDA) Programme

1999 – 2004
The follow-on Programme IDA II

2005 – 2009
IDABC Programme

2010 – 2015
ISA Programme

2016 – 2020
ISA² Programme

Related EU Initiatives

1993
Delors paper
1994
Bangemann Report

2000
Lisbon Strategy for growth and employment
2001
eGovernment Ministerial Conference in Brussels
2003
eGovernment Ministerial Conference in Como
2004
Decision 2004/387/
EC Adopting the IDABC Programme

2005
• Manchester Ministerial Declaration
• ModinisIDM Programme
• eEurope 2005 Action Plan
• eEurope 2005 Initiative
2006
Commission Communication on Interoperability for Pan-European eGovernment Services
2007
• Lisbon Ministerial Declaration
• I2010 Initiative

2009
• Decision 2009/922/
EC Adopting the ISA Programme
• Malmo Ministerial Declaration
2010
• Digital Agenda
• Europe 2020 Strategy

2011
Commission Communication (COM(2011) 882 final) on Open Data, an engine for innovation, growth and transparent governance

2012
Regulation (1025/2012) on European Standardisation
2013
Regulation (1316/2013) establishing the Connecting Europe Facility
2014
eIDAS Regulation (910/2014)
2015
• DSM Strategy
• Decision 2015/2240 establishing the ISA² Programme
2016
General Data Protection Regulation (2016/679)

1998
Standards Directive (199888/34/EC)

2003
Public Sector Information Directive (2003/98/EC)
2004
Public Procurement (Directive 2004/18/EC)

EIF V1

2006
Service Directive (2006/123/EC)
2007
Inspire Directive (2007/2/EC)

EIF V2

2013
Directive 2013/37/EU amending Directive 2003/98/EC on the re-use of public sector information

NEW EIF (2017)

Europe



First eHealth large scale deployment: European Patient Smart Open Services

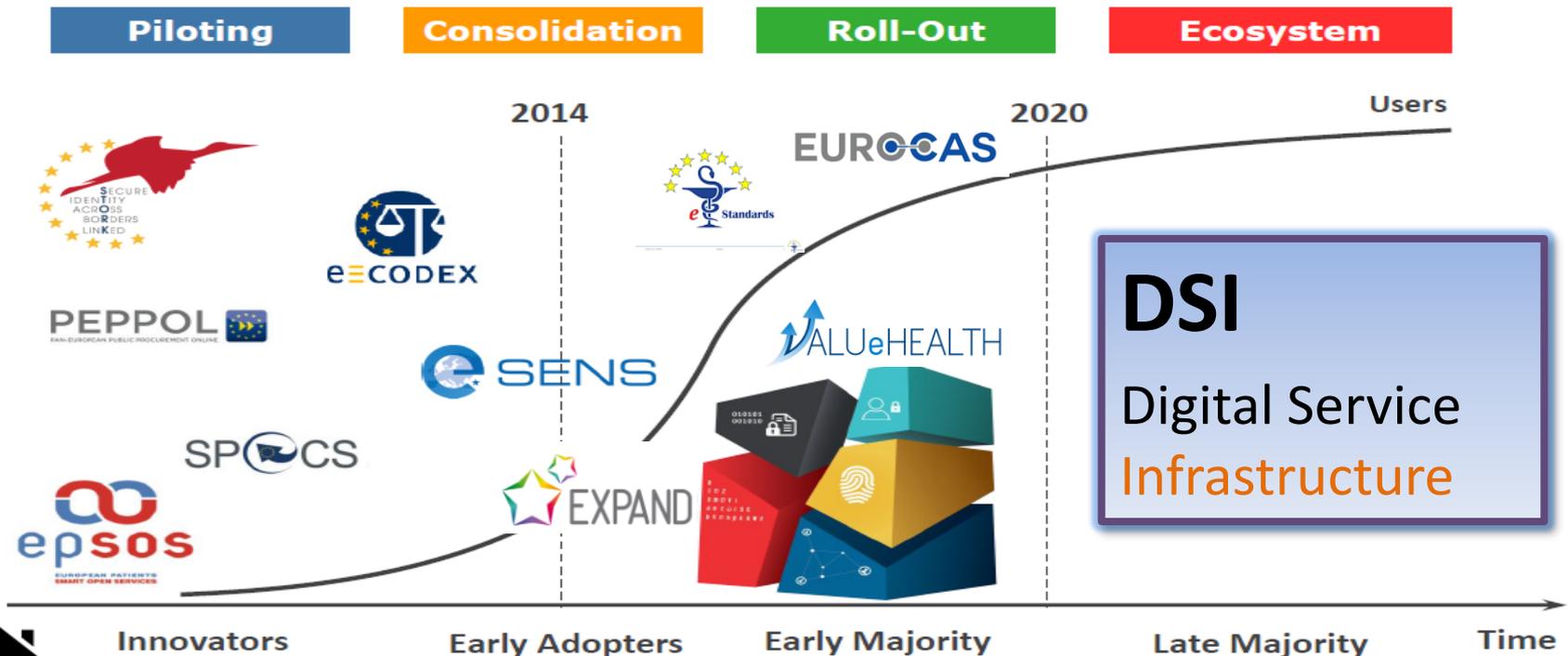
2008 – 2014

36,5 Mio € spent

25 European countries

Creating a #DigitalSingleMarket

The building blocks represent a massive investment since their creation by the Large Scale Pilots. As their user base grows, the Commission is already working on their sustainability beyond CEF.



Source: Gerald Cultot, European Commission, Keynote speech at IHE World Summit 2016

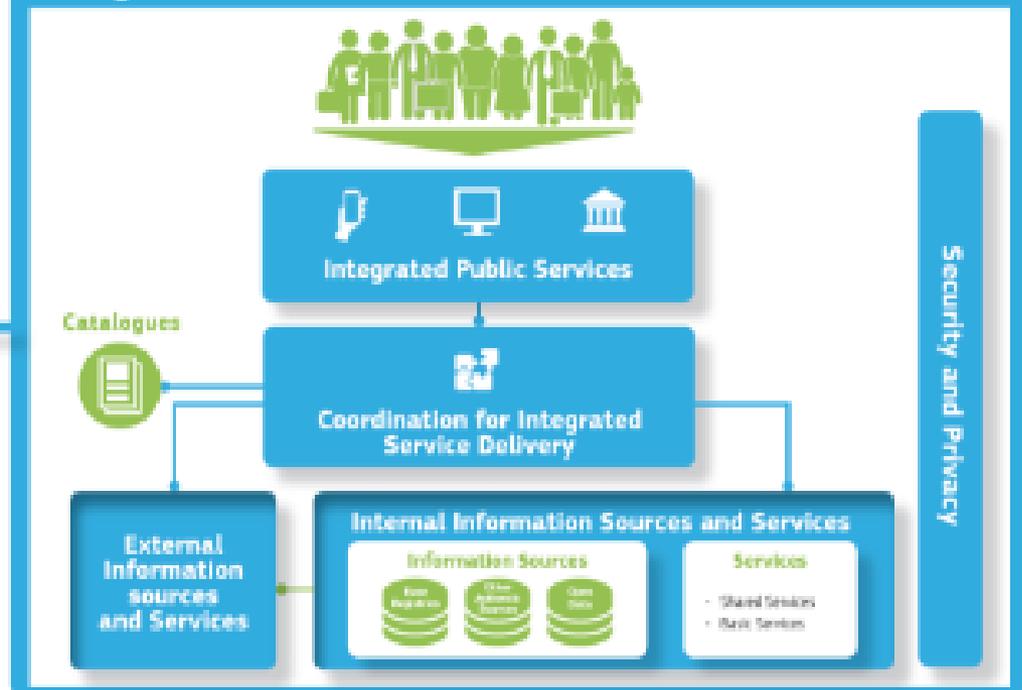
Lesson no1: Interoperability needs special attention and governance

