Interoperability for Healthcare Providers

A Software Insider’s Point of View
About us

• 10 years of expertise exclusively in the medical software field
• about 200 employees (120 involved in software development)
• Microsoft Gold Partner (ISV & MBS)
• ISO 9001:2001 certified
• International presence in several countries (United Kingdom, Bulgaria, South Africa, Republic of Moldova, Germany, Austria)
• HL7 International and HL7 Romania member
• IHE Connectathon participant
Agenda

• Business Case – Medcenter Romania
• Interoperability – nontechnical perspective
• Solution
• Architecture And Design Blueprint
• Tools & Technologies & Standards
• Change management
• Discussions
About Medcenter

- 13 clinics
- 8 laboratories
- 5 hospitals outsourced
- 500 trained users
- 480,000 exchanged documents (HL7 CDA) / month
- 50,000 encounters / month
Security
Directory
Transaction Monitoring
Database Engine Messaging
Workflow
Business Rule Engine
ESB etc

Vocabulary
Electronic Registries
- Medical personnel
- Healthcare Organization
- Persons
- Insured people

Healthcare Prov
HIS
-LIS
-CIS, Pharmacy etc
-PHR

Payers
-Claim and processing

Regulators
-Public Health Reporting
-e-Prescribing
-EHR
-Health Card

Statistics
Data mining
Knowledge Inference
Medical Guidelines
Drug interaction
Fraud detection
Interoperability levels

Syntactic

Semantic

Vocabularies
Identities
Business Rules

Data Structure
Transport

The ability of different systems to work in an integrated way
Requirements for a Healthcare Provider’s Solution

• Leverage existing assets
• Support both customized systems and commercial off-the-shelf (COTS) packages
• Support incremental adoption and implementation
• Provide support for loose coupling between systems
• Incorporate synchronous and asynchronous communication and transaction models
• Be secure
• Support multiple programming languages and platforms
• Handle large volumes and transaction rates that exhibit peaked behavior
• Support different topologies and 24/7 operations
Questions for an electronic service

- What are the operations that we can perform?
- What are the exchanged data structure?
- What are the returned exceptions?
- What about the transport level? (FTP, e-Mail, WS..)
- What is the physical address?
- What about security? (incl. authentication & authorization)
- What is the meaning of the data? (semantic)
- What are the business rules that I should respect?
- Are the rules formalize in a language?
- Can I access the vocabularies used in data structures?
- Can I access the entities used in data structures?
- Do I have a testing environment?
- Do I have simulation features? (ex. Preauthorization)
Success criteria – Medcenter perspective

- Friendly user interface
- Electronic claiming
- Paperless
- Data exchange among all actors involved
- Transparent clinical data reporting
- Prompt implementation of new medical sheets
- Possibility to modify medical vocabularies on the fly
Solution to interoperability issues

Server based communication with HL7 v3, CDA 2.0 documents as a data contract was the chosen solution for the data exchange between healthcare providers.
Deployment Architecture

Implementation Details

• HC Romtelecom
• Applications
  – Hospital Manager 3.0
  – Laboratory Manager
  – IQPACS
  – Inventory
  – Medichart
  – Medipedia
Architecture Backbone Components

Range of services that can be "orchestrated" to enable and support business processes
End User Solutions Based On PnP Medical Framework

Hospital Manager 3.0

UI Components (UIC)

UI Process Components (UIP)

Business Process Components (BPC)

Enterprise Service Bus

RLUS

EIS

OR

EVS

Data Sources

IQ PACS
• **Authentication**
  - Username/Password, SmartCard validated against Kerberos
  - SAML assertions verified by the called service

• **Role based authorization**
  - Roles stored in LDAP
  - Policies defined using XACML language

• **Record level authorization**
Enterprise Vocabulary Services Features
Coding Systems, Value Sets, Mappings

- Manages the data dictionaries for any application
- Offers the functionalities dealing with the management of the coding systems
- Based on HL7 Common Terminology Services
Identity Management Service

- Generates Identity
  HL7 II Data Type
- Context based identity
  Ex: Department, Ward, Doctor, organization, date etc
- Counter availability
- Entity Identity
  Ex: Person, Organization etc
- Acts
  Ex: HL7 CDA, Accounts receivable, Account payable etc
Entity Identification Services

- Allow the lookup and management of a wide variety of entities and roles including, but not limited to HL7 Entities:
  - Patients
  - Persons
  - Devices
  - Organizations
  - Referrals
  - Doctors
  - Companies etc

Integrated with all end user client application
Record Location and Update Service

• Define, at a service level, an appropriate interface to locate, retrieve, and update resources among and between healthcare organizations

• It has two main components:
  – Registry
  – Repository
Publish-Subscribe Service – Features and Tools

- Used in all registry or business services
- Two delivery modes: push and pull
- Based on subscription manager
- Expiry constraints
- Includes XPath or custom filter dialects
Query for Existing Data Service

- Aggregates clinical data from multiple sources (EHR, LIS, PACS, ADT)
- Backbone for Dashboards application
- Used by DSS and Clinical Protocols workflow engine

- HL7 v3 interface profiled by IHE PCC
- Implements paging to improve UI responsiveness
Clinical Templates Tools

Streamlines the development of clinical documents to automate forms generation, data capture, and processing.

enables creation of forms that combine **windows and web presentation** with **HL7 CDA data handling**.
Template Tools - Features

- Multiple Printing Format
- Narrative Designer
- Report Designer
- HL7 Templates
- CDA Data Structure
- Semantic Reasoning
- Ontology Binding
- Form Designer
Templates - Change management

- Template designer
- Narrative designer
- Form designer
- Report designer
- aFine Runtime

Diagram:
- Change Request
- New Feature
- Update CDA Implementation guide
- HL7 Templates/ADL definition
- Implementation & Testing (aFINE IDE)
- User Acceptance Test
- Deployment
Electronic Claiming

Technical experience

- Online claims
- Batch claims
- Workflows
  - Claims
  - Eligibility checking
  - Preauthorization
  - Reimbursement etc
- Reimbursement
  - Per capita
  - Per services
  - DRG etc
- Business Rules Engine (BRE)
Batch Insurance Claiming - Workflow

Data Warehouse

Semantic conversion

Syntactic conversion

Business rule checking
Change management – BATCH eClaimimg

- Data Warehouse
- Semantic conversion
- Syntactic conversion
- Business rule checking

Effort:
- Low
- Medium
- High
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Discussions

Questions