

Architecture and Security Infrastructure in National eHealth Systems

**Secure Access to Patient
Data from anywhere**

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Requirements in a modern Healthcare Society



What do we need to streamline the Process in terms of communication?

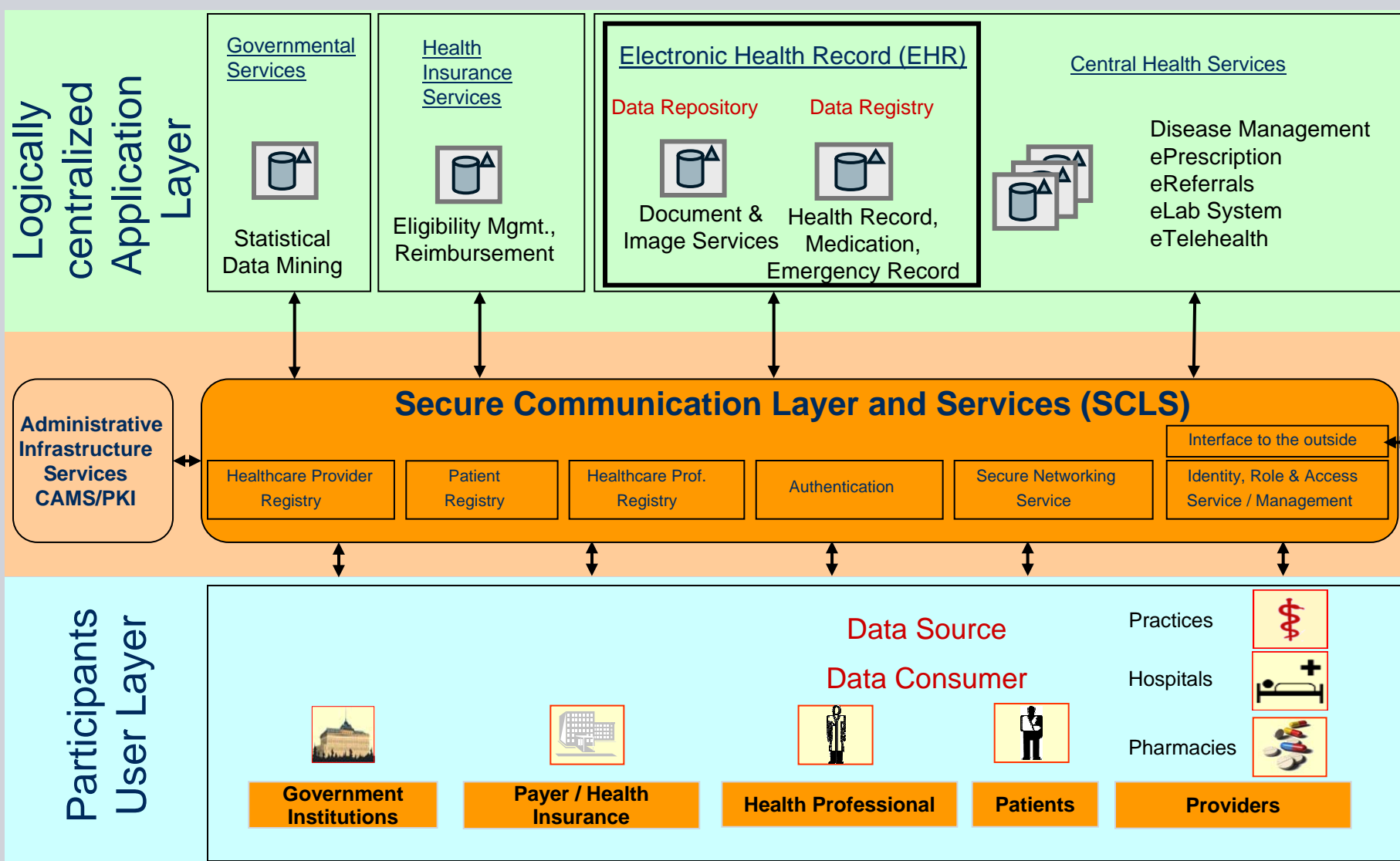
- Who can access the Healthcare Infrastructure? → User Authentication
- Can my data accessed by anybody? → Data Confidentiality / Privacy
- Who may be authorized to access my data? → Authorization
- How can I grant somebody access to my data? → Self Management
- Where should my data be stored? → Centralized / Decentralized
- How can the Healthcare Process be streamlined? → Platform Infrastructure

Requirements regarding IT-Security

What are the technical means to fulfill those Requirements?

