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# INTEGRATED HOSPITAL INFORMATION SYSTEM – IMPLEMENTATION IN  HOLYCROSS ONCOLOGICAL CENTRE – CASE STUDY

Holycross Oncological Centre (Świętokrzyskie Centrum Onkologii)  is a specialised center for health services in oncology. It provides the complex diagnostics and treatment of all oncological cases for the whole region. We serve 16 000 inpatients and over 150000 outpatients per year. Our diagnostic departments perform over 70 000 examinations (X-ray, CT, MRI, mammography, scintigraphy, panendoscopy) and 30 000 histology and  25 000 cytological examinations each year.

Oncological Centre serve the complex medical care covering treatments, extensive screening programs and long term follow-up control for all inhabitants of the region. Annually, in the Holycross region registers about 5 000 new cancer cases. Actual number of open cases is 32 000 patients suffering from cancer. The number of patients, the necessity of their multi-year treatment and observation and the amount of multimedia data including text, figures, images, video and signal data  together with necessity of rapid and wide access to findings from all the patient episodes and casenotes required the use of computerized technologies.

In August, 2005 we start the use of Integrated Hospital IT System. IT System includes Medical Information System, Radiology Information System, Laboratory Information System, Financial System, Pharmacy System, Managing Information System  The concept of the Integrated IT System is shown on Fig. 1.

The heart of the Integrated Hospital IT System is CliniNET System. Its main modules are ADT, Order Entry, Result Reporting, Multimedia Electronic Patient Record, Casenote Tracking system, etc.

The workflow of main processes and communication links (all supported by HL7 and DICOM) are demonstrated in Fig. 2.  The system ensure an on-line  circulation of information in medical systems (Hospital Information System, Laboratory Information System, Radiology Information System, Picture Archiving and Communication System) and bidirectional communication with laboratory and diagnostic medical apparatus.

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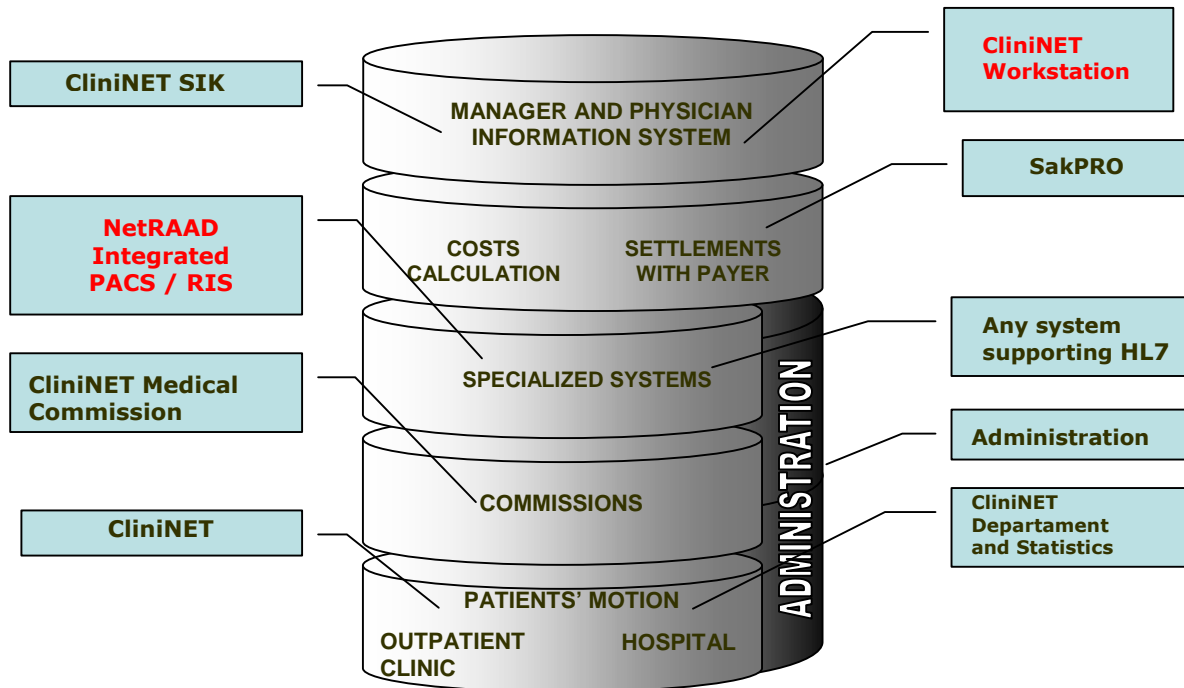
Fig. 1 Concept of the Integrated Hospital  IT System for Holycross Oncological Centre
      in  Kielce

Currently in Integrated Hospital IT System  connects CT, MRI in imaging department, endoscopy units in Endoscopy Dept. and all laboratory analyzers. Accordance with international standards (HL7 and DICOM) ensures the integration and use of medical software and easy interfacing of almost any modality or diagnostic device offered on the market.

