Use Case: e-Health

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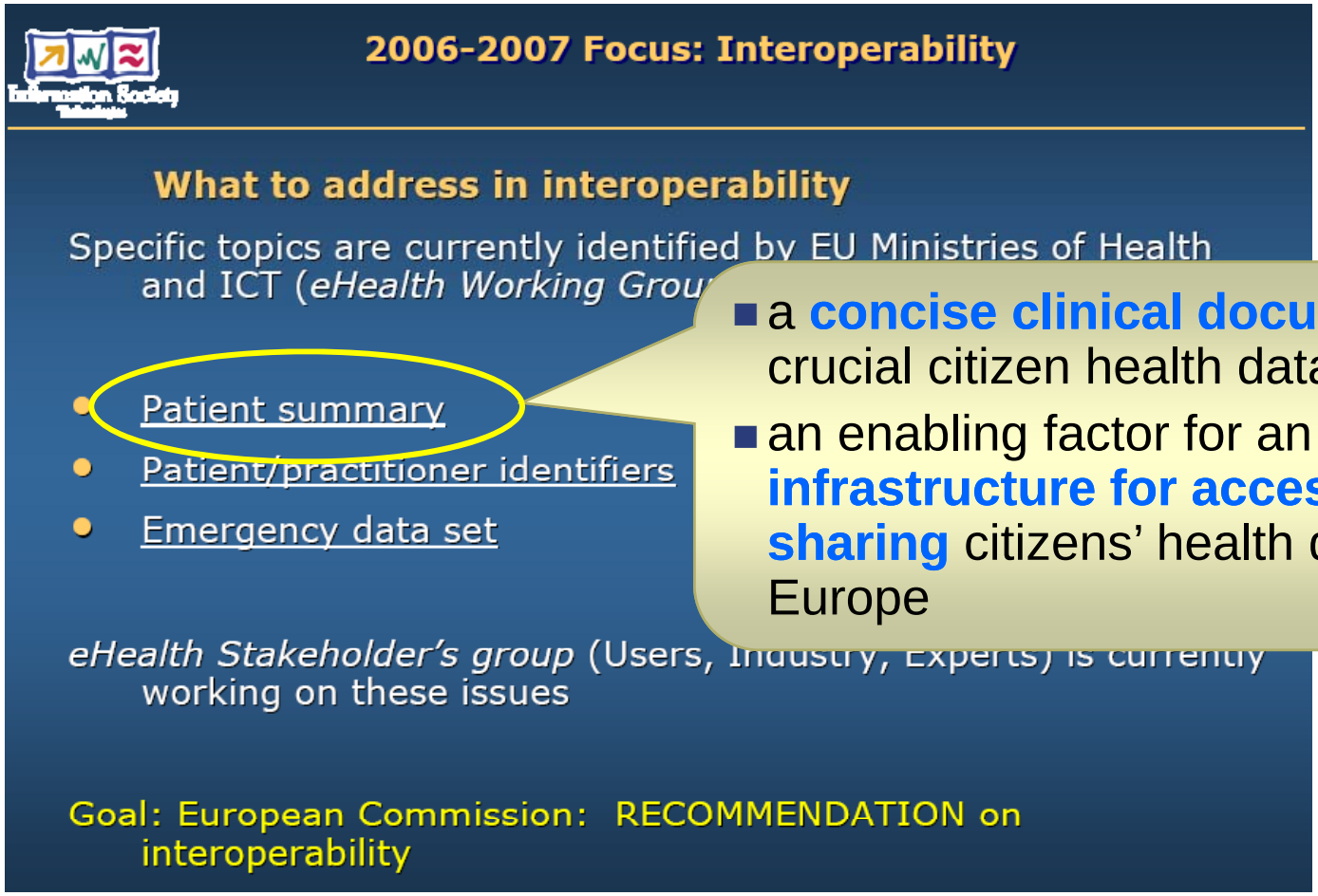
Agenda

