- Please keep your microphone **muted**
- **Questions during the session?** Please use the chat box. We will address the questions in the second part of the webinar
- Note that this webinar will be **recorded** and made available on our IHE-Europe YouTube channel
- Slides will be **sent to you by email** early next week

Join us for the October webinar

IHE Domains:
what do they do -
how can you
participate –

Focus on IHE Radiology Domain

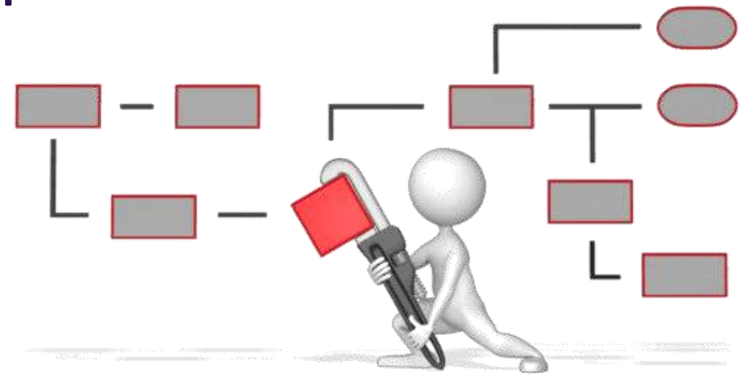
IHE INTERNATIONAL
Integrating the Healthcare Enterprise

Friday 11th or 18th October
1PM CEST

IHE EUROPE WEBINARS

Developing a Business Use Case (BUC)

A review of best practices and country examples



IHE Europe Webinar Series
20-Sep-2024

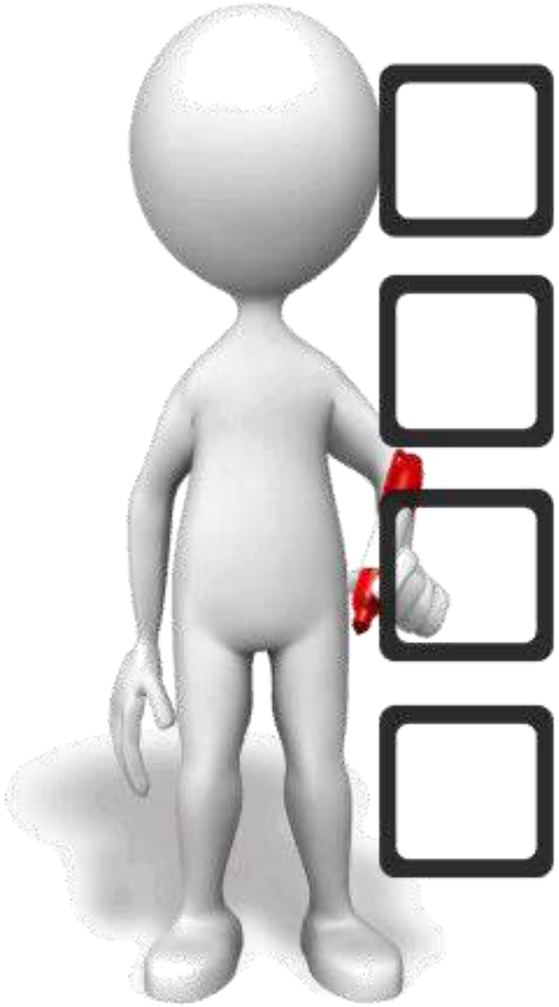
Silvia Winkler
Nicole Veggiotti
Morten Bruun-Rasmussen
Derek Ritz

Agenda

- Welcome and Introduction
- Brief overview: IHE Methodology
- BUC examples:
  - Denmark
  - Austria
  - Italy / Cross-border
- Mapping BUCs to Implementable Specifications
- Q&A

Brief overview: IHE Methodology

What are the parts to an **implementable, conformance-testable** specification?



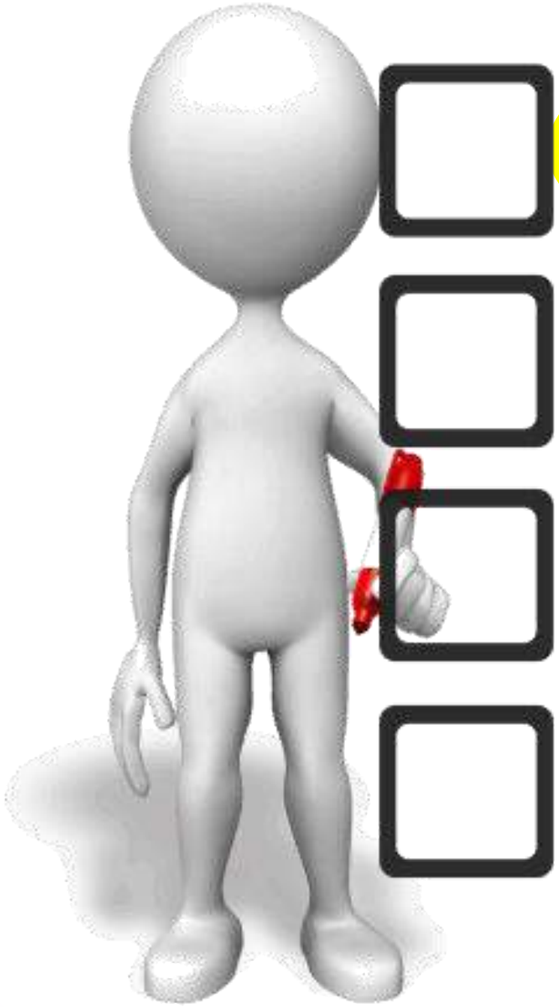
Vol-1: ***Non-engineering*** description of the "interoperability scenario"

Vol-2: Engineering specification of the ***transactional*** behaviours

Vol-3: Engineering specification of the digital health ***content***

Vol-4: ***Contextualization*** of the specification to comply with ***jurisdictional*** norms

What are the parts to an **implementable, conformance-testable** specification?



Vol-1: ***Non-engineering*** description of the "interoperability scenario"

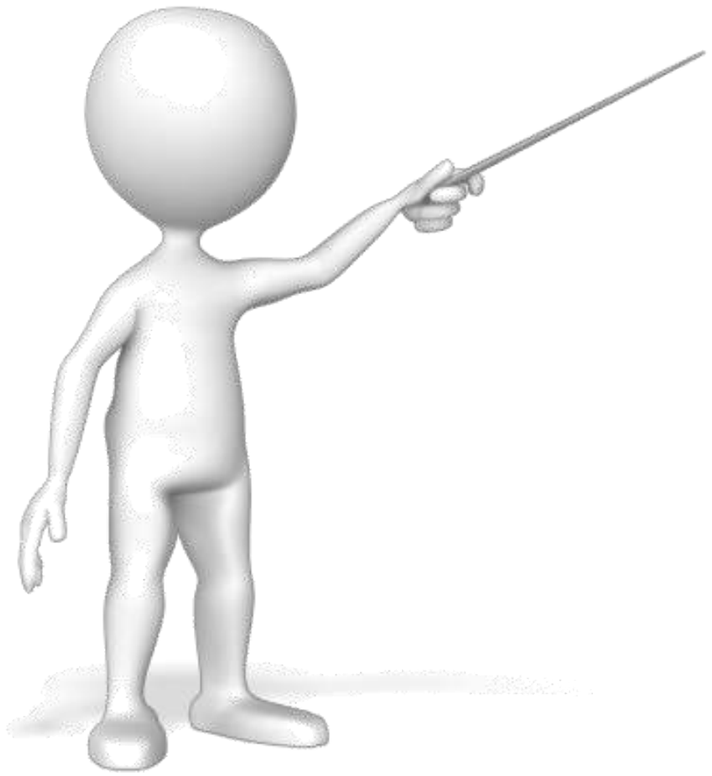
Vol-2: Engineering specification of the ***transactional*** behavi

Vol-3: Engineering specifica f the digital health ***content***

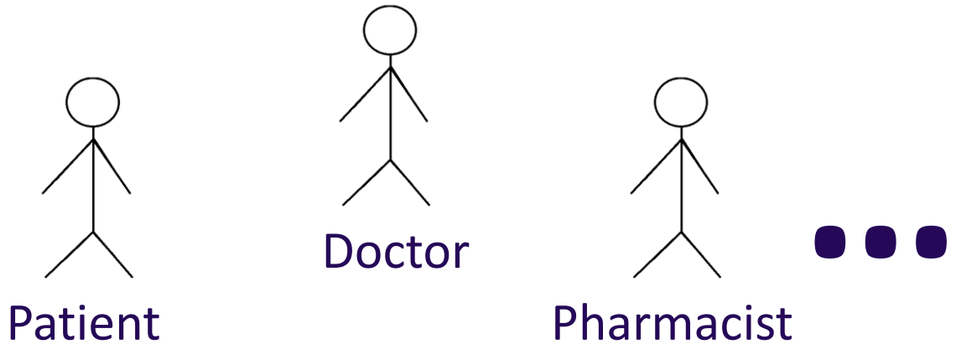
Vol-4: ***Contextualizati*** comply with ***jurisdictio***

The **USE CASE** description is found in **Vol-1**. We ***always*** start with a specification's ***purpose***, described as a ***story***.

A story has **characters**, and they **interact** with each other within a **context**.



There can be **human** and non-human (**system**) characters. We want to include *both* in our story.



