

Integrating the Healthcare Enterprise Domäne “IT Infrastructure“

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Domänen als fachliche Struktur

- IHE is organized by clinical and operational **domains**.
- Each domain includes a **planning committee**, whose primary tasks are long-term scope planning and organizing deployment activities (such as testing events and educational programs).
- and a **technical committee**, whose primary task is developing and documenting this solutions (known as integration profiles),
- Each domain develops and maintains its own set of Technical Framework documents.
- **Coordination among domains** is the responsibility of the Domain Co-chairs Committee, comprising representatives from each of the domain planning and technical committees.
- Technical Framework <DOMAIN> volume 1 “Integration Profile“
- Technical Framework <DOMAIN> volume 2 “Transaction Specification“
- + “Supplements“



Domänen

Radiology

Cardiology

Laboratory

Pharmacy

IT Infrastructure

Patient Care Coordination

Patient Care Devices

Anatomic Pathology

Radiation/Oncology

Eyecare

Quality Research & Public Health



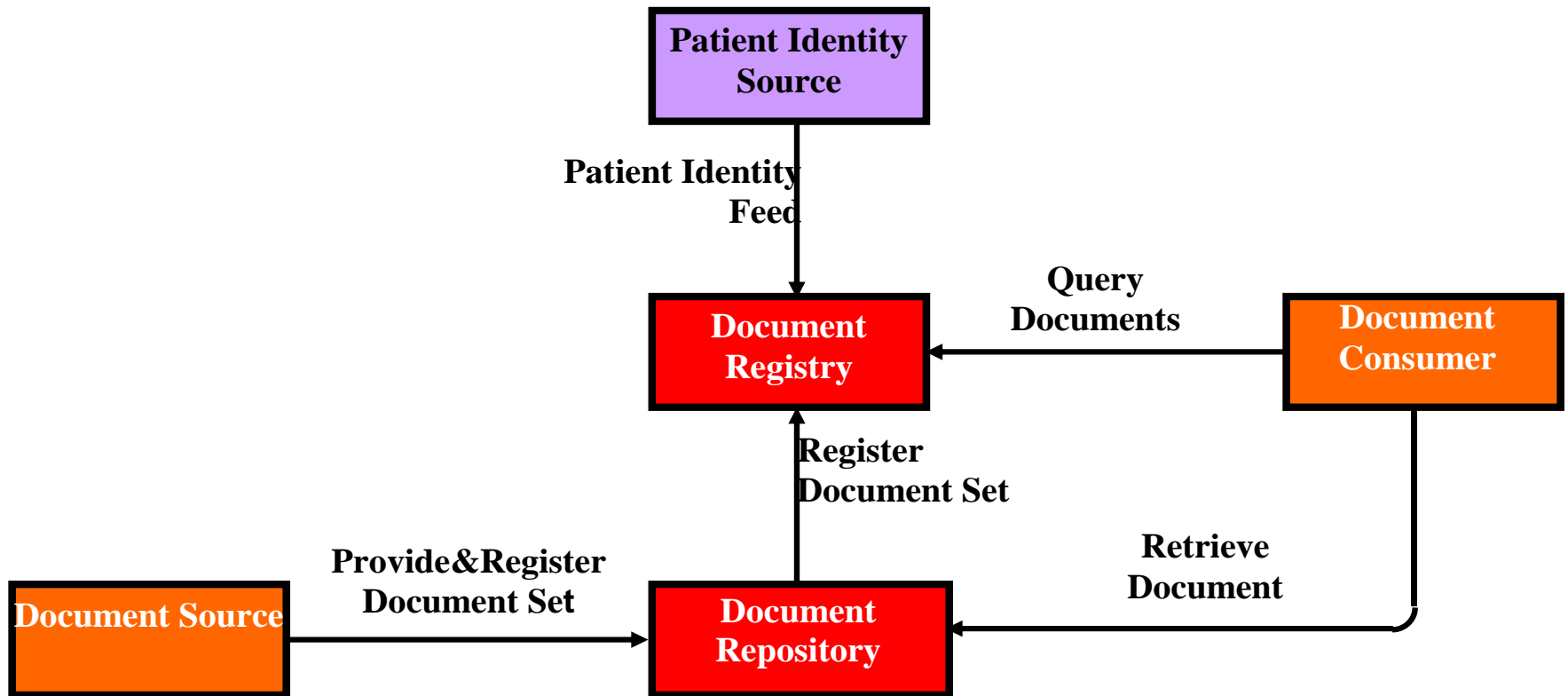
Ziel: Senden von Dokumenten

- Randbedingungen
 - große Objekte
 - Empfänger unbekannt / nicht begrenzt
 - schwache Kopplung: verbindungslos / asynchron
- Features
 - Identifizierung des Subjekts sehr wichtig
 - einrichtungübergreifend
 - Authentifizierung des Absenders
 - Authorisierung des Zugriffs

Idee

- Klinische Dokumente werden in einem Repository (nahe der Quelle) publiziert.
 - Provide
 - Register
- Eine Registry (im Verbund) erlaubt das schnelle Suchen mittels Meta-Daten und antwortet mit Verweisen auf Repositories.
 - Query (Registry)
 - Retrieve (Repository)

Cross-Enterprise Document Sharing (XDS) Transaction Diagram



XDS: Patient Identity Domain

- Eine Patienten-ID-Source verwaltet Patient Records (demographics) und eine Patient Identification Domain um die Records in dieser Domäne global zu identifizieren.
- Patient Demographics Query (PDQ)
 - Identify patient based on query of demographic information
 - Needed by Document Source: assign correct patient ID
 - Needed by Doc. Consumer: query against correct patient ID
- Patient Identity Feed
 - Notification
 - from ADT system
 - to Document Registry
 - of patient admission/registration (as known by Document Source)
 - “Provide” to Registry with existing patient ID