- 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

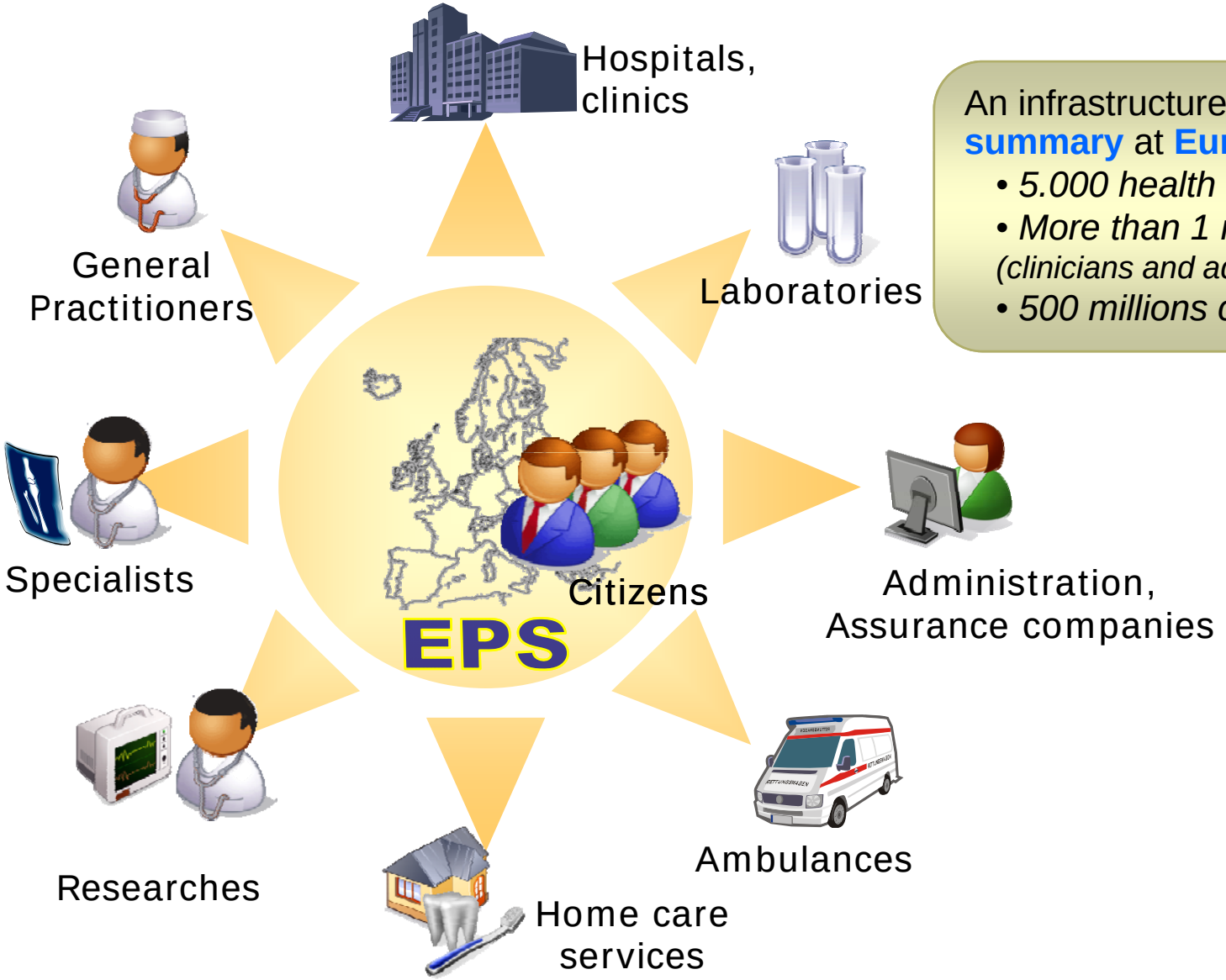
European Strategies in eHealth



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*

Requirements for the EPS Infrastructure

- 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

