


# Use Case: e-Health



- The European Patient Summary (EPS) Scenario
  - eHealth challenges
  - Requirements for the EPS Infrastructure
  - Triple Space Capabilities
  
- The EPS Architecture
  - On top of the Triple Space
  - Inside the Triple Space: Subspaces, Roles and Policies
  - The EPS Ontologies
  
- Reviewers comments and Evaluation Plan
  
- eHealth Demo



## 2006-2007 Focus: Interoperability

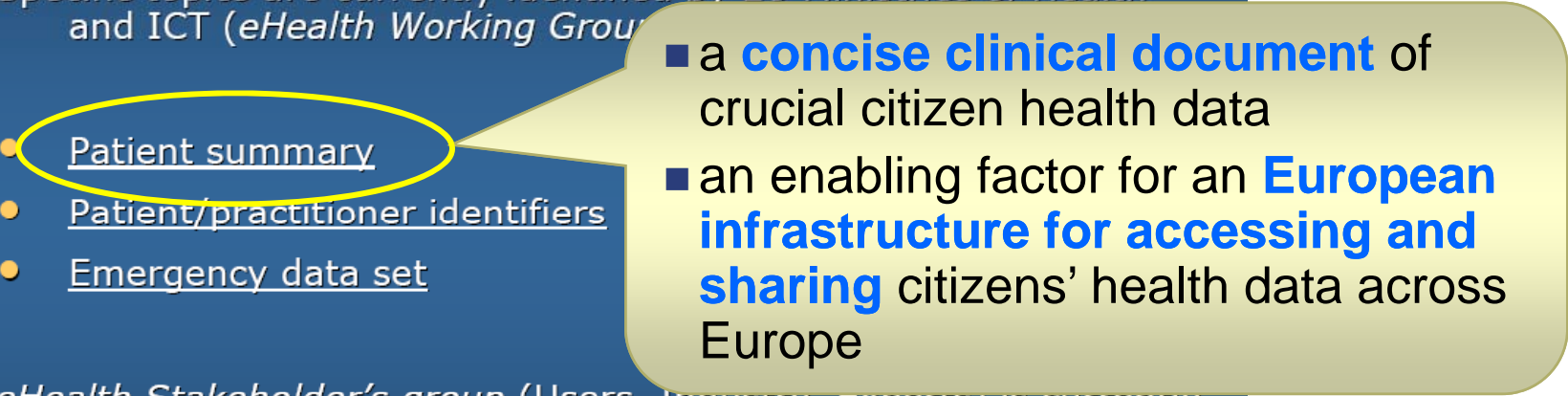
### What to address in interoperability

Specific topics are currently identified by EU Ministries of Health and ICT (*eHealth Working Group*)

- Patient summary
- Patient/practitioner identifiers
- Emergency data set

*eHealth Stakeholder's group* (Users, Industry, Experts) is currently working on these issues

