FP7 REGIONS OF KNOWLEDGE
PROJECT No. 265436

Imagistică Medicală Integrată, Avansată şi Interdisciplinară pentru toţi cetăţenii Europei prin intermediul unei Reţele Regionale de Clustere şi Strategii de Dezvoltare

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IMAGO-MOL

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Clusterul Regional Inovativ de Imagistica Moleculara si Structurala Nord-Est

Conferinţă de lansare
29-31 octombrie 2012, Hotel Unirea, Iaşi

ProiectiMAGO-MOL

PACS REGIONAL

PACS

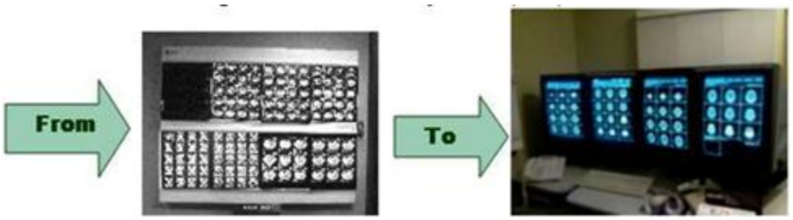
- **P**icture **A**rchiving and **C**ommunication **S**ystem
  - Picture – radiographic/fluoroscopy/US/CT/MRI images and radiology reports
  - Archiving – storing images
  - Communications – access to images and reports at virtually unlimited viewing sites called workstations.
  - System – meaning a complex coordinated network making it all possible

A little history

- a time not so long ago
  - radiographers recorded images on glass plates and processed them in darkrooms by hand – glass plates broke - image storage, later reading and retrieval impossible
  - Polyester – flexible radiographic film in cassets – great improvement – still had to be hand dipped in caustic darkroom chemicals, washed, rinsed, and dried before they could be handled and archived – difficult retrieval;
  - newer systems for loading and unloading cassettes – daylight systems – x-ray film processed without a darkroom
  - automatic processors – film processing in 90 seconds or less;
  - Still difficult archiving and communications.
- significant amount of time in film processing, film viewing, archiving and retrieval of films, and storage space - costly and worthy ….. assuming the films and jacket can be found

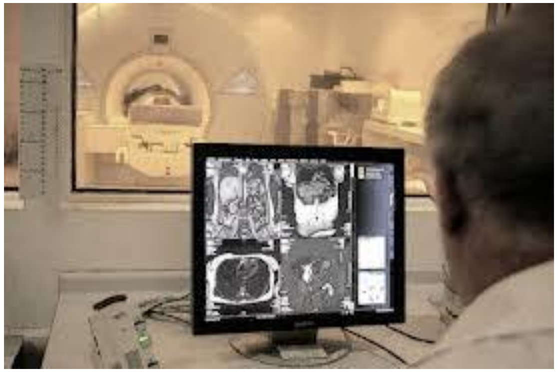
A little history

A little history



- Today – going digital
  - New modalities of examinations – hundreds, sometimes thousands of images
  - IT great development – computers with increased power;
  - Storage – in 2000 1 GB seemed a lot of storage – today taking about TB

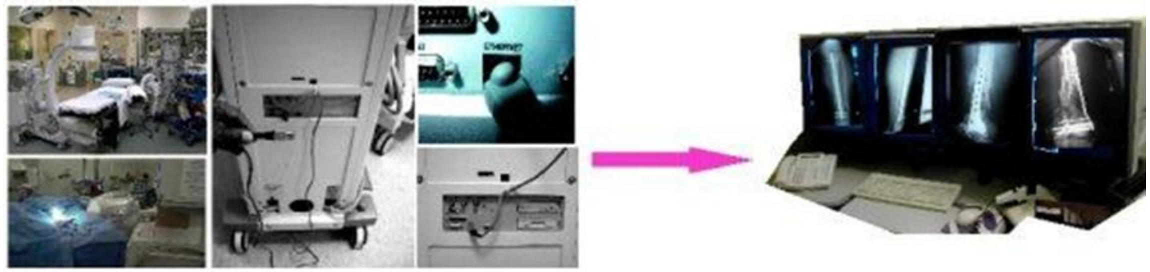
A little history



PACS

- Basic functions of PACS system and network:
  - Image Capture
  - Image Transfer
  - Short Term Storage
  - Long Term Storage
  - Retrieval
  - Image viewing
  - Networking

