

HEALTH IN THE DIGITAL SOCIETY DIGITAL SOCIETY FOR HEALTH

16-18 OCTOBER 2017
TALLINN, ESTONIA

Country Wide Central Medical Image Archive: Estonian example

Andrus Paats, MSc, Foundation of Estonian PACS

Andrus.Paats@ pacs.ee

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OUTLINE OF TALK

- Foundation of Estonian PACS
- Organization
- Technology
- Data (types, amount)
- Data usage
- Possible future applications: Science and Research



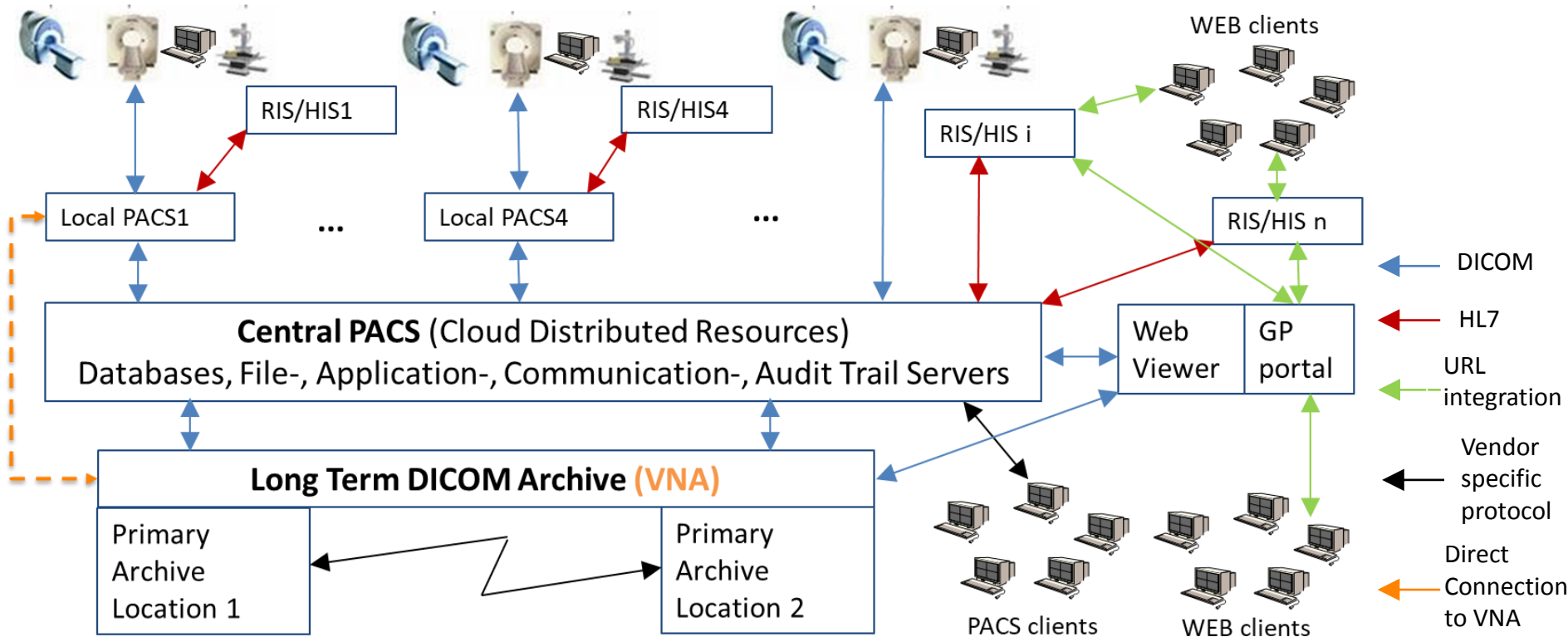
ARCHIVING OF DIGITAL IMAGES IN ESTONIA

- **2001:** Swedish government financed **BITNET project:** AGFA Impax 3.5 PACS installed in **Tartu University Hospital (TUH)**. **Free of charge** DICOM archive and WEB Viewer for Estonian medical institutions
- **2004:** TUH upgraded PACS system hardware and software. Fee for archiving: 1€/study
- **2005:** Hospitals in Tallinn formed consortium for purchasing new powerful PACS as alternative of TUH PACS
- **2005:** State founded National E-Health organization
- **2006:** TUH and North Estonia Medical Centre (NEMC) established Foundation of Estonian PACS (Pildipank)