Cross-Enterprise Document Sharing: Abstract / Scope

- Dokumentenbasierter EHR
- Dokumente bleiben in bestehenden Archiven (PACS)
- Anlegen eines Index mit Verweisen
- “query” und “retrieve” von Dokumenten
- Skalierbare Architektur: mehr Sources / Repositories / Consumer

XDS: Eigenschaften

- VERTEILT: Jede Klinik/Praxis “veröffentlicht” klinische Information, wobei echte Dokumente in einer Repository in der Nähe der Quelle bleiben.
- ÜBERGREIFEND: Eine Registry stellt einen Index über publizierte Information für die berechtigten Kliniken in der clinical affinity domain bereit (Kooperation & SLA).
- DOKUMENTENZENTRIERT: Publizierte klinische Daten liegen als Dokumente in Standard-Formaten vor (HL7-CDA, ASTM-CCR, PDF, DICOM, etc.)

XDS: Eigenschaften (2)

- **SKALIERBAR:** mehr Sources/Consumer, größere/mehrere Repositories, größere Registry
- **INHALTSNEUTRAL:** Nur Document Source und Document Consumer müssen den Inhalt verarbeiten können.
- **STANDARDISIERTE REGISTRY ATTRIBUTE:** Queries basierend auf relevanten Attributen stellen determinierte Suche sicher.
- **KOMBINIERBARE AKTOREN:** Source/Repository (oD) – Registry/Repository (XDS-I)– Source/Repository/Consumer (Localnode)

XDS: Charakteristik

- eFA, PHR, eGA ?
 - überregional gültige Identität & global auflösbare Referenzen
 - zeitlich lange gültige / invariante Identitäten & Referenzen
- Document Source:
 - Abschalten
 - Vorhalten sehr großer Objekte (XDS-I)
 - Berichterstellung bei Anfrage
- Folder: Gruppieren von Dokumenten
- Metadaten-Modell: Suchen, jedoch auch Security (Assertions)

XDS: Einsatz

- Basis für den Austausch von Informationen
 - klinische Dokumente verschiedener Quellen
- Skalierbarer Austausch klinischer Dokumente
 - Niedergelassene, Ambulanzen, Kliniken(stationär), Apotheken, Radiologen mit verschiedenen klinischen IT-Systemen.
- Leichter, jedoch sicherer Zugriff
 - Teilnehmer erhalten Möglichkeit für Query/Retrieve der Dokumente
 - Registry kann Zertifikate für Zugriffssicherung prüfen
- Grundlage für Gesundheitstelematik
 - gemeinsam nutzbarer Electronic Health Record, in einem Verbund, KV-Bezirk, Staat, o.ä.

XDS: Telematik-Szenarien

- Praxisnetz
- Überweisung / Verlegung
- Ferienvertretung
- Mergers, Aquisitions
- Divestitures
- Health Surveillance
- PHR Services
- Remote Consulting

IT Infrastructure (1)

- XDS: Cross-Enterprise Document-Sharing XDS.b (SOAP)
- NAV: Notification of document Availability
- PDQ: Patient Demographics Query
- PAM: Patient Administration Management -konsistente adm. Daten

- ATNA: Audit Trail & Node Authentication
- BPPC: Basic Patient Privacy / Consent
- CT: Consistent Time
- DSG: Digital Signature & Validation
- EUA: Enterprise User Authentication
- PWP: Authorized User Directory



IT Infrastructure (2)

- REQUEST INFORMATION FOR DISPLAY (RID) simple (browser-based) read-only access to domain documents.
- PERSON SYNCHRONIZED APPLICATION (PSA) selection of a patient in one application to cause other applications on a workstation to tune to that same patient.
- PERSONNEL WHITE PAGES (PWP) basic directory information on staff
- CROSS-ENTERPRISE DOCUMENT MEDIA INTERCHANGE (XDM) transfers XDS documents and metadata over media/email
- REGISTRY STORED QUERY TRANSACTION