PACS



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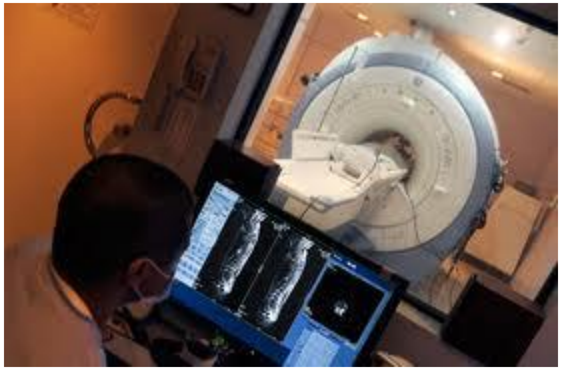

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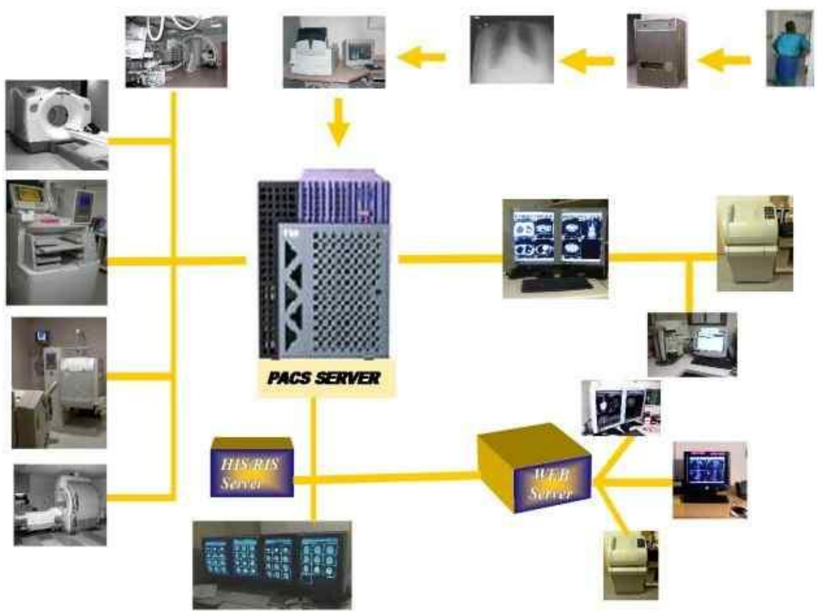

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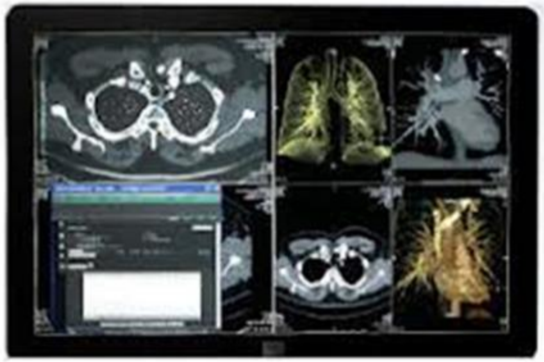

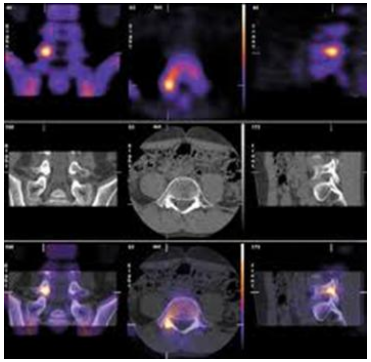

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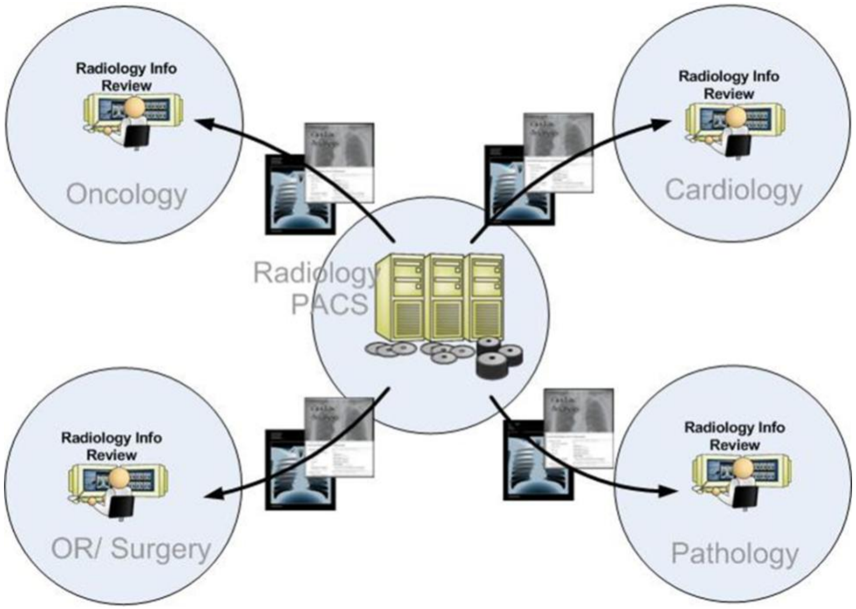

