



CGM NETRAAD

Radiological information system



Synchronizing Healthcare



CompuGroup
Medical





TABLE OF CONTENTS

01 NetRAAD System – fully digital diagnostics

- 1.1. A schematic diagram of the NetRAAD network
- 1.2. System architecture
- 1.3. System scalability
- 1.4. Electronic patient record
- 1.5. Integration with other devices
- 1.6. Intergration with other systems
- 1.7. Database technologies
- 1.8. Security
- 1.9. Certificates and standards

02 NetRAAD PACS – a diagnostics images archive

- 2.1. Integration with hospital infrastructure
- 2.2. PACS Configurator
- 2.3. DiagRAAD Viewer
- 2.4. Medical examinations results on a CD/DVD
- 2.5. Digitizing film images
- 2.6. Rules facilitating work

03 NetRAAD RIS – comprehensive facility management

- 3.1. Personalization
- 3.2. Cooperation with the HIS
- 3.3. System features
- 3.4. Automatic data download
- 3.5. Interpretation by voice
- 3.6. Importing examinations
- 3.7. Reports and summaries

04 Teleradiology – CWT (CTN) system

- 4.1. A schematic diagram of the CWT network
- 4.2. Consultations on examinations
- 4.3. Data security
- 4.4. Why use CWT?

05 EndoRAAD – for endoscopy and ultrasound

- 5.1. A schematic diagram of the EndoRAAD network
- 5.2. System features
- 5.3. Integration with other systems
- 5.4. Why use EndoRAAD?

06 NetRAAD WEB – offsite access to examinations

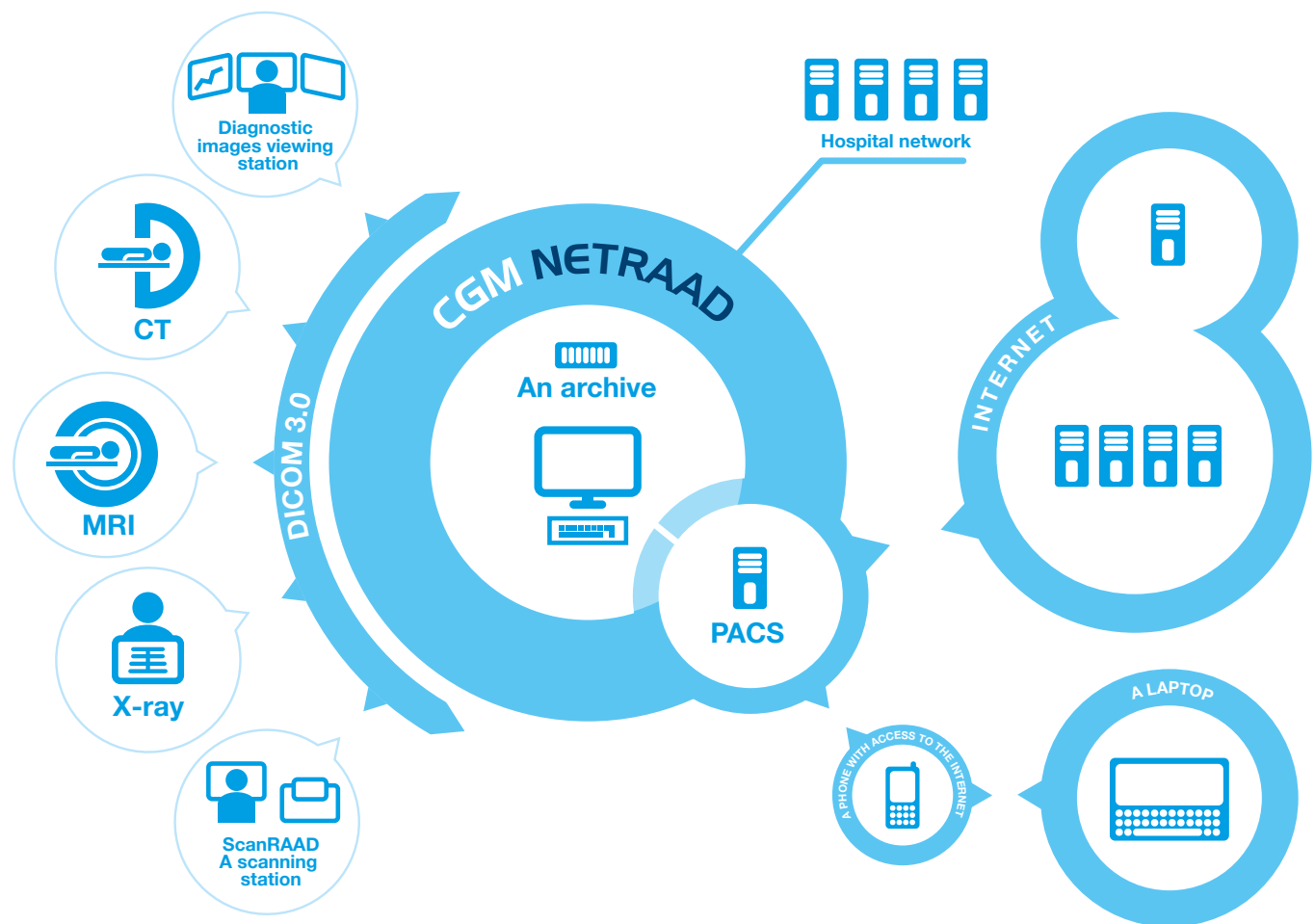
- 6.1. Access to images and examination results