EIF Conceptual Model

Interoperability Governance

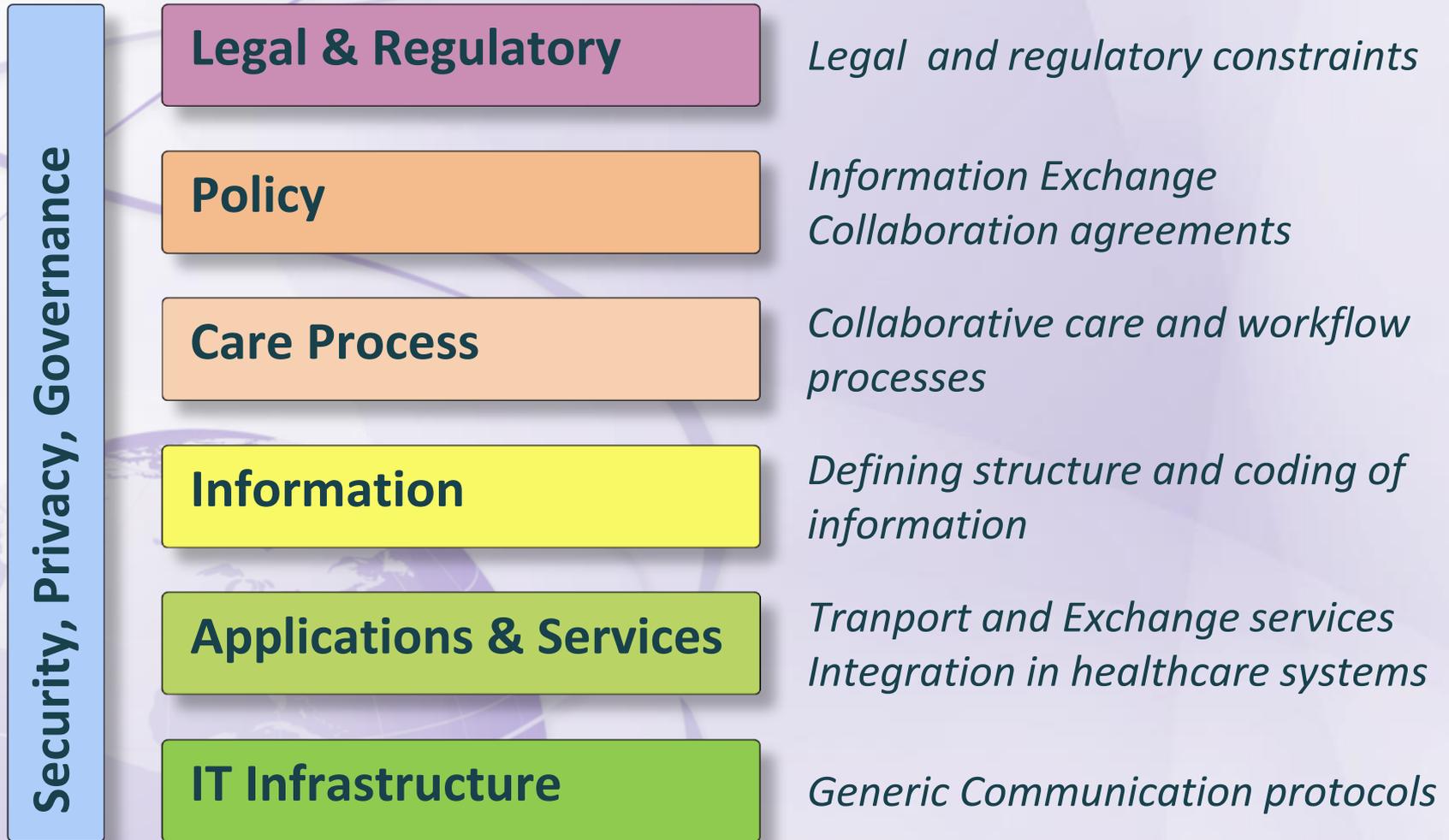


Integrated Public Service Governance



Interoperability Principles

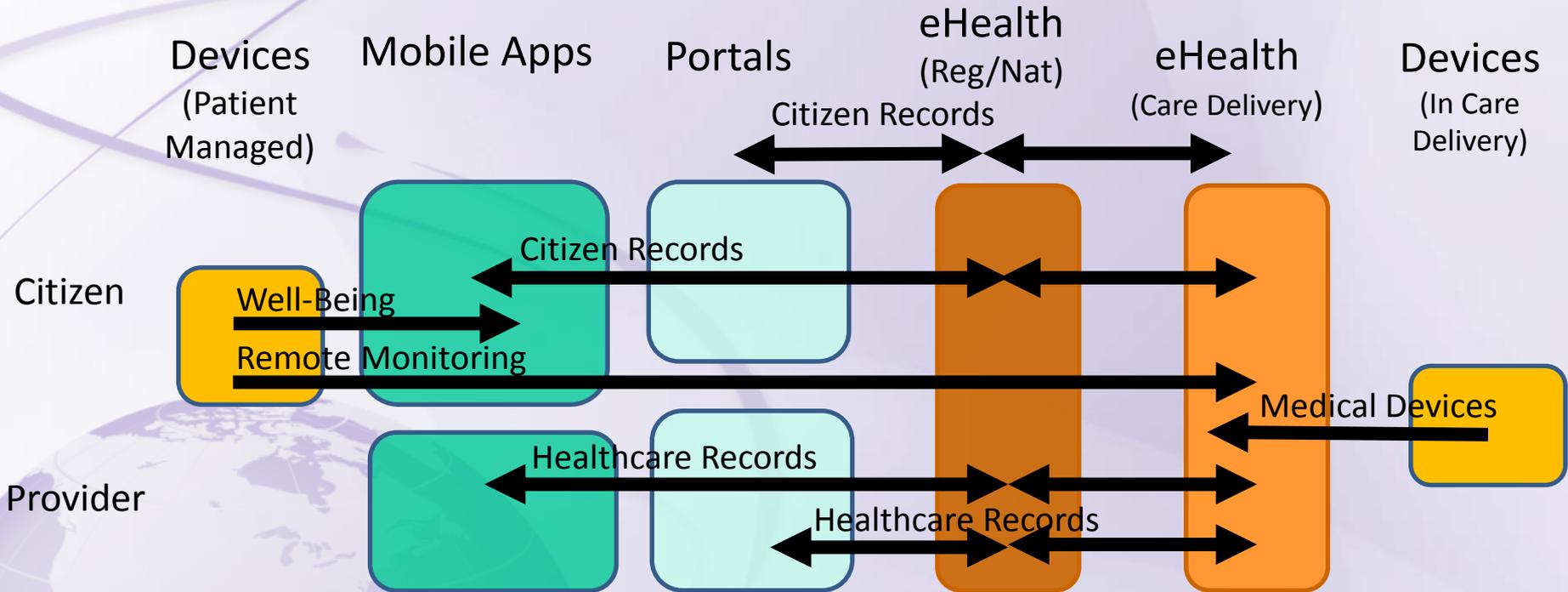
The many dimensions of Interoperability



27 IHE Profiles recognized under EU regulation 1025/2012

Regional, National,	XDS.b	XCF	XCA
Cross-border:	XDR	XDM	XCPD
- Share			
- Patient Id	XDS-I.b	XDS-MS	XD-SD
- Imaging			
- Summaries	XPHR	PRE	DIS
- Lab			
- Privacy	XD LAB	XUA	BPPC
Regional, National, Hospital		PIX	PDQ
Patient Id & Security		ATNA	CT
Hospital-HIS	PAM	SVS	
Hospital-Rad	SWF.b	SWF	PIR
Hospital-Lab	LCSD	LAW	LTW

Next Stop in a future not that far: Interconnected healthcare services networks and devices for the benefit of the patient



mHealth, eHealth and Health/Medical Devices as components
of the connected health system



HL7 FHIR based profiles of IHE: the future ahead

- [Mobile access to Health Documents \(MHD\)](#) a profile on Document Reference and Document Manifest to provide a HTTP REST and Mobile application friendly API for the use cases profiled in XDS, XDR, and XCA.
- [Patient Demographics Query for Mobile \(PDQm\)](#) a profile of the FHIR Patient resource for simple lookup and reference. Following the functionality requirements profiled in PDQ (HL7 v2), and PDQv3 (HL7 v3)
- [Patient Identifier Cross-reference for Mobile \(PIXm\)](#) an operation profile for retrieving just cross-referenced identifiers for a given patient
- [RESTful Query to ATNA](#) a profile on Audit Event for query and reporting
- [Mobile Cross-Enterprise Document Data Element Extraction \(mXDE\)](#) accesses data elements extracted from shared structured documents
- [Mobile Alert Communication Management \(mACM\)](#) a profile on Communication for alert notifications
- [Mobile Care Services Discovery \(mCSD\)](#) provides a RESTful interface to discover Care Services: Organization, Location, Practitioner, and Health Services
- [Mobile Cross-Enterprise Document Data Element Extraction \(mXDE\)](#) accesses data elements extracted from shared structured documents
- [Non-patient File Sharing \(NPFSm\)](#) provides a RESTful interface enable sharing of non-patient files such as clinical workflow definitions, domain policies, and stylesheets
- [Internet User Authorization \(IUA\)](#) a profile of OAuth for use with HTTP REST access
- [Query for Existing Data for Mobile \(mQED\)](#) queries for clinical data elements, including observations, allergy and intolerances, conditions, diagnostic results, medications, immunizations, procedures, encounters and provenance
- [Mobile Retrieve Form for Data Capture \(mRFD\)](#) describes the exchange of context data to allow a seamless form launch with supporting clinical context
- [Dynamic Care Planing](#) (DCP) Profile provides the structures and transactions for care planning, sharing Care Plans that meet the needs of many, such as providers, patients and payers
- [Mobile Medication Administration \(MMA\)](#) describes the requesting and registering of administration of medication in a mobile setting (under development)