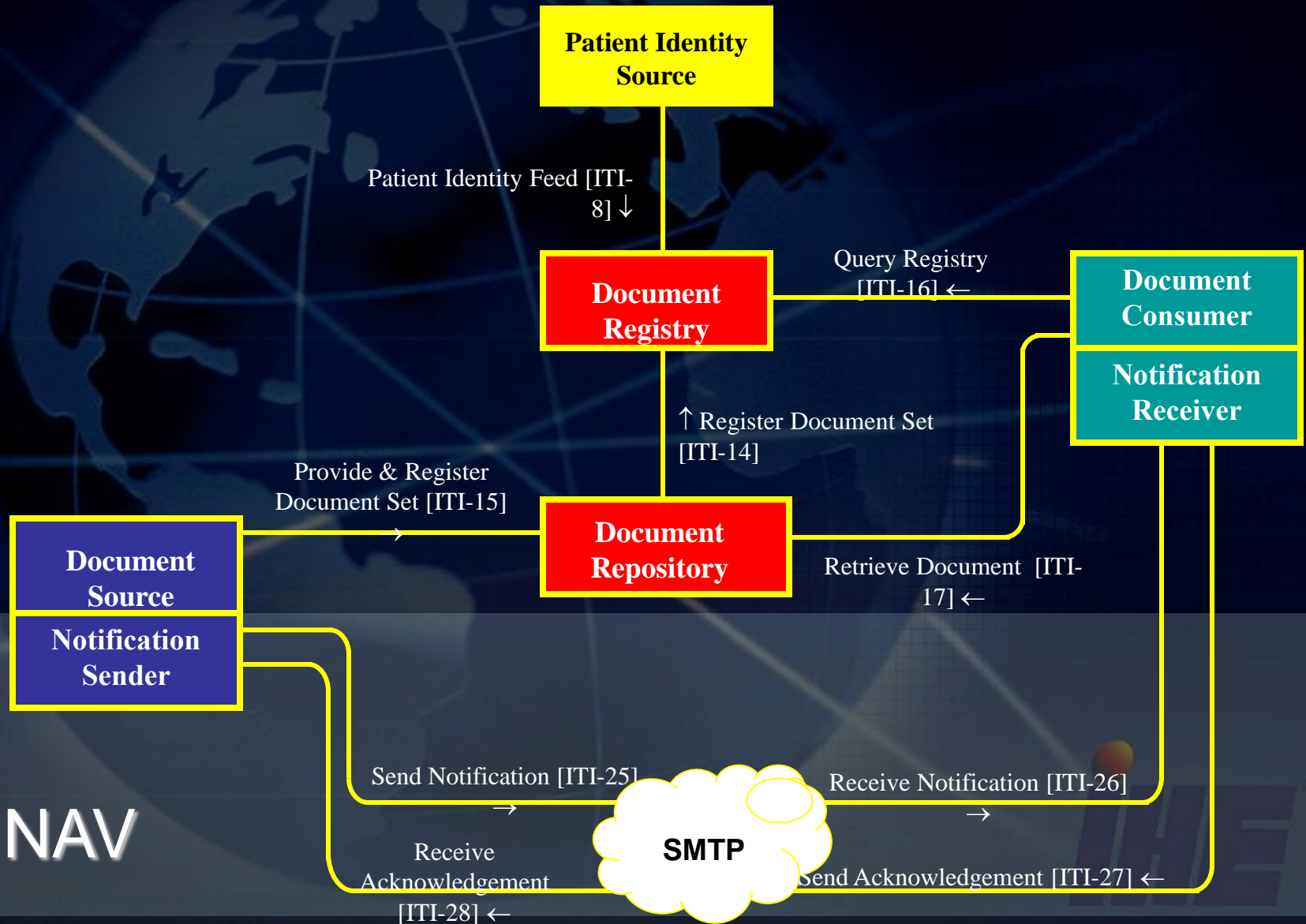


IT Infrastructure (3)

- XAD: Cross-Community Affinity Domain (patient identity)
- PIX: Patient Identity Cross-referencing
- XUA: Cross-Community User Authentication
- XCA: Cross-Community Access
- Cross-Enterprise Privacy Policy (XPP)
 - Policy exchange
 - Policy based access