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Triple Space Capabilities

- 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

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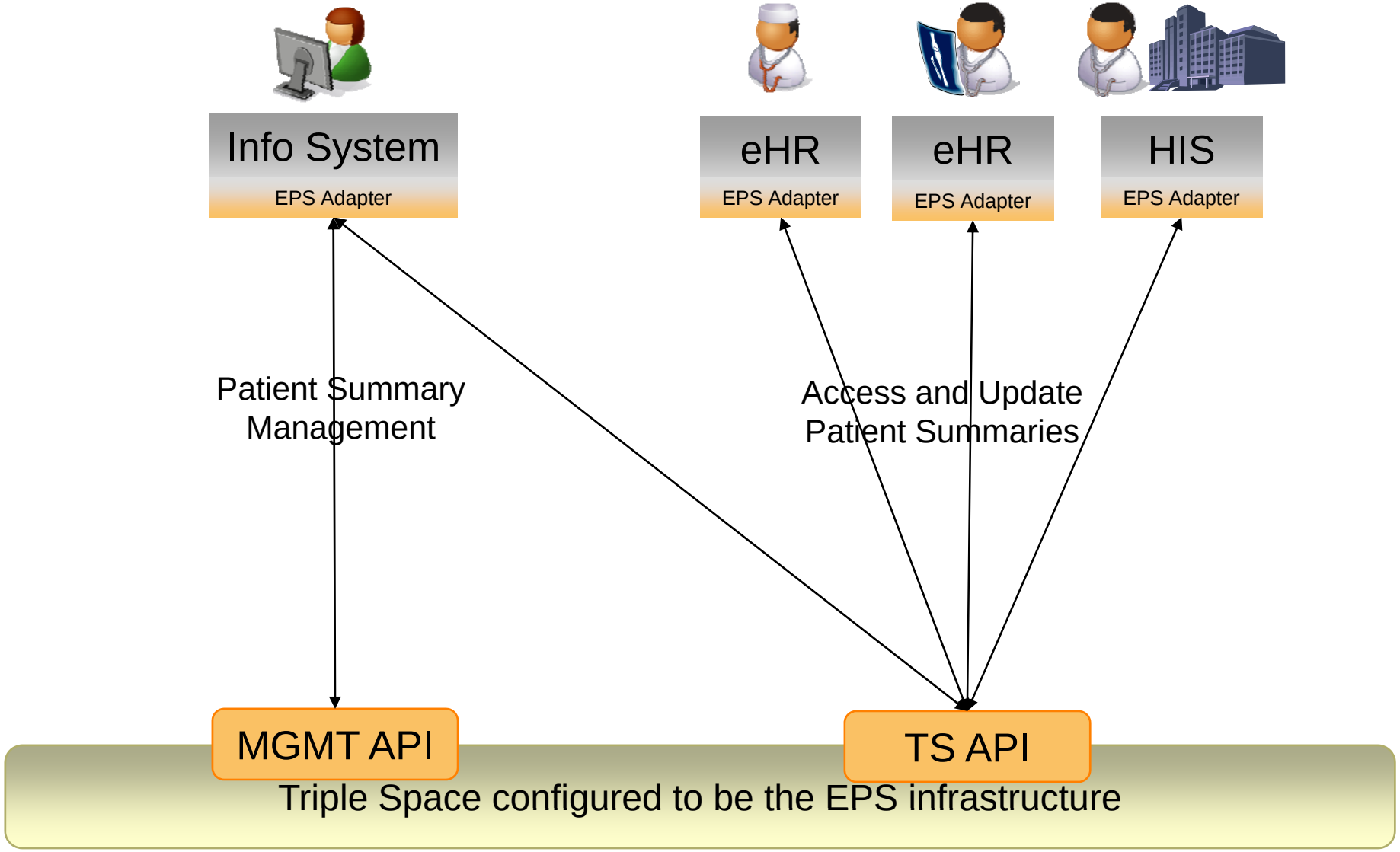
On top of the Triple Space



