SILAM: integrating Laboratory Information Systems within the Liguria Region Electronic Health Record

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Introduction

• During the last few years some important challenges have been posed in the healthcare world in order to develop new standards that improve medical provision, workflow and efficiency in meeting the needs of patients.

• To fulfill these requirements, analytical results should be automatically available directly from the data sources.
Background

• MEDINFO Laboratory cooperates with the Infinity Technology Solutions Company in the project S.I.L.A.M. for the “Realization of an informative system for the adaptation at the state-of-the-art standards reference sector in medical laboratory information systems”

• The project is developed within the regional operative programme POR CRO Regione Liguria 2007-2013 Line 1.2.2: “Industrial Research and experimental development activities”
Standards

• The task is not only to provide information to real people, but also to make this data available to intelligent agents, for this reason standardization and structure play a key role;

• Health Level Seven (HL7) is the reference standard for the infrastructure dedicated to the exchange and sharing of data;

• Logical Observation Identifiers Names and Codes (LOINC) is the best tool for the translation of information related to laboratory studies;
Why HL7v3 ??

• Created specifically for sharing information about a patient
• It standardizes the entire complex of a healthcare system at the level of clinical data
• It is widely extensible
• It makes the various entities of the health-care world interoperable

Why LOINC ??

• It totally integrates with HL7
• It improves the management of clinical data coming from the laboratories, which produce data on behalf of hospitals and clinicians
• It is adopted by TSE (Electronic-Health Chair shared by the Italian Ministry of Public Administration and Italian Regions) in the context of technical standards for the creation and development of the prescription and report document
• Laboratory Information System

• Central data repository, which links the entities with each other

• Clinician’s Information System
Materials & Methods

• In the Visual Studio environment the following have been created:
  ➢ 1 Client for the interface simulating the clinician workflow
  ➢ 1 Client for the interface simulating all the operations that occur in the LIS
  ➢ 1 Web Server representing the entire health-care system of the Liguria region

• By means of SQL server the following have been created:
  ➢ 1 Database that allows the management of data of the entire processes and permits lifelong storage
  ➢ 1 Database for the management of all the operations in the Laboratory Domain
DB Schemas
Description:
• Collecting data from ASL2
• 260 Observations available, sorted by name
• Translation into International Standard LOINC Language
• 685 Observations in LOINC form described by means of 18 parameters
• Describes a series of actions which deals with a specific task in the healthcare domain;
• Descriptions occur through a series of snapshots or chronological events;
• Each snapshot shows the key participants in the Storyboard and the interactions with the other "players";
Imports System.Data
Imports System.Data.SqlClient
<ServiceContract()> _
Public Interface IService
  _
Function PRPA_MT201303UV02_Patient(ByVal pat_iden As PRPA_MT201307UV02, ByVal Auth_Iden As QUQI_MT021001UV01ControlActProcess, _
  ByRef Aknowl As MCCI_MT000100UV01) As PRPA_MT201303UV02Patient
<OperationContract()> _
Function give_exemptions(ByVal fis_code As String) As String()
<OperationContract()> _
Function give_LABS() As NewClasses
<OperationContract()> _
Function give_OBS() As ObservationClass
<OperationContract()> _
Function GIVE_CDA2(ByVal patient As Ana_Patient, ByVal clinician As QUQI_MT021001UV01AuthorOrPerformer) As POCD_MT000040ClinicalDocument
<OperationContract()> _
Function GIVE_CDA1(ByVal patient As PRPA_MT201303UV02Patient, ByVal observations() As POCD_MT000040Observation, _
  ByVal exemptions As POCD_MT000040Section) As POCD_MT000040ClinicalDocument
<OperationContract()> _
Function Test_for_Lab() As POCD_MT000040ClinicalDocument
<OperationContract()> _
Function CLINICAL_DATA(ByVal pat_iden As PRPA_MT201307UV02PatientIdentifier) As COCS_MT100000UVEncounter()
<OperationContract()> _
Function Encounter_DATA(ByVal visita As COCS_MT100000UVEncounter) As COCS_MT100000UVObservation
• Patient Authentication (PRPA_MT201307UV02)
• Collection of Data (Recover of the CDA stored in DB)
• Confirm Execution (POLB_TE004100 & POLB_TE004200)
• Report creation (Writing CDA according with TSE and HL7-Italia Standards)
• Submission of the report (Interaction with WS, CDA Transmission and Storage)
Conclusions & Future Developments

• Currently the system is utilized in a prototypical way, utilizing test data, in order to simulate standard operating conditions;

• In the near future we will test the real potential involving two realities of medium dimension within the Liguria Region Healthcare System;

• It is possible to integrate the entire architecture with new scenario extents, by placing for example a complete Electronic Health Record, or realizing the entire management system of the observation reservations;
The use of technology

• The present application is not directly used by general people
• This application will feed the Electronic Health Record
• Many Italian Regions have specific applications for the use of these data
• Liguria Region has the prototype of the «Conto Corrente Salute» = «Health Bank Account»
• Main ideas of this prototype is the use of the tools of the typical online bank accounts, familiar to most of people
Advises

• A useful Health Record application should be based on analytical data
• These data should be strictly individuated within a reliable context
• International vocabulary could improve this individuation
• Web services with standardized framework will also improve the platform free use of these analytical results
THANK YOU FOR YOUR ATTENTION!!