The Gemini Project

IHE Integrating
the Healthcare
Enterprise

IHE Services to the Stakeholders community

1. Connectathons and Projectathons

2. Gazelle Test Bed and Tools

3. Training

4. Virtual Connectathons

5. Consulting / IoP Specifications

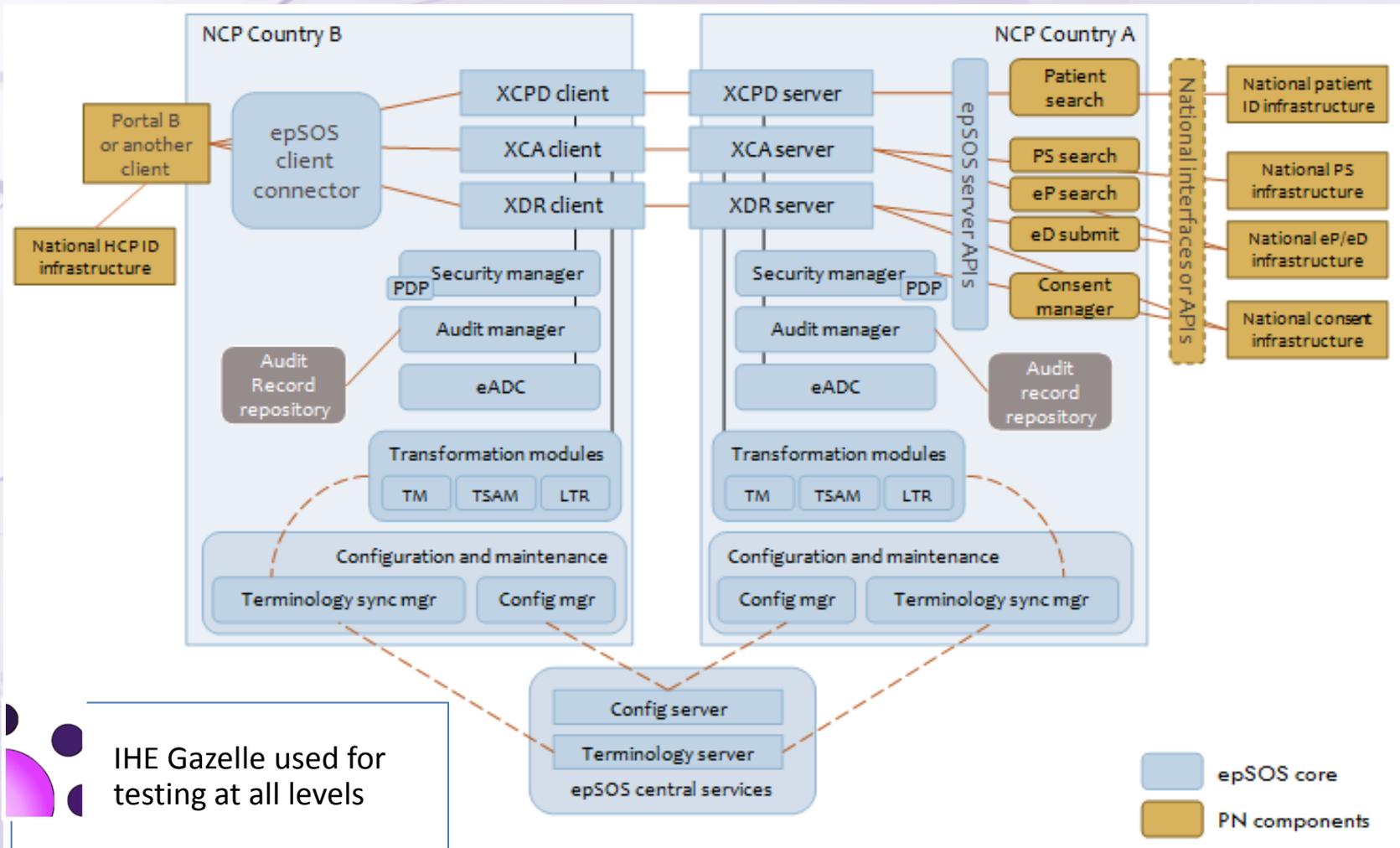
6. Tailored Test Tools

9. Conformity Assessment/Report

8. Interoperability Showcases

7. Tailored Test Plans

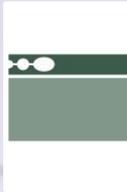
eHDSI Architecture is based on IHE profiles



eHealth Belgique Platform: 11 common services to all regions



Coordination de sous-
processus électroniques
API – web services



Portail



Gestion intégrée des
utilisateurs et des accès



Gestion de loggings



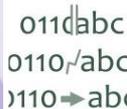
Système de chiffrement
end-to-end



eHealthBox



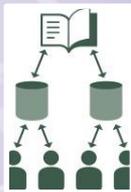
Timestamping



Codage et anonymization



Consultation du Registre
national et des registres
BCSS

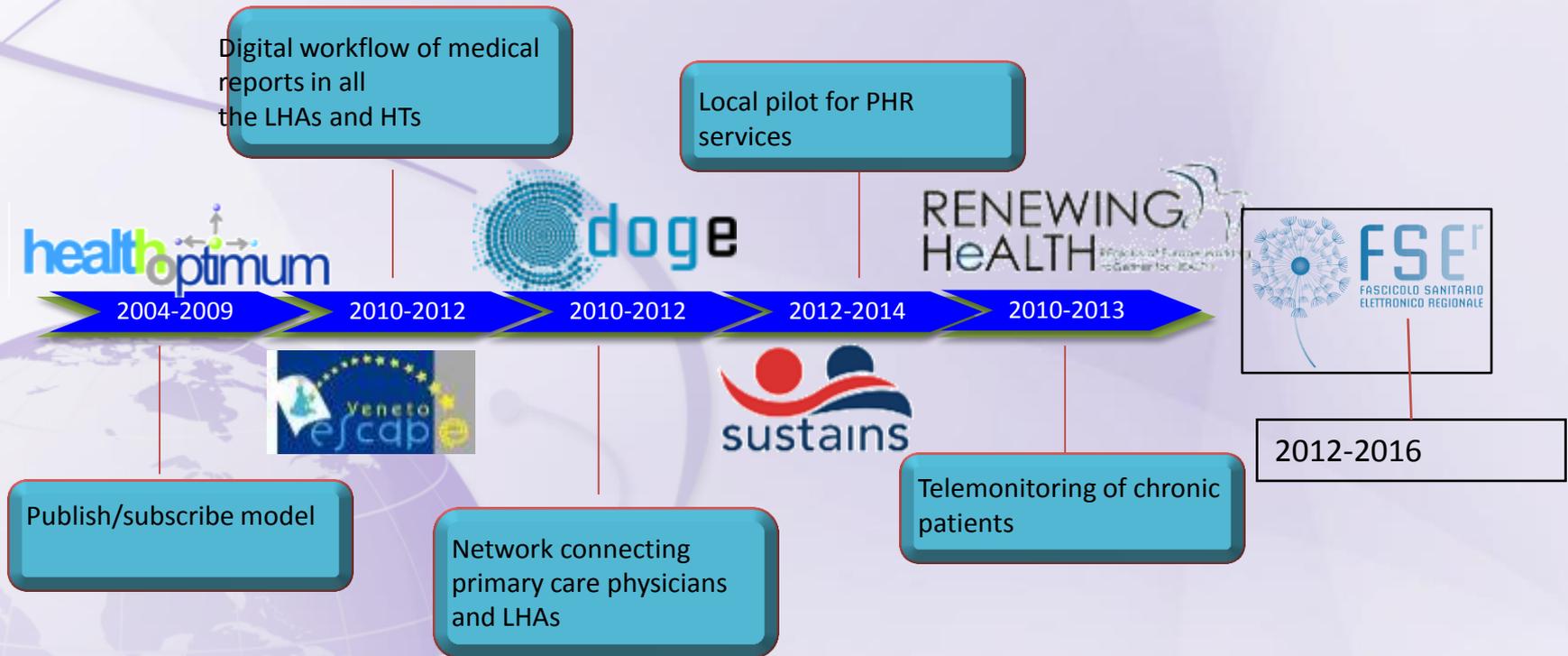


Répertoire des références
(metahub)



Gazelle Interoperability
Lab (document validation)

Veneto Region, Italy the history of the projects



APP FSEr

The possibility to manage your e-prescriptions on your own and with your GP

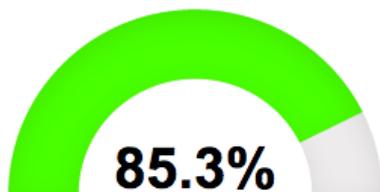
- To give FSEr consent to your GP
- Digital Identity
- To open your FSE
- First service of “Sanità KM 0” world to reset distances from my GP and me



