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Independent eHealth/EMR consultant
- Active in eHealth since 1991
  - PACS implementations (NM, RAD, CARD)
  - EMR implementations (department/hospital)
  - OR implementations (laparoscopy)
  - Regional Cardiology Network Friesland
  - Consultant eHealth / interoperability
- Active with IHE since 2004
- Role in epSOS
  - Industry Team coordinator (Year 2)
  - Commissioned by Foncare B.V., Zest, NL

Today’s presentation
- A bit about IHE
- Overview of epSOS – the project
- Overview of epSOS – the architecture
- Brief in-depth look – profiles and standards
- Current status of epSOS and future outlook

What is IHE?
- IHE = Integrating the Healthcare Enterprise
- Initiative of both users and providers
  - users: healthcare professionals
  - providers: industry
- Aim: improve information sharing in healthcare computer systems
- Means: by promoting coordinated use of established standards
  - to address real-world clinical needs in support of optimal patient care
- Systems developed in accordance with IHE
  - communicate with one another better
  - are easier to implement
  - enable care providers to use information more effectively
Influence of IHE in epSOS (1)
- IHE and industry: big influence on technical design of epSOS
  - "Both feet on the ground": practical, not academical solutions
  - Prove that many products and projects are IHE based
  - Report on real life field experiences to the epSOS project
- IHE profiles have been chosen in favor of OMG standards
  - IHE XCA instead of OMG RLUS
  - IHE XCPD instead of OMG EIS
- Incorporate epSOS work in IHE en HL7 (profiles / extensions)
  - IHE extensions on e.g. PCC and XCA profiles

Influence of IHE in epSOS (2)
- IHE Europe builds the test tools for epSOS
  - Eric Poiseau and Karima Bourquard + team
  - IHE Connectathon tools, adapted epSOS where necessary
- IHE Europe helps organizing the Projectathon
  - Projectathon = Project Connectathon
  - Bratislava (Slovakia), November 23-28 2010
  - Pisa (Italy), April 11-15 alongside IHE Connectathon

Goals of IHE involvement in epSOS
- Involvement of IHE at European eHealth developments
- Having IHE methodology adopted
  - both Industry and European eHealth organisations
- Organize involvement/influence of industry in epSOS
  - Coordination of the Industry Team
- Adoption of specific IHE profiles European eHealth
- Having epSOS work incorporated in IHE-profiles!
Overview of epSOS

epSOS in one slide
- Abbreviation: European Patient Smart Open Services
- Goal: supporting patient mobility in the EU, using IT solutions
- Means: interconnecting national eHealth systems
- Involved: 20 of the 27 member states, plus 3
  - epSOS 1: Denmark, Germany, England, France, Greece, Italy, Netherlands, Malta, Slovakia, Spain, Czech Republic and Sweden
  - epSOS 2: Belgium, Estonia, Poland, Bulgaria, Malta, Poland, Portugal and Slovenia, plus Norway, Switzerland and Turkey
- Methods: develop, build and test an infrastructure
- Exchange: (1) patient summary, (2) medication history
- Prerequisites:
  - epSOS doesn’t change national regulations or eHealth infra
  - epSOS won’t require a centrally managed infrastructure

A brief history, leading up to epSOS
- 2003-2006: Discussed during ministerial conferences
- 2004: eHealth Action Plan, start of I2010 initiative
- 2007 (Berlin): start of the eHealth Initiative
- General advantages of telemedicine for patients and society
- 2008: European directive on patients rights on cross border healthcare
- 2008: EC recommendation on cross-border eHealth interoperability
- 2008: eHealth standardisation EC Mandate 403
  - provide a consistent set of standards
  - addresses the needs of this rapidly-evolving field
  - benefits future healthcare provision

epSOS expected results
- Citizens and patients
  - Quicker and easier access to patient information when staying in a EU member state / epSOS participating nation
- Health care providers
  - Improving health care provider cooperation across borders
  - Quick access to key patient data
- Health care quality
  - Reducing medication errors
  - Exchange medication data among doctors/pharmacists in Europe

epSOS project structure

Current Industry Team (IT)

IT Steering Group members are underlined
So why is a company involved?