**Goal: European Commission: RECOMMENDATION on interoperability**

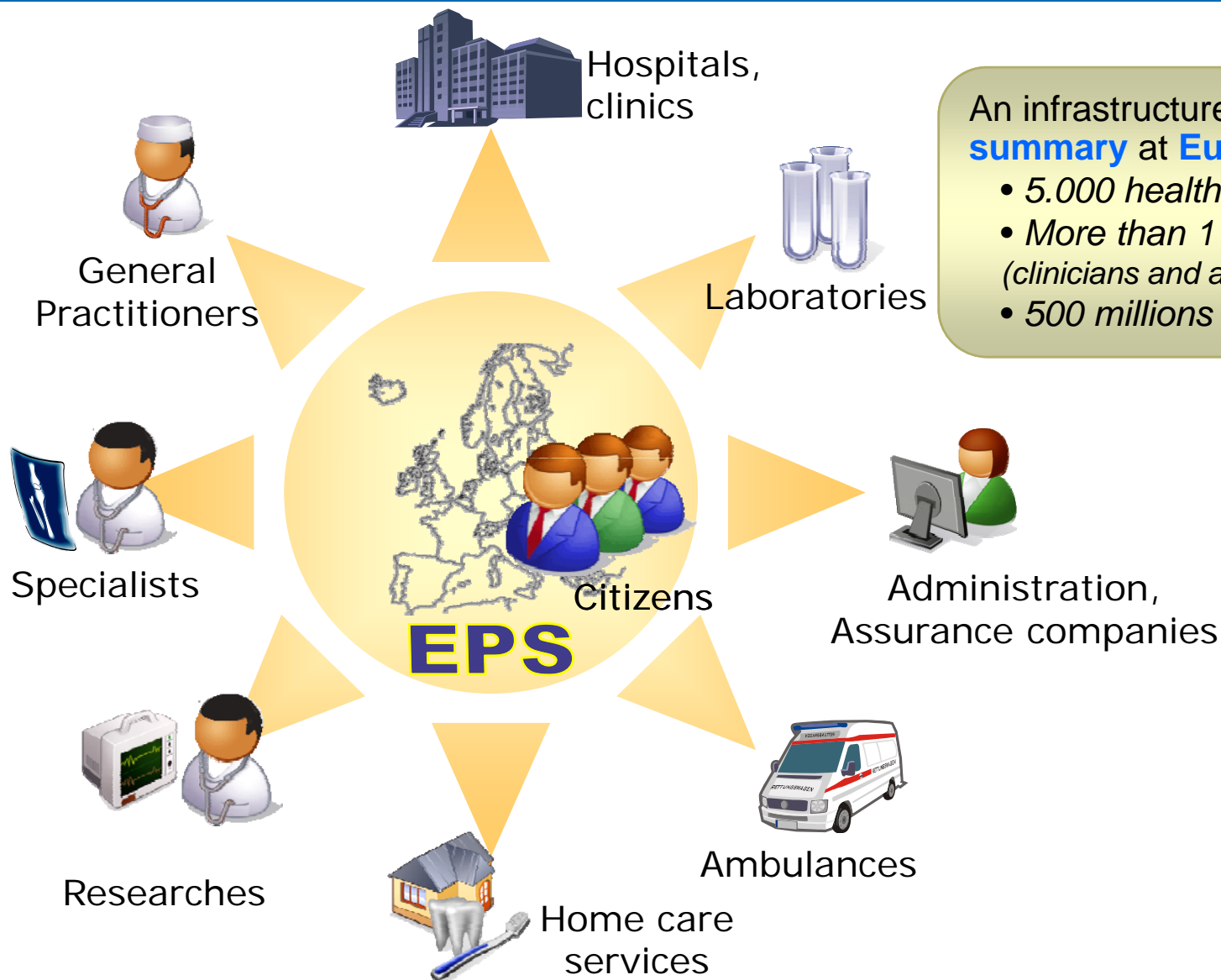


- a **concise clinical document** of crucial citizen health data
- an enabling factor for an **European infrastructure for accessing and sharing** citizens' health data across Europe

**Ilias Iakovidis** (Deputy Head of Unit – ICT for Health, DG INFOSO, EC)  
"European Commission activities in eHealth: The achievements and future prospects." Med-e-Tel Luxembourg, April 5, 2006

# The eHealth Scenario in TripCom

## The European Patient Summary (EPS)



An infrastructure for a **patient summary** at **European level**

- 5.000 health authorities
- More than 1 million users (clinicians and administrative staff)
- 500 millions citizen summaries

## ■ Multilateral Solution

- **Virtual common** infrastructure distributed among parties
- **Coordinate** multidisciplinary actors in access data **asynchronously** and from **different locations**