01

NetRAAD System – fully digital diagnostics

NetRAAD is an integrated information system dedicated to the comprehensive computerization of diagnostic imaging centers and facilities. The system allows the management of medical information and digital diagnostic images – creating and archiving a complete documentation in the form of electronic patient records. NetRAAD improves the operation of a diagnostic imaging facility, provides for cost optimization and a transition to a fully filmless operation.

1.1. A schematic diagram of the NetRAAD network





1.2. System architecture

NetRAAD system architecture is based on the modules enabling full digitization of a diagnostic facility. The PACS image archive and the RIS management system of a diagnostic center are fully integrated with each other. The combination of these elements improves the operation of a diagnostic facility, while giving access to medical records, imaging examinations, and a possibility to manage the facility. The EndoRAAD system enables the digitization of endoscopic and ultrasound procedure rooms. Easy access to images and results is provided for by NetRAAD WEB. NetRAAD is complemented by a teleradiological CWT system which enables diagnostics at a distance.

1.3. System scalability

NetRAAD allows connecting multiple devices and diagnostic facilities within a hospital, a clinic or a large medical network. Scalability of the system allows for expansion tailored to requirements without having to modify and implement additional software. NetRAAD is efficient in both large and small diagnostic centers. The range of features and the number of modules depend on the expectations of customers and individual needs of a healthcare facility.

1.4. Electronic patient record

NetRAAD enables the creation of an electronic patient record, presenting integrated medical data from various diagnostic facilities. The system can be operated using a standard web browser, which offers several users an opportunity to work in the system simultaneously, even in respect of the same diagnostic examination. Work in the system is also possible outside the medical center, so that authorized users can quickly gain insight into imaging examinations, interpretations and information about the patient.



1.5. Integration with other devices

NetRAAD system is compatible with all devices that generate digital images compliant with the DICOM standard. It is also fully operative in endoscopic and ultrasound procedure rooms that generate video examinations.

1.6. Integration with other systems

NetRAAD system enables (on-line) cooperation with other systems, based on the HL7 standard. This standard was created to facilitate communication between different medical systems and guarantees proper communication regardless of the system's manufacturer and technology used.

1.7. Database technologies

NetRAAD system is based on database technologies by leading manufacturers employing the latest solutions in respect of data architecture. NetRAAD uses UNIX (Red Hat Linux) class software, which is characterized by its exceptional stability and security.

1.8. Security

NetRAAD provides the highest security of collected and processed medical data. The encryption technology used prevents intercepting and altering the transmitted data. The system allows defining access (keys/rules) to medical data based on user authorization.