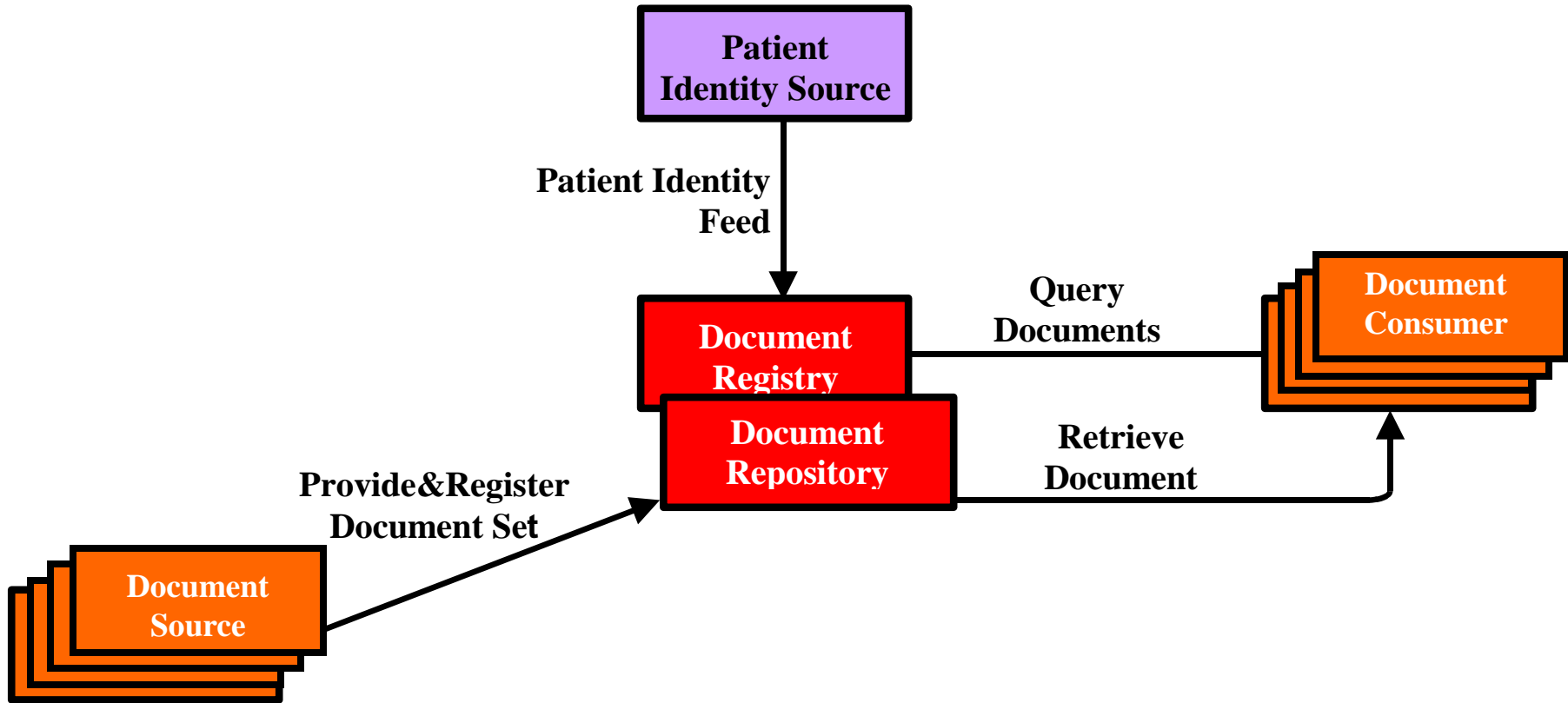


XDS / NAV : Kombination der Akteure



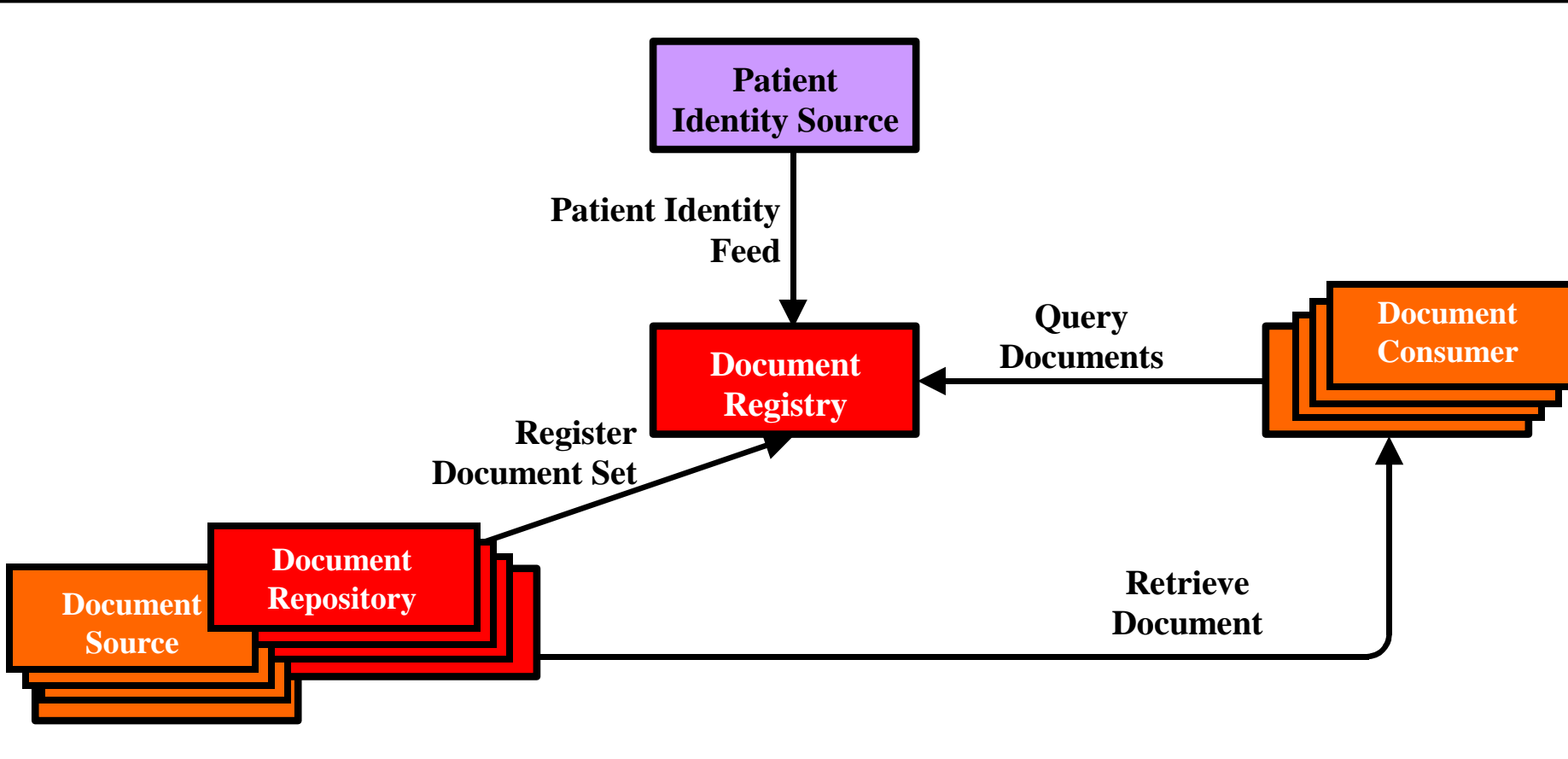
IHE-XDS

Zentralisierte Architektur



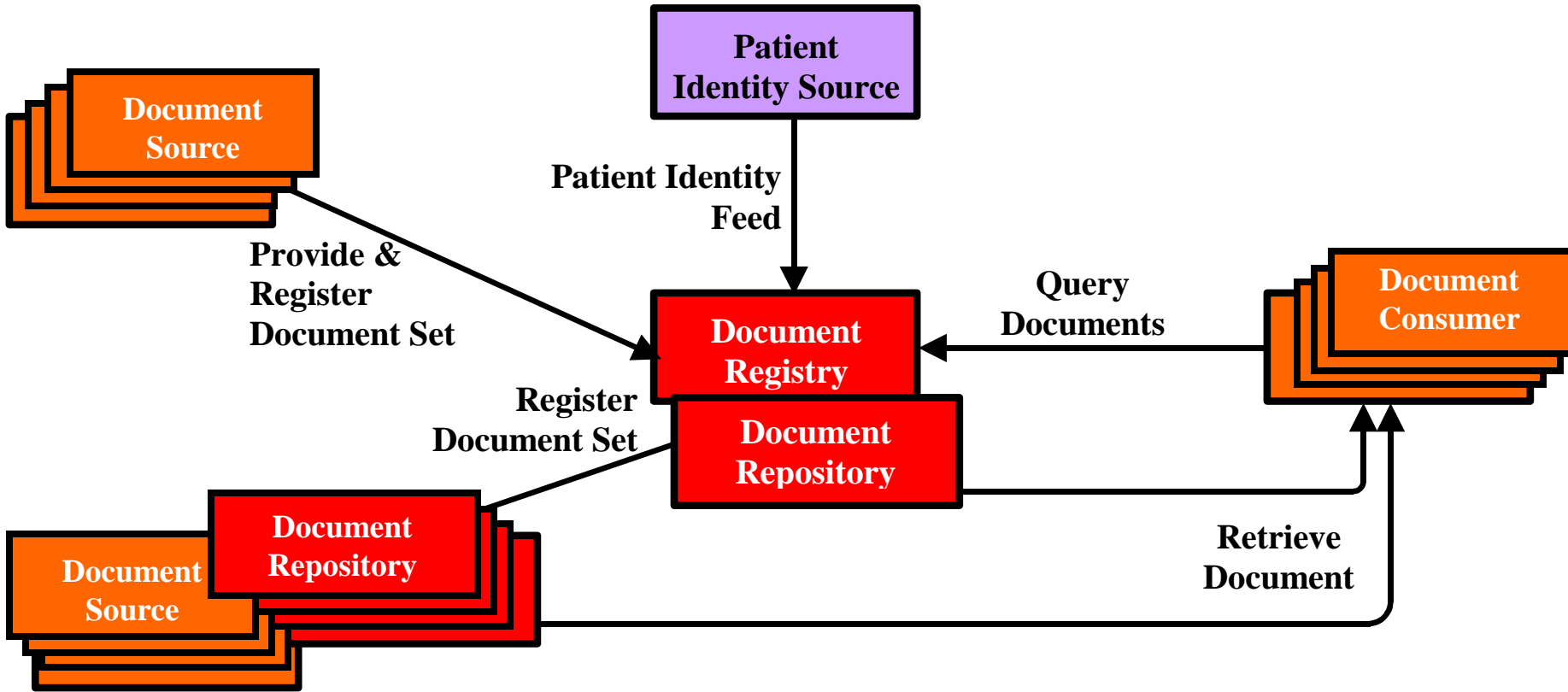
IHE-XDS

Dezentralisierte Architektur