## ■ Scalability

- 500.000.000 Patient Summaries
- 5.000 Local Health Authorities

## ■ Privacy and Data Ownership

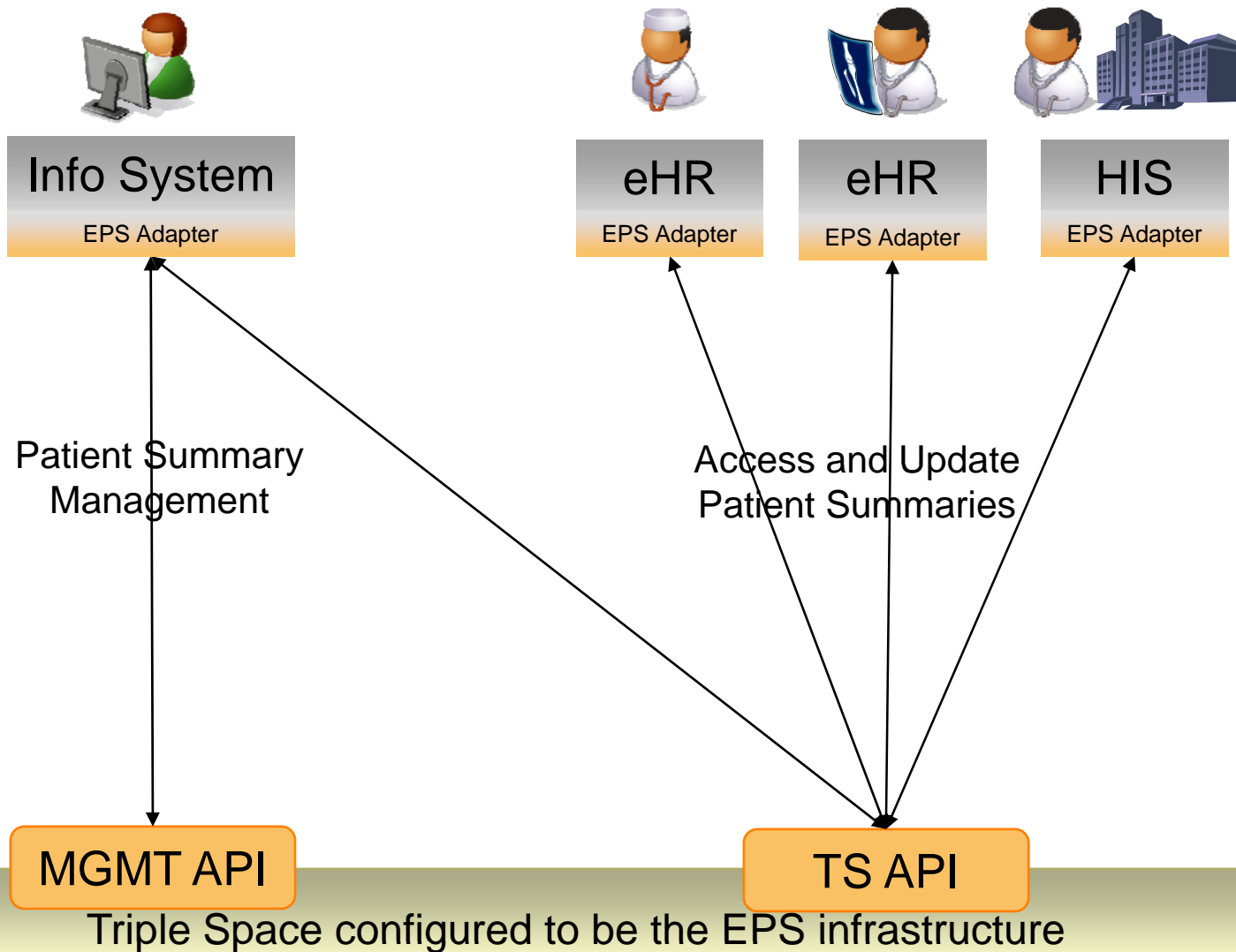
- National and Local policies to authorize caregivers to access citizen data
- Each healthcare party owns the summaries of the cared citizens