Data Analytics based document created and stored in the region

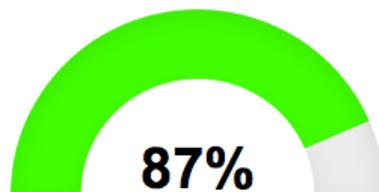


Erogazione dema Azienda



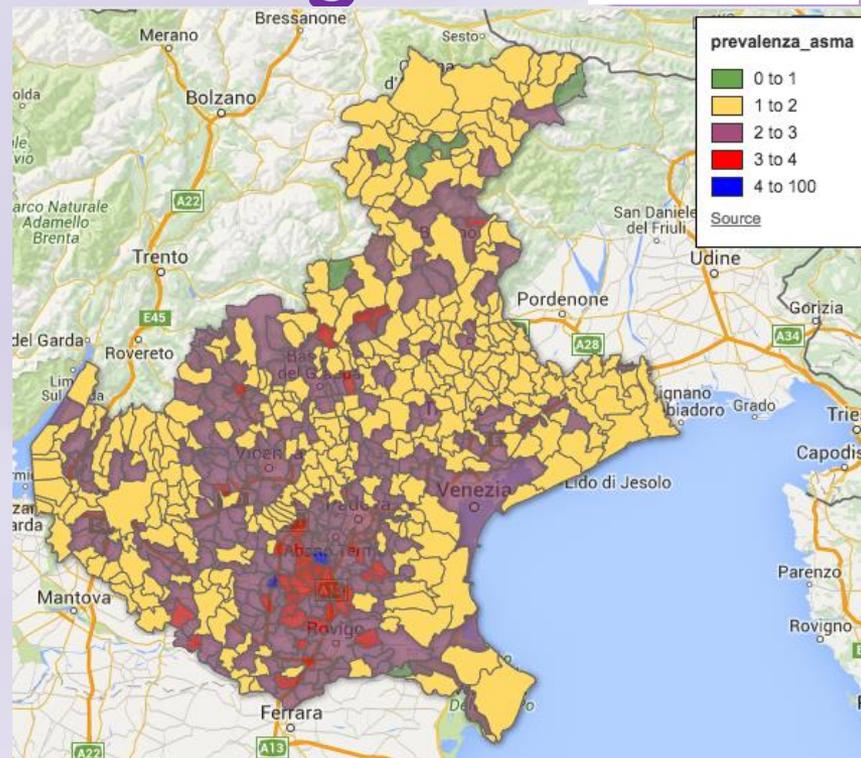
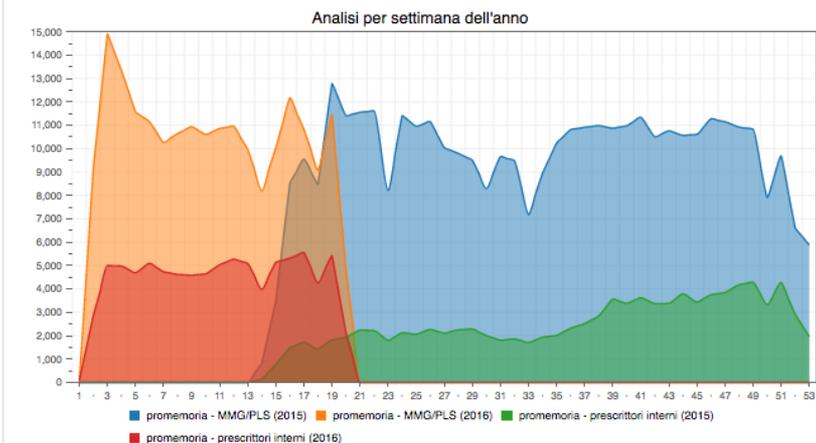
0 % ricette erogate dema 100

Prescrittori interni dema



0 % medici 100

Ricette specialistiche prescritte dall'Azienda



Asthma prevalence of drug consumption

Gazelle Usage by Veneto Region, Italy



- Suitable tool for the certification process for systems involved in the regional HIE
- Used in the context of ePrescription, eDispensation, Patient management, laboratory Information system
- 67 systems with 118 users

Integration Profile Information														
Id	257													
Keyword	NR													
Name	Notifiche di Inizio e Fine Ricovero													
Description	Il presente documento ha l'obiettivo principale di adempiere a quanto decretato dal Ministero della Salute di concerto con il Ministero del Lavoro e delle Politiche Sociali e il Ministero dell'Economia e delle Finanze con il PM 14 ottobre 2015, modificato al decreto 24 febbraio 2012, recante Definizi tematico dei dati delle certificazioni implementazioni													
Status	NR_10 Trasferimento/Prescrizione	NotificheRicovero2015	ready	connectathon	No Peer	false	elecst	m.giardello	8/13/15 9:57:46 AM					
Document Section	None	NR_11 Ricovero non lavoratore	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	m.giardello	8/13/15 9:58:34 AM				
		NR_12 Consenso negato lavoratore	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	m.giardello	8/13/15 9:58:50 AM				
		NR_13 Consenso lavoratore	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	m.giardello	8/13/15 9:59:18 AM				
		NR_14 AggiornamentoRicovero	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	m.giardello	8/13/15 9:59:46 AM				
		NR_15 Cancellazione Ricovero	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	m.giardello	8/13/15 10:01:09 AM				
		NR_16 Rettifica inizio ricovero	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	m.giardello	8/13/15 10:04:06 AM				
		NR_17 Rettifica Certificato	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	m.giardello	8/13/15 10:03:52 AM				
		NR_18 Ri-stampa certificato	NotificheRicovero2015	ready	connectathon	No Peer	false	elecst	m.giardello	8/13/15 10:03:37 AM				
		NR_19 Rifiuto stampa certificato	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	m.giardello	8/13/15 10:03:23 AM				
		NR_20 RettificaChiusuraRicovero	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	m.giardello	8/13/15 10:03:08 AM				
		NR_21 Ri-ospedalizzazione	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	elecst	8/24/15 10:06:04 AM				
		NR_22 Ricovero Day Hospital	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	m.giardello	8/13/15 10:02:41 AM				
		NR_23 Paziente STP	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	m.giardello	8/13/15 10:02:25 AM				
		NR_24 Paziente sconosciuto	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	m.giardello	8/13/15 10:02:12 AM				
		NR_30 Scenario notifiche	NotificheRicovero2015	ready	connectathon	Peer To Peer	false	elecst	m.giardello	8/13/15 10:01:41 AM				

Proxy Tool: Allows to view the list of messages passing from the initiator system to the responder one and to analyze them. In total, 29322 messages passed through the proxy tool.

Lesson no2: Interoperability Testing is key to successful implementations and deployments



Switzerland: first country that will certify systems by law until 2020

many specifications, and then?

interoperability in and between EHR-communities secured via certification!

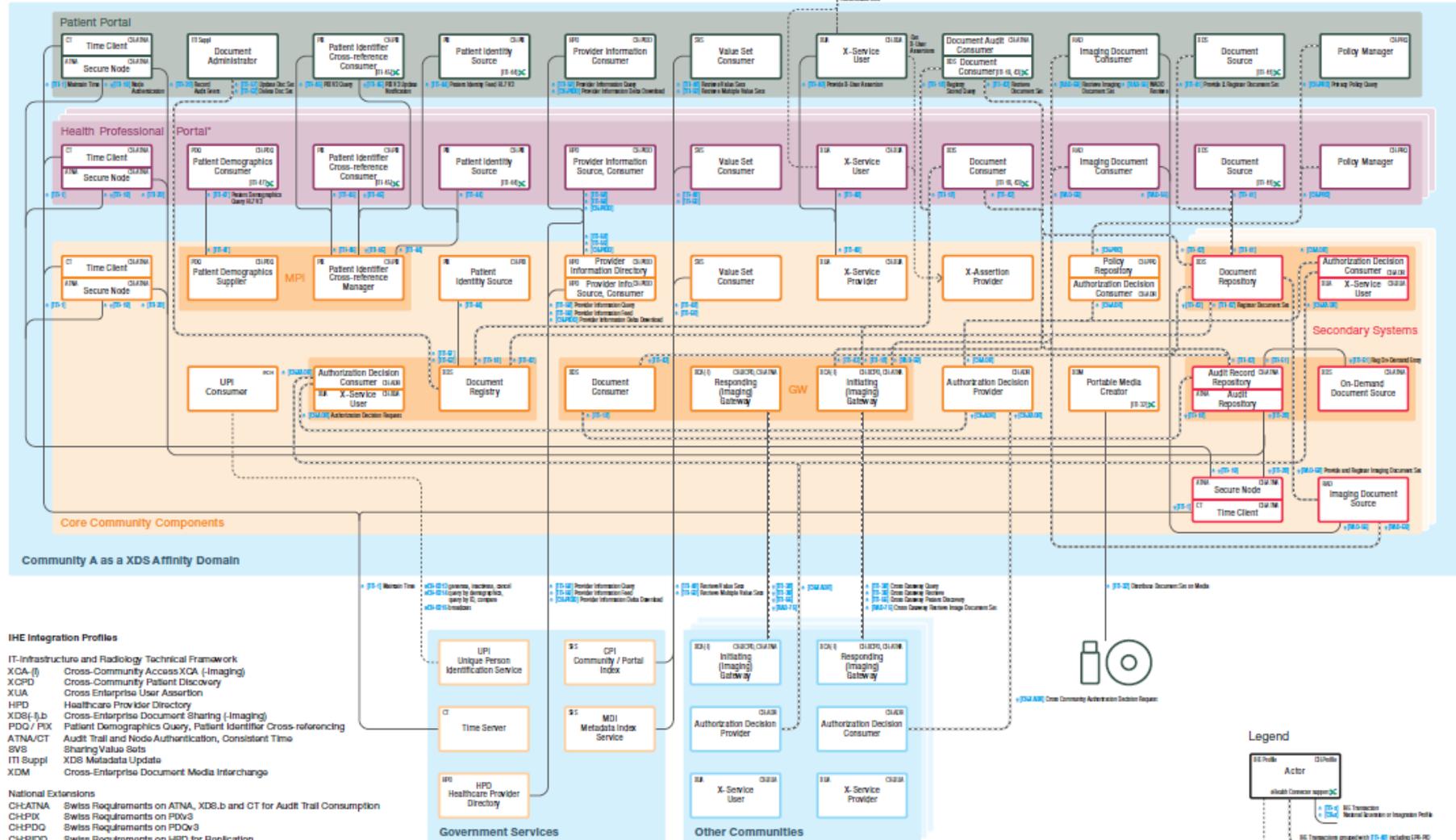
- ISO based certification process by law
- only certified EHR-communities are allowed to participate
- certification of organization, processes and technology
- technical certification done with certification platform derived from reference platform (basis is IHE Europe CAS environment)
- live-testing via 'Swiss EHR Projectathon'