- User Authentication → Cryptographic user authentication (Smart-Card)
- Data Confidentiality → Encryption of data
- Authorization → Identity/Access Management
- Self Management → Portal technology
- Centralized/Decentralized Data Store → EHR architecture
- Platform Infrastructure → Security Platform for any application

National Healthcare Information Infrastructure Architecture



National Healthcare Information Infrastructure Architecture - Registries



Secure Communication Layer and Services (SCLS)

Healthcare Provider
Registry

Patient
Registry

Healthcare Prof.
Registry

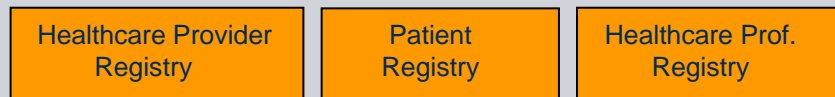
Authentication

Secure Networking
Service

Interface to the outside

Identity, Role & Access
Service / Management

National Healthcare Information Infrastructure Architecture - Registries



Registries are nationwide databases for the central storage of participating identities. They are optimized for quick access. Only valid certificates will allow communication within the telematic infrastructure.

- **Provider Registry:**

- The ID of each participating health provider is stored in this registry.

- **Patient Registry:**

- The ID of each participating patient is stored in this registry. Furthermore demographic data, unique identifiers and links to patient data, might be included.

- **Health Professional Registry:**

- The ID of each participating health professional is stored in this registry. Depending on the country the information provided might include details of the health professional's qualification.

National Healthcare Information Infrastructure Architecture – Security Services



Secure Communication Layer and Services (SCLS)

Healthcare Provider
Registry

Patient
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Registry

Authentication

Secure Networking
Service

Interface to the outside

Identity, Role & Access
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Authentication

Secure Networking
Service

Security Services care for confidential access and user authentication

- Authentication:

- WHO? Secure identity check of participating identities (patient, health professional, IT).

- Secure Networking:

- Confidentiality, traceability is ensured.

National Healthcare Information Infrastructure Architecture – Identity and Role Management



Secure Communication Layer and Services (SCLS)

Healthcare Provider Registry

Patient Registry

Healthcare Prof. Registry

Authentication

Secure Networking Service

Interface to the outside

Identity, Role & Access Service / Management

Identity, Role & Access
Service / Management

Managing identities, roles and permissions

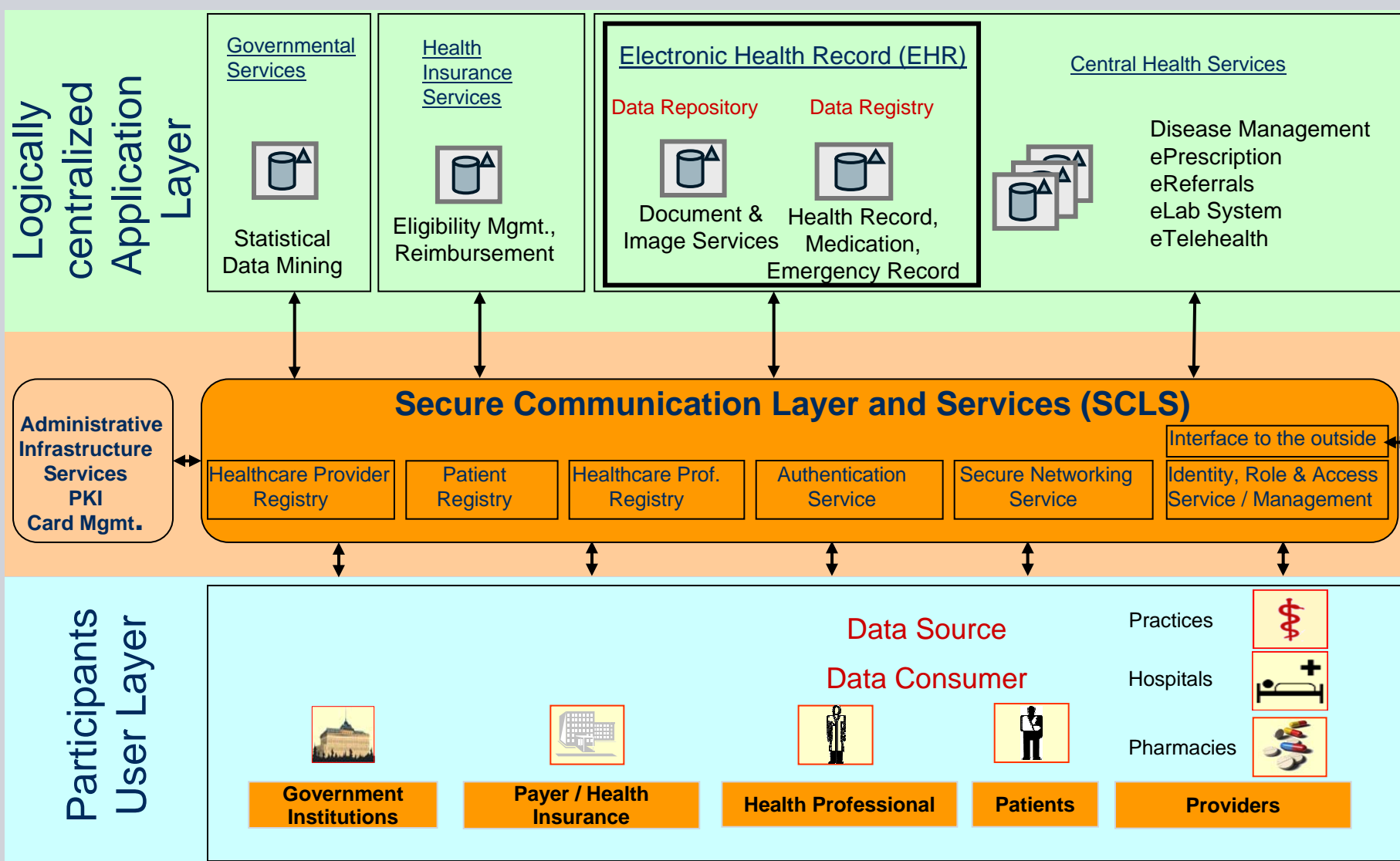
- Identity and Role Management:

- Who belongs to which group of user (role)? And which permissions do these users implicitly own by this role?

- Access Management:

- Who is allowed to do what? And who has the authority to decide on what?

National Healthcare Information Infrastructure Architecture



National Healthcare Information Infrastructure Architecture – centralized Applications

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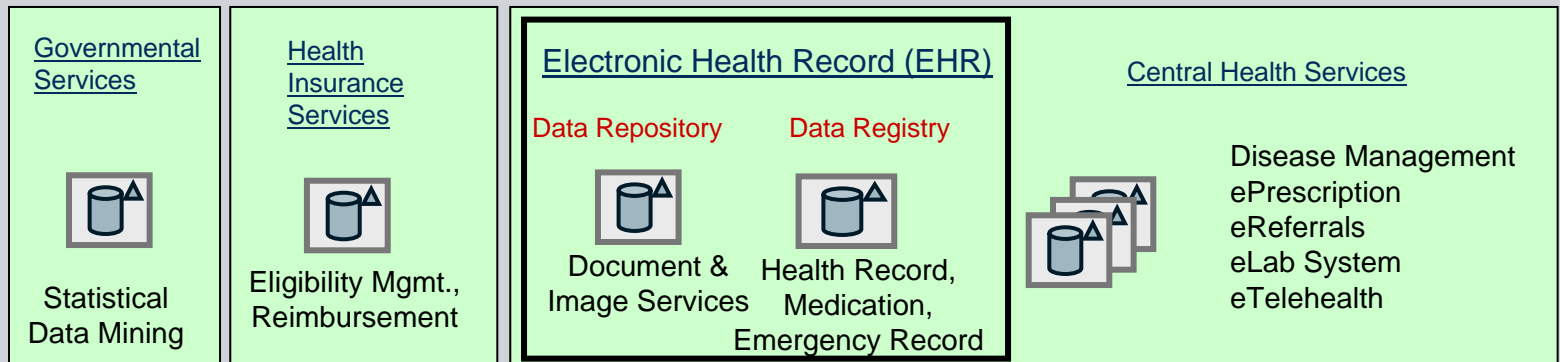


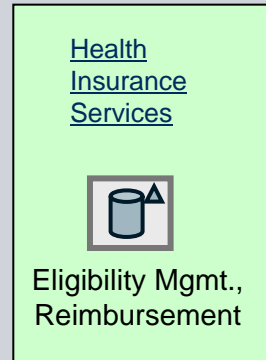


Governmental Services

- Epidemiological Forecast:
 - Supports advanced forecast algorithms to cope with epidemiological events like SARS or bird flue.
- Data for medical Research:
 - Advanced data mining mechanisms will deliver sound statistical data with regards to contraindications and health trends.