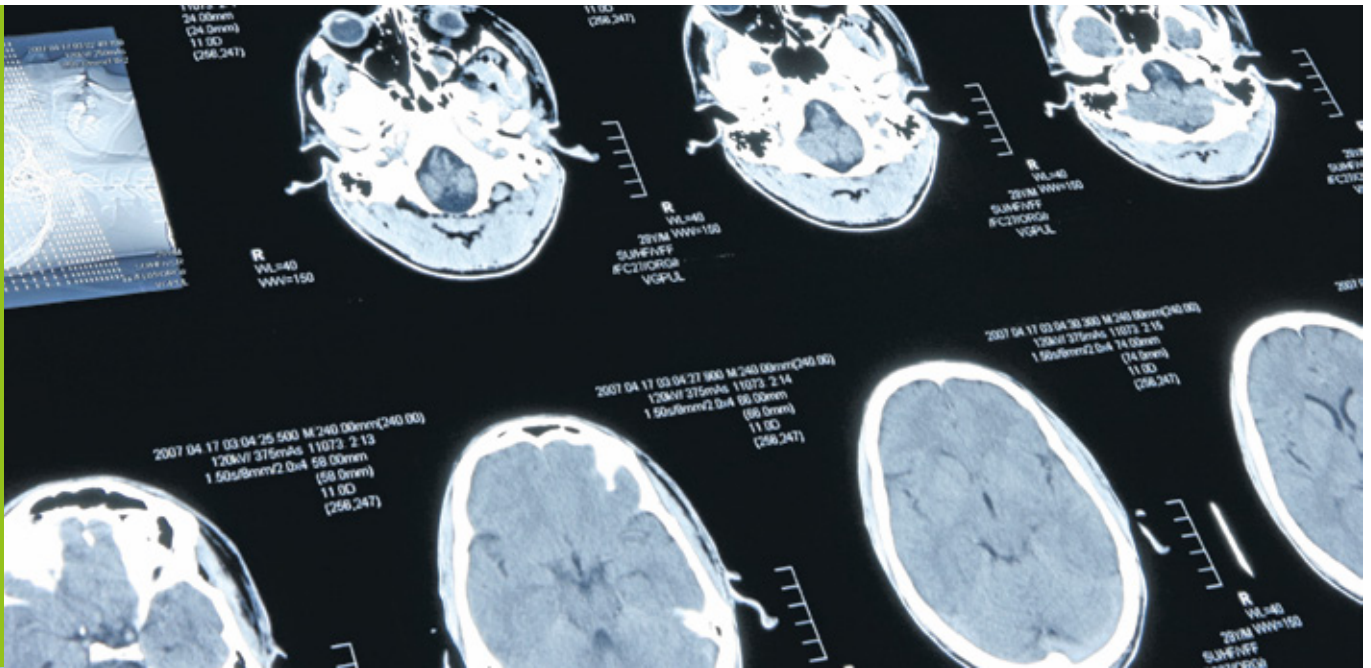
1.9. Certificates and standards

CGM Polska systems, including NetRAAD, comply with the requirements for the exchange of information and diagnostic images in medical environments. NetRAAD system was qualified as Class II A medical devices and obtained EN ISO 13485:2003 + AC:2007 certification and ISO 9001:2008. It is compliant with the DICOM, DICOM RT, HL7 standards, HTTP and SSL protocols. The system also complies with the guidelines of the ACR (American College of Radiology) for diagnostic image quality.

02

NetRAAD PACS – a diagnostics images archive

NetRAAD PACS is a central element of NetRAAD system. Its main features include archiving of diagnostic images in the DICOM format. NetRAAD PACS acquires images directly from devices and diagnostic stations and then locates them in an appropriate destination on the server's hard drive.



2.1. Integration with hospital infrastructure

NetRAAD PACS enables central archiving of medical images from various diagnostic laboratories. It archives and distributes imaging examinations of several different diagnostic laboratories within a single database. This makes them easily accessible and ready for follow-up diagnostic stages.

NetRAAD PACS can operate both as a stand-alone application, as well as in conjunction with the RIS and HIS. This greatly facilitates the flow of information and the creation of an Electronic Patient Record (EPR).



2.2. PACS Configurator

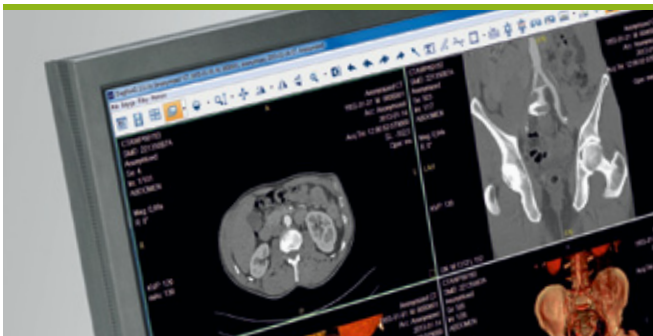
PACS Configurator is a module for PACS archive management. It is used to quickly configure the archive and provides for an easy definition of archiving rules. The module uses a graphic interface showing a list of devices connected to the PACS server.