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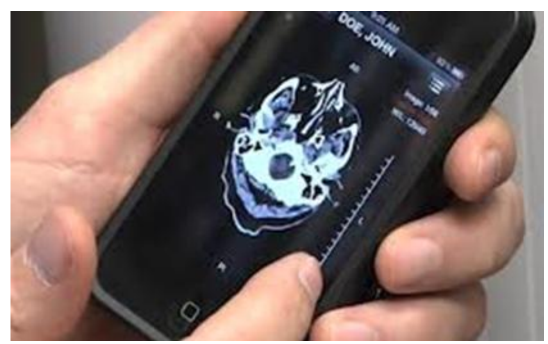

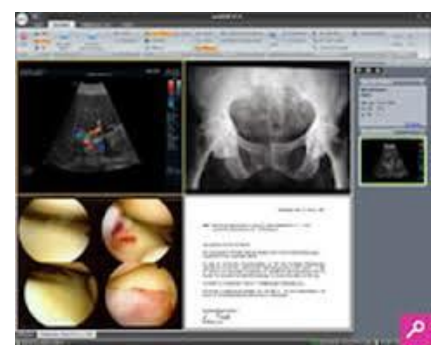

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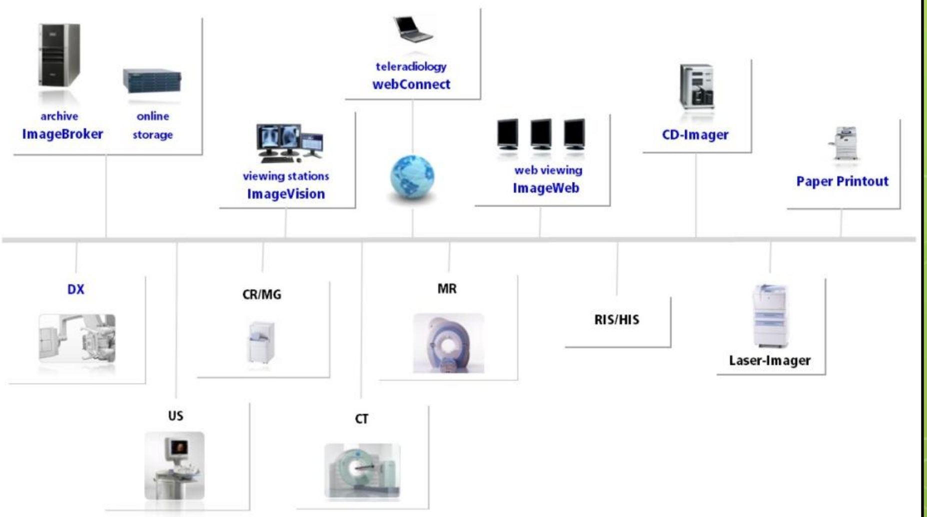

