R+D+i II Jornada en TIC i Salut

Trobada catalanofrancesa per a grups de recerca, empreses i centres tecnològics i assistencials

Per tal de participar en l'apartat B2B caldrà enviar la fitxa implementada, abans del **8 d'abril** a:
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GRUP UNIVERSITARI/ CENTRE DE RECERCA/ EMPRESA: Grup Universitari

NOM D'ENTITAT: Distributed Multimedia Applications Group (DMAG), Universitat Politècnica de Catalunya (UPC)

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FORMAT DE PRESENTACIÓ (pòster/ *Demos): pòster

PROPOSTA A PRESENTAR (Títol del Projecte):
   Privacitat als Health Records

ÀREA TEMÀTICA (Qualitat de vida i autonomia personal/ Innovació en la pràctica assistencial/ Les TIC al servei del ciutadà i la coresponsabilització en la seva salut):
   Les TIC al servei del ciutadà i la coresponsabilització en la seva salut

*NECESSITATS TÈCNIQUES I D'ESPAI:

PROJECT ABSTRACT

The Distributed Multimedia Applications Group (DMAG) is a research group of the Computers Architecture Department in the Universitat Politècnica de Catalunya (UPC). Nowadays, the group has more than 10 researchers, being most of them doctors. The research and development areas in which they are currently working include the creation, management and distribution of multimedia content in a secure and interoperable way, privacy, digital rights management, medatata interoperability, and multimedia search, all of them in the different areas, such as the content life cycle and e-health applications.

It is worth noting that the group has a long experience in standardisation. The DMAG is member of HL7 Spain and currently is participating in a project, carried out by the Security Work Group of HL7 International, which defines a security and privacy ontology. Moreover, different members of the group are editors of International Standards, like MPEG and JPEG in the areas of the management and exchange of digital rights and e-contracts, middleware multimedia systems, and metadata search and interoperability.

This contribution presents on of the research lines in which we are working in the e-health area.

One of the main objectives of HL7, Health Level Seven, International (http://www.hl7.org/), is to enable different health information systems interoperate. To this end, HL7 is developing standards that define the models for the exchange of clinical documents, as well as for electronic and personal health records. One of the current concerns of HL7 International is the security requirements in the exchange of clinical information, especially those related with the protection of patients' privacy. This has lead to the Security Work Group to start a project in which they are defining a security and privacy ontology.

There are other standard initiatives with the same aim, to define the elements and components of an architecture that enables the exchange of electronic health records (EHRs) between different health information systems. ISO 13606 (Health informatics – Electronic health record communication), in its Part 1 defines a reference model for EHRs and in its Part 4 proposes standard mechanisms for the secure creation and management of EHRs that guarantee the confidentiality of their contents and control their usage.

On the other hand, the MPEG-21 standard (http://mpeg.chiariglione.org/standards/mpeg-21/mpeg-21.htm) defines a solution that enables different multimedia systems interoperate. Part 2 of this standard (ISO/IEC 21000-2), Digital Item Declaration, defines a model for the exchange of digital items, which consist of the digital content and metadata describing the content. Part 4 (ISO/IEC 21000-4), Intellectual Property Management and Protection (IPMP) Components, defines a model for the protection of digital items at any level of granularity, from a complete digital item to a specific asset. This part of the standard also provides mechanisms to describe and retrieve IPMP tools, as well as the models to associate protection information and privacy policies to the protected contents. Part 19 (ISO/IEC 21000-19), Media Value Chain Ontology, defines an ontology that formalises the representation of the digital contents' value chain. Such ontology represents in a standard way the intellectual property through the value chain by means of different types of intellectual property entities, actions and roles. Finally, part 15(ISO/IEC 21000-15), Event

Reporting, standardises mechanisms to exchange information about events, related to digital items, between peers and users of a multimedia system.

The objective of this proposal is to present a standard based platform for the management and exchange of EHRs between different health information systems, which protects patients' privacy in all the process and guarantee the confidentiality, integrity and availability of the patients' data. Such platform also allows patients to access to their clinical records, define their privacy policies, and check if they are enforced.

The proposed solution is based on MIPAMS (http://dmag.ac.upc.edu/MIPAMS), a secure digital content distribution and management platform compliant with the MPEG-21 standard. MIPAMS has been defined and implemented by the DMAG, and consists of 8 web services (content, objects registration, licensing, authorization, protection, search, reporting and authentication) and 2 modules (user application and workflow manager).

The platform for the management and exchange of protected health records presented in this paper makes use of the technologies defined in the MPEG-21 standard for the secure exchange health records, protect patients' privacy and guarantee the confidentiality, integrity and availability of the health records data. Note that for defining privacy policy the OASIS eXtensible Access Control Markup Language, XACML, (http://www.oasis-open.org/committees/xacml/) has been chosen.

