An Approach for Message Exchange Using Archetypes

João L. C. Moraes[a], Wanderley L. Souza[a], Luciana T. Cavalini[b], Luís F. Pires[c], Antonio F. Prado[a]

[a] *Federal University of São Carlos, São Carlos, SP, Brazil*
[b] *Federal University Fluminense, Niterói, RJ, Brazil*
[c] *University of Twente, Enschede, The Netherlands*

Abstract and Objective

The application of ICT on the whole range of health sector activities, known as e-health, can simplify the access to health care services and will only be acceptable for realistic scenarios if it supports efficient information exchange amongst the caregivers and their patients. The aim of this paper is present an approach for message exchange to realistic scenarios.

Keywords: Archetypes, *open*EHR, Interoperability.

Introduction

The exchange of health information among heterogeneous Electronic Healthcare Record (EHR) systems in healthcare environments requires communication standards that enable the interoperability between these systems. *open*EHR[1] is a foundation dedicated to the research of interoperable EHRs, and defined an open architecture based on two-level modeling that separates information from knowledge.

The motivation behind this work was to explore if the clinical archetypes can be used for exchange message between EHR in order to contribute to semantic interoperability.

Methods

The *openEHR* architecture has been developed based on the two-level modeling paradigm. On the first level, a common *Reference Model* (RM) has been defined, using a predefined set of classes that model the structure of an electronic record; and on the second level, *Archetype Model* (AM) have been defined by restricting the RM classes, in the form of *archetypes*, expressed in the Archetype Definition Language (ADL). An archetype constitutes a formal model of a concept and is easily understandable by a domain expert.

The *open*EHR Foundation's archetype repository (Clinical Knowledge Manager-CKM) contains a set of archetypes that can be reused in health applications. We have developed new archetypes, which represent clinical concepts of the cardiology domain such as: *Pacemaker Implantation, Vascular Cardiac Surgery, Angioplasty Cardiac,* and *Pacemaker Evaluation*.

The approach consists of two parts: RM, delivering the EHR information container needed on the one hand, and the EHR meta-models, called AM for expressing the clinical content on the other hand, as shown in Figure 1. Each part has the corresponding models that are also called RM-XMLBeans based on

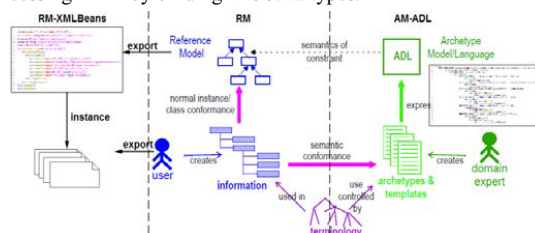XMLBeans and AM-ADL. XMLBeans is a technology for accessing XML by binding it to Java types.

Figure 1 - Message Generator Scheme

Results

The Cardiology Center at Marília (CCM) provides ongoing follow-up care for pacemaker implantation in patients, and has a clinical HIS to document the care provided to patients. Our approach proposes a message generator component in order to gathering all the patient's information for pacemaker implantation. In this scenario Dr. Call is close to implant a pacemaker on patient Martins. Figure 2 depicts the message generator component by serializing the extract of the *open*EHR archetype containing patient's data. Figure 2 shows information about the patient's EHR which are presented in Dr. Call's device
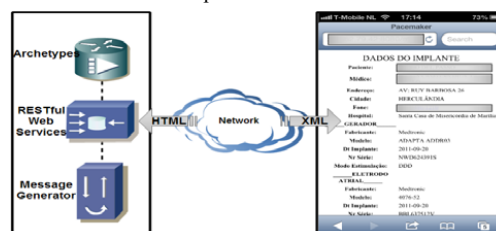

Figure 2 – System for Pacemaker Implantation

Conclusion

This paper presented an approach to exchange messages, which uses the *open*EHR standard. Our study was sufficiently large to investigate the archetype usage for message exchange in healthcare environments. We presented the realistic scenario that shows the acceptance of our message exchanging approach by caregivers, which reacted positively with respect to the usefulness of the approach. In further work we will evaluate the performance of our approach. In conclusion, the present study found that the caregivers accept the use of the technology that use a standard to data exchange in order to permit the interoperability between different healthcare systems.

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[1] http://www.openehr.org