## ■ Subsidiarity

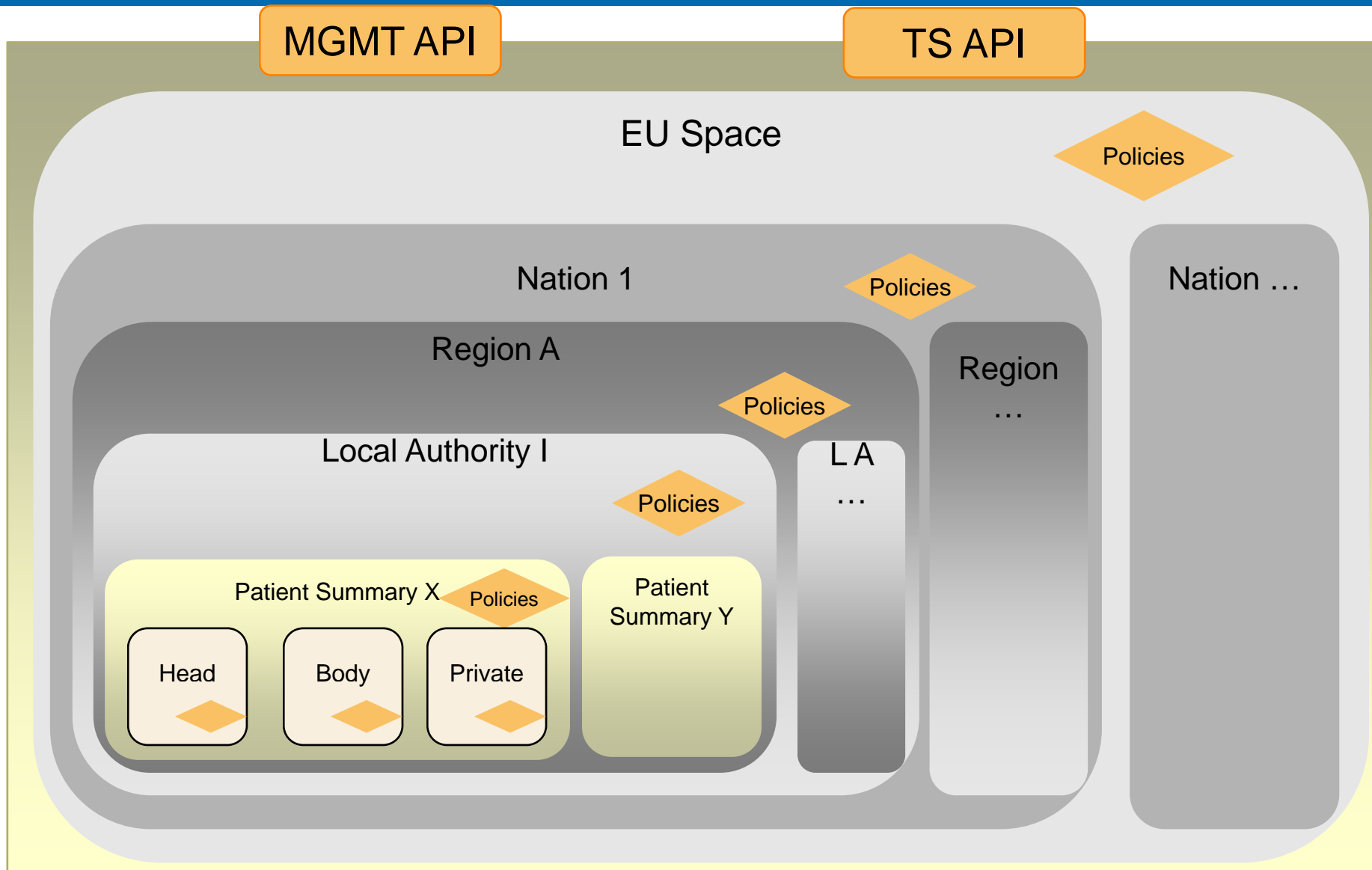
- Overcome the **heterogeneity** of data and applications
  - Intensive use of **knowledge**: structured data and Terminologies