National Healthcare Information Infrastructure Architecture – centralized Applications

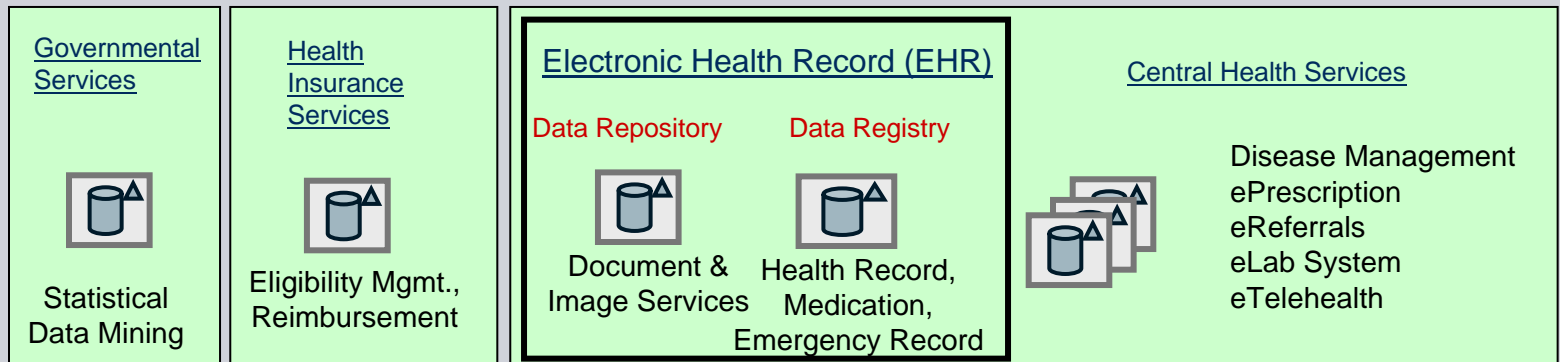




Health Insurance Services

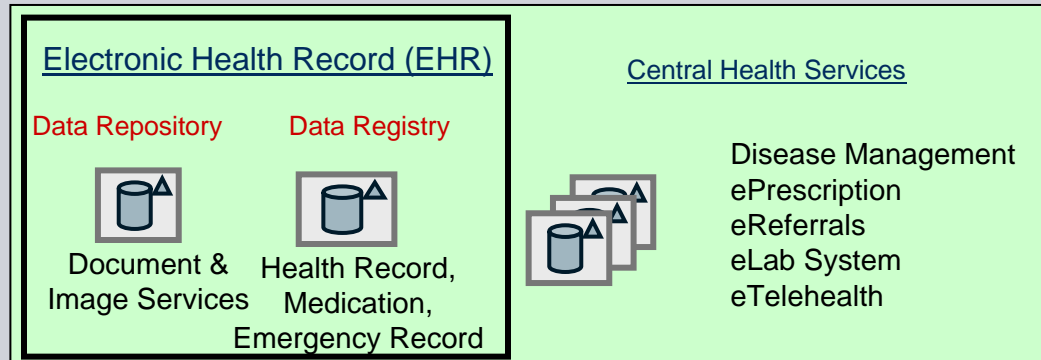
- Eligibility Management:
 - To prevent fraud and guarantee the health provider payment.
- Transparency in the payment process:
 - Due to short payment / refund cycles efficient finance management is possible.

National Healthcare Information Infrastructure Architecture – centralized Applications



National Healthcare Information Infrastructure Architecture – centralized Applications