IHE-XDS

Gemischte Architektur





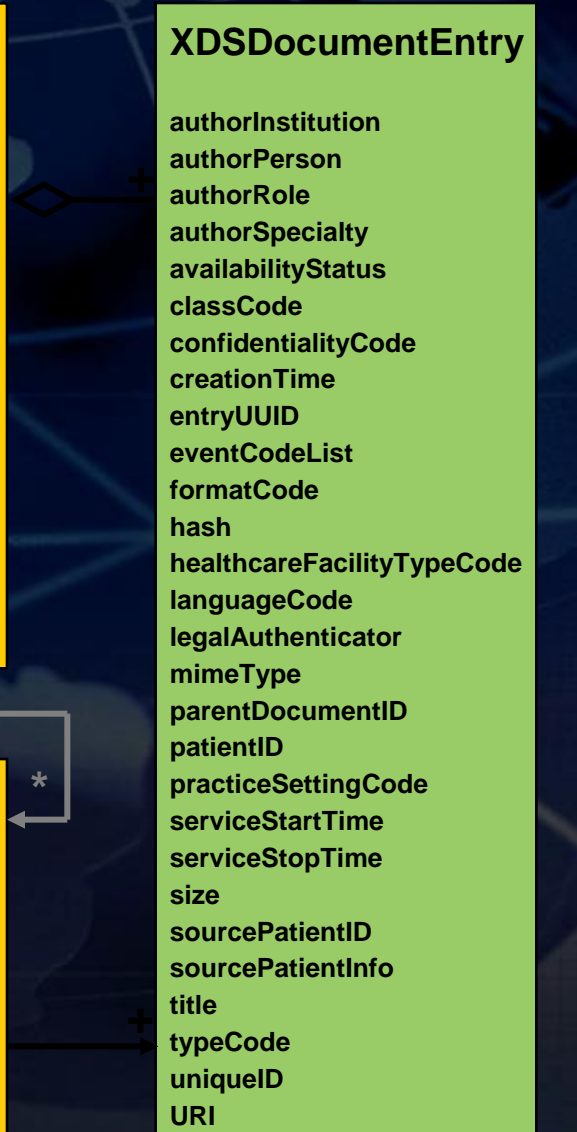
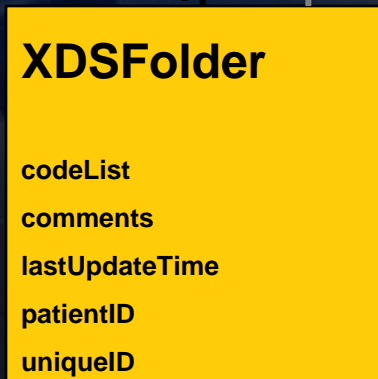
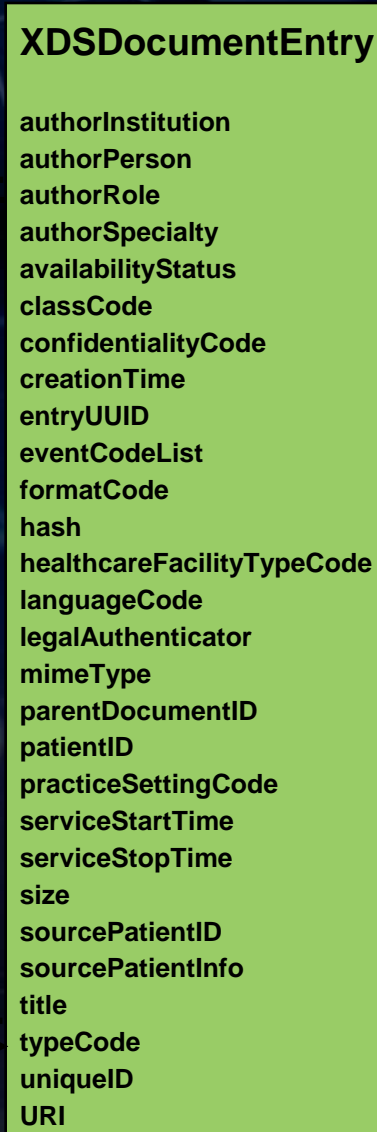
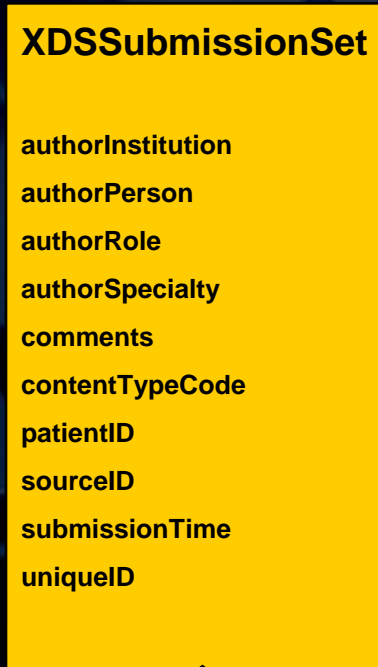
Danke für Ihre Aufmerksamkeit !



