Semantic interoperability: A method using LOINC and an EAI component for the LIMS integration

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Abstract

Clinical information systems through their service-oriented architecture are composed of heterogeneous and complex systems. Semantic interoperability based on terminologies allows these systems to combine their informations and process them automatically and relevantly. This paper presents a solution to interoperability in healthcare based on the use of the Enterprise Application Integration (EAI) and LOINC terminology.

Keywords:

Semantic interoperability, Loinc, mediator

Introduction

The aim of the work done in the University Hospital of Rennes was to introduce the semantic interoperability in laboratory tests results exchanged between the Laboratory Information Management System (LIMS) and the electronic medical record (EHR). This task consists of mapping each system's interface terminology to the others. This approach has a huge limitation: it supposes that n^2 mapping has to be defined, n being the number of systems that are to be semantically integrated. The common way to dodge this issue is to use reference terminologies as pivot terms. Each local terminology is mapped to a concept of the reference terminology [1].

Methods

We then mapped local observation concepts to LOINC terms, an international terminology growing important [2]. This was facilitated thanks to an automated assistant we have developed.

We used an *Enterprise Application Integration (EAI)* as middleware not only to bridge our systems but we have also adapted it to give semantic meaning to the data exchanged.
This integration platform carries out the transformation of messages [3] before transferring it to the EHR, by exploiting the mapping table and substituting the local codes contained in each message, to the equivalent LOINC code.

Results

The mapping process has been tested on a sample of laboratory tests and has allowed us to map 70% of them.

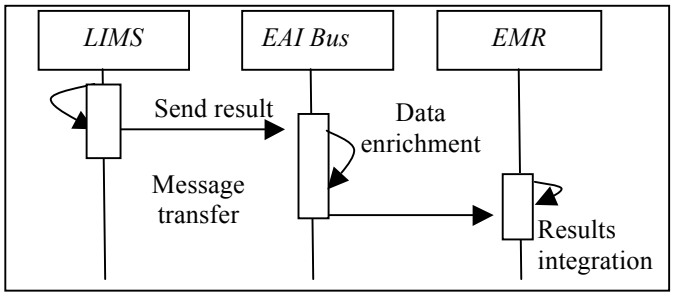
local record (code | Component| System| Units of measure| label) : **B2MI3** | B2-microguline | U-urine | µg/l | Béta-2 Microglobuline
LOINC terms: **1953-9**|BETA-2-MICROGLIBULIN|MCNC|urine|µg/l

Figure 1-Example of the mapping tasks the assistant realizes.

Thanks to the integration platform we obtained the modification of all the messages containing at least one test code in the mapping table appended. The idenfiers, which have not been found in this table, generated a failure message.

Figure 2-Exchanges between the laboratory system and the EMR after using the EAI.

Discussion and conclusion



Our solution provides centralized management of semantic data enrichment. Despite the obtained results our work must be extended, to domains other than biochemistry, to other medical terminologies and applied to other exchanges between patient records and other HIS components.

References

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