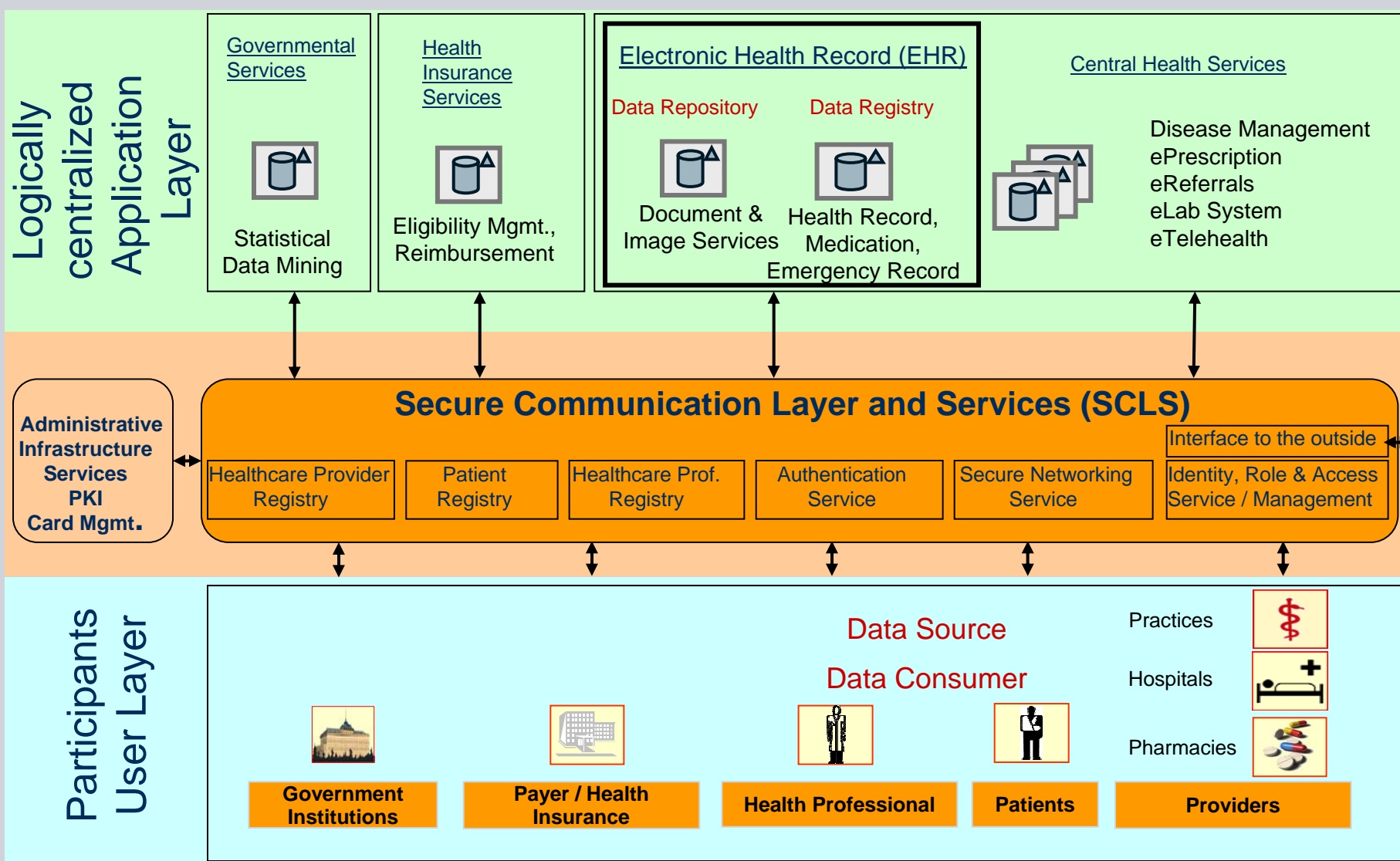
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EHR and Central Health Services

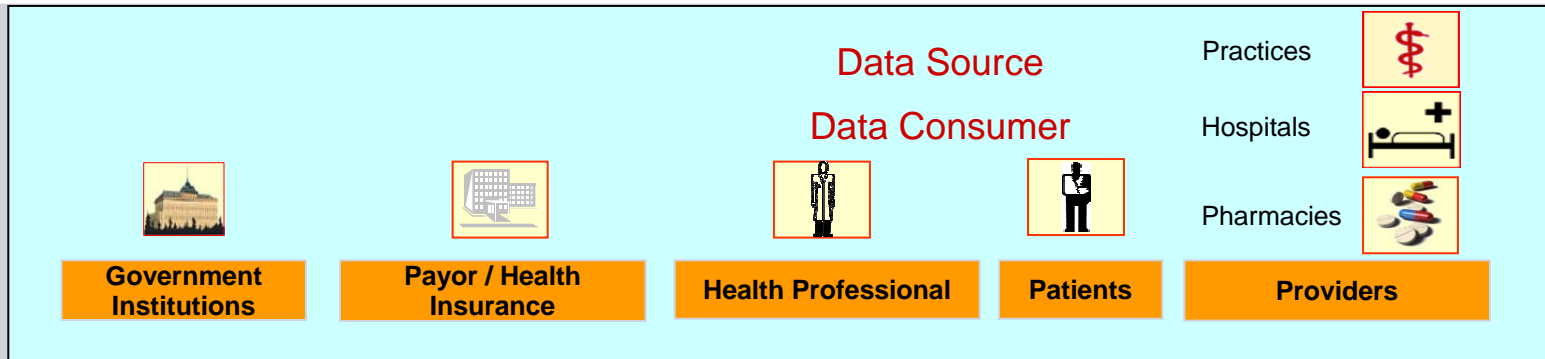
- The Electronic Health Record (EHR):
 - A patient centric data repository for medical information
- Central Health Services:
 - These are the actual applications which support the overlaid medical workflow.