ebXML Registry vs XDS

- XDS is a Profile of the ebXML Registry standard
- ebXML Registry is two standards
 - ebRIM (Registry Info Model)
 - ebRS (Registry Services - protocols)
- XDS uses a SMALL subset of ebRIM and ebRS

Class Diagram



some attributes help to describe / identify

- author
- patient
- document source
- encounter

other describe logical / technical info

- title
- type of document
- eventCodeList
- classCode
- availabilityCode
- confidentialityCode
- formatCode
- language
- MIME Type
- size



XDS: Standards Used

- HL7 Version 2.3.1
 - Messages for Patient Identity Management
- HL7 Version 2.5
 - Metadata: Registry Attribute values
- DICOM, ASTM CCR, HL7 CDA Release 2, CEN EHRcom
 - Metadata: Document Entry Attributes

XDS: Query Standards Used

- ISO/IEC 9075 Database Language SQL
 - Registry Query Language
- SOAP with Attachments
 - Protocol for communication with XDS Registries and Repositories
- SHA-1 [FIPS 180-1]
 - Document Hashes
- OASIS/ebXML (UN CEFACT)
 - Registry Information Model v2.0
 - Registry Services Specifications v2.0
 - Messaging Services Specifications v2.0

XDS: Content Standards Used

- Outside scope of XDS; layer on top of XDS
- Documented as Document Content Profiles
 - Document use cases and translation of document content into registry metadata
 - Publishable separately
 - Guide for writing DCPs available
 - Intended mostly for IHE domain committees
- Of concern only to Document Source and Document Consumer actors
- Examples include: HL7 CDA, DICOM, ASTM CCR

XDS: Protocol Standards Used

- HTTP
 - Protocol for Retrieve Document
 - Online SOAP bindings
- SMTP
 - Offline ebMS bindings
- IETF
 - Language Identifiers
- MIME
 - Document Type codes
- UTF-8
 - Encoding of Registry Attributes

Protocol Layering

Metadata & Documents

within

SOAP with Attachments

within

HTTP Post

within

...



Cross-Enterprise Document Sharing (XDS) *Standards Used*

Klinische IT-Standards

HL7 CDA, CEN EHRcom

HL7, ASTM CCR

DICOM ...