FOUNDATION OF ESTONIAN PACS (PILDIPANK)

- **Purpose:** to develop and manage the one common environment for transmission, archiving and usage of medical images for all Estonian healthcare institutions in equal conditions
- Integrating technologies, images, clients, knowledge, experienced people and resources into one organization
- Organization: small, effective, specialists from hospitals: <10 persons
- **2014:** Government authorized Foundation of Estonian PACS to act as a Central Medical Image archive
 - Law requires to store all DICOM images in central archive from 01.09.2014.
 - Reimbursement problem: state covers 25%, 75% is covered by medical institutions.
- **2016:** State finance is stopped. Pildipank subsidized archiving with 25% of price
- **2017:** Estonian Health Insurance Fund starts to finance archiving of images

TECHNOLOGY: ARCHIVE



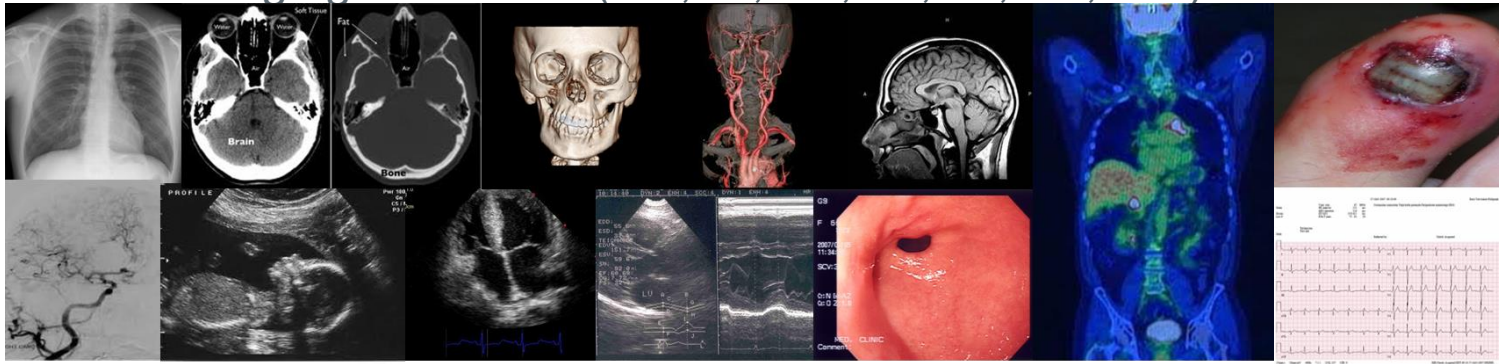
TECHNOLOGY: NETWORK

- Data communication between modalities and Central Archive is done using encrypted network channels (VPN)
- Encryption is done with:
 - Special hardware devices (VPN router)
 - Special software solutions
 - Mobile Telecommunication System Operator solutions
- Web based image distribution is based on secure SSL protocol