Five possible reasons:

- Support the EU cause
- A way of getting news on eHealth / epSOS
- Push epSOS architecture in the ‘right’ direction
- Expand business/personal network across EU / PN’s
- Find business opportunities

Project phases

- Analysis and inventarisation
  - Describing eHealth situation in the participating nations
  - Describe legal issues at the member state level
- Service definition
  - Describe use cases in detail
  - Draft and finalize a global architecture
- Systems design
  - Decide on the acceptance of standards
  - Decide on the acceptance of standards
- Develop and test pilot systems
  - Development of a software toolbox
  - Projectathon (= epSOS Project Connectathon)
- Actual field tests

To summarize

- epSOS is an EU project to support EC directives on healthcare
- Coordinated centrally, implemented locally
  - epSOS does not require changes in countries’ eHealth infrastructure
  - epSOS does not require changes in countries legislation
- epSOS project: 23 countries, approx. 50 beneficiaries + industry
- Initially until end-2011, extended until end-2013
- Two stage rocket
  - Specification of the architecture
  - Real world piloting (not just lab testing) the specification
- Third stage: sustainable pan-European eHealth solution

epSOS architecture

The architecture of epSOS (1)

- National Contact Point (NCP)
  - Set of “services” to be built by a nation to disclose the internal eHealth infrastructure
  - Every service has an IHE-like ‘interoperability profile’ defined

The architecture of epSOS (2)

- “Circle of Trust”
  - Network of interconnected NCPs that have a trusted relationship
  - Technical (which systems are allowed to connect, IHE ATNA)
  - Legal (decide which data is exchanged, who exchanges using what, legal framework agreement)
The architecture of epSOS (3)

- Trusted Gateway Infrastructure:
  - Network of gateways with a trust relationship
- Medical Document Exchange:
  - Common data exchange profile
- Health Care Professional (HCP) Identification/Authentication:
  - Profile for data exchange between HCP's identity
- Patient Identification/Authentication:
  - Profile for common patient identifier
  - Improve accuracy of patient identification
- Access Control:
  - Profile for access control, technical and legal
- System Management:
  - Means/tools to support implementation and use of epSOS

Use case Patient Summary

- Two use cases:
  - Patient ("Country A") visits foreign country ("Country B") incidentally
    - e.g. tourist, congress attendee
  - Patient visits foreign country regularly
    - e.g. second office of a company, resident of a border region
- Challenges:
  - Patient identification
  - Patient consent
  - Definition of the minimal data set

Patient Summary challenges

- Patient identification:
  - Unique identification for a patient in home country ("Country A")
    - Based on home country legislation
    - Query unique ID or demographic data (name plus DOB)
- Patient consent:
  - "Opt-in" principle
    - Patient can consent in his/her home country
    - Emergency access:
      - Consent during visit in foreign country
        - This consent will only be valid for the "Country B", limited period
- Definition of the minimal data set:
  - HL7 CDA chosen as source format
  - Choice has been made for subsets of widely used coding systems

Patient Summary data set

- Patient identification:
  - Unique identification for a patient in his/her home country ("Country A")
- Name / address / city of residence
  - Full name, gender, date of birth
- Allergies:
  - Description of allergies and related substances
- Other medical alerts
- Current problems:
  - Overview of current problems and/or cases requiring treatment/follow-up
- Medication overview
- Insurance data
- Date of patient summary, date of last update
- Author organisation, author of patient summary

Use case ePrescription

- Two main use cases:
  - "Medicine already prescribed in country A":
    - Patient is prescribed medication in his/her home country and needs a refill
during his/her stay abroad from a local pharmacy
  - "Medicine newly prescribed in country B":
    - A patient was prescribed medication during his/her stay abroad and needs
to prescribe the back home at his/her own pharmacy
- Challenges:
  - Patient identification
  - Interpreting the medication prescription (semantics, agent, medication name etc.)
  - Definition of the minimal data set required to prescribe / dispense

Patient Summary mapping

- Unique identification for a patient in his/her home country ("Country A")
- Information on allergies and related substances
- Current problems/diagnoses requiring treatment/follow-up
- Medication
- Insurance data
- Date of patient summary, date of last update
- Author organisation, author of patient summary
**ePrescription**
- Prescription provider
  - Actor that compiles medication prescription based on the available patient information
- NCP
  - Communication bridge between Country "A" and Country "B"
- Semantics
- Dispense Provider
  - Actor that queries prescription and then dispenses the medication.