- **Decentralized, Distributed and Shared Space**
  - Each healthcare party provides resources to the whole space
- **Persistent Publication**
  - Actors persistently publish and update data in their own subspace, enforcing data ownership
  - Other actors can retrieve the published data
- **Security Mechanisms**
  - Global and local policies to access data
- **Coordination Support**
  - Interactions decoupled in time, location and reference
- **Semantic Interoperability**
  - To cope with heterogeneity among data and processes

# EPS Architecture On top of the Triple Space



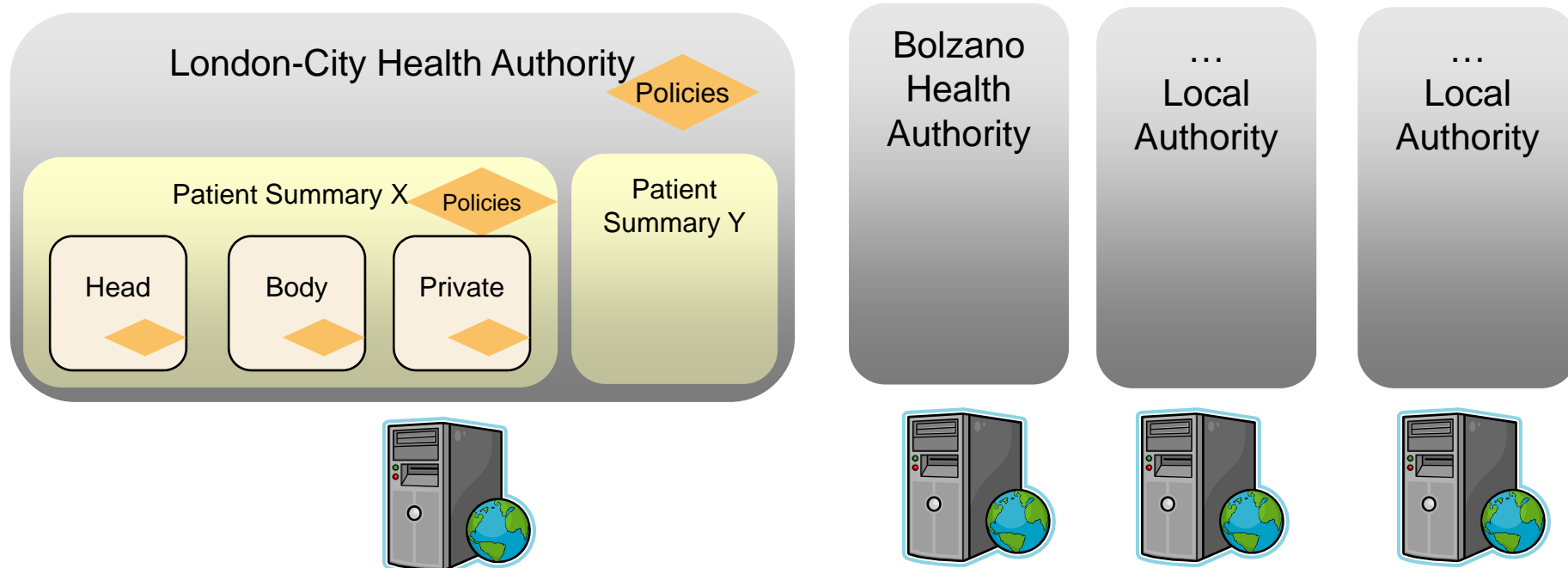
# EPS Architecture Inside the Triple Space



- The Subspaces of a single PS space
  - **Head**: For administrative accesses
  - **Body**: For clinical accesses
  - **Private**: To restrict access to some data
- Roles and Policies (for an Health Authority)

| Role                    | Patient Summary | Head    | Body | Private |
|-------------------------|-----------------|---------|------|---------|
| Administrative Employee | R, W, D         | R, W, D | -    | -       |
| Personal GP             | R               | R       | R, W | R, W    |
| Specialist              | R               | R       | R, W | -       |
| Paramedic               | R               | R       | R    | -       |