Swiss Electronic Patient Record (EPR)

Overview of IHE Integration Profiles, National Extensions and National Integration Profiles



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Eidgenössisches Departement des Innern EDI
Bundesamt für Gesundheit BAG



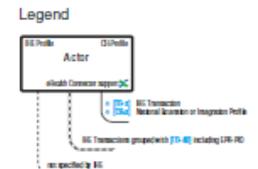
IHE Integration Profiles

- IT-Infrastructure and Radiology Technical Framework**
- XCA-(f) Cross-Community Access XCA (-Imaging)
 - XCPD Cross-Community Patient Discovery
 - XUA Cross-Enterprise User Assertion
 - HPD Healthcare Provider Directory
 - XDS(-f,b) Cross-Enterprise Document Sharing (-Imaging)
 - PDO/ PX Patient Demographics Query, Patient Identifier Cross-referencing
 - ATNA/CT Audit Trail and Node Authentication, Consistent Time
 - SVS Sharing Value Sets
 - ITI Suppl XDS Metadata Update
 - XDM Cross-Enterprise Document Media Interchange

- National Extensions**
- CH-ATNA Swiss Requirements on ATNA, XDS.b and CT for Audit Trail Consumption
 - CH-CPD Swiss Requirements on PDW3
 - CH-PDO Swiss Requirements on PDOv3
 - CH-HPD Swiss Requirements on HPD for Replication
 - CH-XCPD Swiss Requirements on XCPD for Cross-Community Patient Discovery
 - CH-XUA Swiss Requirements on XUA for XDS, ADR and PPO

- National Integration Profiles**
- CH-ADR Authorization Decision Request
 - CH-PPQ Privacy Policy Query

*Primary Systems can reference the same actors as a Health Professional Portal



EPR Projectathon 2017

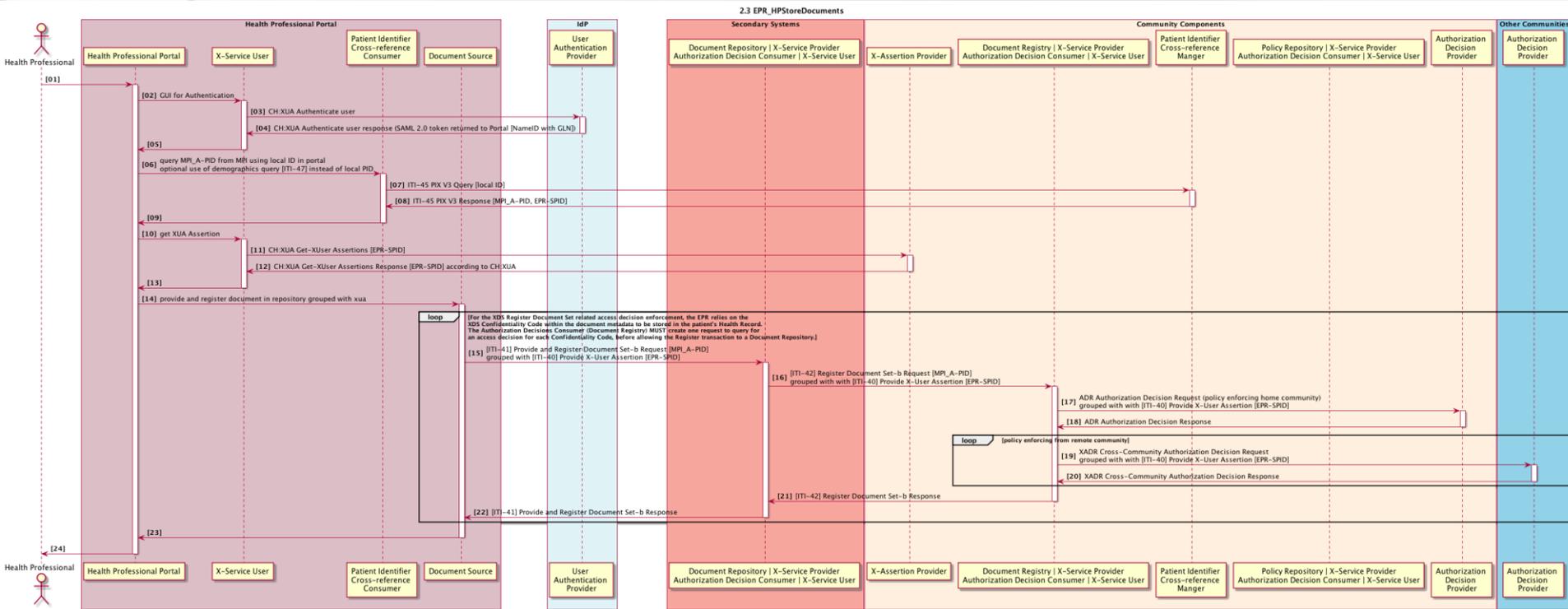
- 16 vendors
- 2 Federal Organisations
- 30 systems
- 75 participants
- 18 monitors



EPR Projectathon 2018: 22 Vendors 94 participants

IHE BEST Practice

Lesson no3: Setting up the testing continuum within a project/strategy is important (Projectathons)



CH-EPR end-to-end workflow testing

ELGA Austria: use of common data sets and clinical document nationwide

CDA: Standardisierung medizinischer Befunde



- **Anhebung der Qualität der Befunde durch österreichweite Harmonisierung der Befundstruktur und -Codierung**
 - Einheitliche Darstellung
 - Leichtere Lesbarkeit
 - Erhöhung der Vollständigkeit der Dokumentation

- **Durch Einbettung von maschinenlesbarer Information wird eine weitere Verarbeitung in ihren EDV-Systemen möglich – und das übergreifend über Befunde verschiedener Organisationen**
 - **Automatische Zusammenfassungen** (z.B. Diagnosen mehrerer Befunde)
 - **Automatische Warnungen** (z.B. Allergien, wichtige Diagnosen, Medikamente)
 - **Erinnerungen**
 - **Zeitreihendarstellung** (z.B. Verlauf von Laborparametern)
 - **Intelligente Unterstützung** (Unterstützung von Klinischen Leitlinien)