National Healthcare Information Infrastructure Architecture



National Healthcare Information Infrastructure Architecture - Participants

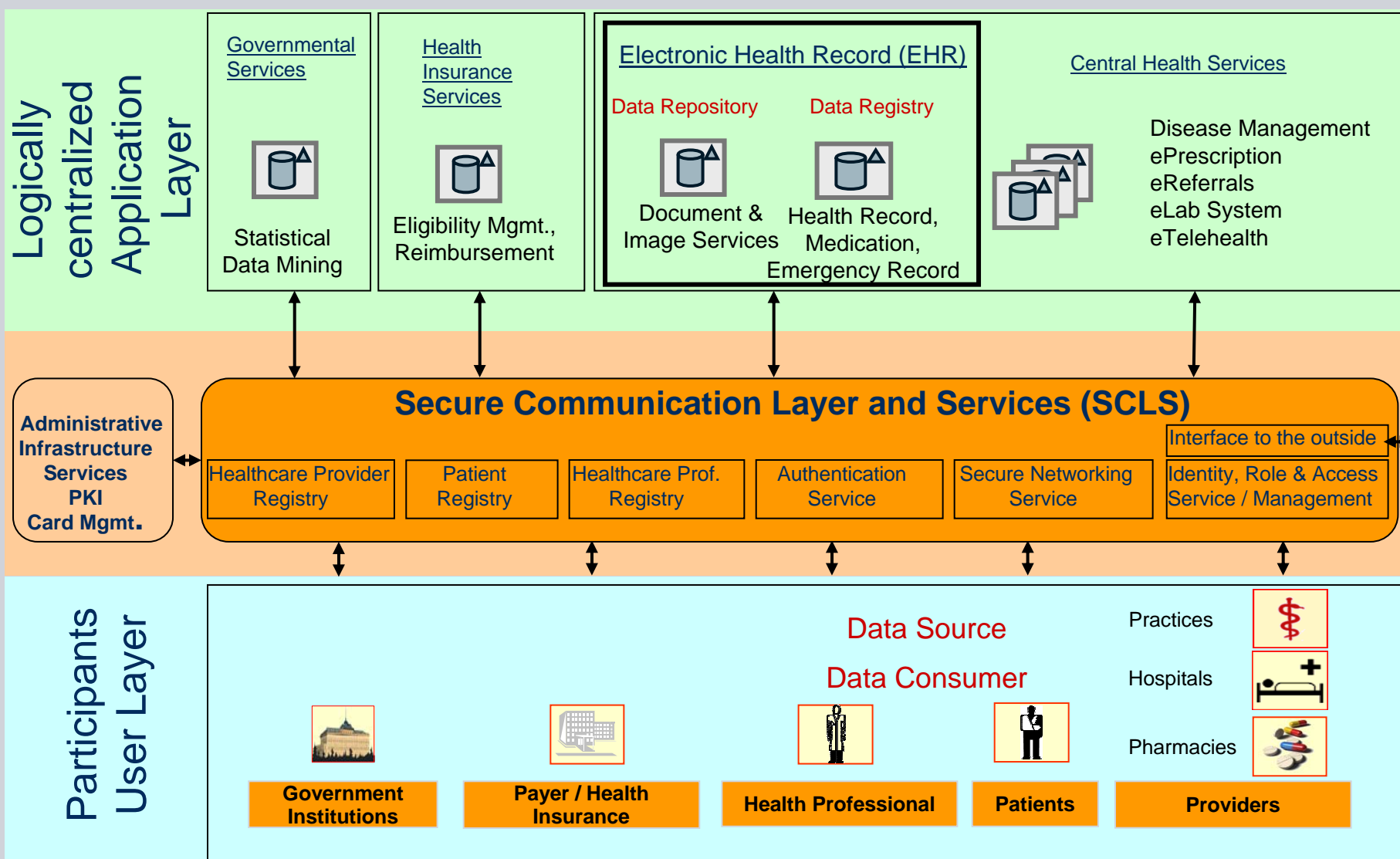
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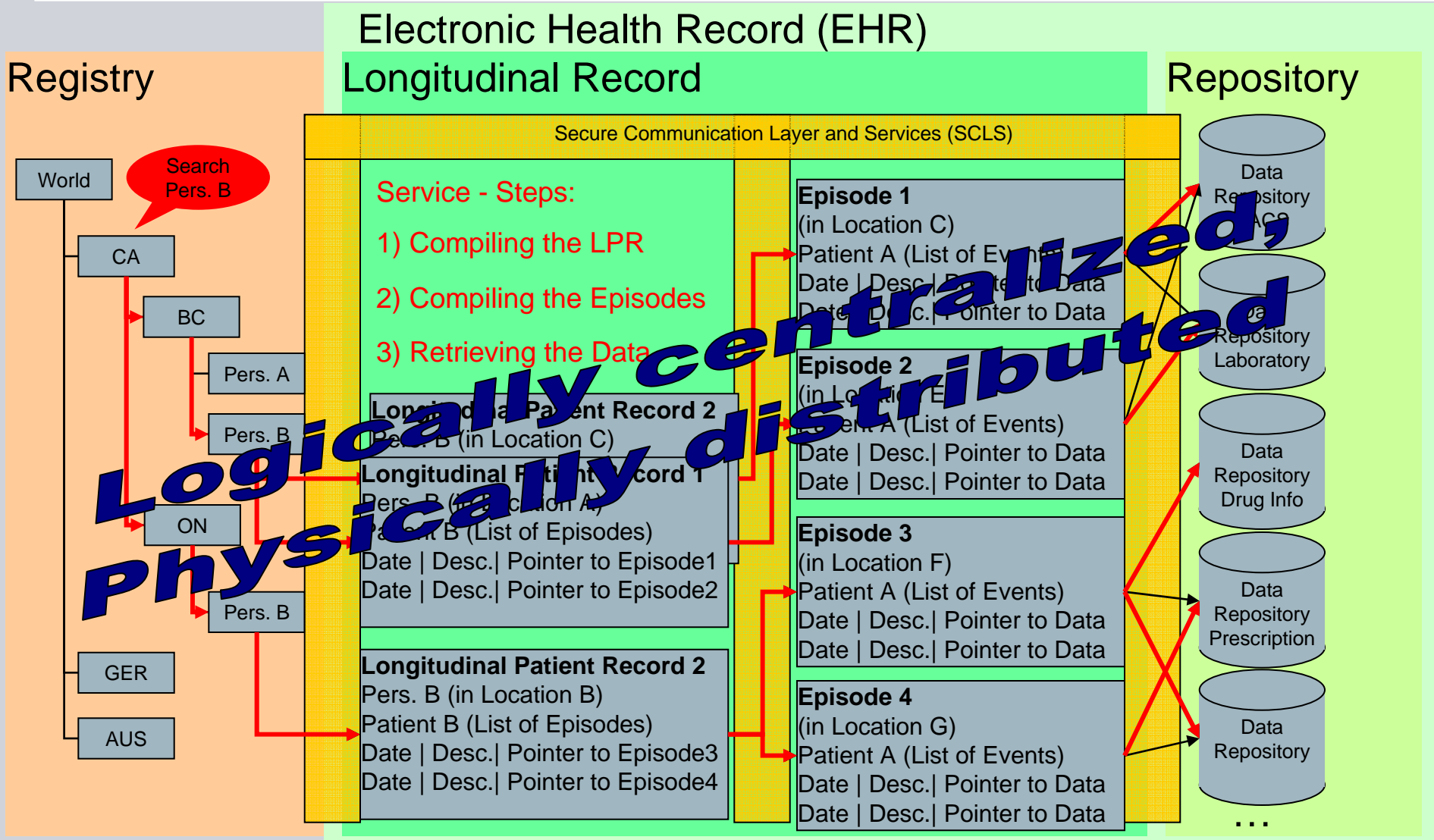
Participants

- Government Institutions → national health management
- Health Insurances → financing of the system
- Health Professionals → medical experts
- Patients → targets of the system
- Health Care Providers → GP's, hospitals, Pharmacies,...

National Healthcare Information Infrastructure Architecture – How does the system work for EHR?