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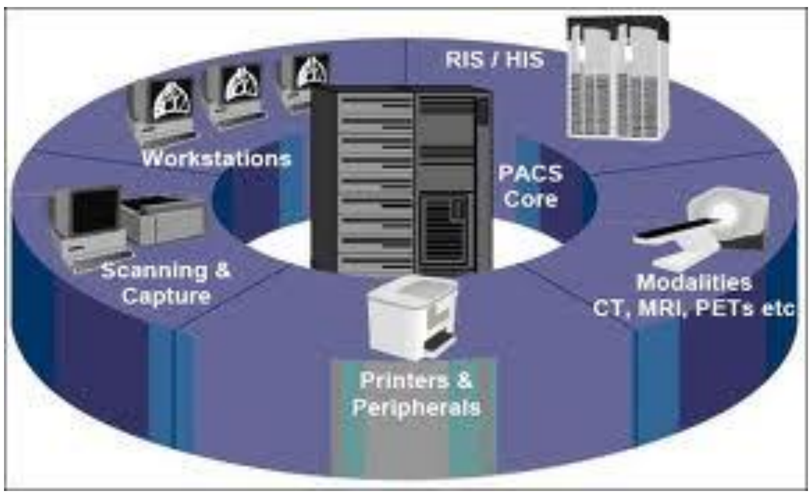
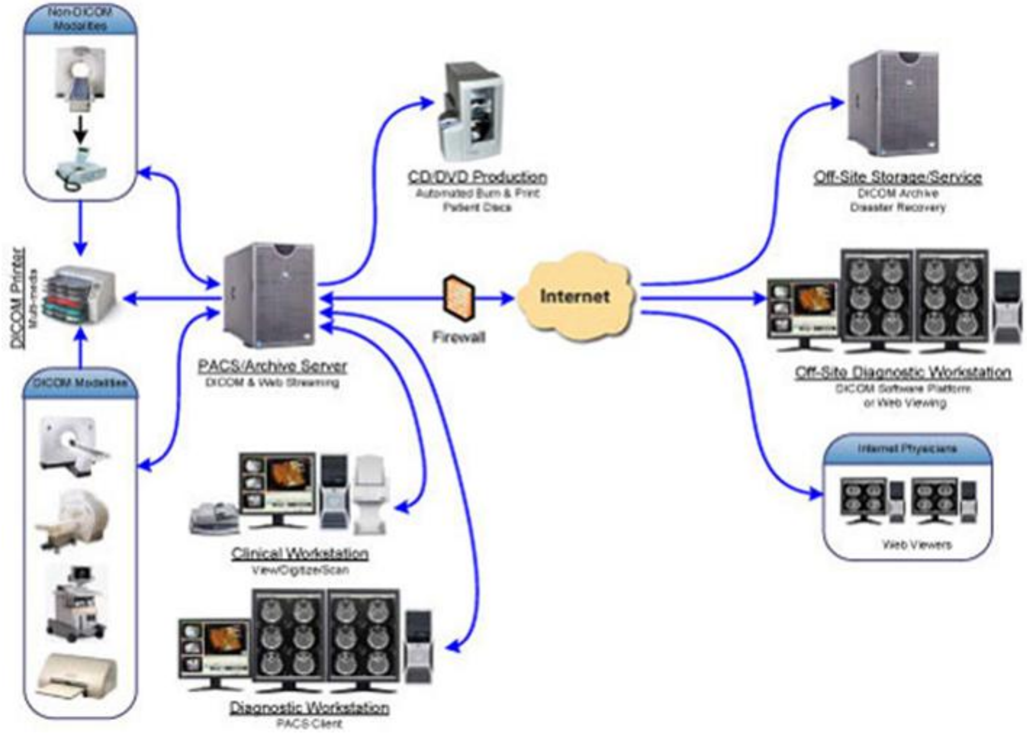


LOCAL

REGIONAL

PACS

- Picture Archiving and Communication System



PACS – going regional

- **WHY** do we need it for:
- Ones makes an examination in a hospital and is needed in another one
- You need access to medical imaging history of a patient to identify any subtle change
- One have an accident, is evaluated in a medical facility and needs treatment in another – by the time he/she arrives there the doctors already know what is to be done
- need advice from an expert but there is no time or possibility for him/her to get on the scene
- Research, large studies about diseases and their aspects in the population at regional level
- Integration of various imaging modalities, fast access – saving time means saving life/improve outcome
- Minimize the costs for every participating healthcare provider

PACS

- Picture Archiving and Communication System - patient information data from:
- Radiology Information System,
- Hospital Information System
- bring up images using:
  - the patient's medical record number,
  - or name, sex, age and other connecting data such as their date of birth
  - such medical data is entered into the PACS record through a data bridge
- Imaging modalities (CXR, US, CT, MRI), functional imaging (PET-CT, fMRI), other medical devices producing images (endoscopy, patology, ophthalmology, surgery) and the data bridge – same language - DICOM