- Each Local Health Authority is responsible of the management of the citizen data
  - Provides resources to the EPS
  - Defines its policies accordingly to regional/national and European policies



### ■ The EPS Ontologies

- Based upon the most adopted standard for exchanging patient data, such as HL7 CDA and ASTM CCR
- Models existing Coding Systems to re-use clinical terminologies, such as: ICD10, ICD9, LOINC, MESH, MTH, NCI, RXNORM, UMLS

### ■ Head

- Registry data (name, date of birth, residence)
- Administrative data (IDs, insurance info)

### ■ Body

- Problems, Alerts, Medications, Immunizations, Encounters
- Procedures, Advance Directives, Plan Of Care

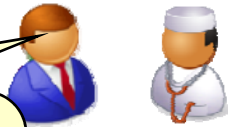
- *Special attention should be paid to the use of realistic data sets large enough to demonstrate scalability beyond existing RDF infrastructures*
- The EPS ontologies are based on the most common eHealth message standards and coding systems
- A realistic instance has been manually generated to meet the use case
- The instance is used as a “seed” by a tool for generating millions of different instances

- *The requirements specified in deliverable D8b.1 might be too ambitious especially with respect to the performance requirements*
- Providing good performances is one of the challenges of TripCom
  - Specific attention is paid in the design in order to be flexible in front of the various types of requirements
- The Shared-Care Path storyboard emphasizes the added-values of TripCom
  - Sharing data, coordination support, security policies, scalability

- *The project should define concrete evaluation plans for testing the achievement of the objectives in the context of the use cases*
  
- Defined in the scope of T6.6
- Functional and Non-Functional evaluation
  - By measuring and evaluating the capabilities to support the storyboard
  - During M29-M30
- Scalability Evaluation
  - By loading the generated data and making stress tests
  - During M34-M36

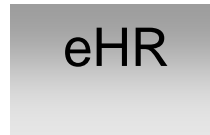
- Multidisciplinary caregivers **care for the same citizen**
  - Strong need to share and access the same data (decoupling time, location, reference and schema)
  - Respect security and privacy regulations
  
- **Storyboard steps**
  - 1: The Initialization of the Patient Summary in London
  - 2: The Surgical Operation at Regional Hospital in Bolzano
  - 3: The Monitoring of the Patient in London

# Step 1: The Initialization of the Patient Summary in London



Please, initialize my data in the EPS

My EHIC number is:  
25247536304251172339



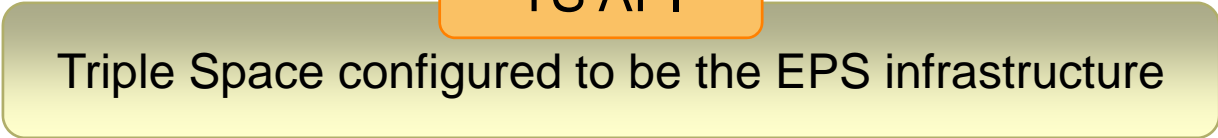
Read Administrative Data:  
Mr. Christian Corrs  
Date of Birth  
Address  
Insurance Data  
IDs

Update Clinical Data:

Problems: Calcium deficiency (UMLS C0392519)  
Medications: Mirapex (RXNORM 218402)  
Alerts: Morphine adverse reaction (UMLS C0569385) to Morphine (MTH S0063559)  
Immunization: Tetanus (ICD9 037)  
...