The model for the electronic health records that we have defined to meet previously mentioned requirements, is a profile of the Part 2 of the MPEG-21 standard, compatible with the models defined by HL7 and ISO 215. Then, the clinical data exchanged is protected using the mechanisms defined in the MPEG-21 IPMP Components standard, which enables the protection of electronic and personal health records at any level of granularity, form a complete health record to a specific record or resource, for example a radiography. Finally, protection information, privacy policy and usage rules are associated to the protected records.

The XACML standard is used for defining access policies, which determine the usage rules for the health records. The policies state the operations that specific roles can perform over specific types of resources, as defined in the l'HL7 Role Based Access Control (RBAC). Roles are assigned to users when they authenticate in the system by means of a SAML token, which determines the role of the user for a session. In order to enforce such policies we have implemented an authoriser, as defined by the XACML standard. It is worth noting, that the solution is designed to support licenses defined according to a rights expression language, like the defined in Part 5 (ISO/IEC 21000-5) of the MPEG-21 standard, or the ODRL (Open Digital Rights Language, http://odrl.net), instead of policies, when defining the usage rules for the health records.

The semantics for the permissions and roles in health information systems are specified in the MVCO Ontology (Part 19 of the MPEG-21 standard), by means of an extension, since the MVCO permission model is equivalent to the one defined for the HL7 Security and Privacy Ontology. Such permissions are later associated to the clinical data through XACML policies, as described previously.

Finally, in order to have a registry of the operations performed over the clinical data, to provide users the opportunity to verify that the privacy policies they have defined are enforced; we make use of the MPEG-21 Event Reporting standard. Each time a user tries to access to a health record, that is, the authoriser receives an authorisation request, an event

report will be created. Event reports follow the model defined in the MPEG-21 standard and are stored in the logs server.

Figure 1 presents the architecture that we have defined for the project, which is a particularization of MIPAMS for the secure management and exchange of electronic health records between different health information systems.
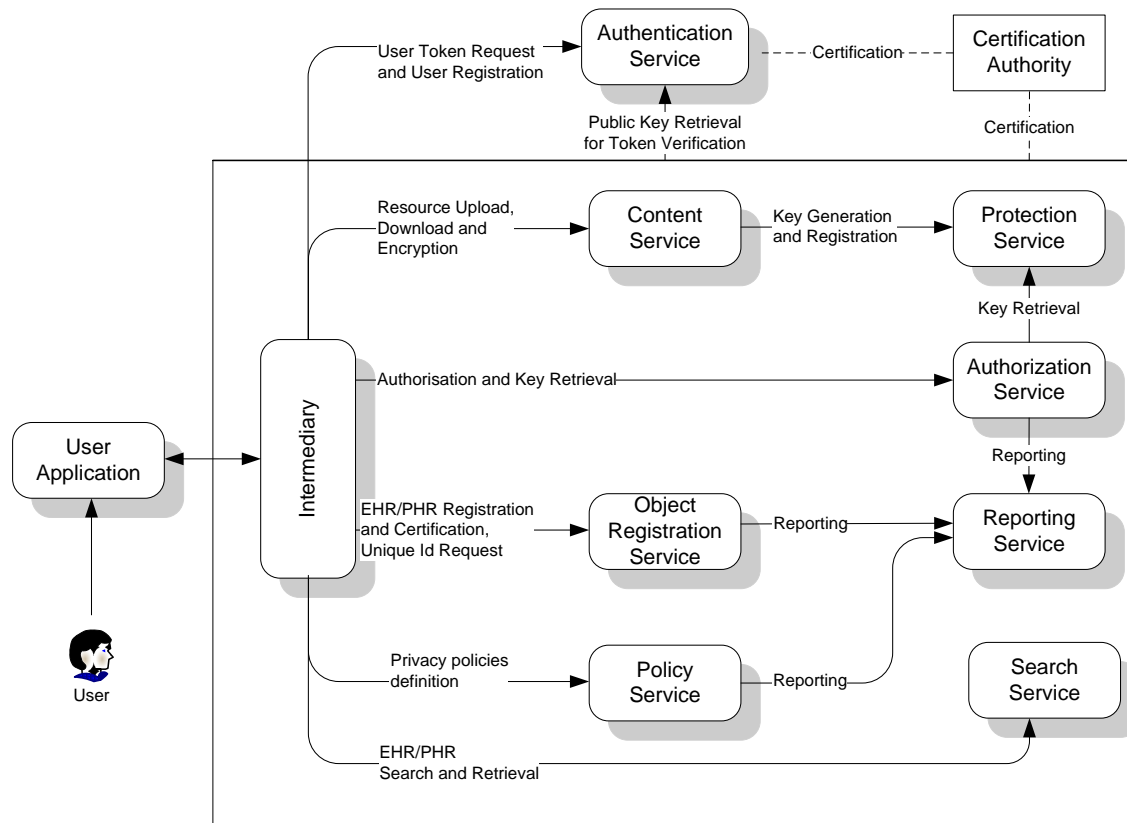

Figure 1. Platform for the management and exchange of electronic health records