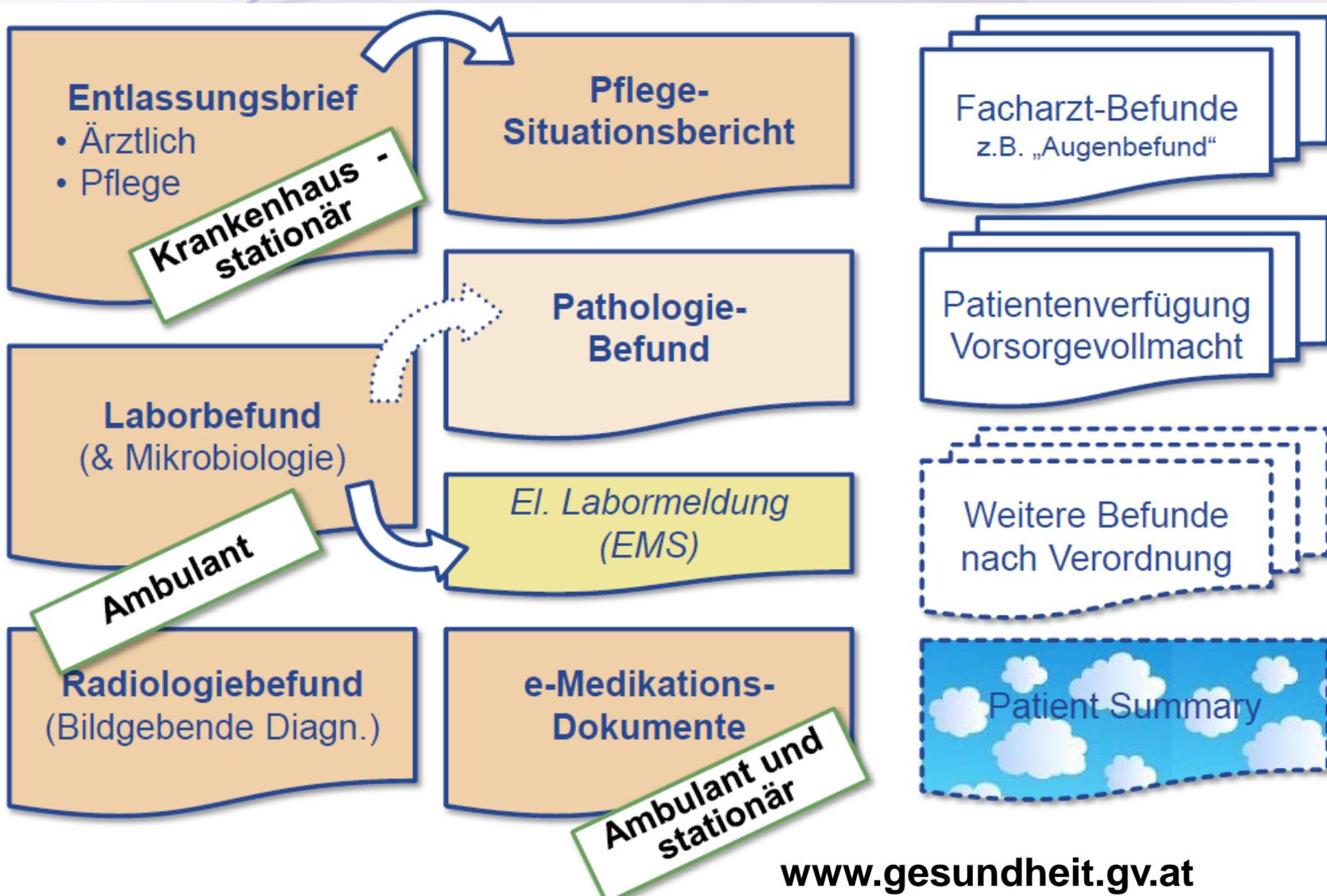


Common data sets
and terminologies



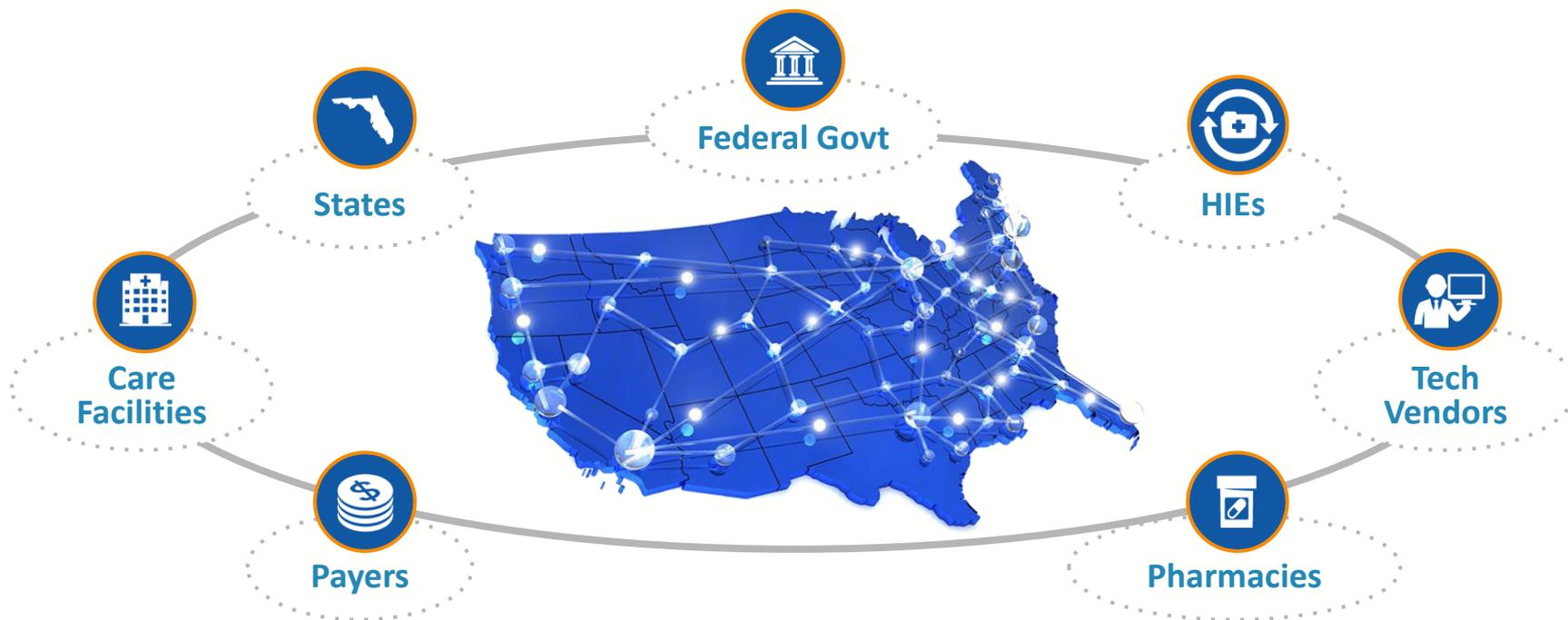
HL7 CDA
documents

ELGA Austria: list of common document types



Introduction to the eHealth Exchange

Rapidly growing network for securely sharing health information over the Internet



Shared Governance and Trust Agreement

Common Standards, Specifications & Policies

eHealth Exchange Stats

The eHealth Exchange (“Exchange”) is a group of federal agencies and non-federal organizations that came together under a common mission and purpose to improve patient care, streamline disability benefit claims, and improve public health reporting through secure, trusted, and interoperable health information exchange.

All 50 states



50,000 medical groups

Four federal agencies
(DoD, VA, CMS, SSA)



3,400+ dialysis centers



8,300 pharmacies

65% of U.S. hospitals



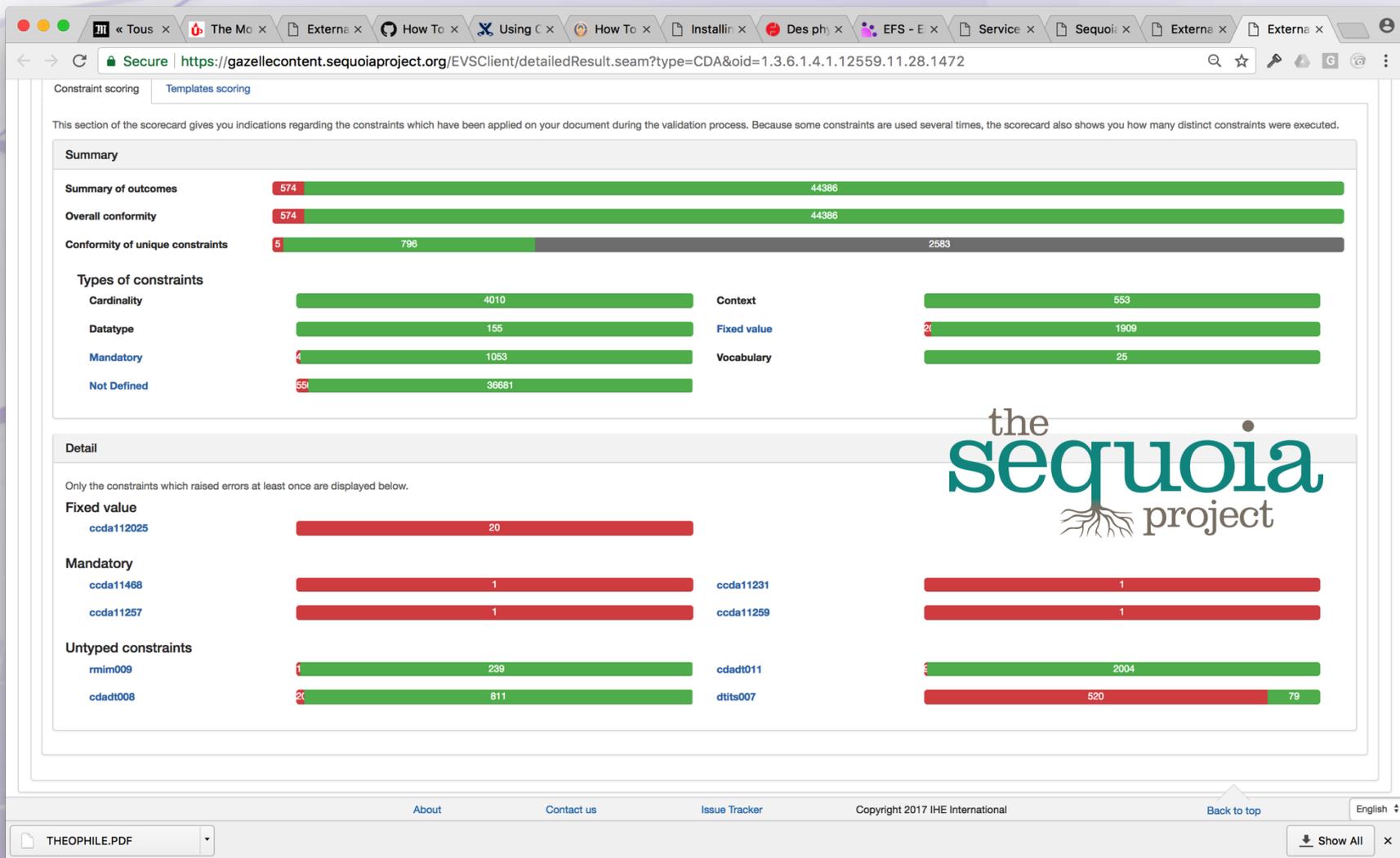
Supporting more than
100 million patients