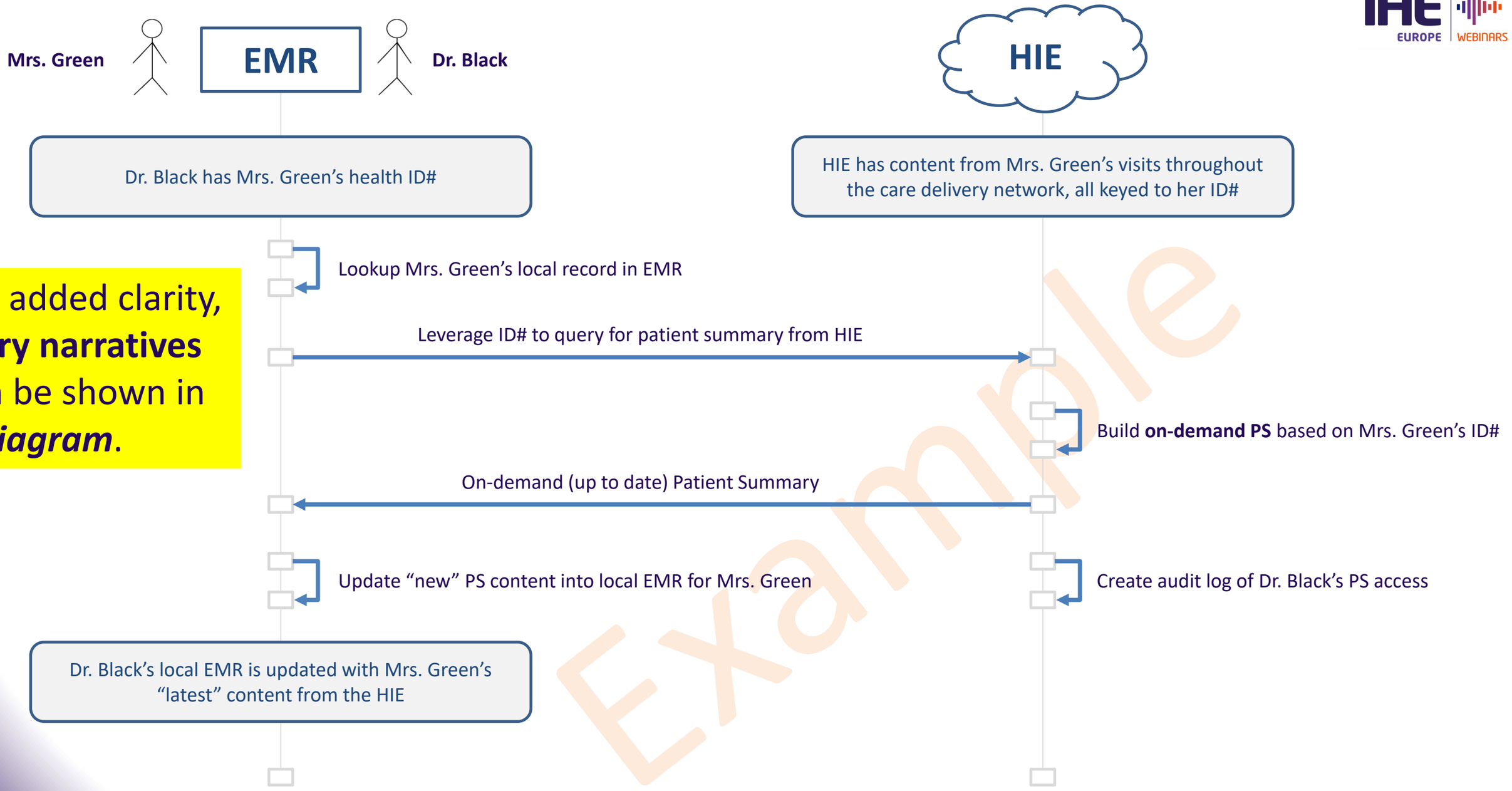
The story is written as a narrative.

Mrs. Green visits Dr. Black for her diabetes checkup.

To give her safe and high-quality care, Dr. Black wants to know about any healthcare activities since the last time he saw Mrs. Green.

Dr. Black retrieves Mrs. Green's most up-to-date health information from the regional Health Information Exchange.

With this up-to-date health information, Dr. Black can discuss with Mrs. Green the best care pathway for her.

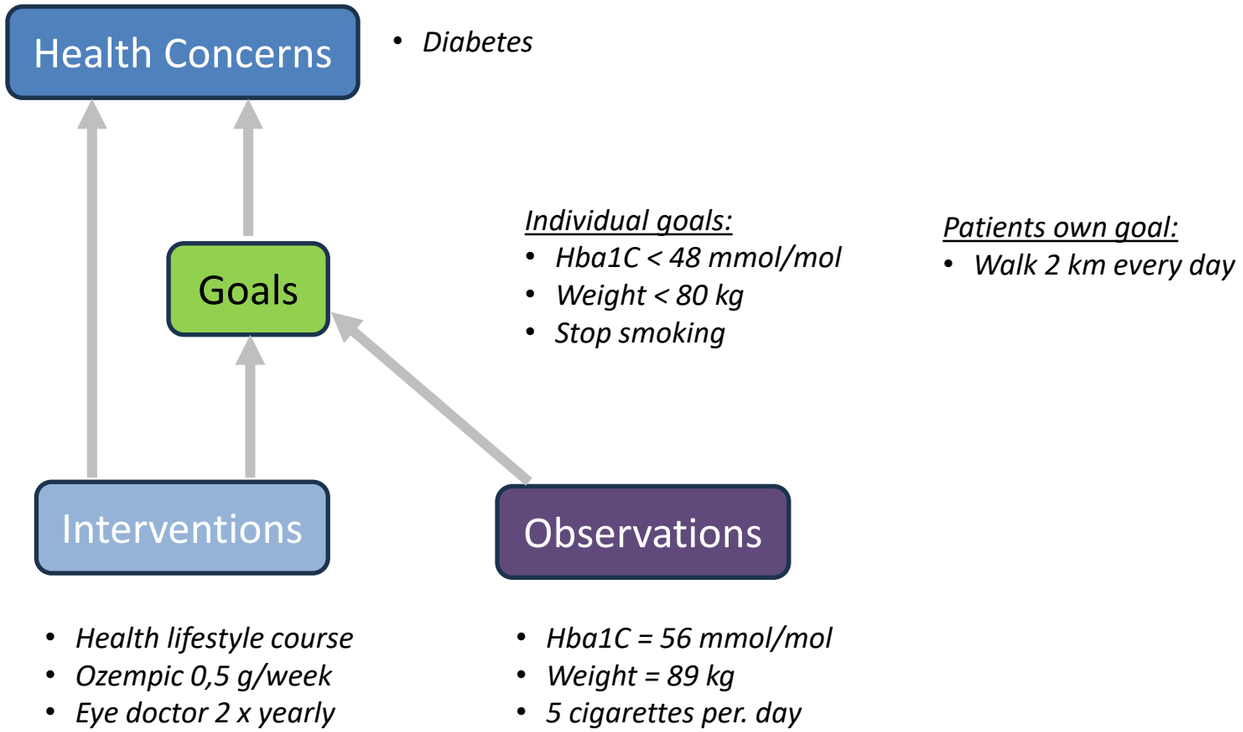


For added clarity, **story narratives** can be shown in a ***diagram***.

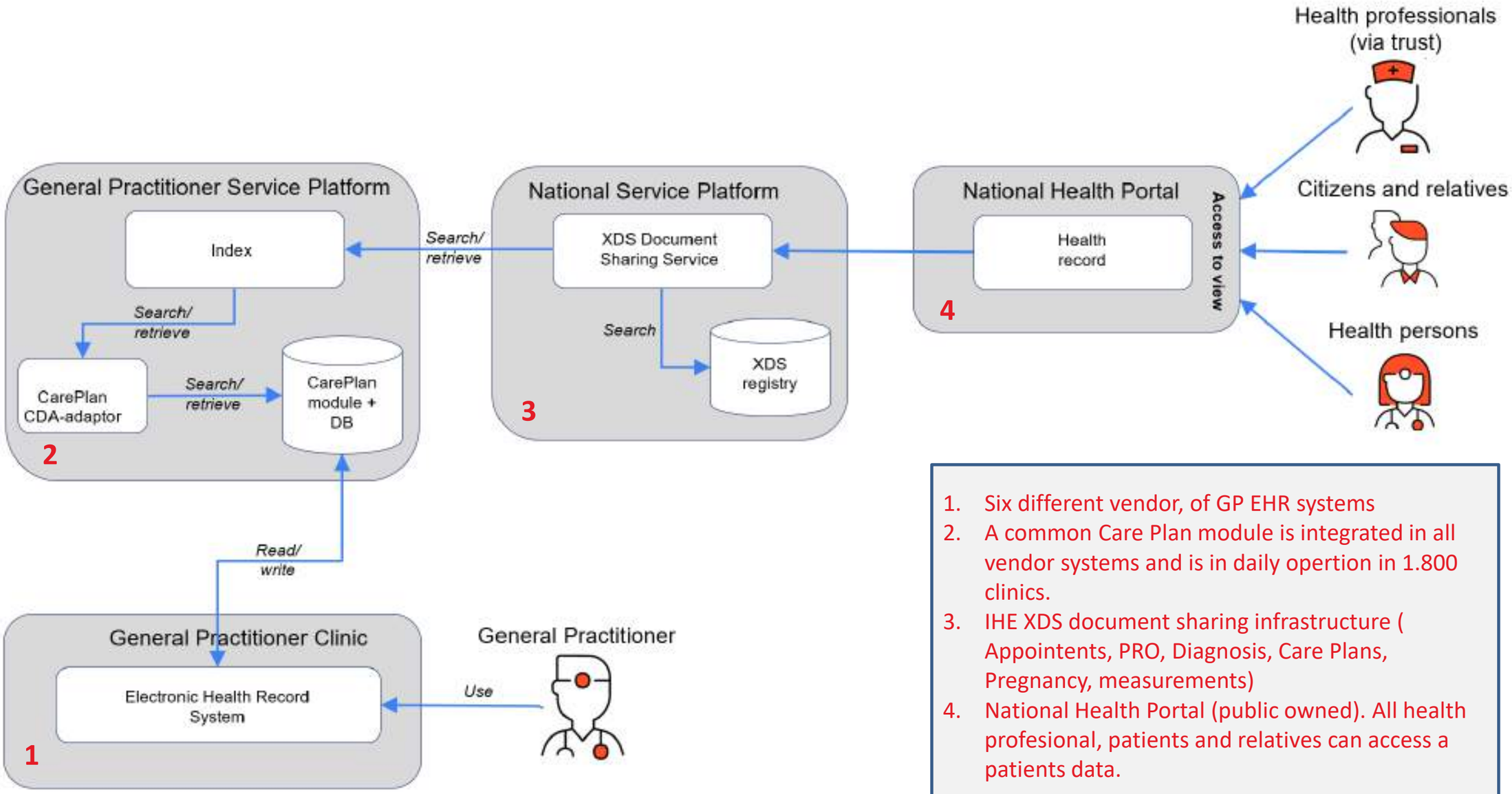
- Every conformance-testable, implementable digital health specification **begins** (in Vol-1) with one or more **USE CASE** stories.
- Stories include **characters**; these characters **interact** with each other within a **context**.
- It is a best practice to identify both the **human** and the non-human (**system**) characters in the story.
- A “picture” can be worth 1000 words. The story narrative can be illustrated by one or more **diagrams** that show the interactions between the characters – and the situational contexts that **precede** and **follow** these interactions.

