

## Volume 1 / Issue 2 2005 - eHealth Developments

### Metropolitan PACS and Support Network

---

#### Authors

**Michal Javornik and Otto Dostal**

*Institute of Computer Science,*

*Masaryk University, Brno, Czech Republic*

E-Mail: [javor@ics.muni.cz](mailto:javor@ics.muni.cz)

Tools to share medical knowledge, to support and assist in decision-making and to provide relevant and accurate sources of information for scientific research all enhance synergy among the medical community. They also play a very important role in healthcare and consequently the community they serve. Most hospitals in the Czech Republic currently use a PACS (Picture Archiving and Communication System) locally, independent of others, to store and evaluate video data produced by various methods (i.e. x-ray, ultrasound, computed tomography, etc.). This image information is available only within the particular hospital. Most new acquisitions are equipped with the DICOM (Digital Image Communication in Medicine) standard. This enables interconnection of medical devices, computer servers and long-term storage devices of high capacity via high speed computer networks. The goal of the MeDiMed (Metropolitan Digital Imaging System in Medicine) project is to establish an open, collaborative environment to support daily routine. It also supports coordinated research and education among cooperating healthcare institutions and faculties of medicine by exploiting the large potential of databases of medical image information being processed in hospitals today.

#### Masaryk University

Masaryk University combines high requirements for original research with systematic efforts to create the conditions for a broad approach to university education, corresponding to the capabilities of students and the demands placed on them by the employment market in a modern society.

One of the major strategic goals of Masaryk University is the internationalisation of the university. To achieve this, it has established a wide range of contacts with universities in Europe, North and South America, Asia, Africa and Australia. Bilateral and multilateral agreements provide for the exchange of students and teachers, research and various kinds of joint activities.

#### Background Technology

There is a large fibre-optic cable network owned and operated by the universities in the Czech Republic. The development of this network started in 1993. It is a private network connected to the National Research and Education Network (NREN), operated by CESNET (the Czech Certificate Authority), through the Institute of Computer Science of Masaryk University.

The Institute of Computer Science of Masaryk University operates a shared regional PACS since 2002. That solution was from its inception designed to serve as a reliable and accessible communication node and also as an educational and research tool available to any hospital or other healthcare institution, including medical faculties, interested in participating.

Outsourcing of the hospitals' archiving and communications technology facilitates cooperation among hospitals using existing patient multimedia data.

The Shared Regional PACS is more than just a set of computer network applications. Gradually, it changes the way medical specialists think, enhances cooperation and encourages sharing of patient data in electronic form. It builds a network of medical specialists. The impact of this work is not only in patient care but also in the education of medical specialists. The implementation of the project has increased the speed of communication among individual hospitals and allowed consultation on decisions, due to direct connections via optic networks.



### Support for Training and Research

The core of the solution is a tailored commercial PACS. It forms the repository of anonymous medical image studies, accessible through a supporting computer network infrastructure of Masaryk University. Every incorporated image study must be annotated with a detailed description in DICOM Structured Report format and must be assigned a set of key words describing all the medical findings and diagnosis for better retrieval of specific cases.

Dedicated diagnostic workstations are used and primarily connected to the hospital PACS or other image-generating equipment communicating in DICOM standard. The DICOM connection accessing the Educational and Research PACS is used when an appropriate image for teaching or research purposes is identified and sent to the database and also when searching and retrieving image information.

Tailored PACS can be used as a "PACS trainer" for the education and training of radiologists, particularly where the "PACS trainer" forms the basis for additional educational and research applications. For example, the application can be used for teaching by developing Case Studies using a shared platform accessible at all stages of a given medical case referencing the relevant Image Studies. For every area of medicine, there is a board of physicians responsible for determining the correctness of information incorporated and used for teaching of medical students.

One of the basic principles when sending images into the Educational and Research PACS is the coordinated assignment of a fictitious patient identity, so it can offer a more complex view of the evolution of the patient's health in situations where the patient is being treated in different healthcare facilities.

Therefore, the legal barrier preventing access to sensitive and confidential patient data is removed.

### Conclusion

The whole integrated solution of the Educational and Research PACS is certified by CESNET so it can form part of a hospital information system infrastructure of cooperating healthcare institutions. All software tools are strictly based on the DICOM standard so they could be easily incorporated into existing systems of participating hospitals or other relevant institutions. Specialised and dedicated workstations can also be used for daily diagnostic purposes in the radiology departments.

Published on : Sun, 20 Mar 2005