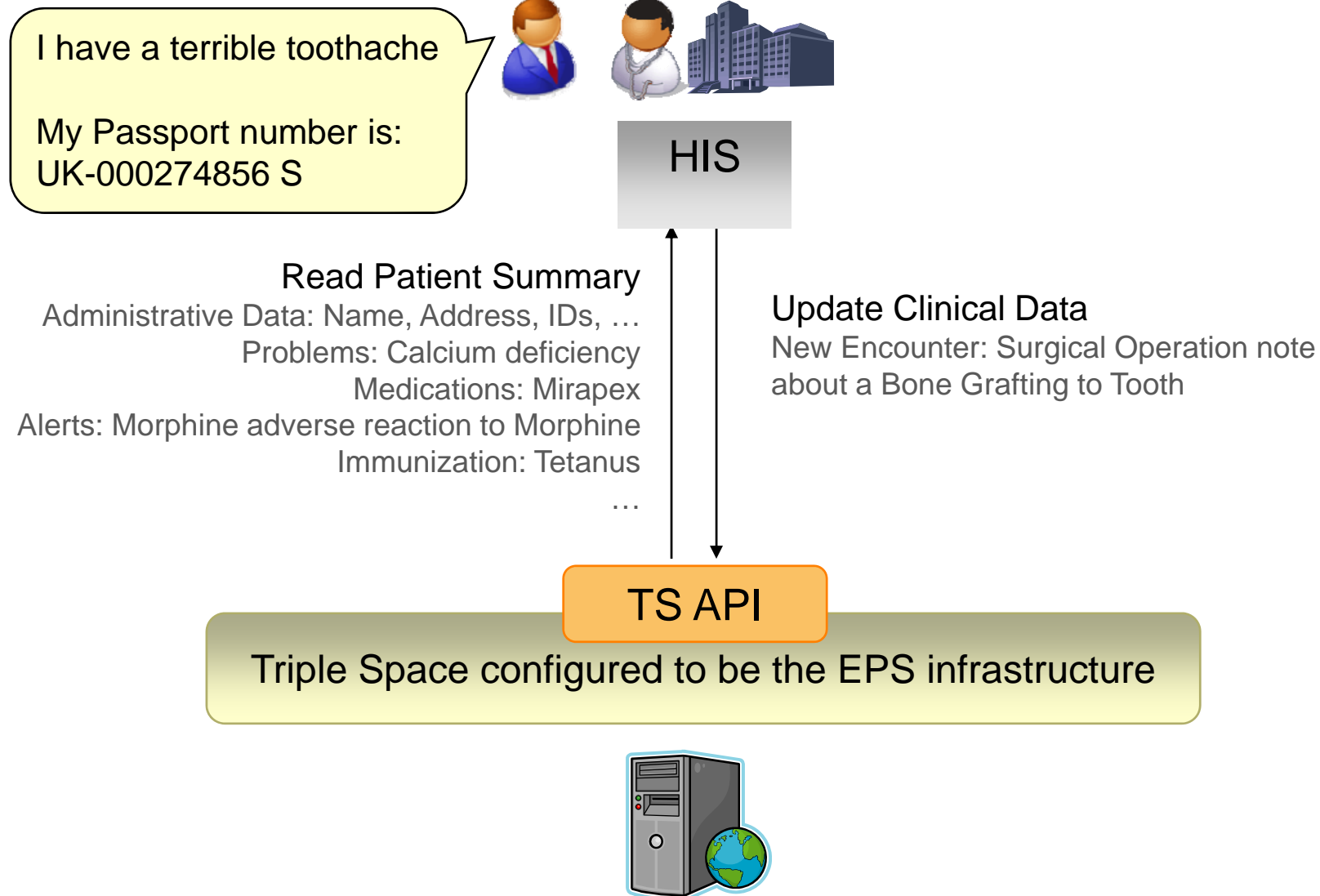
Insert private data:

New Problem: Haemorrhoids (ICD10 I84)