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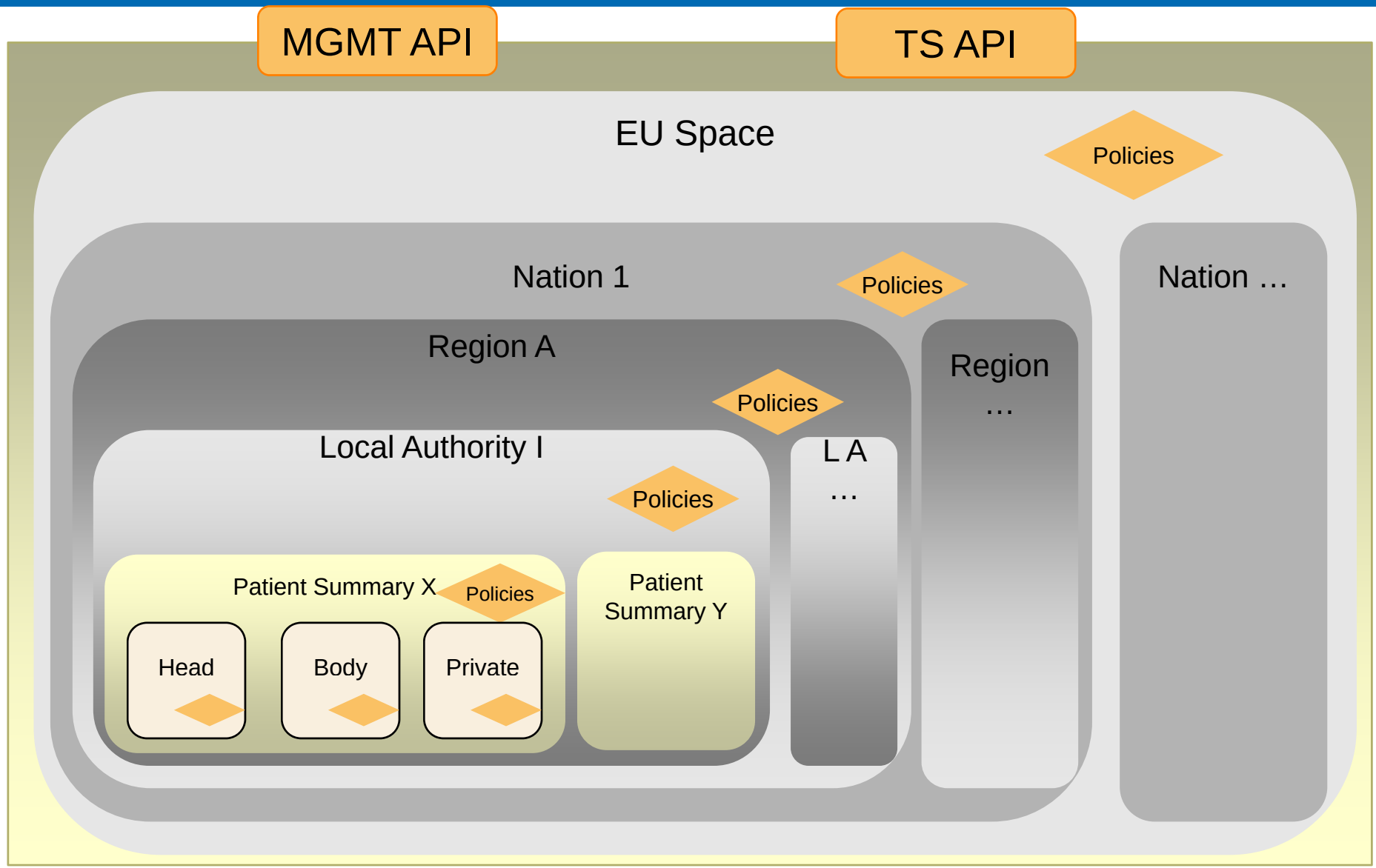
Inside the Triple Space