COLLECTED DATA TYPES

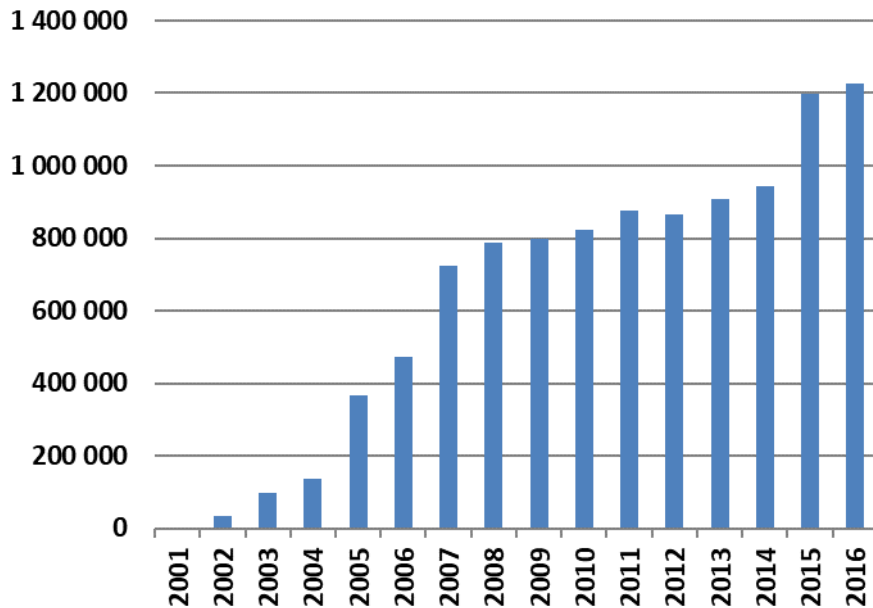
- Central Archive has capability to receive DICOM images from most of modern imaging modalities (CR,CT,MR,US,ES,NM, etc.)



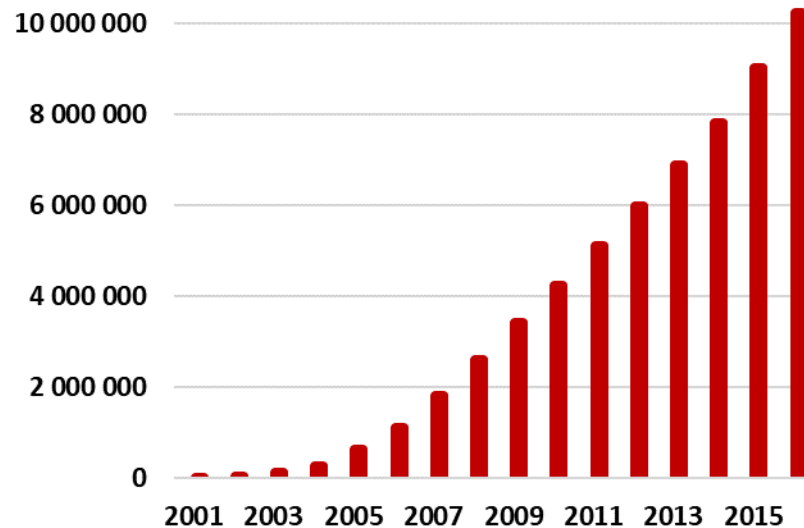
- Old images digitized from old plain X-Ray film
- Images of patient done by photo camera or operation theatre devices
- Radiology reports
- ECG in numeric format