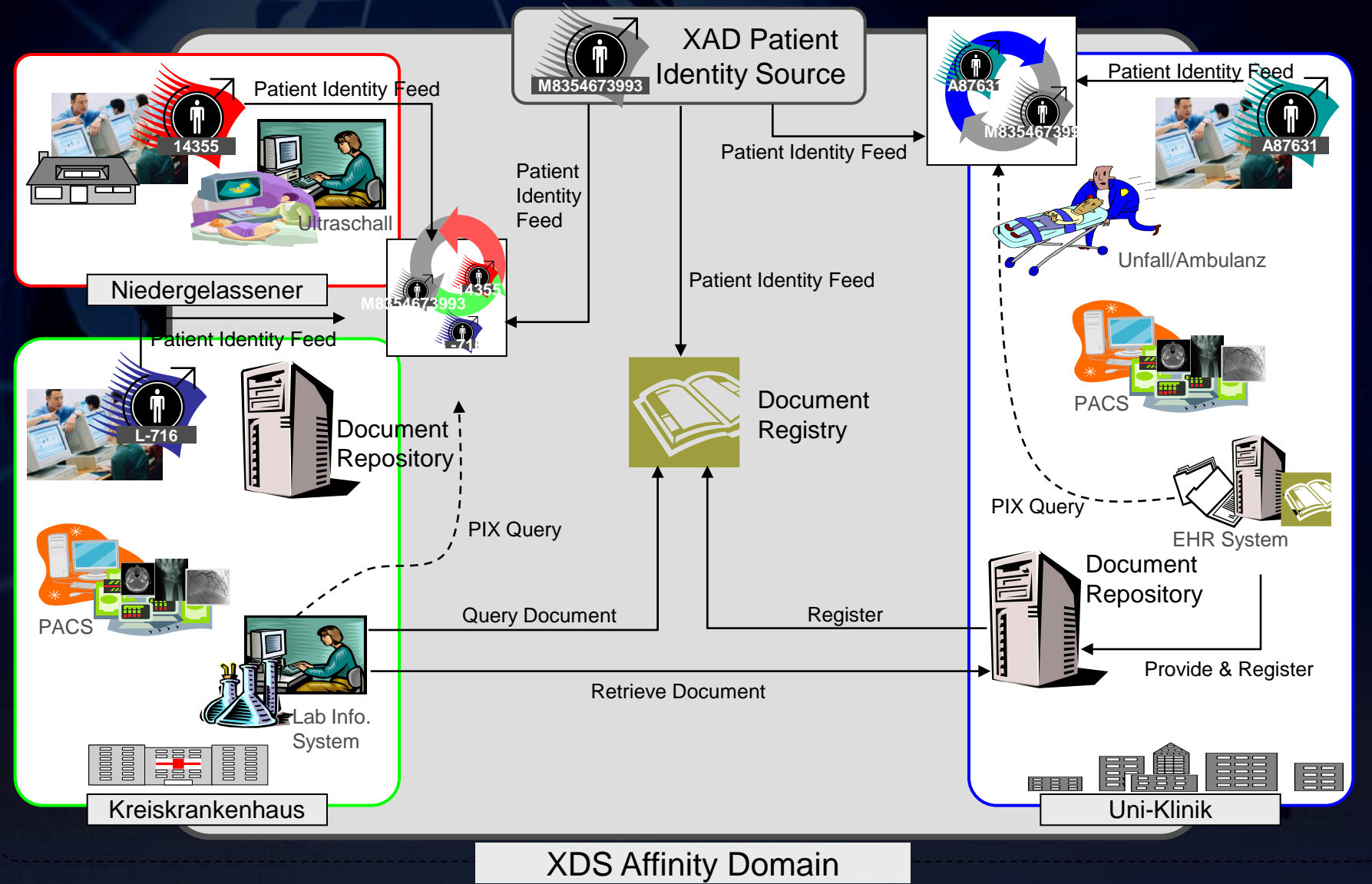
Electronic Business Standards

ebXML, SOAP ...

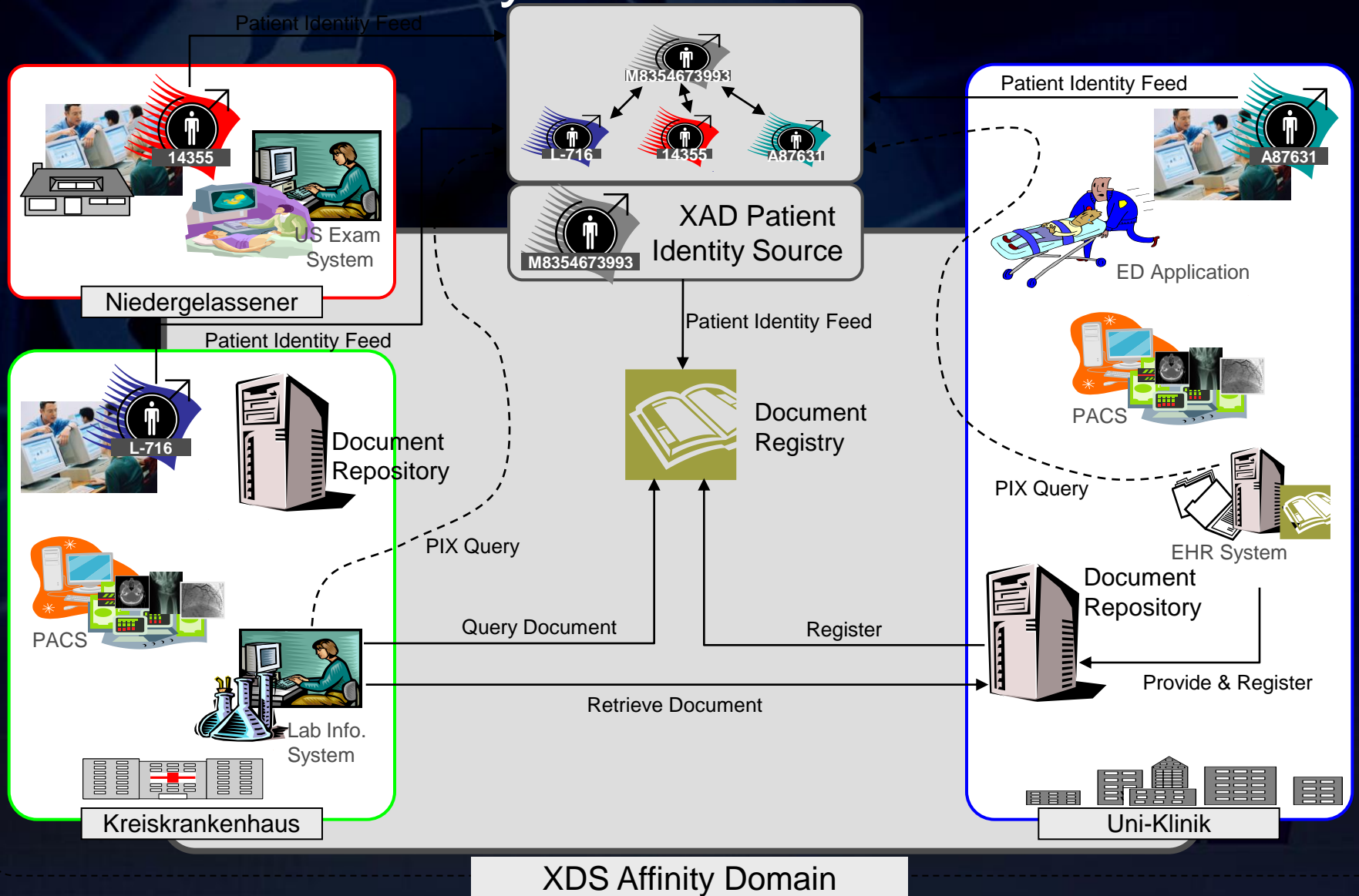
Internet Standards

HTML, HTTP,
ISO, PDF, JPEG ...