Medical patient record includes  physician's and nurse's notes and observations, biochemical test results, tumor markers, radiological reports and imaging and video data all available at any user station in the hospital.  All patient medical data are kept in the system during all treatment and observation period  and are accessible on-line in hospital computer network and in the near future – with development of telemedical services – will be accessible in every place and time. Currently  more  than  500  workstations  work in IHITS (personal computers and  terminals). Every specialized  system (CliniNET, NetRAAD, KS – Pharmacy, SIMPLE SYSTEM V, Managing Information System, LIS-TCH) is  located  on  dedicated server with an on-line shadow server. (Fig. 3).
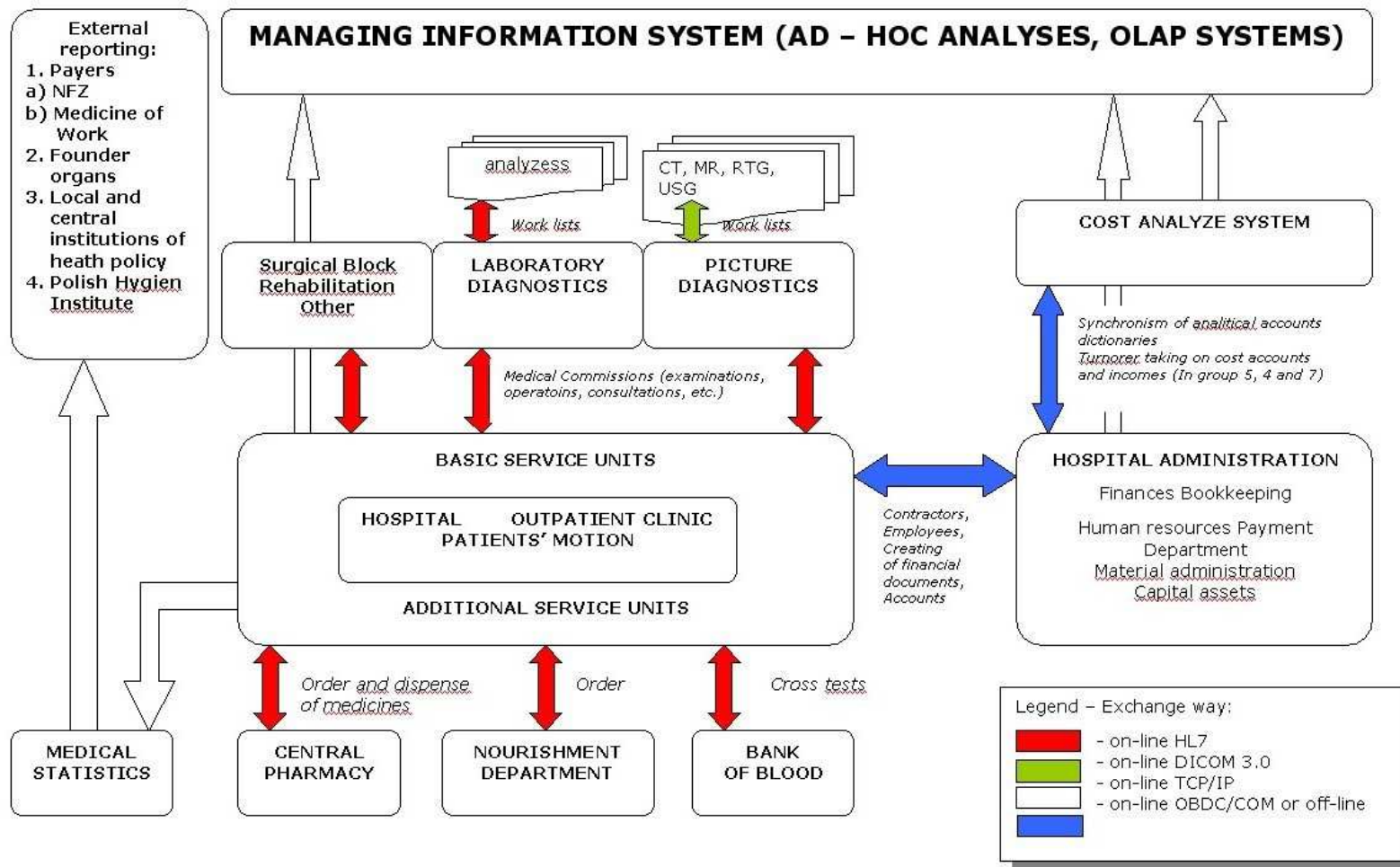
Fig. 2 Data flow diagram of Integrated Computerized Hospital System of of Holycross Cancer
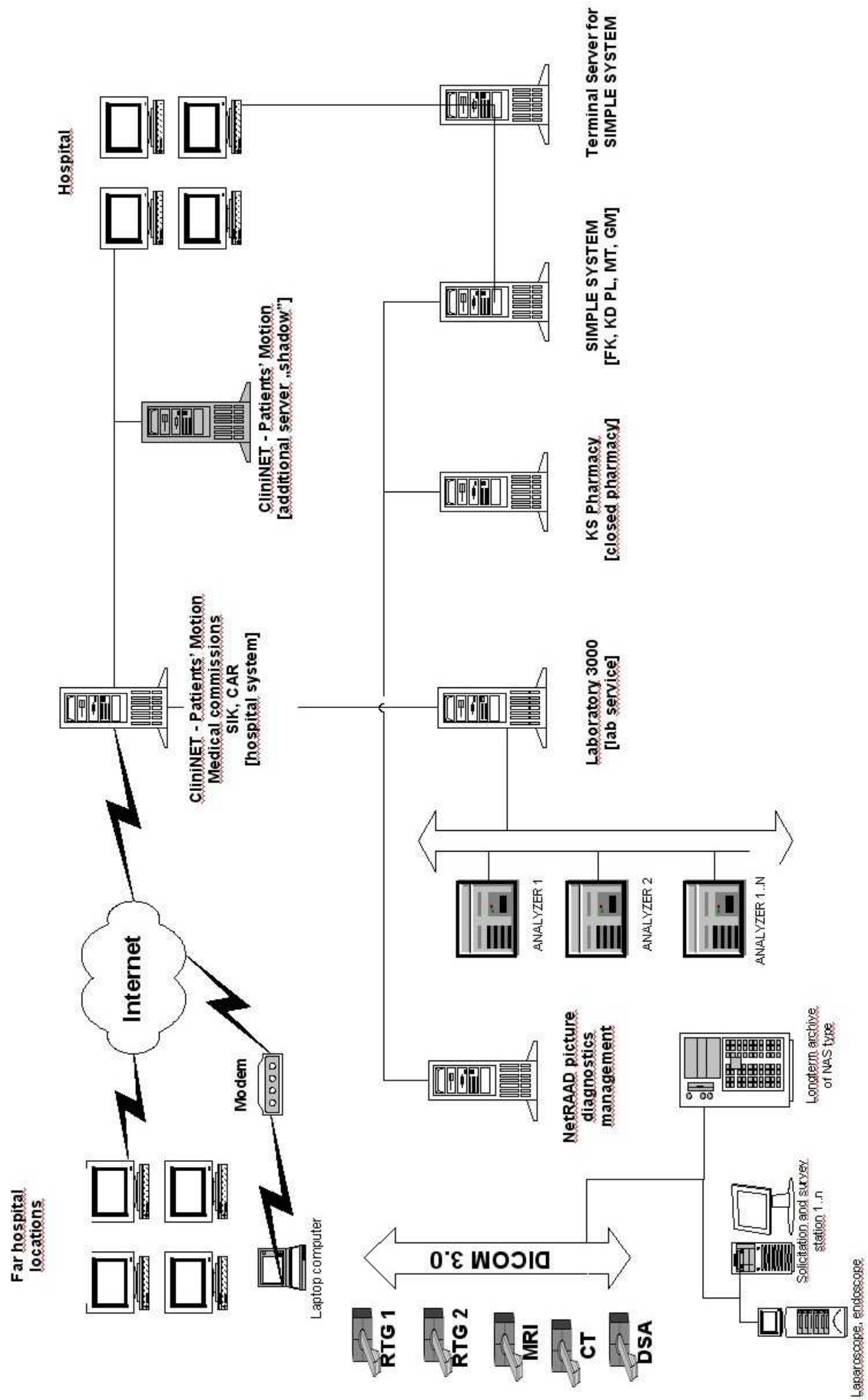Centre in Kielce

Fig. 3 Architecture of Integrated Hospital IT System of Holycross Cancer Centre in Kielce

The serves work on various system platforms  – MS Windows Server, Linux Redhat and using various database systems – Sybase Enterprise, MS SQL Server.

The distinctive feature  of IHITS in HCC is  opportunity to work on terminals (diskless PCs controlled with X-Windows) and personal computers (with MS Windows) with web browser only. Office software integration allows for parallel use of Open Office or MS Office.
The system gives an opportunity to work remotely from outside and provides an ready to use platform for  teleconsultations in the field of radiology and others.

Implementation of protocol HL7 and DICOM was a natural move to standardize our Hospital IT System, its openness as we plan to convert it into a broad platform for telemedical services for the region. Progress of medicine and new achievements in oncology take medical services outside hospital and require much closer and more continuous care over cancer patient.  Integrated Hospital Information System with web based access and multimedia medical record was a natural choice for us. Today after almost a year after the start we are still learning new ways the system may help us and our patients. We already have firm plans of common use of our system by near-by hospitals and clinics.

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