2.3. DiagRAAD Viewer

DiagRAAD is a multi-purpose digital viewer of medical images in a DICOM format. It allows displaying and manipulating diagnostic images and offers a number of tools designed to perform advanced medical measurements. DiagRAAD does not require installation on the workstation, as it is launched from a web browser. Web-based architecture enables the analysis of the diagnostic image from any workstation connected to the system.

An additional feature of the viewer is facilitating comprehensive ECG-based diagnostics. The software provides for e.g. visualization, transformation and interpretation of the ECG.



Selected features of DiagRAAD viewer:

- displaying several image series simultaneously,
- animation of image sequences,
- importing images in a DICOM format from other media,
- rotation by any angle and image orientation change,
- an option to enlarge the selected image area,
- measurement of the distance, angle and the two lines length ratio,
- measurement of the surface of any shape,
- measurement of density and of the standard deviation in the selected area,
- measurement of the image intensity at a given spot,
- preview of the ECG curve for angiographic images,
- MPR,
- volume rendering,
- 3D visualization,
- MIP,
- MinIP,
- exporting a DICOM image to: JPEG, PNG, BMP, GIF, TIF, DCM formats,
- color reversal.

2.4. Medical examinations results on a CD/DVD

NetRAAD allows writing tests onto a CD/DVD. Apart from diagnostic images, a radiological browser is included on the disc with a mechanism to automatically run the disc on a computer. This solution guarantees easy access to information both for the patient, as well as for medical facilities provided with examination results by the patient.

2.5. Digitizing film images

ScanRAAD module is used to convert images from traditional radiographic film to a digital format. Diagnostic images are processed by scanning or digitization using a frame grabber. Digitized images are then converted into a DICOM format. ScanRAAD allows modifying and enhancing the processed images.

2.6. Rules facilitating work

NetRAAD PACS offers a feature which enables defining certain rules of image archiving, such as "always send to the same destination," or "send to different addresses, depending on the type of test, day, time, or an ordering unit". A prefetching feature is another advantage. It automatically fetches a historical patient test record from the archive, the content of which is associated with the current test. Prefetching improves a radiologist's workflow, provides access to all patient imaging and eliminates the need to perform additional operations, which greatly facilitates accurate analysis and interpretation of the current running test (interpretation of relevant test).



"DiagRAAD is an excellent diagnostic tool. A number of specialized features allows a very detailed analysis of medical images".

A radiologist



"PACS Configurator is a tool that allows easy configuration of devices connected to the system and the monitoring their current operation".

A System administrator

03

NetRAAD RIS

– comprehensive facility management

NetRAAD RIS is a modern IT system for comprehensive management of a diagnostic imaging facility. It facilitates management of radiology, cardiology, endoscopy and ultrasound procedure room. It allows for a smooth and safe transfer of image and textual data within a hospital, a clinic or a medical network based on Web technology.



3.1. Personalization



NetRAAD was designed for individual needs of all users of the system and the specific nature of individual diagnostic facilities. A user – a physician, a technician, a system administrator and even hospital managers – can define the application screens according to personal preferences and adapt the tools and different features to individual needs.

3.2. Cooperation with the HIS

Through the HL7 standard of medical information exchange NetRAAD RIS is fully integrated with the hospital information system (HIS). System integration enables creating a comprehensive IT infrastructure in the facility ensuring information flow between the systems. Integration with the general hospital system is ideal for e.g. ordering tests and creating electronic patient records.

NetRAAD RIS system operates in a client - server mode based on Web technology. It can be accessed through a web browser, so the system does not require installation on the workstations. Web-based architecture provides access to medical data from any workstation connected to the system.

3.3. System features



NetRAAD RIS is a flexible system catering for the expansion of the facility by further diagnostic laboratories and new equipment purchases. It undergoes systematic modifications and extensions by new features. The number of modules or individual tools can be tailored to the individual user's needs and the profile of a diagnostic facility.

Selected features of NetRAAD RIS:

- registration of patients for diagnostic examinations,
- creation of schedules,
- entering descriptive examination results,
- access to structured test result forms,
- generating different types of reports,
- creation of waiting lists,
- sending examinations to be teleradiologically interpreted directly from the RIS without having to use additional tools,
- access to an Electronic Patient Record with an option of data editing,
- invoicing,
- integration of the diagnostic software by different manufacturers – from the system.

