Standardi in priporočila za teleradiološke informacijske sisteme

Standards and Recommendations for Teleradiology Information Systems

Andrea Poli, Dejan Dinevski

Teleradiology: definition and standards

Teleradiology is the electronic transmission of diagnostic imaging studies from one location to another for the purposes of interpretation and/or consultation. This definition includes PACS networks inside hospitals as well as solutions for remote areas.

Since teleradiology deals with radiological images, the first aspect to consider is the standard that should be used for image communication. For this purpose the choice can be only one and it is the DICOM (Digital Image Communication in Medicine) protocol. There are no other de facto standards for treating digital radiological images.

Two interesting aspects of the DICOM protocol are important for teleradiology purposes:

- WADO (Web Access to DICOM Objects): This standard specifies a web-based service for accessing and presenting DICOM (Digital Imaging and Communications in Medicine) persistent objects (e.g. images, medical imaging reports). This is intended for distribution of results and images to healthcare professionals. It provides a simple mechanism to access a DICOM persistent object from HTML pages or XML documents, through HTTP/HTTPs protocol, using DICOM UIDs (Unique Identifiers).

- Streaming: New developments in DICOM involve image streaming through JPIP (JPEG2000 Interactive Protocol), which is the only DICOM-approved image streaming protocol. JPIP provides efficient transmission and streaming of DICOM images over various bandwidth networks, enabling any viewing client to access imaging data from any JPIP-compliant server. JPIP presents only the portion of the image that is requested by the

Organizaciji avtorjev: University of Trieste (AP), Medicinska fakulteta, Univerza v Mariboru (DD).

Kontaktna oseba: Dejan Dinevski, Medicinska fakulteta, Univerza v Mariboru, Slomškov trg 15, SI-2000 Maribor. e-naslov: dejan.dinevski@uni-mb.si.

viewer. It is even possible to view an image by progressively improving its quality as more blocks arrive at the viewing station.

Recommendations for teleradiology

Keeping to the technological level without entering in the clinical one, once standards are chosen, there are other issues to be resolved before starting a teleradiology project. The most important aspect that should be treated is the interoperability, especially related to the workflow. Fortunately there are some initiatives that can help us in defining system roles and behavior of each system involved in a teleradiology environment. The most important one is IHE (Integrating the Healthcare Enterprise), an initiative that was born in 1998 in the USA. Its main purpose is to foster the adoption of standards and interoperability solutions in the clinical practice, starting from radiology and extending the solution to other specialties.

Many of the solutions proposed by IHE, which are named profiles, are easily portable and usable in the teleradiology field. The most important one are XDS and XDS-I. IHE Cross Enterprise Document Sharing (XDS) is a set of technological and practical rules that enables to share documents across different domains. It differentiates from previous approaches in the way that it aims to overcome implementation problems by separating logically indexing information (the meta-data) from the actual content. This allows XDS to support a wide range of documents, though presenting a simple and consistent method

to store, index, locate and retrieve them for clinical use. This logical separation also permits adding XDS export functions to existing systems in a rather simple way, since it allows using existing output formats such as CDA, PDF and even simple text documents, as well as DICOM and JPEG Images.XDS uses existing 'open' IT standards (HTTP and ebXML – an OASIS and ISO standard) to share stored electronic documents, and therefore enable development of wide-area electronic healthcare records. XDS is a great tool in addressing the interoperability problems which are inherent to sharing electronic healthcare records between different IT systems

Literature

1. Sajeesh Kumar D, Krupinski EA: Teleradiology.
2. Pianykh OS: Digital Imaging and Communications in Medicine (DICOM): A Practical Introduction and Survival Guide. 2008: Springer.
3. IHE web site. http://www.ihe.net.
4. Taubman D, Prandolini R: Architecture, philosophy and performance of JPIP: Internet protocol standard for JPEG2000. International Symposium on Visual Communications and Image Processing (VCIP2003), 2003.
5. JPEG2000 image coding system – Part 9: Interactivity tools, APIs and Protocols – ISO/IEC JTC 1/SC 29/WG 1N3052R. Web page http://www.jpeg.org, 2003.
6. ACR Technical Standard for Teleradiology. Revised ed. 2002: American College of Radiology.
7. Healthcare Foundation web page. http://www.chcf.org/documents/ihealth/OpenSourcePrimer.pdf, 2006.
8. Integrating the Healthcare Enterprise web site. http://www.ihe.net.