BUC example: Care Plan Sharing

What is a Care Plan

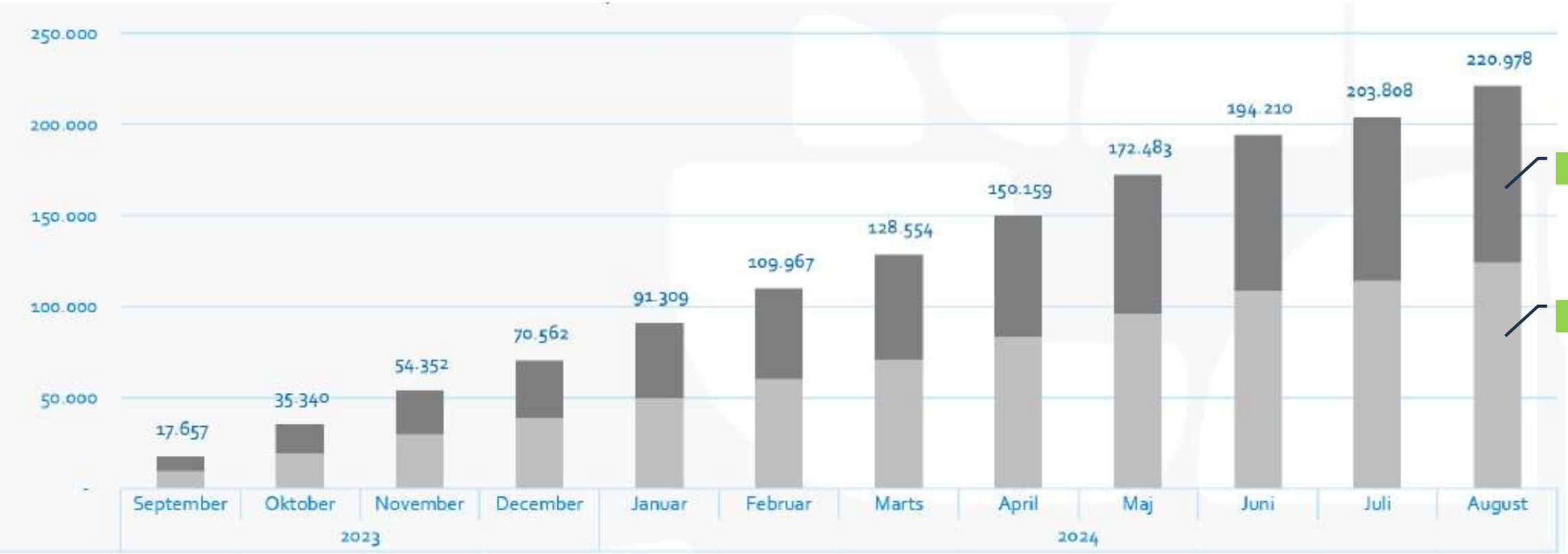


Care Plan Sharing via the National Health Infrastructure



1. Six different vendor, of GP EHR systems
2. A common Care Plan module is integrated in all vendor systems and is in daily opertion in 1.800 clinics.
3. IHE XDS document sharing infrastructure (Appointents, PRO, Diagnosis, Care Plans, Pregnancy, measurements)
4. National Health Portal (public owned). All health profesional, patients and relatives can access a patients data.

Monitoring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35.340
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70.562
91.309
109.967
128.554
150.159
172.483
194.210
203.808
220.978
September
Oktober
November
December
Januar
Februar
Marts
April
Maj
Juni
Juli
August
2023
2024
New
Update

BUC example: Radiology

ELGA: Radiology Image Exchange

Primary Use Cases

- ❑ Assignment
- ❑ Request
- ❑ Referral

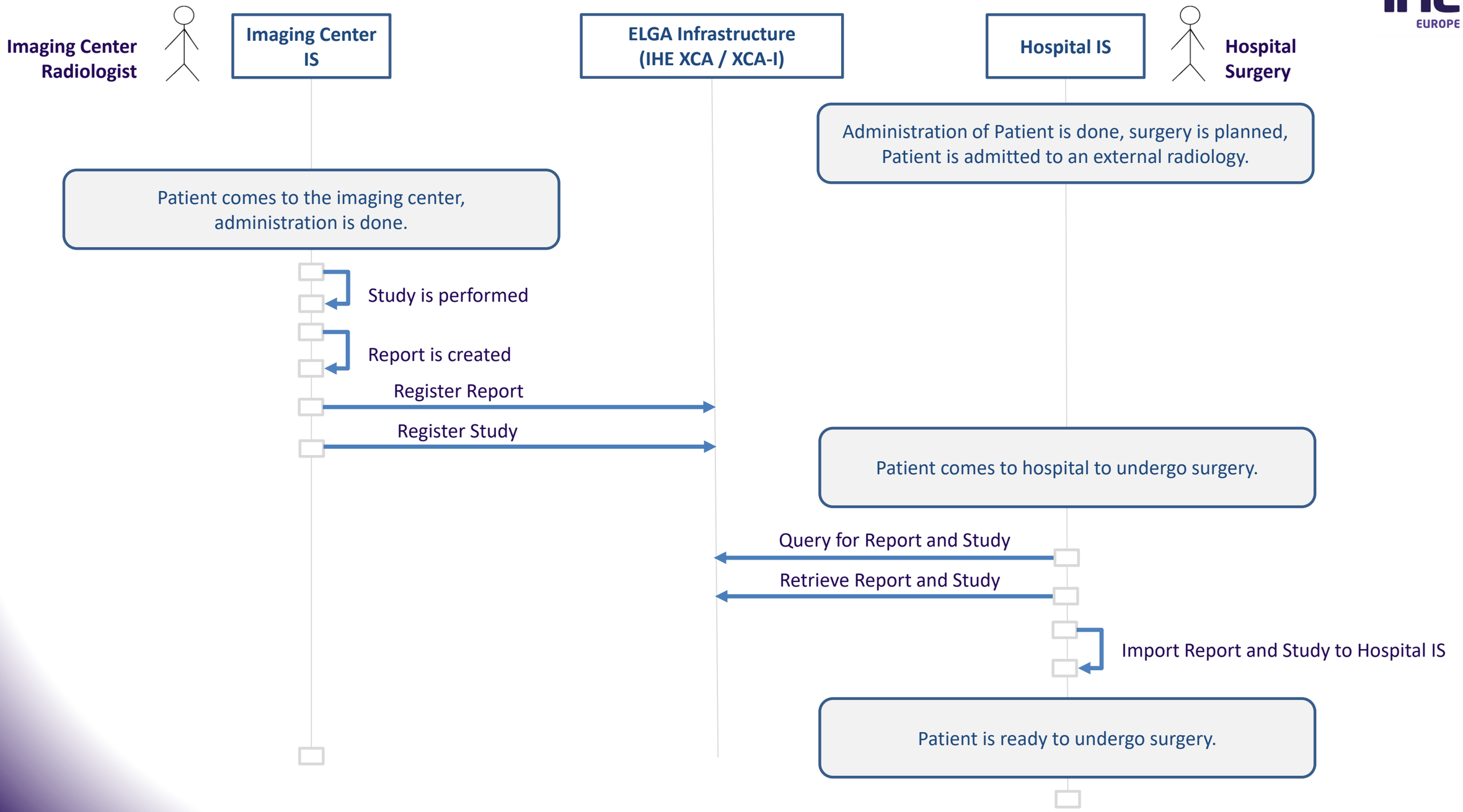
Secondary Use Cases

- ❑ Mamma-Screening
- ❑ Preliminary Reads
- ❑ Expert Opinion

Helm E, Schuler A, Mayr H. Cross-Enterprise Communication and Data Exchange in Radiology in Austria: Technology and Use Cases. Stud Health Technol Inform. 2018;248:64-71.
https://pubmed.ncbi.nlm.nih.gov/29726420/

BUC Image Exchange in Case of Assignment

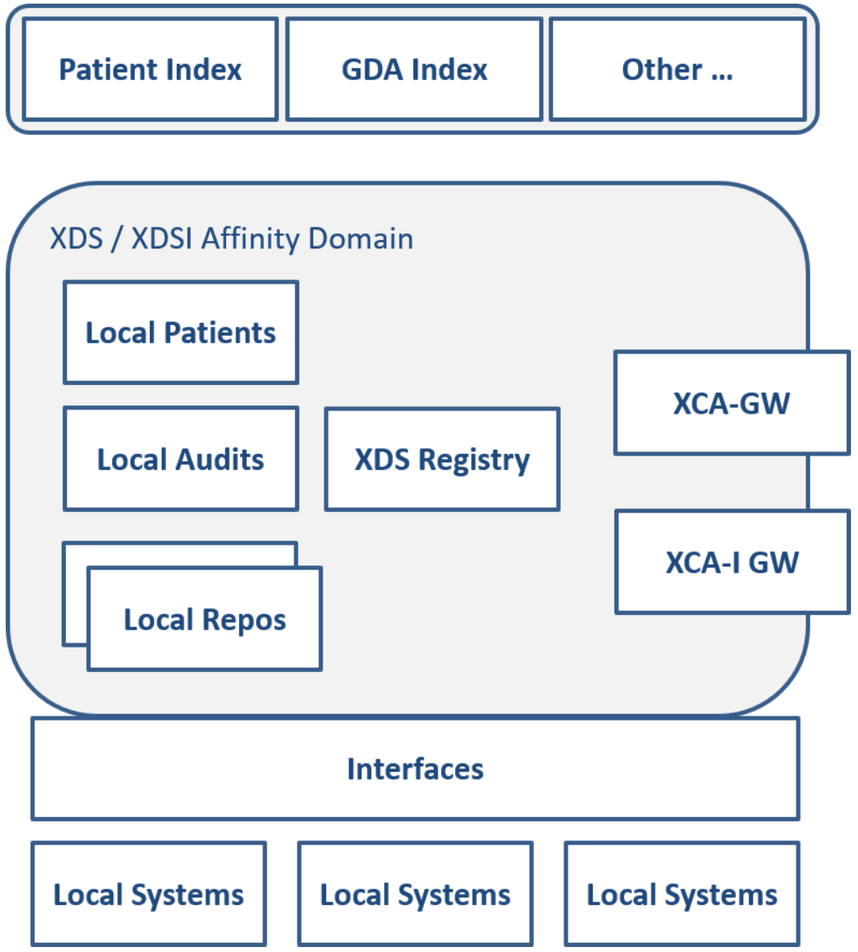
- Patient has to undergo surgery in an hospital and is requested to have a CT exam before.
  - Patient books this exam at an imaging center outside the hospital.
- The imaging center does the CT study and creates a report.
- Report and CT study is registered in ELGA.
- Patient comes to hospital to have surgery.
- Report and CT Images are available in ELGA.
  - CT study and report may be downloaded for further use in hospital


Imaging Center Radiologist
Imaging Center IS
ELGA Infrastructure (IHE XCA / XCA-I)
Hospital IS
Hospital Surgery
Administration of Patient is done, surgery is planned, Patient is admitted to an external radiology.
Patient comes to the imaging center, administration is done.
Study is performed
Report is created
Register Report
Register Study
Patient comes to hospital to undergo surgery.
Query for Report and Study
Retrieve Report and Study
Import Report and Study to Hospital IS
Patient is ready to undergo surgery.

BUC Image Exchange in Case of Assignment

ELGA Infrastructure

- XCA / XCA-I Architecture
- > 10 Affinity Domains with divergent internal structure
- Central services:
  - Patient Index
  - Index of Healthcare Providers
  - Terminology Server
  - Authorization
  - Patient Portal
  - Audit Trail



Using ELGA, the Austrian eHealth infrastructure, in radiology Use Cases

- is a paradigm shift from “push” to “pull” – this avoids administration of hundreds of point-to-point connections
- makes data available whenever and wherever needed - for the actual case and beyond
- enforces the out-hospital sector with the promise of more efficiency and cost reduction

BUC example: Patient-facing App (PFA)

Unicom and Patient-Facing Apps

Project acronym: UNICOM

Project name: Up-scaling of global unique drug identification

Funding: Horizon 2020 IA, Grant Agreement no. 875299

Duration: December 2019 - May 2024

The UNICOM project helps to ensure that any drug and its contents can be accurately identified anywhere in the world.