COLLECTED DATA VOLUMES

Number of Archived Studies per Year

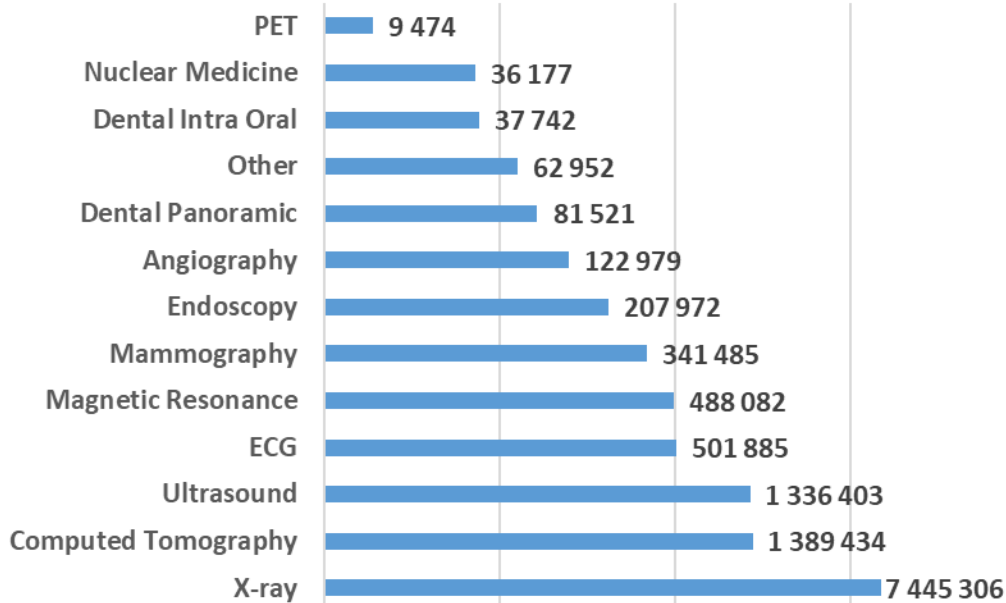


Number of Studies in Archive



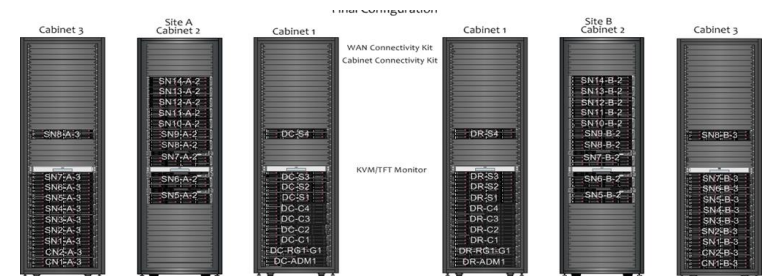
CURRENT ARCHIVE SIZE

Number of Studies in Archive by Modality



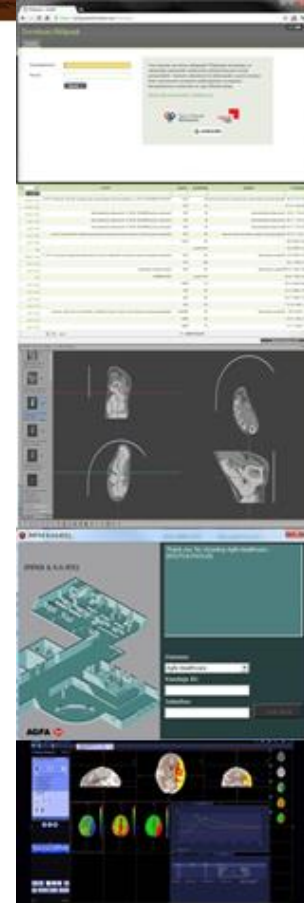
Total number of studies:
> 12 millions

Archive size:
non compressed **820 TB**



ACCESS TO THE DATA IN CENTRAL ARCHIVE

- All Estonian Hospital's Information Systems are integrated with Pildipank
- All General Practitioners have Access to Pildipank
- Data access is granted to Healthcare Service Providers based on standard contract
- Data is allowed to use only for patient diagnostic and treatment purposes
- Via Pildipank PACS client (Agfa Impax)
- Via Pildipank image portal
- Via WebViewer
- Via integrated healthcare providers information systems
- Via DICOM protocol for hospital's
 - PACS systems
 - DICOM workstation



POSSIBLE FUTURE APPLICATIONS: SCIENCE AND RESEARCH. PREREQUISITES

- Legal rights to share anonymous patient data
 - Patient rights to collected data
 - Medical institution rights to collected data
- Recourses
 - Separated hardware and software components for live and research system
 - Not influencing the performance of live systems and daily workflow
 - For anonymization and data sharing
 - For fulfilling the ISKE (*IT Baseline Protection Manual*), GDPR and other additional regulations from state
 - Human recourses for setting up and supporting the service
- Finances

CONCLUSIONS:

- Images of Estonian people are archived centrally and are accessible by personal ID for medical purposes
- For sharing the data for science and research the Foundation of Estonian PACS has: data, knowledge, people
- Currently there is missing
 - Proper legislation
 - Financial recourses
- Data sharing service can not be free of charge
- Pildipank can offer extra value for science and research by connecting the anonymized data with single person
- **Pildipank project success:** co-operation with healthcare providers and initiatives from down to up

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