Example 1: Access to a particular patient record Electronic Health Record (EHR)



Example 2: Implementation of the Health Card in Germany

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Requirements for a modern Healthcare Society

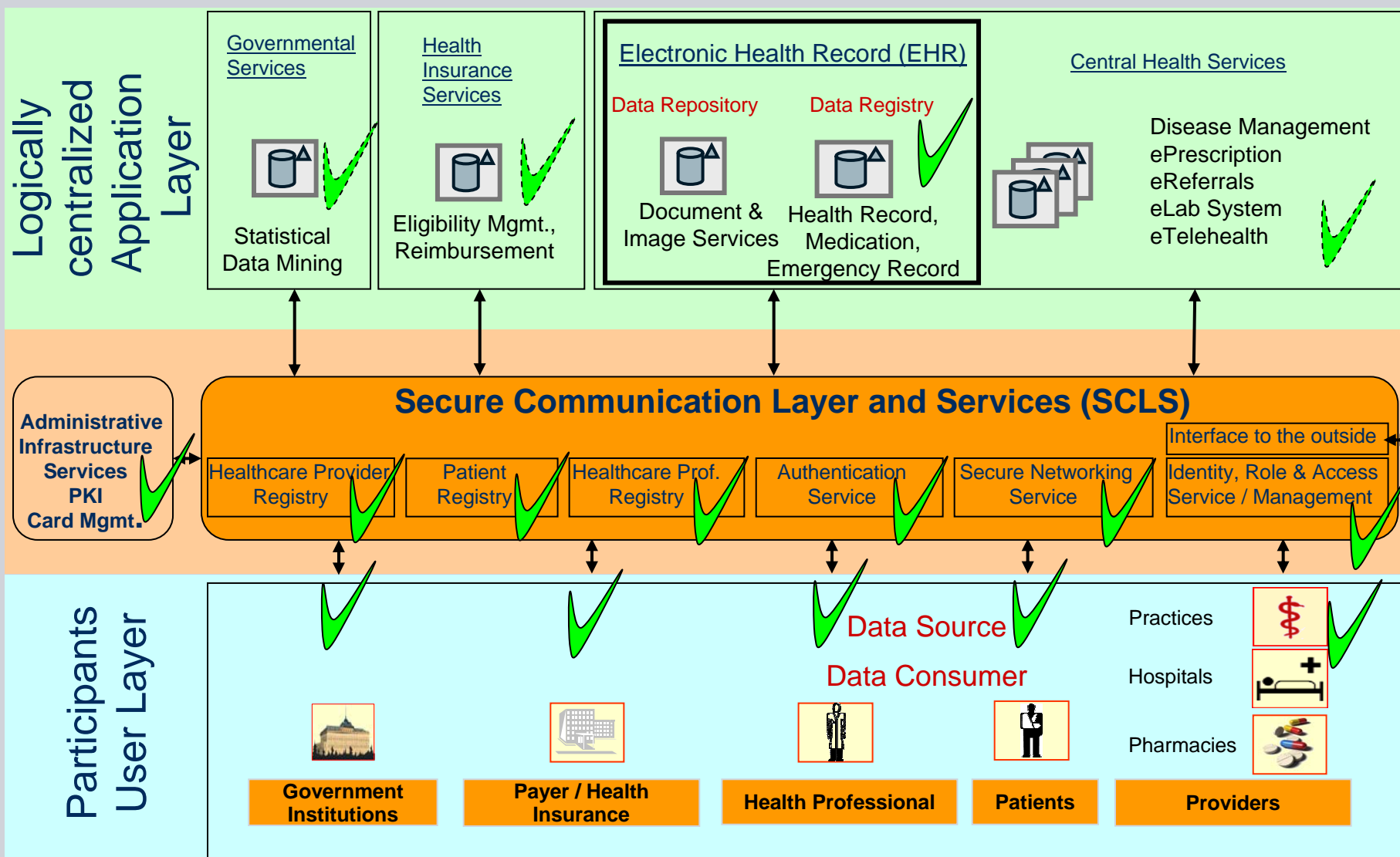
Requirements regarding IT-Security

Architectural View

Siemens deliverables

Why Siemens / References

National Healthcare Information Infrastructure Architecture – What can be delivered by Siemens?



Process Optimization in Healthcare Benefits for the Customer

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An electronically networked healthcare system ensures

- Higher quality of treatment
- Cost savings through more efficient administration
- Reduction of fraud and errors
- Fewer multiple examinations and treatment courses
- Process optimization



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**Thank You
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