In UNICOM, patient-facing apps aim to empower patients' access to medicinal information and find substitute drugs abroad.

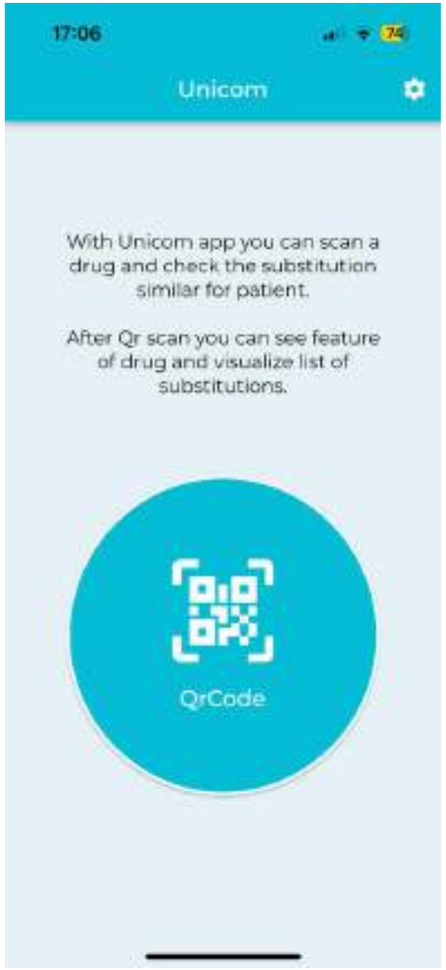
An important purpose of these applications is to provide patients **with information about the medications they are taking, put them on their personal medication list, and have a secure tool with them when travelling abroad** to find the same or equivalent medications in a foreign country.

Types of applications

The UNICOM project provides two types of applications.

One type is dedicated to patients, and three different applications are developed for this scope (Pharmawizard4UNICOM, eHealthPass, and InfoSAGE).

The second type is dedicated to healthcare providers.



> BENEFICIARIES

Beth Israel Lahey Health

Beth Israel Deaconess Medical Center

Patient-Facing Apps (PFA)

With the Patient-Facing App the user is able to:

- **Create a Medication List** — The patient saves Medicinal Products on his/her mobile device
- **Generate QR codes for the Healthcare Provider App** — To communicate with the pharmacist (dispenser) about the drug that need to be substituted
- **Add substitute drugs to the Medication List** — To record pharmacist's chosen medication on the app

UNICOM

Healthcare Provider App (HCPA)

With the HealthCare Provider App the user is able to:

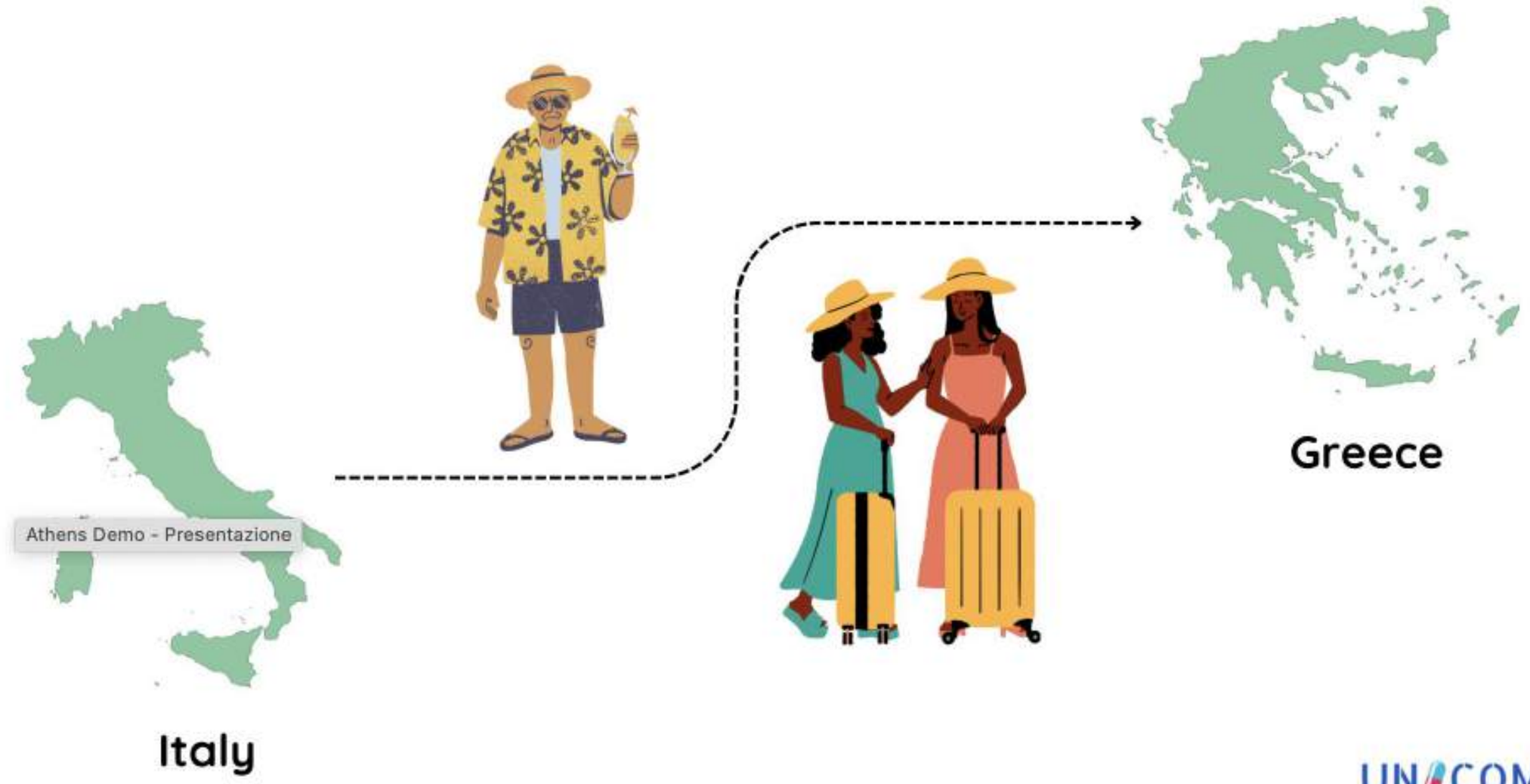
- **Scan FPA-generated QR codes** → To obtain a list of similar medications and their characteristics
- **View the medication the patient is currently taking** → Thanks to a Medication-IDMP Multilanguage Representation
- **Consult a list of potential substitute medications** → To select the best substitute medications for the patient
- **Generate a QR Code to be sent back to the PFA** → To inform the patient with the chosen medication's characteristics

Our citizen: Mario!

The use case presented involves a Italian citizen Mario suffers from epileptic attacks and uses **carbamazepine** to treat this disease

Patient medication list:
Carbamazepine, to treat epileptic attacks

Italian citizen travels to Greece



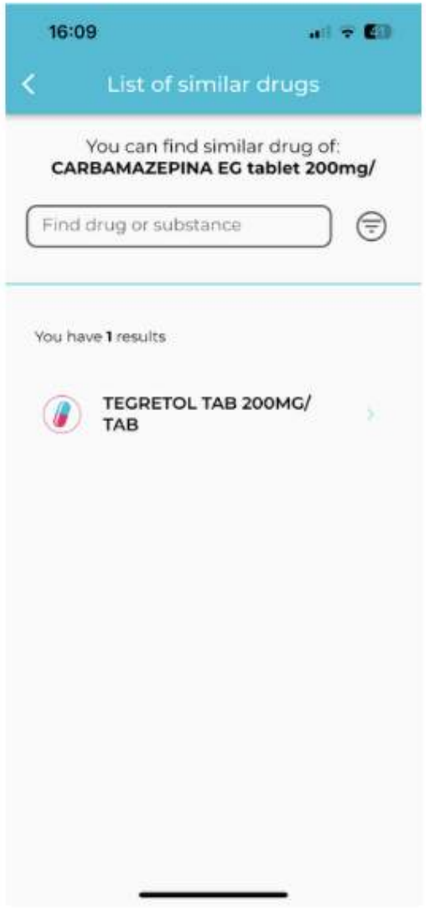
Italian citizen travels to Greece

The Italian citizen goes to Greece on holiday but forgets the medicine **carmazepine** at home in Italy. **He absolutely must find a good substitute for his carbamazepine.** He goes to the pharmacy, and thanks to the application provided by the UNICOM project...

