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Architecture of distributed picture archiving and communication systems for storing and processing high resolution medical images

New generation medicine demands better quality of analysis, increasing the amount of data collected during checkup, and simultaneously decreasing the invasiveness of the procedure. Thus it becomes urgent not only to develop advanced modern hardware, but also to implement special software infrastructure for using it in everyday clinical practice.

MARS (Medipix All Resolution System) micro-CT scanner is employing Medipix electronics based on GaAs semiconductor detectors, investigated at DLNP JINR. It allows to obtain high quality medical images while decreasing the irradiation of an examined object compared to currently used scanner models. Scanner design make it possible to take up to 720 shadow projections of an object with a spatial resolution up to $55 \mu\text{m}^2$. The opposite side of such an accuracy is a significant growth of accumulated data amount, challenging us to search for new solutions in the field of distributed Picture Archiving and Communication Systems (PACS).

The talk will cover technical requirements for implementing a distributed PACS server for storing large high-quality medical images, with respect to the technical specifications of the next-day medical imaging hardware like the MARS micro-CT scanner, as well as Russian legacy claims, international standards in medical imaging software, speed and cost limitations. The architecture of such a server will be discussed, reviewing both the existing well-distributed components that could be utilized, and the ones needed to be developed anew. The system design will be aimed to make it as ergonomic and adapted to the needs of end users as possible.

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