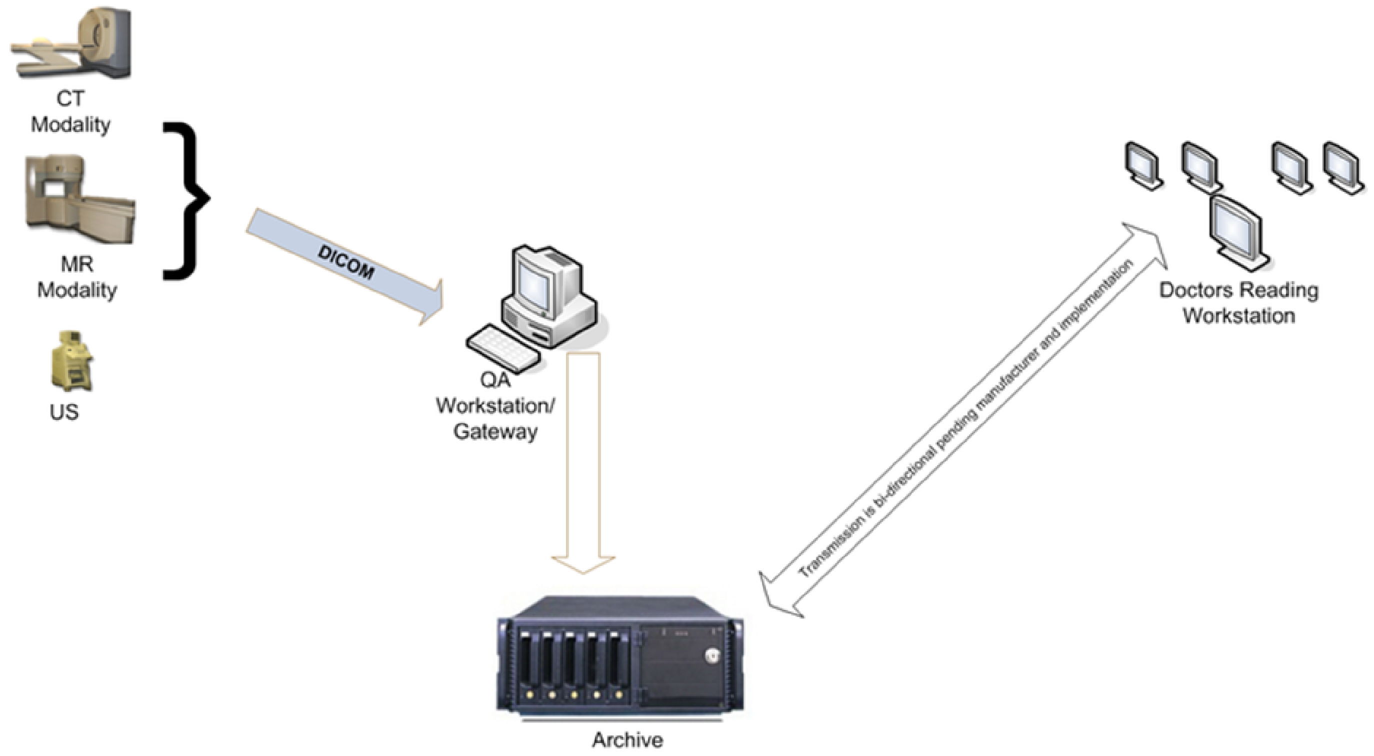
DICOM

- Digital Imaging and COmmunication in Medicine standard
- Exchange of images and related patient information other the network
  - Picture Archiving and Communication System - patient information data from:
  - Radiology Information System,
  - Hospital Information System

DICOM

- All real-world data – patients data, studies, medical devices – are viewed by DICOM as objects with respective properties or attributes
- The definitions of these objects and attributes – standardized – DICOM Information Object Definitions (IODs)
  - collections of attributes, describing each particular data object
  - a patient IOD: name, medical record number (ID), sex, age, weight, smoking status, and so on – as many attributes as needed to capture all clinically relevant patient information
- DICOM maintains a list of all standard attributes (more than 2000 of them) – DICOM data dictionary, to ensure consistency in attribute naming and processing
- data captured as DICOM data attributes – can be transmitted and processed between various DICOM devices and software – Application Entities (AEs)
- DICOM applications provide services to each other. Because each service usually involves some data exchange (typically performed over a computer network), it becomes natural to associate particular service types with the data (IODs) that they process. DICOM calls these associations Service-Object Pairs (SOPs), and groups them into SOP Classes.

DICOM


CT
Modality
MR
Modality
US
DICOM
QA
Workstation/
Gateway
Archive
Transmission is bi-directional pending manufacturer and implementation
Doctors Reading
Workstation

TELEMEDICINE

- **World Health Organization (WHO)** definition:
- use of telecommunication technologies and information technologies to deliver medical information and service to locations at a distance from care giver, patient, medical information or equipment.
- With the application of modern information and communication technologies telemedicine represents the way to transfer medical data from one place to another, thus provide medical care regardless to physical location of a doctor and patient.
- Telemedicine applications include:
  - telediagnostics,
  - teleconsultations,
  - telemonitoring,
  - tele-care,
  - remote access to information that are in one or more data basis.
- telemedicine is a process, not technology.

What we need

- Equipments DICOM compatible
- Communication infrastructure
- Support from all medical entities – public and private
- Support from authorities in the entire region