UNICOM

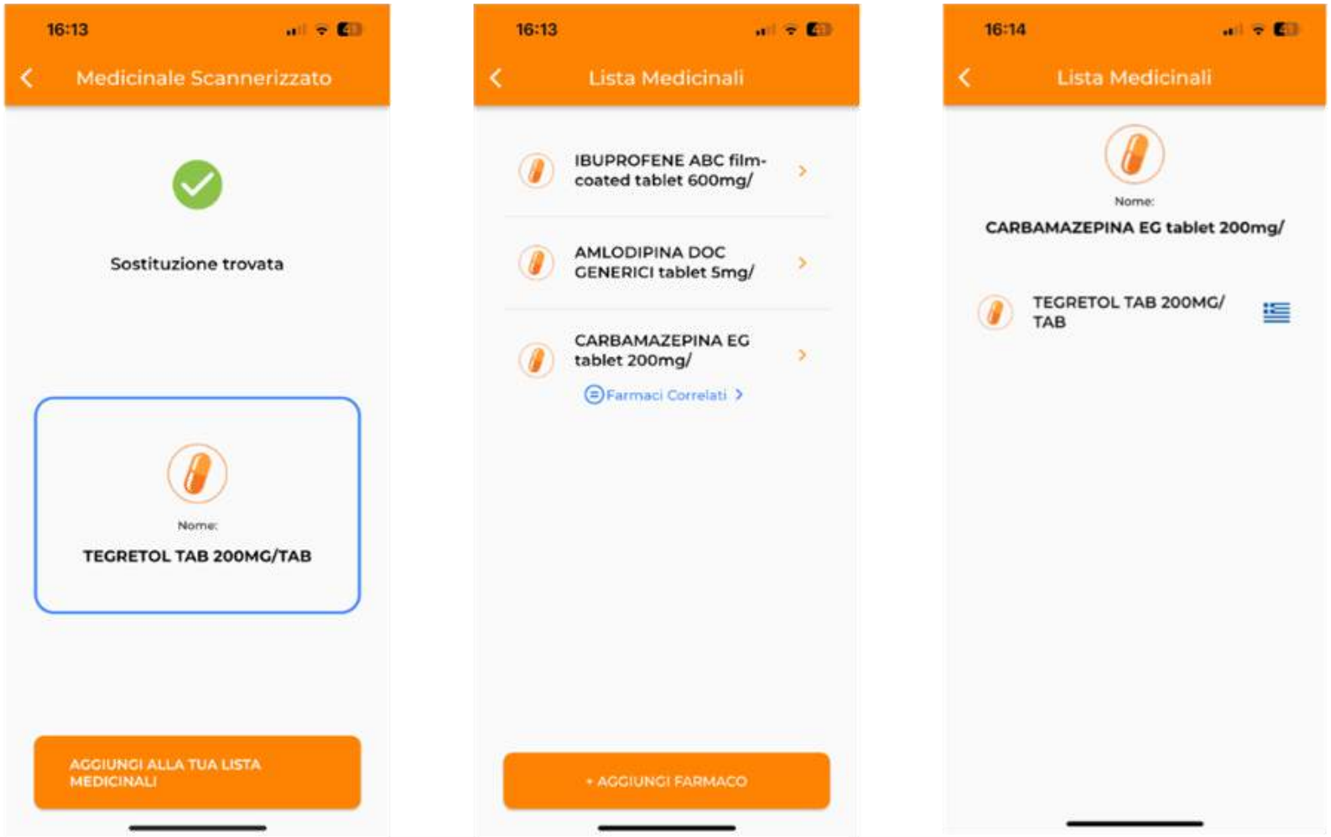
Italian citizen travels to Greece

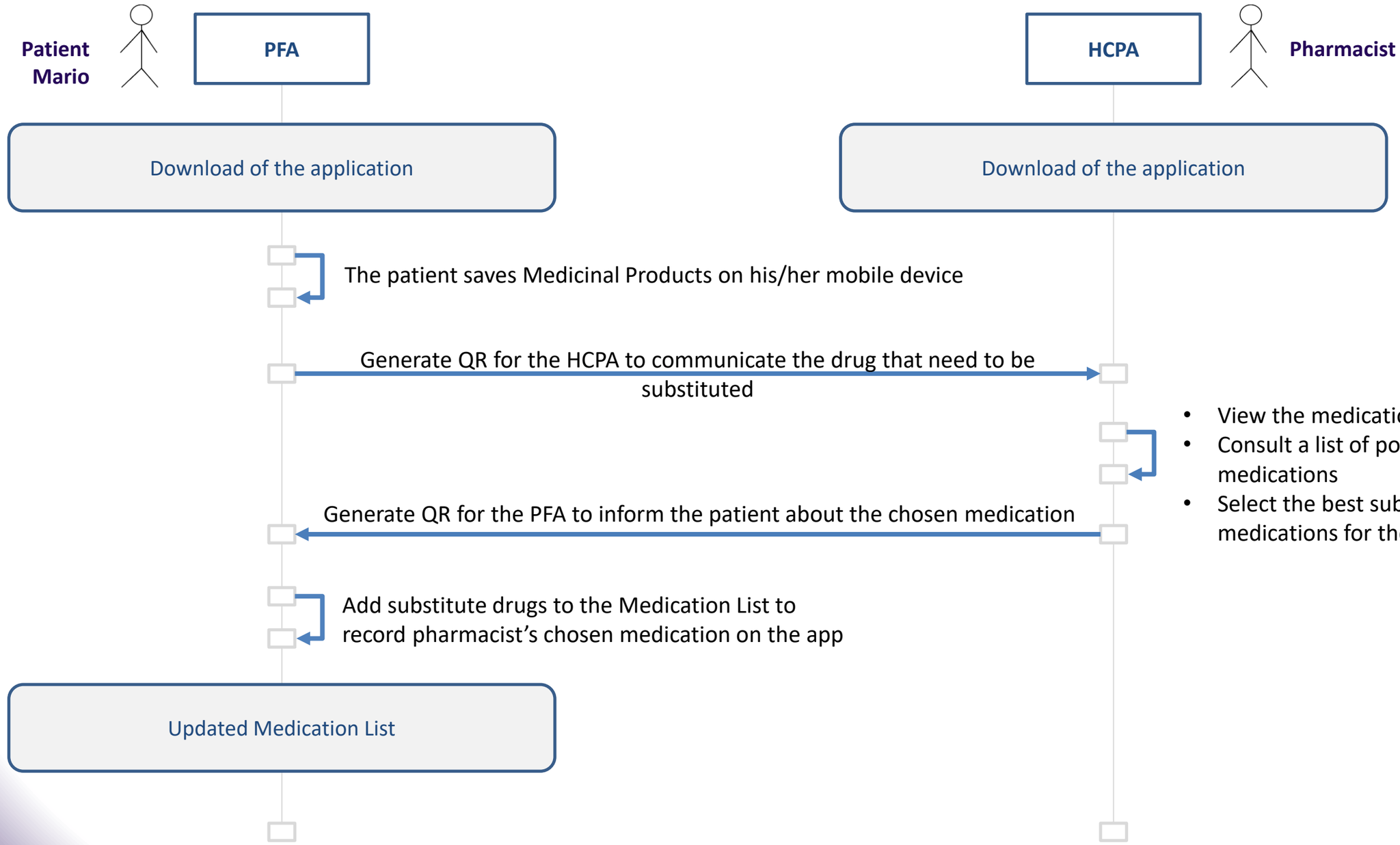
The pharmacist recognizes that the medicine comes from Italy. Thanks to the HCPA, the dispenser **can identify a similar medicine marketed in Greece**. The dispenser shows the patient the new drug.



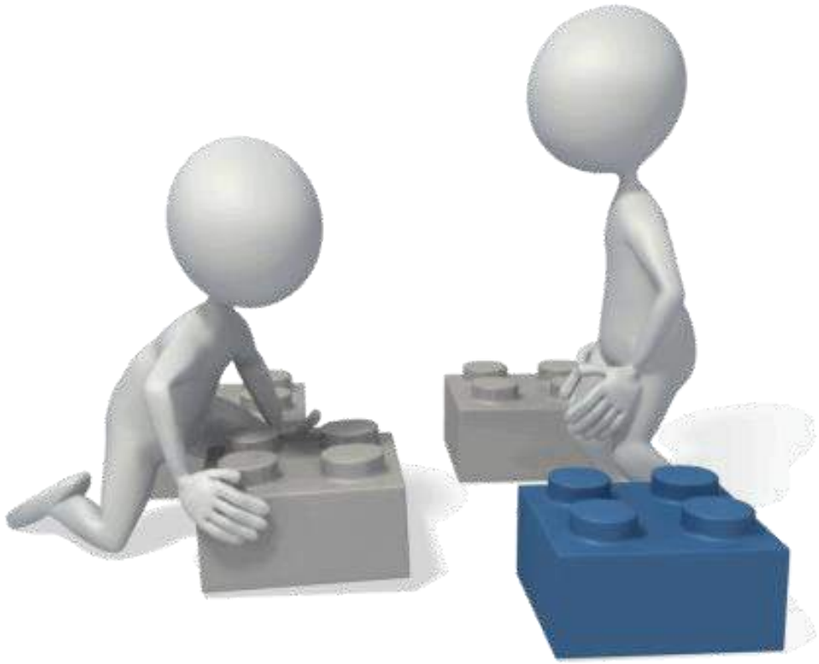
Italian citizen travels to Greece

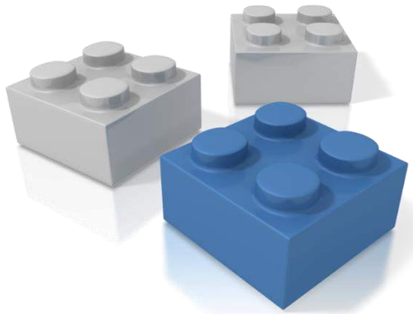
The Italian citizen scans the pharmacist's QR code and adds this drug to the Medication List. Now the Italian citizen has **carbamazepine** in his bag




Patient Mario
PFA
HCPA
Pharmacist
Download of the application
Download of the application
The patient saves Medicinal Products on his/her mobile device
Generate QR for the HCPA to communicate the drug that need to be substituted
View the medication
Consult a list of potential substitute medications
Select the best substitute medications for the patient
Generate QR for the PFA to inform the patient about the chosen medication
Add substitute drugs to the Medication List to record pharmacist's chosen medication on the app
Updated Medication List

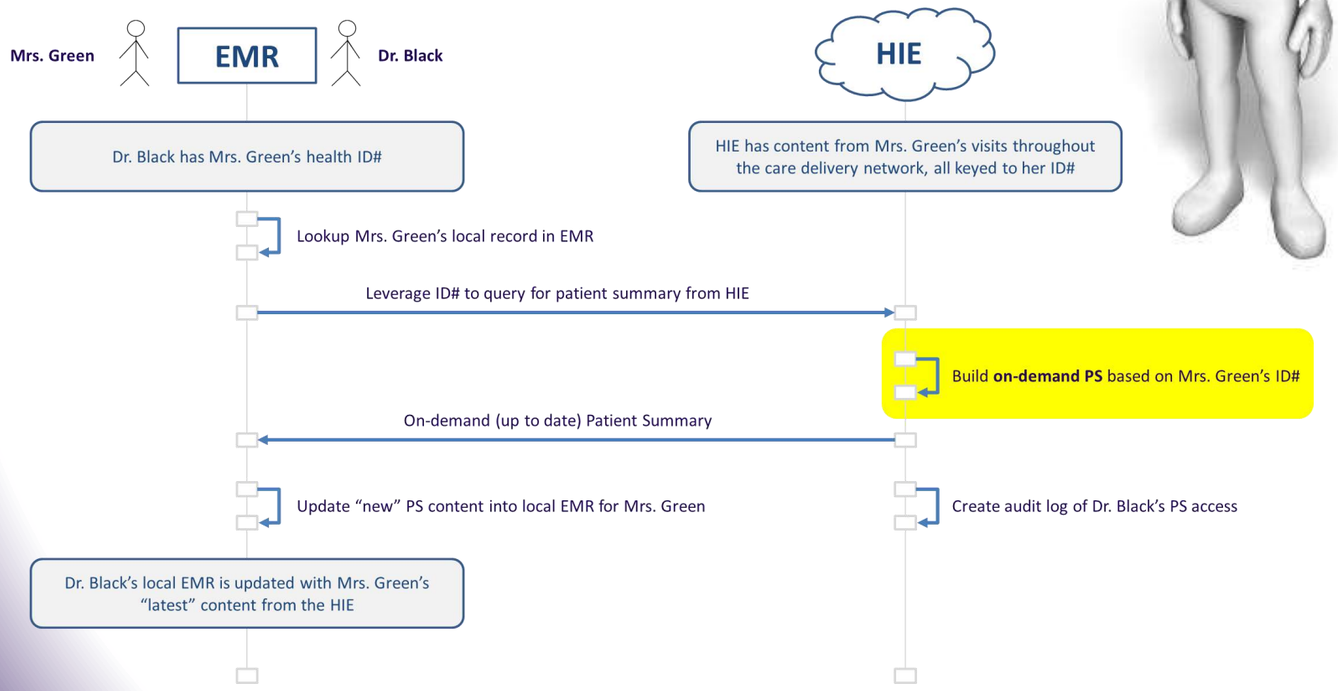
Re-usable Lego® blocks: IHE Profiles





How do we get from ***stories*** to **specifications**?