**ePrescription Semantics**
- NCP has an important role in translating (transcoding) medical data
- Minimal data set contains information on:
  - Patient
  - Medication name, agent, dosage, medication period, etc.
- epSOS 'pivot' format
  - Structure based on profiles of IHE PCC domain

**Information in the own language**
- Goal: health communication and data exchange
  - Maybe
    - Patient information available in Country A PS
    - Original document in the own language from Country A PS
    - Cross referencing between code systems

**Profiles and Standards**
- ePrescription
  - Based on HL7v3 CDA – Structure based on profiles of IHE PCC domain
- SNOMED CT
  - SNOMED CT Locally used terminologies A
- LOINC
  - LOINC subset
  - LOINC subset
- ICD-9
  - ICD-9 Italian extension
  - ICD-9 French extension

**NATIONAL RESPONSIBILITY**
- Definition of a common data structure (e.g., ePrescription)
  - Implementation
  - Policies and procedures
  - (Medication management)
  - Determining reference terminology for PS en eP

**Information in the own language**
- epSOS Reference terminology Subset of SNOMED CT LOINC ICD-10 ICD-9...
- 25 valuesets from LOINC (2), HL7 (3), SNOMED CT (13), ICD-10 (1), UCUM (1), EDQM (3), ISO (1) and ATC (1)
- ePrescription Semantics
  - Actor that queries prescription
  - Dispense Provider
  - Dispense Provider
  - (Dispensing the medication)
  - (Dispensing the medication)

**Information in the own language**
- Patient information is coded to epSOS format
  - LOINC
  - LOINC
  - LOINC
epSOS profiles versus IHE profiles (1)

<table>
<thead>
<tr>
<th>Definition</th>
<th>epSOS</th>
<th>IHE</th>
<th>Adapt</th>
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<tr>
<td>Establish mutual trust</td>
<td>Circle of Trust</td>
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<td>Get Resource URL</td>
<td>Circle of Trust</td>
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<tr>
<td>Maintain Time</td>
<td>Consistent Time</td>
<td>CT</td>
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<tr>
<td>Get Resource URL</td>
<td>Loc/Retrv Shared Object</td>
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<td>Format Audit Trail</td>
<td>Audit Trail</td>
<td>ATNA</td>
<td>1</td>
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<tr>
<td>Provide Identity Assertion</td>
<td>XUA</td>
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<td>Query Medical Data</td>
<td>Medical Data Access</td>
<td>XCA</td>
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<td>Retrieve Medical Data</td>
<td>Medical Data Access</td>
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<td>Notify Medical Data Processing</td>
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<tr>
<td>Attest Authenticity</td>
<td>Attest Authenticity</td>
<td>DSIG</td>
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epSOS profiles versus IHE profiles (2)

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<th>Adapt</th>
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<td>Patient ID discovery</td>
<td>ID and Location Handshake</td>
<td>XCPD</td>
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<tr>
<td>Patient Data Location Query</td>
<td>ID and Location Handshake</td>
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<tr>
<td>Request Authorization Assertion</td>
<td>Authorization Handshake</td>
<td>BPPC+</td>
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<td>CRL Retrieval</td>
<td>PKI Operational Protocols</td>
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<tr>
<td>Certificate Status Verification</td>
<td>PKI Operational Protocols</td>
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<tr>
<td>CDA Prescription Document</td>
<td>-</td>
<td>PCC</td>
<td>2</td>
</tr>
<tr>
<td>CDA Dispensation Document</td>
<td>-</td>
<td>PCC</td>
<td>2</td>
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<tr>
<td>CDA Patient Summary</td>
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Status and Future

Outlook into remaining project period
- Remaining project period: 2012 – 2013
- Start of actual large scale pilots by January 2012
- New “Projectathon” during IHE Connectathon, Bern (CH) May 2012
- Two more “pilot waves”: one end-2012, next one spring 2013
- at least, that is what Industry has advised
- Build on sustainability
  - epSOS as project will end by December 2013
  - epSOS as infrastructure should
  - Participating nations should
  - EU has a Digital Agenda program that can sustain infrastructure

Questions?

Thanks for your attention!