3.4. Automatic data download

The module allows creating worklists (patient data and orders) available to imaging devices equipped with the DICOM Modality Worklist module. Consequently, the order information is sent directly to the device without the operator having to “manually” enter data.



“NetRAAD RIS has improved the management of our diagnostic facility. After a few weeks of using the system we have seen improved productivity, the quality of service to our patients has also improved”.

A physician

3.5. Interpretation by voice



SpeechRAAD is a component application of NetRAAD system which allows recording and archiving an audio interpretation of an examination. Users of this module can interpret the examination by voice, which is stored in the system in the form of a sound file.

Selected features of SpeechRAAD:

- free manipulation of the recording (forwarding/rewinding/inserting/overwriting),
- playing a recording,
- compression to DSS/DS2, MP3/WMA formats,
- sending a recording to the RIS,
- an equalizer.

3.6. Importing examinations

The module allows importing DICOM images and graphic files to a PACS archive and assigning them to a specific patient in the RIS. The module enables previewing DICOM images and includes features such as zoom in, zoom out, change of contrast and rotation. Imported examinations are stored in a PACS archive and are available in an electronic patient record.

3.7. Reports and summaries

The module allows generating various types of analytical reports and summaries. Users gain access to the reports on examinations performed, ordering units, materials used, the cost of procedures performed, and can create other reports according to their own criteria.



“The possibility of sending orders to other labs directly from NetRAAD RIS is a major convenience. The results automatically appear in the system”.

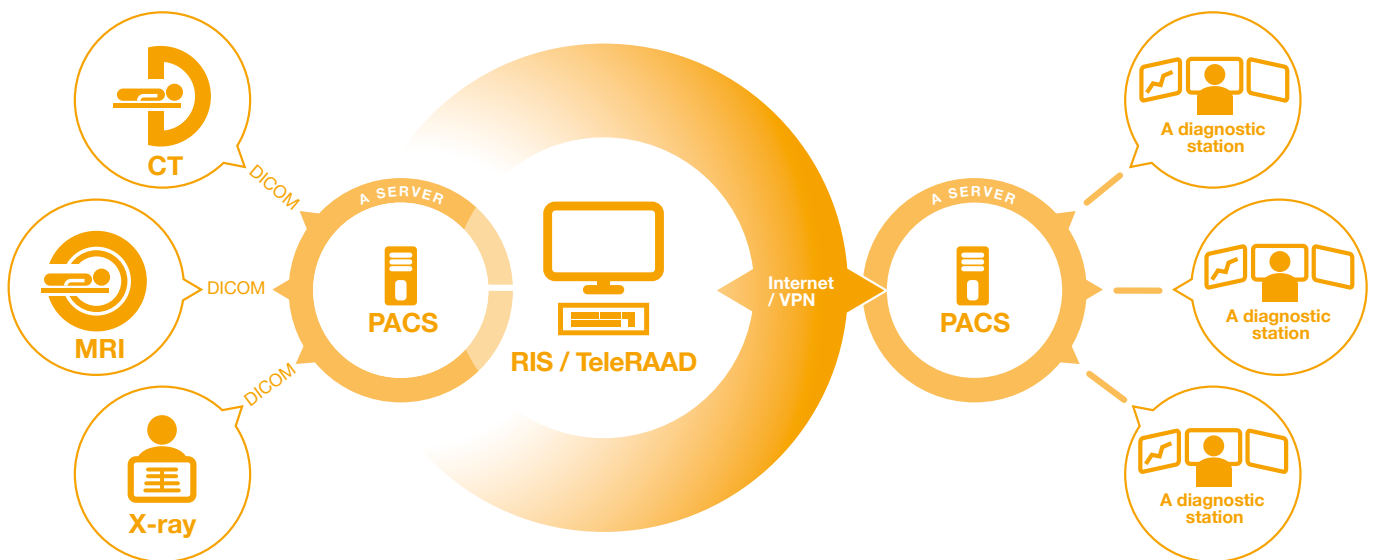
A physician

04

Teleradiology – CWT (CTN) system

Teleradiology, or consultations at a distance, is currently the latest form of medical service that combines elements of telecommunications, information technology and medicine. It helps eliminate distance barriers, allowing an exchange of information and diagnostic images between facilities performing examinations and diagnostic centers. Teleradiology is undoubtedly an important tool of a modern radiologist, which is gaining considerable recognition among professionals around the world.

4.1. A schematic diagram of the CWT network



CWT (the central teleradiological node) is a teleradiology consultation platform. It provides for a quick transfer and interpretation of radiological examinations in reputable consultation centers.