Problem: How do we build an **on-demand PS**?



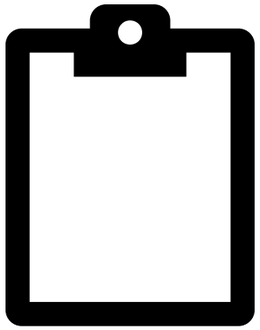
Canada Health Infoway
Inforoute Santé du Canada

Domestically, Canada has adopted a **4-phase model** based on the IHE Methodology as its **process** for digital health specification development.

Canada Health Infoway
Inforoute Santé du Canada

1

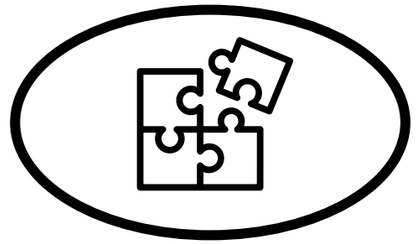
Phase 1 Clinical/Business Definition



Phase 1
Clinical/Business
Definition

2

Phase 2 Workflow Components



Phase 1
Clinical/Business
Definition

Phase 2
Workflow
Components

3

Phase 3 Interoperability Standards

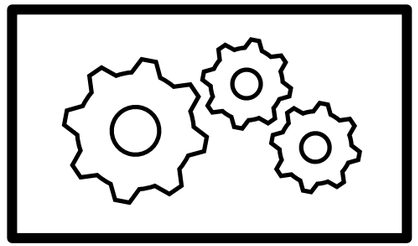
Phase 1
Clinical/Business
Definition

Phase 2
Workflow
Components

Phase 3
Interoperability
Standards

4

Phase 4
Implementable Architecture

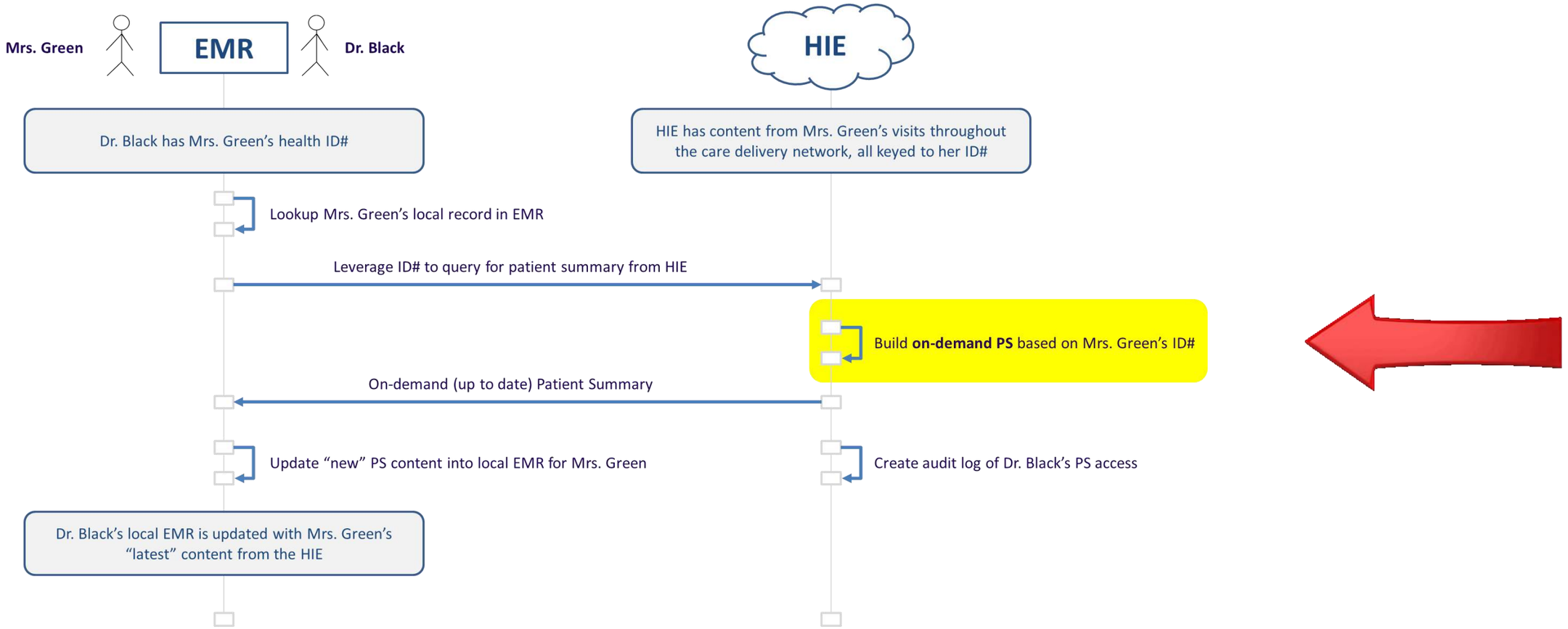


Phase 1
Clinical/Business
Definition

Phase 2
Workflow
Components

Phase 3
Interoperability
Standards

Phase 4
Implementable
Architecture



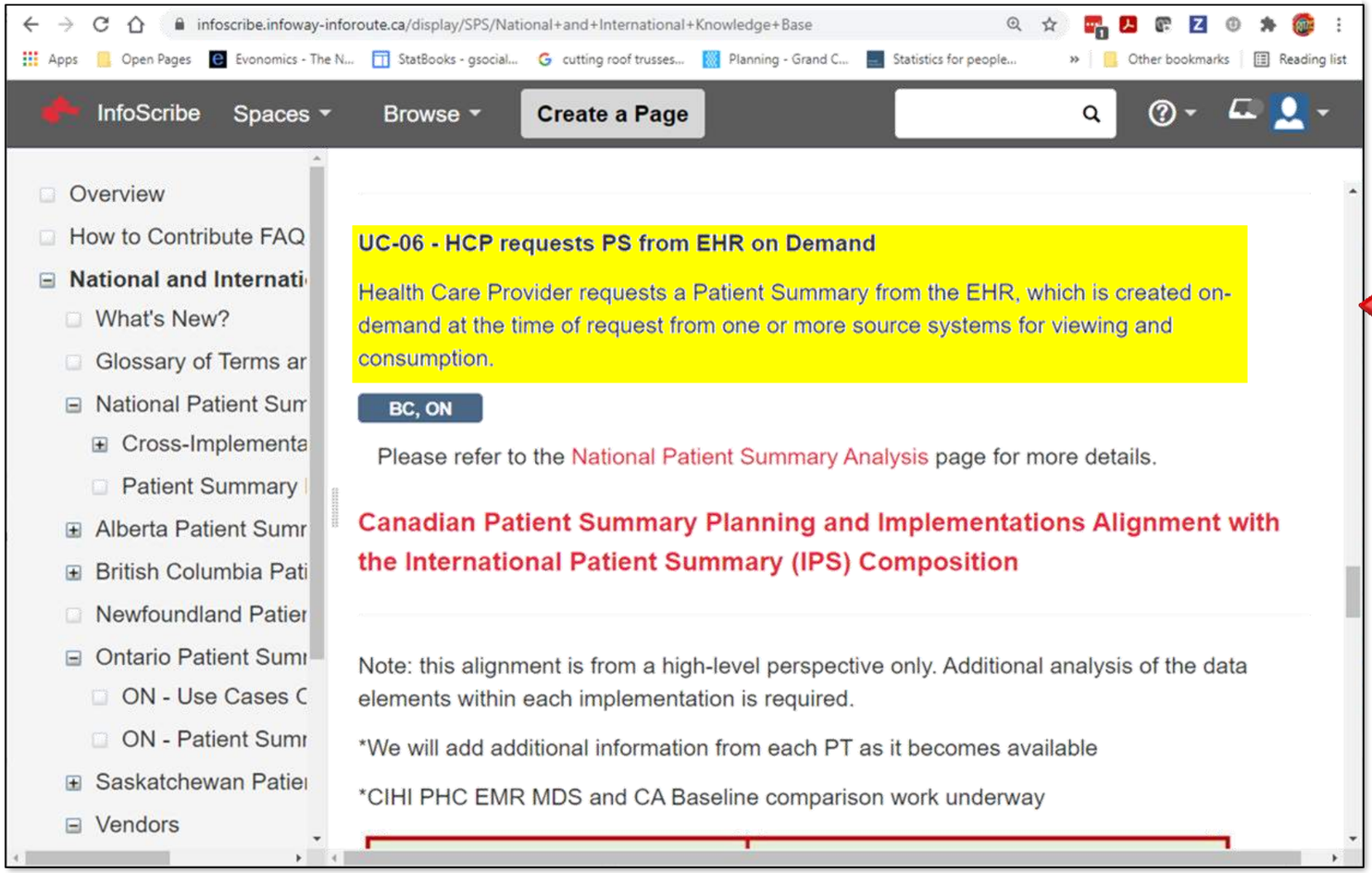
Let's illustrate this with an example…

Phase 1
Clinical/Business
Definition

Phase 2
Workflow
Components

Phase 3
Interoperability
Standards

Phase 4
Implementable
Architecture



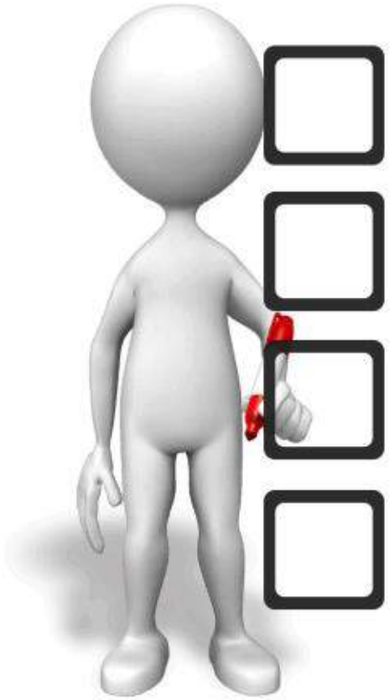
Phase 1
Clinical/Business
Definition

Phase 2
Workflow
Components

Phase 3
Interoperability
Standards

Phase 4
Implementable
Architecture

An on-demand **Patient Summary Builder** would need to be able to…



Unambiguously identify the patient (get the enterprise ID)

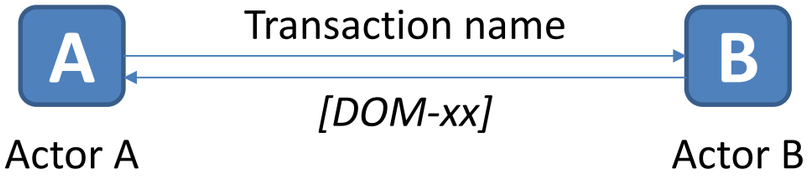
Get permission to access data sources holding this patient's data

Use this permission to fetch data from all the pertinent sources

Assemble the retrieved data into a well-formed patient summary

A bit of pedagogy…

At the heart of IHE's engineering artefacts is the notion of re-usable building blocks: the **actor-transaction pair**.