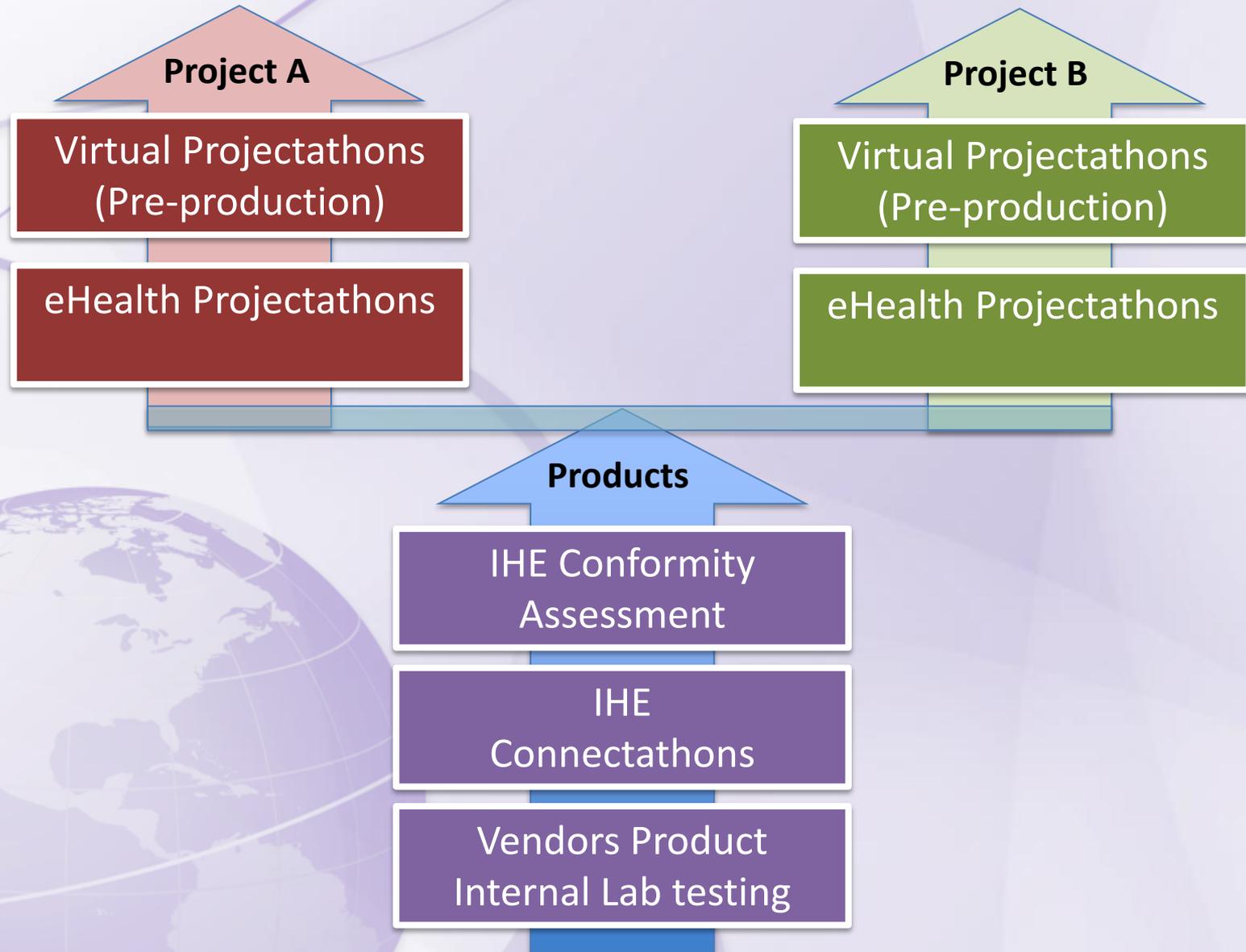
35% Growth in participation last year
46 Regional / State HIOs in production

IHE BEST Practice

Lesson no4: Building quality on exchanged information establishes trust between stakeholders