Subspaces, Roles and Policies

- 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	-

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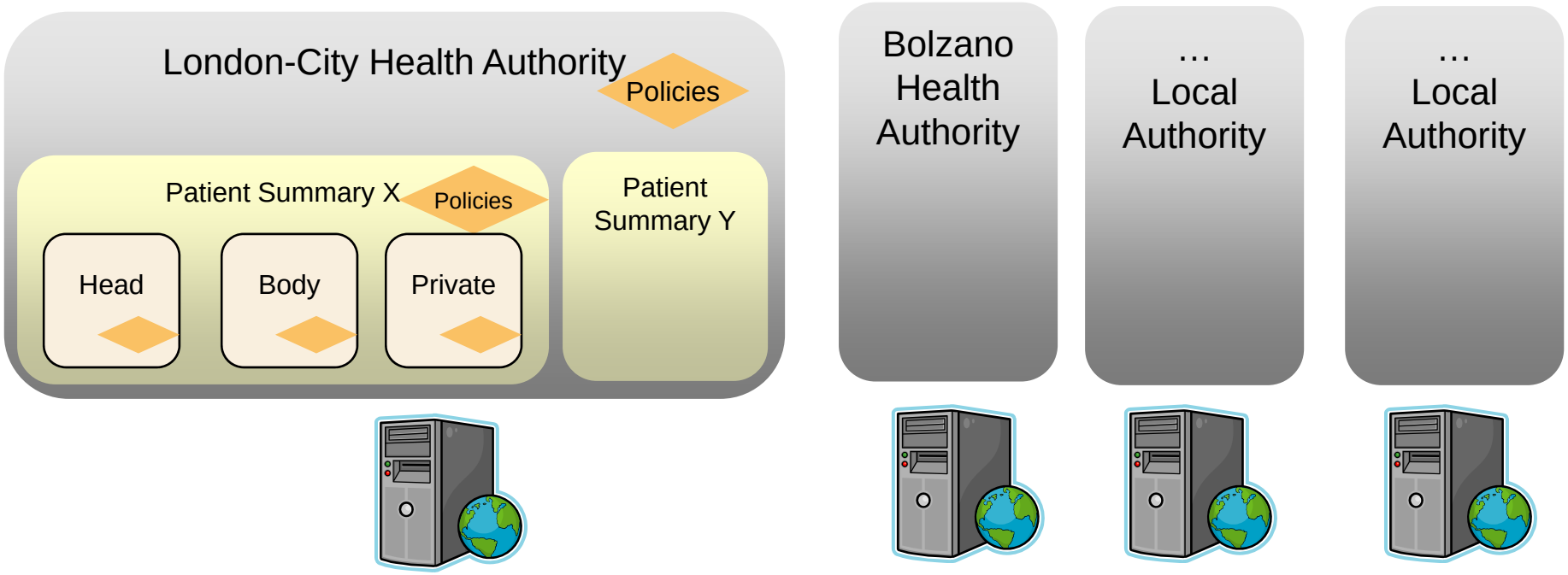
Physical Deploy

- 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

- 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

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Large and Realistic Data Sets

- *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

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Performance Requirements

- *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

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Evaluation Plan

- *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

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The Shared Care-Path Storyboard

- 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

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Step 1: The Initialization of the Patient Summary in London

Please, initialize my data in the EPS

My EHIC number is:
252475363042511723 39

eHR

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)
…

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

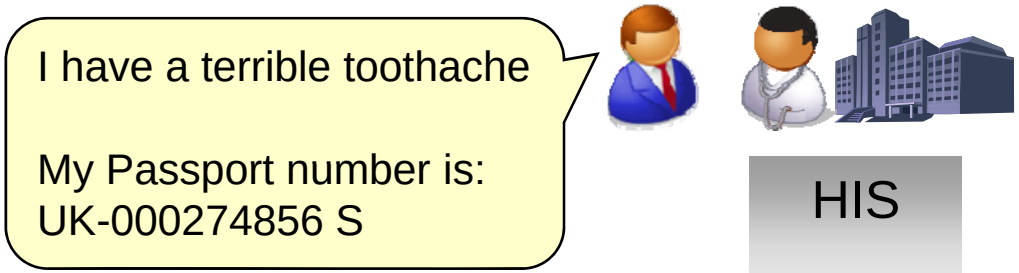
Insert private data:
New Problem: Haemorrhoids (ICD10 I84)

TS API

Triple Space configured to be the EPS infrastructure

tsc://london-city.england.gb.eps.eu

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



Step 3: The Monitoring of the Patient in London

eHR

Monitor the health status of the citizen

Encounter: Surgical Operation note about a Bone Grafting to Tooth

TS API

Triple Space configured to be the EPS infrastructure

tsc://london-city.england.gb.eps.eu

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Features used in the storyboard

- 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

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