Multilevel use of image repository in the field of veterinary imaging and dissemination of training tools

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Purpose
To gather the appropriate MRI and CT studies provided by centres of excellence in order to assemble the repository. To setup a knowledge base in radioanatomy build upon this repository as first level. A second step is the construction of a database of radiopathology cases. The final level is the integration in an e-learning platform.
Methods and materials
The supplied material is delivered by our centres of excellence by ftp or by portable media containing the original DICOM datasets. The acquired datasets need to be anonymized and structured following the veterinary anatomy. The dataset will be linked with the radiopathology database. The datasets will be incorporated into our PACS environment accessible through the internet.
Results
The creation of a growing database itself is essential for the veterinary world to get acquainted to the CT and MRI imaging techniques and possibilities. This results in a better knowledge of anatomy and radiopathology of the general professionals. It can contribute to an e-learning environment for university-colleges veterinary sciences.
Conclusion
The gathering of interesting datasets is a time consuming process that hampers the progressing of the project. Never the less the trend of handling sectional imaging in the veterinary imaging world is set.

On demand IHE XDS document registries on the cloud

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Purpose
Health Information Technology (IT) has the potential to enable a significant transformation in the delivery of healthcare, turning it safer, more effective and efficient[1]. However, implementing regional or national IT faces many barriers, such as inter-site interoperability, heterogeneity of information systems, complexity of the implementation, initial economical investment, and maintenance of the IT infrastructure, turning such solutions in a difficult, and long-standing process [1–2]. IHE initiative aims to achieve truly inter-site interoperability by pointing which standards may be used in most of the clinical interactions. The XDS-I profile facilitates the registration, distribution and access of medical images across multiple healthcare institutions. Its focus is to provide a standard-based specification for managing the sharing of documents between healthcare providers, ranging from a private physician office to a metropolitan Hospital [3–4]. XDS-I extends XDS profile taking into account the medical imaging specificities. XDS assumes that the healthcare institutions belong to one or more XDS Affinity Domains (XAD). An XAD is a trust community of healthcare providers that agreed to cooperate using a common infrastructure of document repositories and one registry. XAD's policies must be defined, such as patient identification, control of access or security model. The central and critical piece of the XDS architecture is the Document Registry. The XDS Registry holds the meta-data of the clinical documents enabling the cross-institutional discovery of clinical documents. Without it, the documents would be impossible to track and the inter-institutional document sharing would be disabled. Giving to the healthcare institutions a way to immediately launch, configure, manage and monitor XDS Registries on the Cloud through a web-browser expedites the inter-institutional relationships.
Methods
Our framework relies in a set of core web routines (e.g., Java Servlets), accessed through web-browser, that interacts with the API of a Cloud provider (e.g., Amazon, Eucalyptus). One snapshot of a pre-configured operating system and virtual application software (XDS Registry) is used to create virtual machines within the chosen IaaS cloud. When a user triggers the launching of a new XDS Registry, the system—through the cloud's API—clones the snapshot and initializes the virtual machine keeping the original snapshot unchanged. After this the user may take advantage of the facilitated user graphical interface provided by the web-portal and apply the following actions on the launched XDS Registry (web-service based):

- **Configure:** definition of the other IHE actors that interact with the XDS Registry. More precisely, configure URIs, public keys or X.509 certificates of the actors Patient Identity Source, XDS Document Repositories and XDS Imaging Document Sources.
- **Manage:** Add or remove new institutions to the XAD. By removing an institution the X.509 certificates associated with that institution are disabled and the XDS Actors of that institution no longer are able to interact with the Registry.
- **Monitor:** View usage statistics and check the Registry event logs.

Besides these actions, the web-portal may enable many-to-many relationships. The web-portal is a meeting point of healthcare institutions that have an account in our framework. This scenario creates a favourable environment that might converge in new inter-institutional professional relationships and eventually the creation of new XDS-I Affinity Domains. Furthermore, clinical information is valuable and private, normally protected by rigid country laws, preventing it from disclosure. Our system allows the XAD Administrator to configure the level of the privacy of the meta-data on the XDS Registry. All sensitive fields of the XDS Document Entry (meta-data that describes the document) on the XDS Registry may be ciphered with a secret key generated by the XDS Registry. For instance, fields such as patient demographics, author institution, author person, author role, author speciality may be hidden from the cloud provider. Ciphering the data on the cloud's storage devices prevents data-mining routines over the stored patient meta-data. However, is theoretically possible (although unlikely) for the cloud provider to access the meta-data in memory when it is being ciphered or deciphered on the fly. Therefore, there is also the possibility for the XDS Registry not to hold any sensitive field (even ciphered). This way, the XDS Registry will only hold pointers and surrogate keys, ensuring a high level of data privacy.
Results
E-health and telemedicine are rapidly evolving from point-to-point to many-to-many relationships. In addition, the medical expertise around the patient is more widely distributed and, at the same time, work is more and more frequently performed within heterogeneous teams of experts. This scenario magnifies the need to share patient medical information across workplaces and institutions. Inter-institutional medical imaging exchange is more than just data transmission from a site to another. The road-map to trusted cross-organization e-health systems begins from understanding security and privacy protection