Phase 1
Clinical/Business
Definition

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Workflow
Components

Phase 3
Interoperability
Standards

Phase 4
Implementable
Architecture

Patient Demographics Consumer

Patient Identity Registry

Mobile patient demographics query [ITI-78]

☑ **Unambiguously identify the patient (get the enterprise ID)**

Get permission to access data sources holding this patient's data

Use this permission to fetch data from all the pertinent sources

Assemble the retrieved data into a well-formed patient summary

Phase 1
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Standards

Phase 4
Implementable
Architecture

Authorization Client

Authorization Server

Get access token
[ITI-71]

- ☑ Unambiguously identify the patient (get the enterprise ID)
- ☑ **Get permission to access data sources holding this patient's data**

Use this permission to fetch data from all the pertinent sources

Assemble the retrieved data into a well-formed patient summary

Phase 1
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Definition

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Components

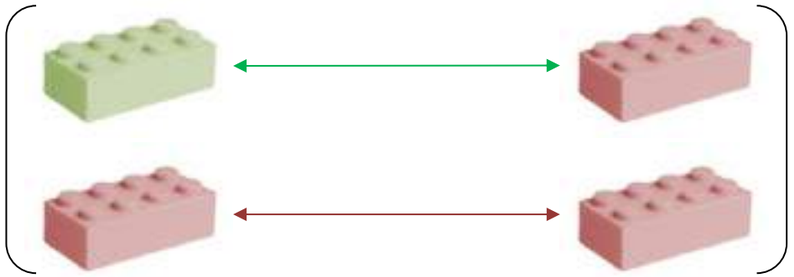
Phase 3
Interoperability
Standards

Phase 4
Implementable
Architecture

Incorporate access token
[ITI-72]

Authorization Client

Resource Server



Document Consumer

Document Responder

Find document references
[ITI-67]
Retrieve document
[ITI-68]

HL7 CDA

- ☑ Unambiguously identify the patient (get the enterprise ID)
- ☑ Get permission to access data sources holding this patient's data
- ☑ **Use this permission to fetch data from all the pertinent sources**

Assemble the retrieved data into a well-formed patient summary

Phase 1
Clinical/Business
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Workflow
Components

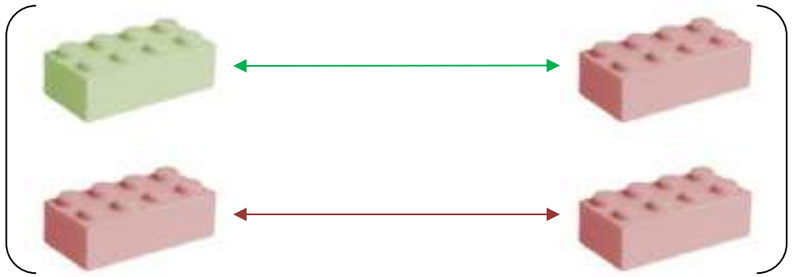
Phase 3
Interoperability
Standards

Phase 4
Implementable
Architecture

Incorporate access token
[ITI-72]

Authorization Client

Resource Server



Clinical Data Consumer

Clinical Data Responder

Mobile query existing data
[PCC-44]

HL7® FHIR®

- ☑ Unambiguously identify the patient (get the enterprise ID)
- ☑ Get permission to access data sources holding this patient's data
- ☑ **Use this permission to fetch data from all the pertinent sources**

Assemble the retrieved data into a well-formed patient summary

Phase 1
Clinical/Business
Definition

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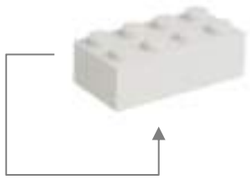
Components

Phase 3
Interoperability
Standards

Phase 4
Implementable
Architecture

Patient Summary Builder



Assemble patient summary [CAN-01]

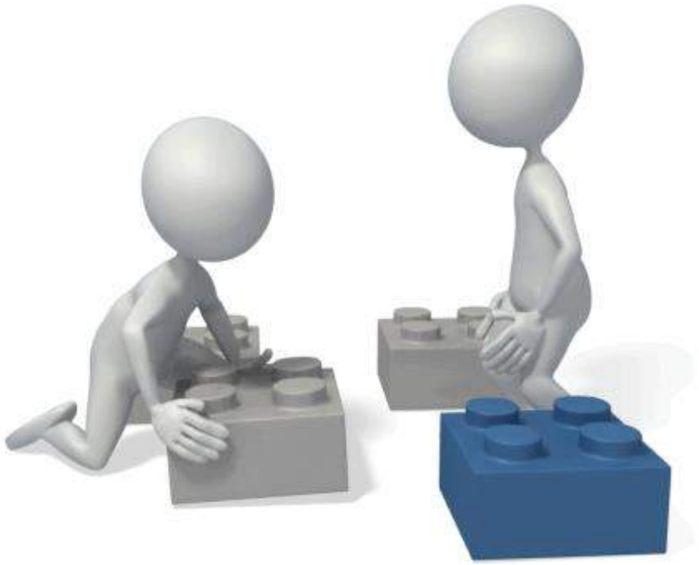
- ☑ Unambiguously identify the patient (get the enterprise ID)
- ☑ Get permission to access data sources holding this patient's data
- ☑ Use this permission to fetch data from all the pertinent sources
- ✕ **Assemble the retrieved data into a well-formed patient summary**

Phase 1
Clinical/Business
Definition

Phase 2
Workflow
Components

Phase 3
Interoperability
Standards

Phase 4
Implementable
Architecture



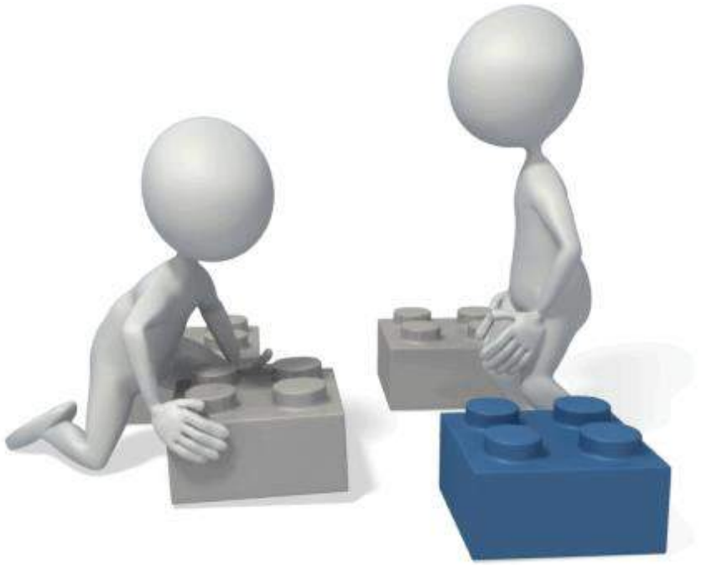
We need to “assemble” the characteristics of our new **Patient Summary Builder** actor from the already-existing building blocks, *plus* define the normative properties of a new “**Assemble patient summary**” transaction.

Phase 1
Clinical/Business
Definition

Phase 2
Workflow
Components

Phase 3
Interoperability
Standards

Phase 4
Implementable
Architecture



Patient Summary Builder

[CAN-01]

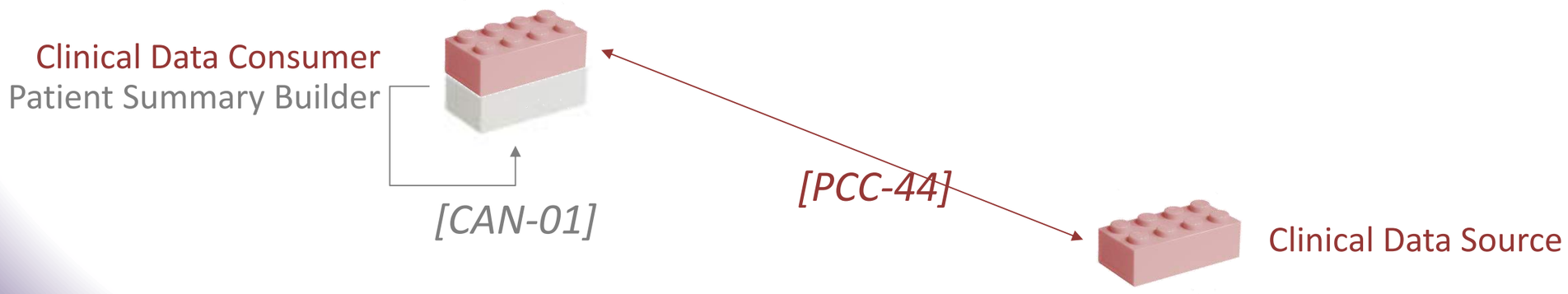
We nee[illegible]semble” the characteristics of our new Patient Summary Assembler actor from the available building blocks, plus define the normative properties of a new “Assemble patient summary” transaction.