Overview of overall testing continuum





Connectathon



Bern 2012

Istanbul 2013

Vienna 2014 © IHEServices Copyright 2015

Bochum 2016

Venice 2017 29

Connectathons in Europe

European Connectathons

2001: Charenton-le-pont Paris, France

2002: Villejuif in Paris, France

2003: Aachen, Germany

2004: Padova, Italy

2005: Noordwijkerhout, The Netherlands

2006: Barcelona, Spain

2007: Berlin, Germany

2008: Oxford, UK

2009: Vienna, Austria

2010: Bordeaux, France

2011: Pisa, Italy

2012: Bern, Switzerland

2013: Istanbul, Turkey

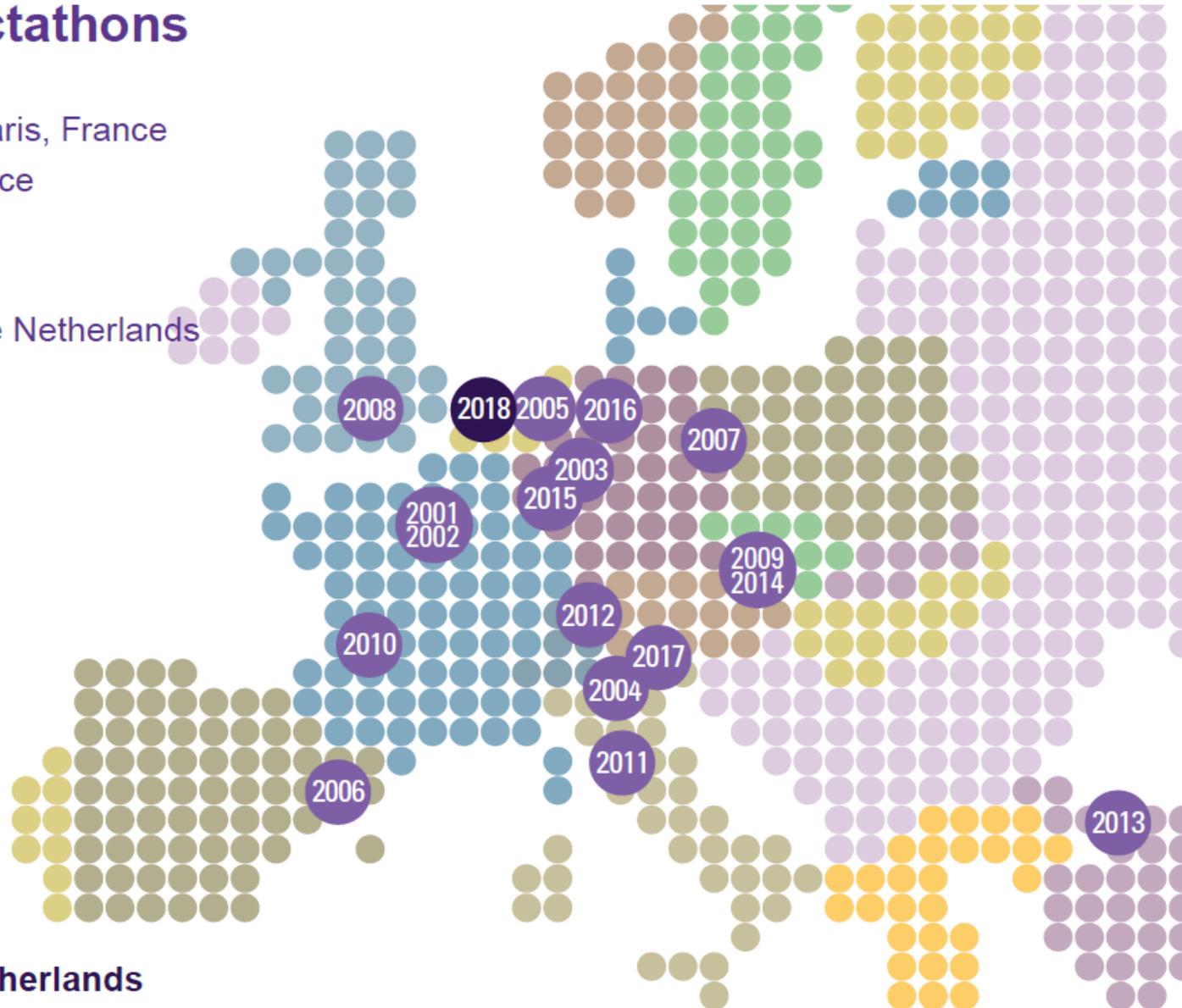
2014: Vienna, Austria

2015: Luxembourg

2016: Bochum, Germany

2017: Venice, Italy

2018: The Hague, The Netherlands





SAVE the DATE
for the next connectivity test marathon



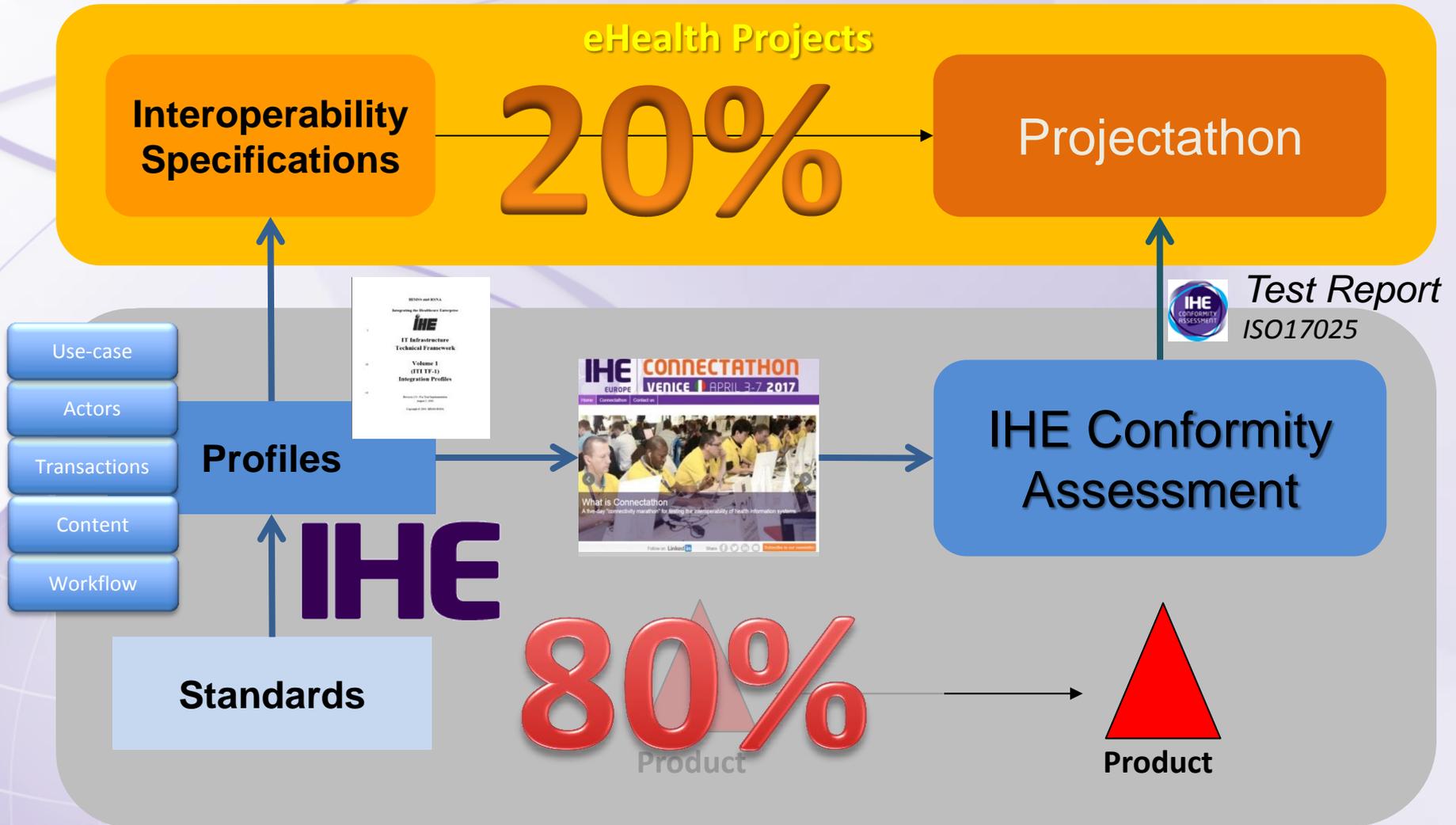
IHE[®]
EUROPE

CONNECTATHON
RENNES  **APRIL 8-12 2019**

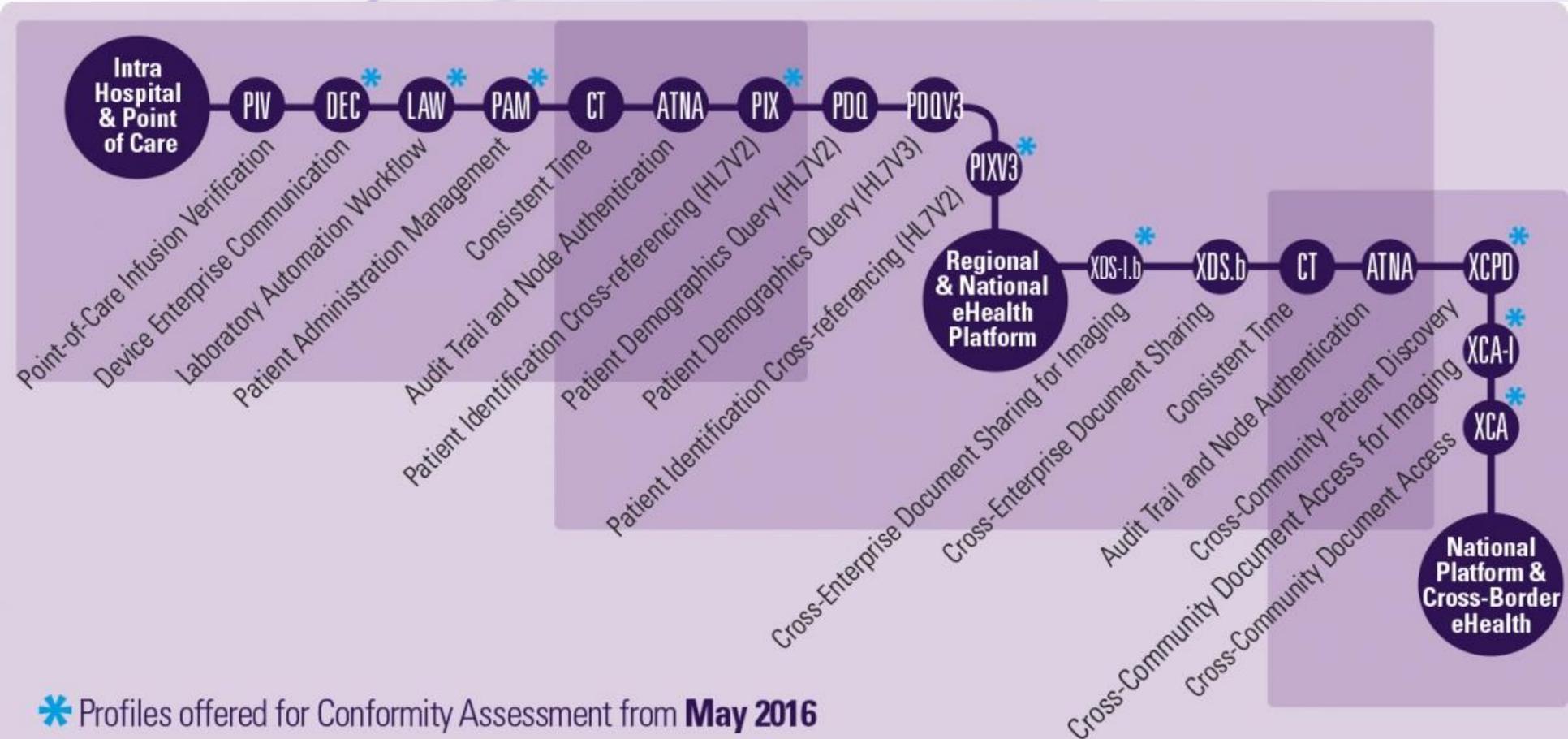
IHE Conformity Assessment

- Test Report provided by a trusted neutral organization (generally called testing laboratory) that guarantees that the IHE profile implementation in a commercial products is positively tested against an IHE intl conformity assessment scheme defined in term of ISO17025.
 - Specific version of a specific product
 - Requires vendor to pass connectathon for seeking profile conformity assessment

Conformity and eHealth Projects



IHE Conformity Assessment Scheme



* Profiles offered for Conformity Assessment from **May 2016**



KEREVAL HEALTH LAB TESTING
ACCREDITATION N° 1-2347
SCOPE AVAILABLE ON
WWW.COFRAC.FR

Some Lessons Learnt... more to come!

- Interoperability is a prerequisite to enable new added value healthcare services through IT systems. Governance of Interoperability is important
- Competence centers need to be appointed as the custodian of interoperability, specification and testing
- Testing is paramount for the success of complex IT project and the education of Stakeholder members. DO test events!
- Quality of information exchanged is of crucial important. DO Validate the quality of input and output of information exchange processes.
- Bringing together the stakeholders is a catalyst for success in a consensus based approach DO involve stakeholder as early as possible
- Certification of IT components in healthcare is the next step in an organized healthcare information exchange world
- Technologies are evolving and new challenges are ahead in a connect world. Standards and Integration Profiles provide a solution



Thank you!

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www.ihe-Europe.net

Questions ?



IHE-Europe's mission: IHE-Europe engages clinicians, health authorities, industry, and users to improve healthcare interoperability by... [read more >>>](#)