Imaging examinations are sent for a consultation via the Internet through a secured VPN (Virtual Private Network). The consultation result is sent back in the form of electronic medical records to the RIS where it automatically appears and is available as part of an electronic patient record.

4.2. Consultations on examinations

Access to highly specialized medical personnel providing services 24/7/365 is an important feature of the CWT system. Depending on the needs and characteristics of medical cases, interpretations are provided within 2 to 48 hours. Consultations include a full range of diagnostic imaging.



4.3. Data security



Particular emphasis was placed on the security features of the CWT system. The technology used in communication between an individual ordering unit and a consultation center meets the highest standards in this regard:

- a high level of security,
- authorized and monitored access to the system,
- data encryption – SSL and VPN,
- an electronic signature,
- a secure PACS archive.



“With CWT our small facility gained access to professional interpreting centers and specialized radiologists. The quality of our services has significantly increased”.

A hospital director

4.4. Why use CWT?

A CWT radiological consultation platform supports the development of medical facilities and improves the quality of patient care. The waiting time for a consultation is reduced significantly, and the presence of a patient and a physician in the same location is no longer necessary. It helps in situations when the team of radiologists needs support in peak workload times during the vacation periods, seasonal holidays or during night shifts. It is also a perfect solution for difficulties with finding a full-time radiology specialist.

Benefits of CWT implementation:

- consultations of examination available 24/7/365,
- fast performance – handling emergency examinations in even up to 30 min.,
- scheduled examinations in up to 24 h,
- access to highly specialized medical staff,
- the full range of MRI, CT, DR, MG reports,
- cost optimization,
- the increase in the quality of patient care.



“The CWT system has significantly increased the competitiveness of our facility. Night shifts, holidays and vacation time do not cause problems in the continuity of our diagnostic facility”.