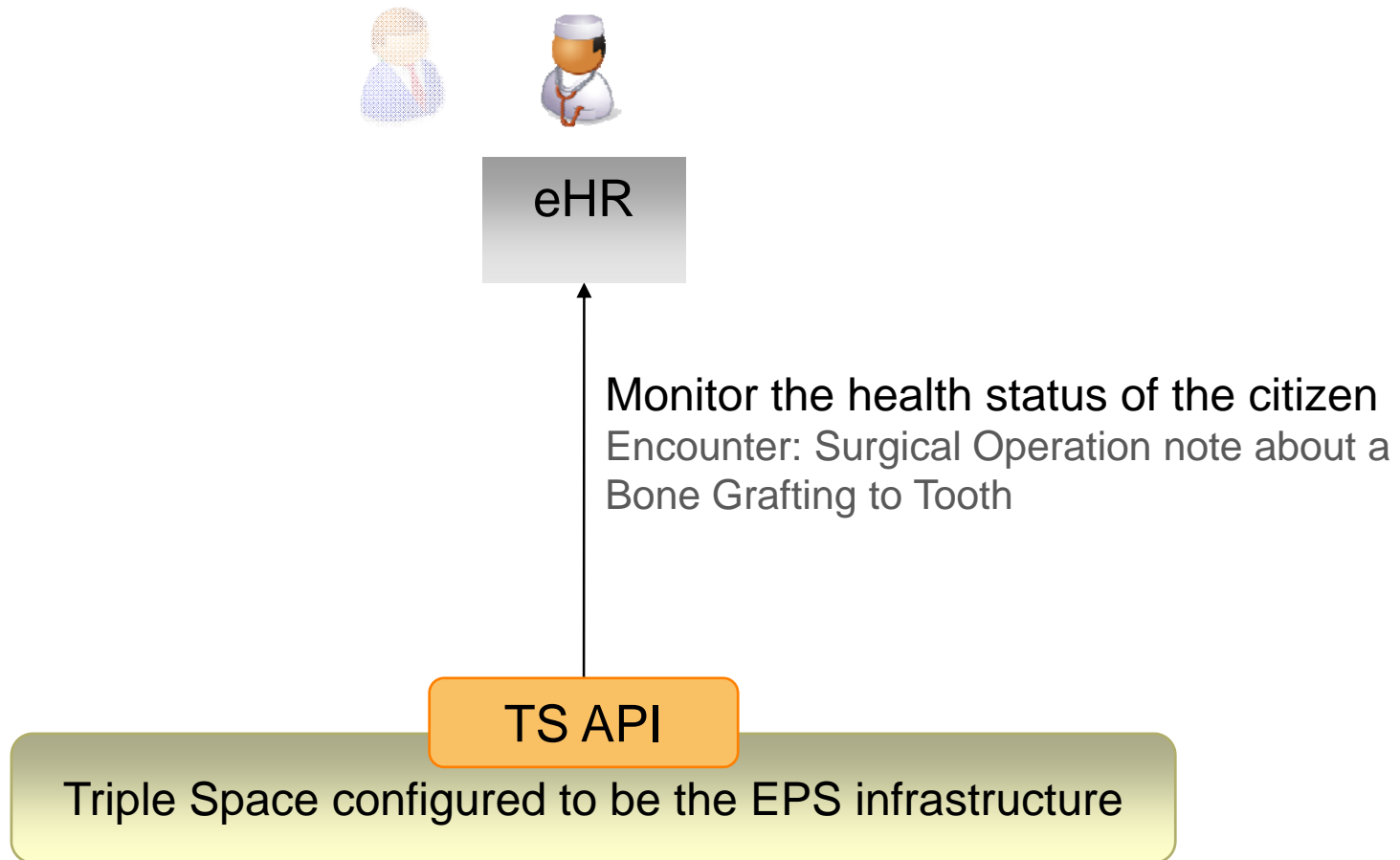
[tsc://london-city.England.gb.eps.eu](https://tsc://london-city.England.gb.eps.eu)

# Step 2: The Surgical Operation at a Regional Hospital in Bolzano



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# Step 3: The Monitoring of the Patient in London



[tsc://london-city.England.gb.eps.eu](http://tsc://london-city.England.gb.eps.eu)

- Management API
  - Create spaces
  - Set security policies
  
- Triple Space API
  - Out triples in a space
    - Security enforcements
  - Read triples with SPARQL queries
    - Querying over space hierarchy
    - Security enforcements