Phase 1
Clinical/Business
Definition

Phase 2
Workflow
Components

Phase 3
Interoperability
Standards

Phase 4
Implementable
Architecture

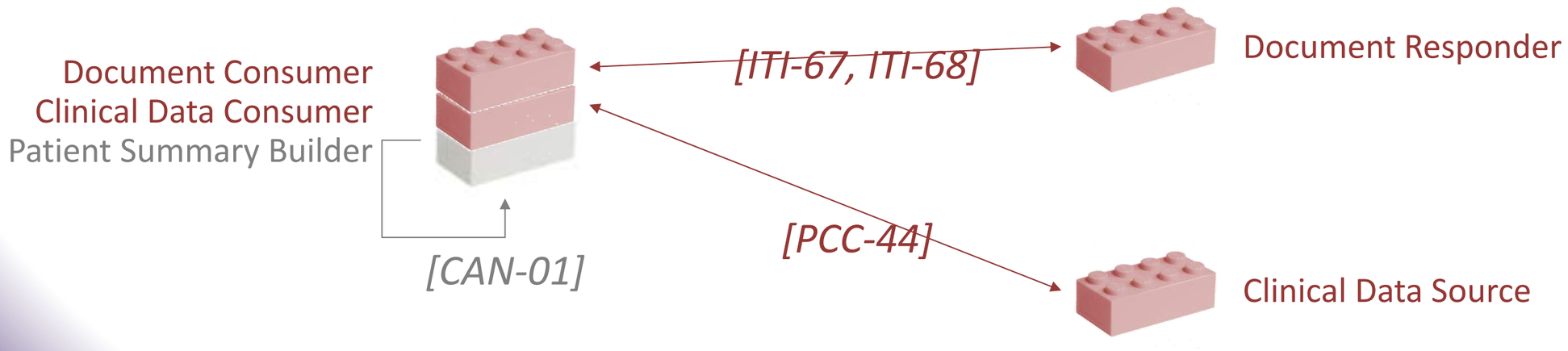


Phase 1
Clinical/Business
Definition

Phase 2
Workflow
Components

Phase 3
Interoperability
Standards

Phase 4
Implementable
Architecture



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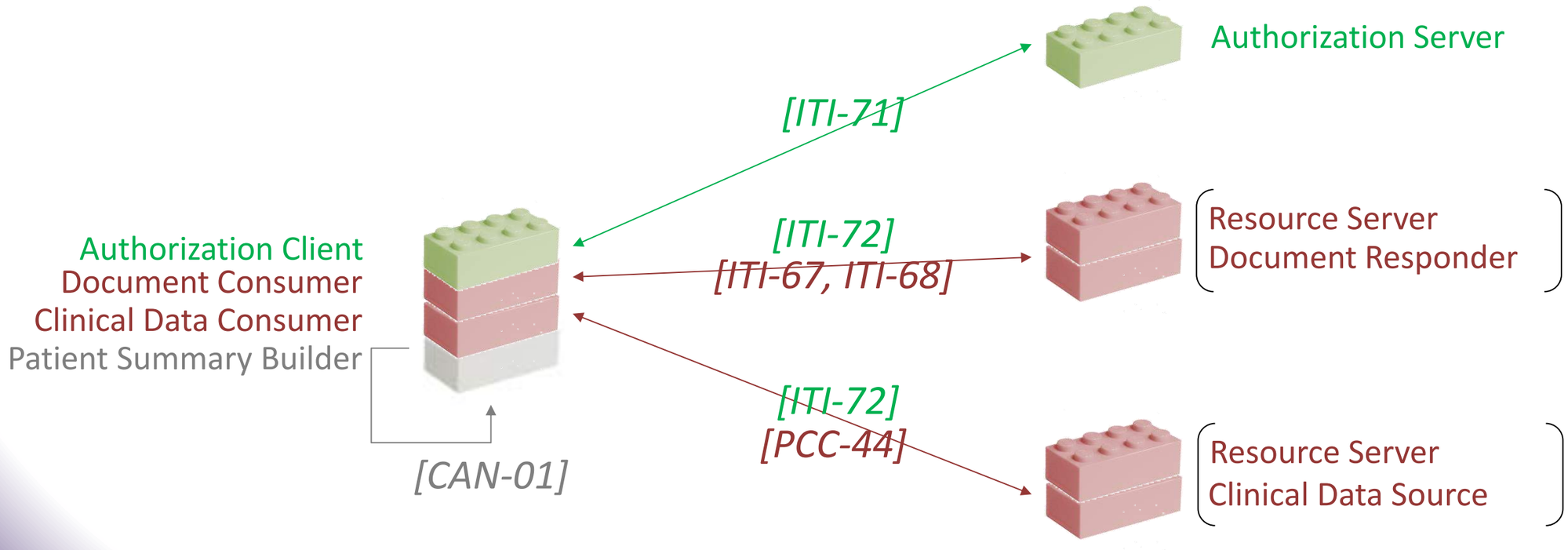

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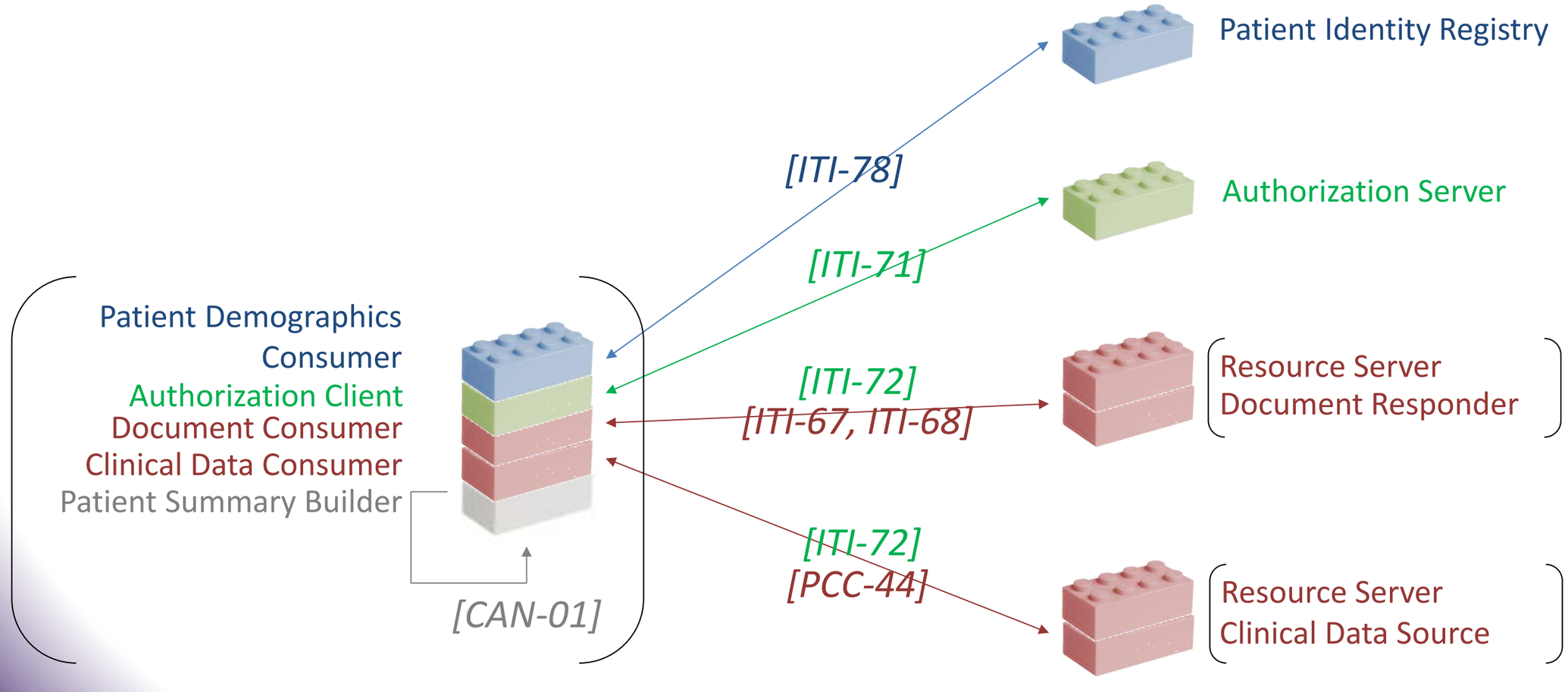
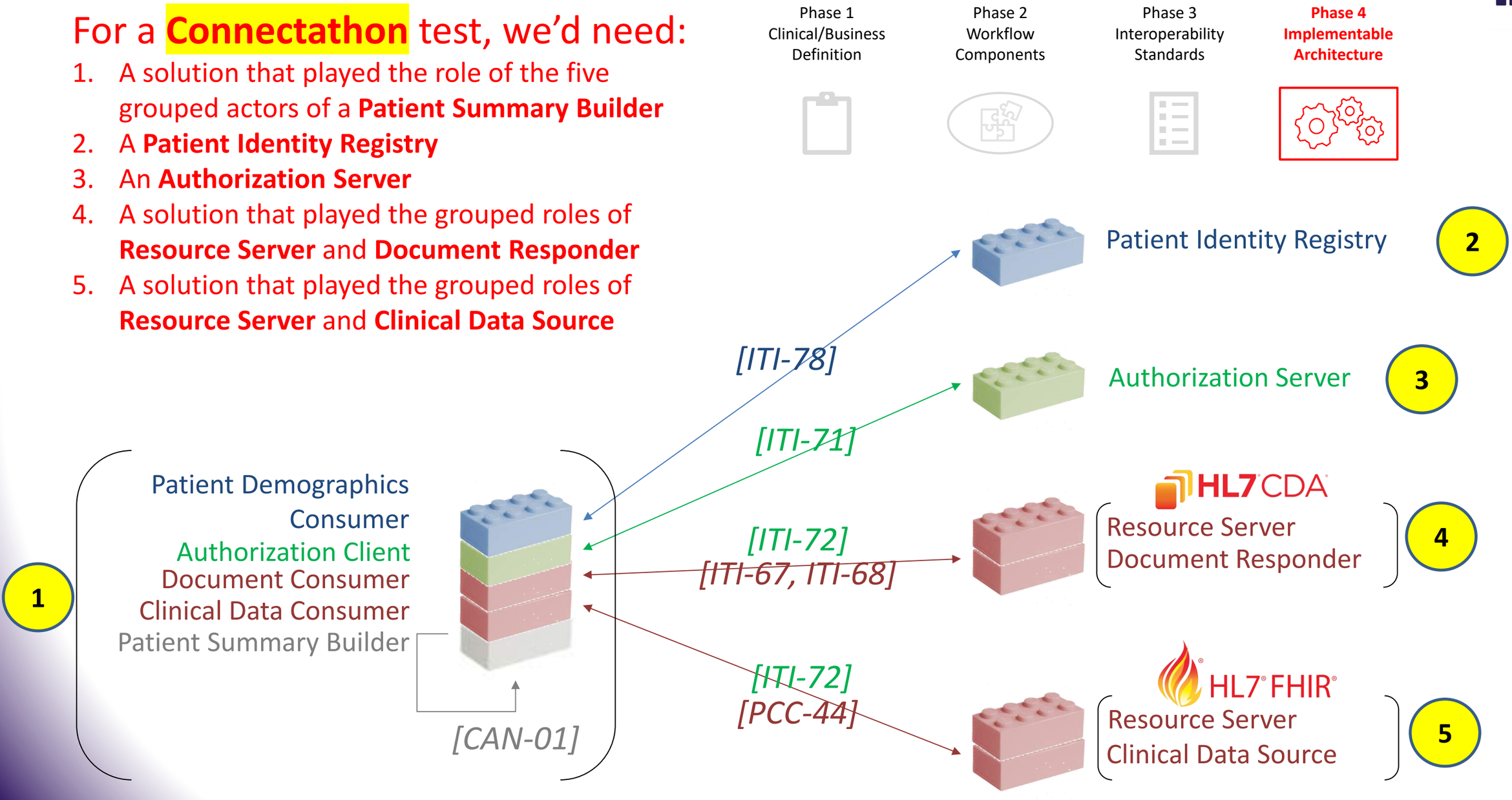


For a **Connectathon** test, we'd need:

1. A solution that played the role of the five grouped actors of a **Patient Summary Builder**
2. A **Patient Identity Registry**
3. An **Authorization Server**
4. A solution that played the grouped roles of **Resource Server** and **Document Responder**
5. A solution that played the grouped roles of **Resource Server** and **Clinical Data Source**



- The role of the USER STORIES is **foundational**. They define what the specification must **do**. (1)
- The stories are mapped to **workflow** steps (2) and these, in turn, are mapped to standards-based **"building blocks"** (3). NOTE: *sometimes*, we identify a **gap** where a new building block is needed.
- Blocks are **assembled** into conformance-testable reference architectures (4).

Where it is practical to do so – to maximize **implementability** we should try to define our USER STORIES in terms of “building blocks” that we are ***already have***.

Thank you!

Contact us and follow us

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Friday 11th of October
1PM CEST