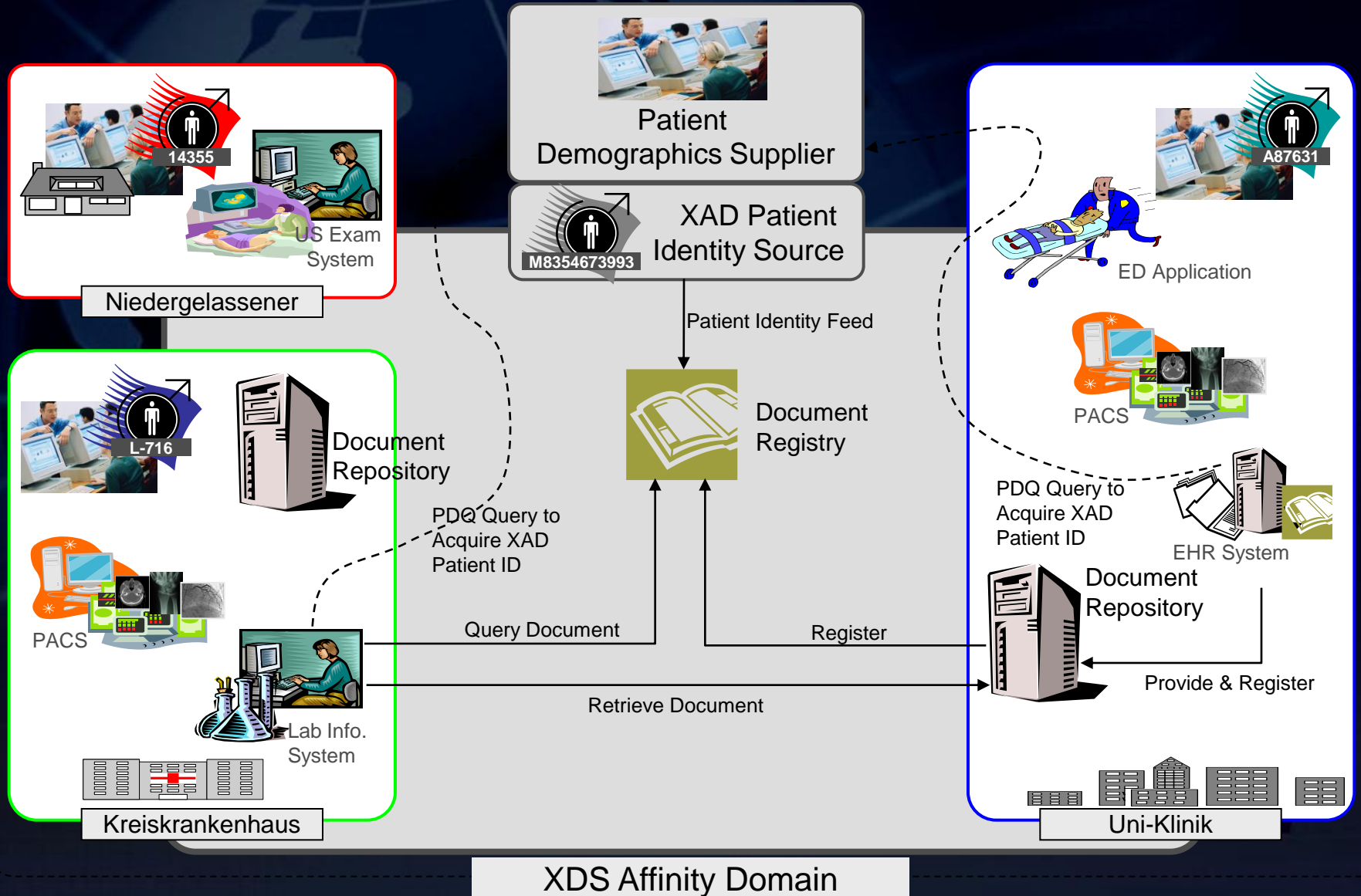
Suche XAD Patienten-ID mit lokalem PIX-Service



Suche Patienten-ID mit Affinity Domain PIX Service



Suche Patienten-ID mit Patient Demographic Query (PDQ)



ITI Historie

2004

- Patient Identifier Cross-referencing for MPI (PIX)
- Retrieve Information for Display (RID)
- Consistent Time (CT)
- Patient Synchronized Applications (PSA)
- Enterprise User Authentication (EUA)

2005

- Patient Demographic Query (PDQ)
- Cross Enterprise Document Sharing (XDS)
- Audit Trail and Note Authentication (ATNA)
- Personnel White Pages (PWP)

2006

- Cross-Enterprise User Authentication (XUA)
- Document Digital Signature (DSG)
- Notification of Document Availability (NAV)
- Patient Administration/Management (PAM)



IT Infrastructure Profiles : Discussions

- XDS Federation
- XUA – Cross-Enterprise User Authentication
- Scheduling / Workflow Support
- PIX and PDQ using HL7 v3
- Web Services Transport for IHE Transactions
- Anonymization / Pseudonymization
- Patient-controlled access



Referenzen

Quellen (Executive Summary)