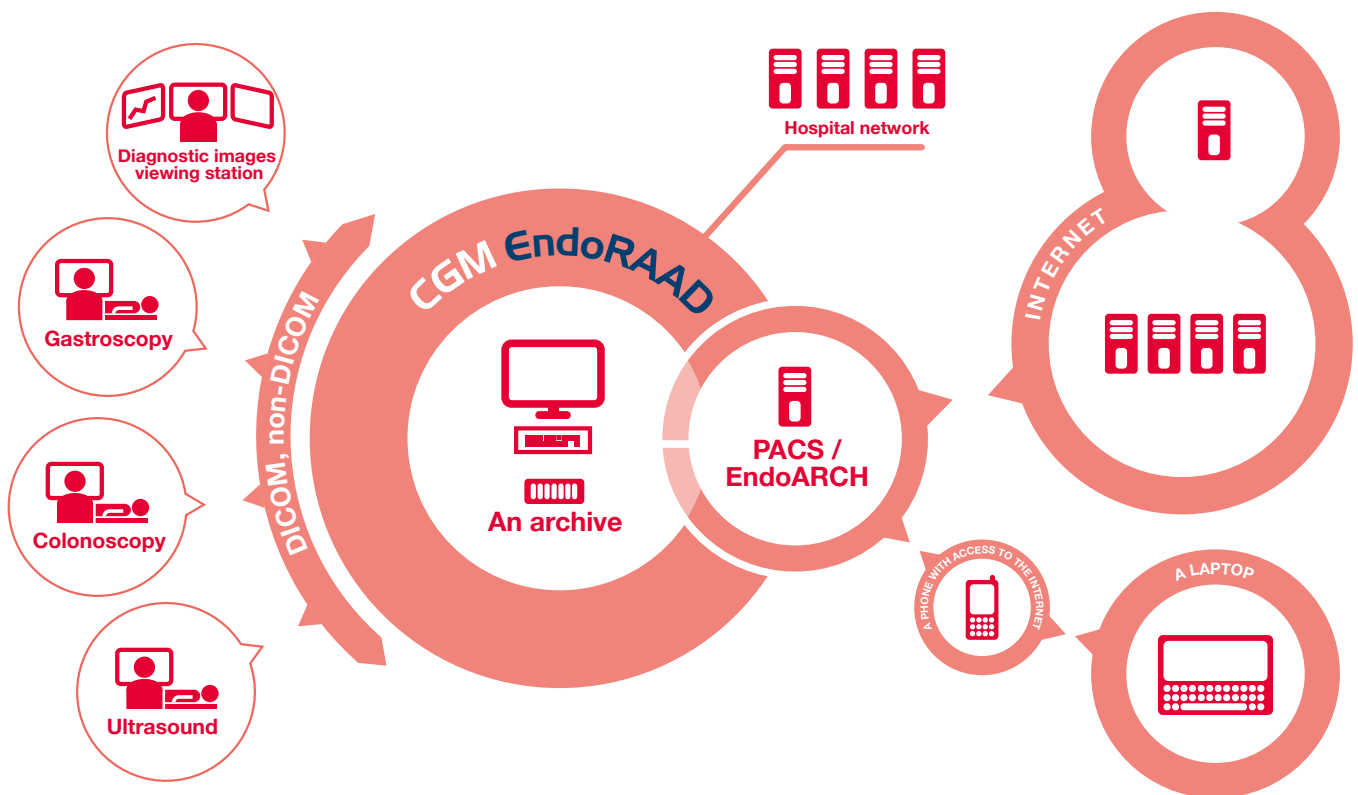
A hospital director

05

EndoRAAD – for endoscopy and ultrasound

EndoRAAD is a digital system design to record, archive and interpret diagnostic images and video examinations. It is used in endoscopy and ultrasound, as well as in laparoscopy, colonoscopy, gastroscopy, sigmoidoscopy, ERCP, bronchoscopy and EUS procedure rooms. Images or video sequences recorded during an examination are stored in a dedicated archive and made available to physicians for interpretation.

5.1. A schematic diagram of the EndoRAAD network





5.2. System features

EndoRAAD is a multi-module system which provides a number of features, including work in the treatment room, archiving of diagnostic examinations and diagnostic facility management. The system allows users to create reports (capture images and video sequences) in “real time” during the examination. After they are archived, all the images and reports can be viewed on hospital wards and in other locations via any web browser.

Selected features:

- saving and archiving any video sequences or individual images,
- a print-out of test results along with the images,
- archiving data in DICOM and non-DICOM formats,
- archiving data from other imaging facilities - a single central archive for all examinations,
- registration of patients for examinations, creating schedules and worklists,
- writing examinations and results onto a CD/DVD.

5.3. Integration with other systems

The system allows access to a worklist, from which a patient can be selected including his/her demographics, the episode and information about the order. Through the HL7 standard EndoRAAD communicates with other systems in the hospital, facilitating the flow of orders and medical data. This solution enables the creation of a complete medical record for each patient.

5.4. Why use EndoRAAD?

An important aspect of the ergonomics of the system is its simplicity and intuitive quality. EndoRAAD supports work and is user-friendly. Built-in reports generators are a significant advantage facilitating the workflow. Physicians can generate examination result forms, taking into account clinical components of individual medical procedures performed in various endoscopic and ultrasound procedure rooms.

Benefits of EndoRAAD implementation:

- in an intuitive and easy-to-use system,
- access to a report generator,
- integration with other systems.



“Pre-defined result templates are a major advantage. This significantly reduces the time required to create medical records”.

A physician



“EndoRAAD system is easy to use and intuitive, it enables smooth performance of an examination”.

A physician

06

NetRAAD WEB – offsite access to examinations

Physicians need quick and easy access to medical information outside an office and even outside the hospital. Easy access to complete patient information via a web browser is a major advantage in daily work.

Independence of medical data distribution from the system platform used in the hospital network and from workstations is possible by means of the NetRAAD WEB application used for the distribution of imaging.



6.1. Access to images and examination results

NetRAAD WEB supports the distribution of archived images and examinations interpretations in the hospital and offsite (remote locations, teleconsultations). It groups and yields any medical images, regardless of time and place (in the emergency room and in outpatient clinics) and verifies the right of access to examinations through an extensive control system. WEB NetRAAD is equipped with a graphic table of contents in the form of icons. Depending on the requirements of a diagnostician, the system allows previewing images in a diagnostic or a reference quality, so it is possible to optimize the network transfer load.

The application can be used in Windows, Linux, Mac OS X and other platforms.



“Access to medical information has never been so simple, all you need is a tablet with access to the Internet”.

A physician





Synchronizing Healthcare

CompuGroup Medical Polska Sp. z o.o.,
ul. Do Dysa 9, 20-149 Lublin
tel.: +48 81 444 20 15, fax +48 81 444 20 18
www.cgmpolska.pl



CompuGroup
Medical