iQ-ROUTER

VERSION 5.0

IMAGE COMPRESSION,
TELERADIOLOGY AND
WORKFLOW MANAGEMENT

MD CE 0482

Component of
iQ-SYSTEM PACS

HIGH-SPEED ENCRYPTED DICOM DATA TRANSMISSION THROUGH ANY NETWORK

iQ-ROUTER ❶ is the ideal tool for any frequently used and/or critical connection between imaging centers. It works with state-of-the-art algorithms that compress medical images in a lossless compressed format maintaining the diagnostic quality of the images. Extensive and fast data transmissions can be achieved, accelerating the imaging workflow. It saves time, resources and money, not only when used in low-bandwidth areas, but also by searching for relevant priors of a patient and automatically sending them to the workstation whenever data is sent through iQ-ROUTER.

In standard DICOM networks, native (uncompressed) DICOM transmissions via wide area networks generate bottlenecks and cause slow data transmissions when data leaves the LAN. iQ-ROUTER's multi-channel technology guarantees constant high performance during imaging study exchange between multiple centers, even managing up to 100 channels simultaneously.

iQ-ROUTER offers bidirectional communication which means that modalities can not only send data over the teleradiology line, but DICOM stations, such as reading stations, can query and retrieve needed data. The access to different DICOM stations is regulated by means of access control.

> **❶ iQ-ROUTER is a component of iQ-SYSTEM PACS**
> – a picture archiving and communication system (PACS) for the management, retention, routing, analysis and review of medical images stored in proper DICOM format and a system of interrelated software components.
>
> The other components are iQ-WEB, iQ-VIEW and iQ-4VIEW. Every component in this system is responsible for performing its specific tasks. The components can be used all together and in various combinations. The full scope of functionality of iQ-SYSTEM PACS is reached when integrating all components into the imaging network.

THREE EDITIONS – TAILORED TO YOUR NEEDS

Choose the edition that best fits the size and conditions of your medical network, depending on the number of stations you need to connect and the number of data adjustments you plan to implement.

iQ-ROUTER	iQ-ROUTER PRO	iQ-ROUTER PREMIUM
• Ideally suited for small imaging centers with a low number of imaging devices.	• Perfectly meets the requirements of mid-sized imaging centers and small hospitals	• Intended as central image distribution node for imaging center groups, VNA and large hospitals
• Connect up to 3 DICOM nodes	• Connect up to 11 or 21 DICOM nodes	• Connect up to 100, 200 or 300 DICOM nodes
• Apply up to 5 attribute rules	• Apply up to 25 or 53 attribute rules	• Apply up to 250, 503, 753 attribute rules

- • Flexible compression or decompression of DICOM imaging data supporting virtually any object
- • Fully customizable rule-based attribute manipulation for consistent DICOM data & successful DICOM transfers
- • High-speed encrypted DICOM data transmission without the need for VPN
- • FIPS, HIPAA and GDPR compliant to ensure cybersecurity

VERSATILITY AND FLEXIBLE CUSTOMIZATION OF iQ-ROUTER

SECURE TRANSMISSIONS

The iQ-ROUTER editions support virtually all DICOM formats and transfer syntaxes, thus making the software exceptionally versatile. Thanks to the use of the DICOM TLS/SSL protocol, privacy between two communicating partners is maintained without the need for VPNs. By supporting Unicode, iQ-ROUTER allows the correct transmission of most worldwide characters, including those of Asian and all European languages. Using iQ-ROUTER, any DICOM attribute can be added, modified (e.g. using prefixes or suffixes) or deleted.

REGULAR EXPRESSIONS

iQ-ROUTER includes regular expressions which means that based on user-defined rules, the software can automatically correct virtually any image or data error as well as DICOM inconsistencies.
It can, for example, adjust incorrectly coded image acquisition parameters or number formats (e.g. remove leading zeros). Accurate data exchange between various modalities and workstations is at last possible, regardless of the vendor.
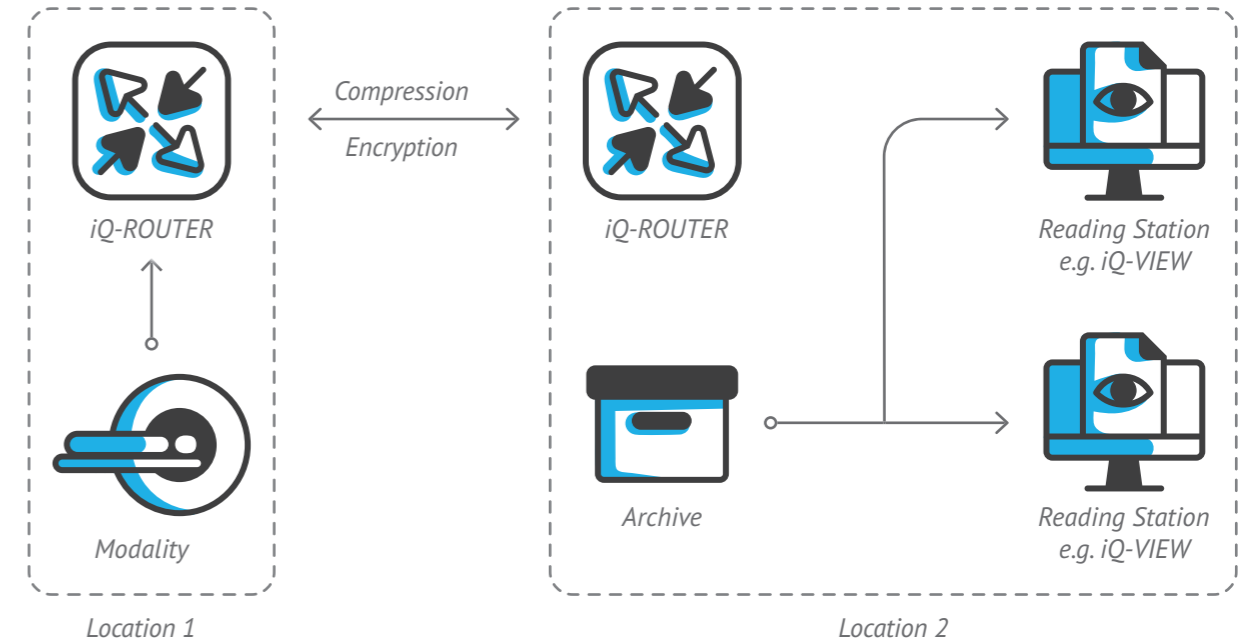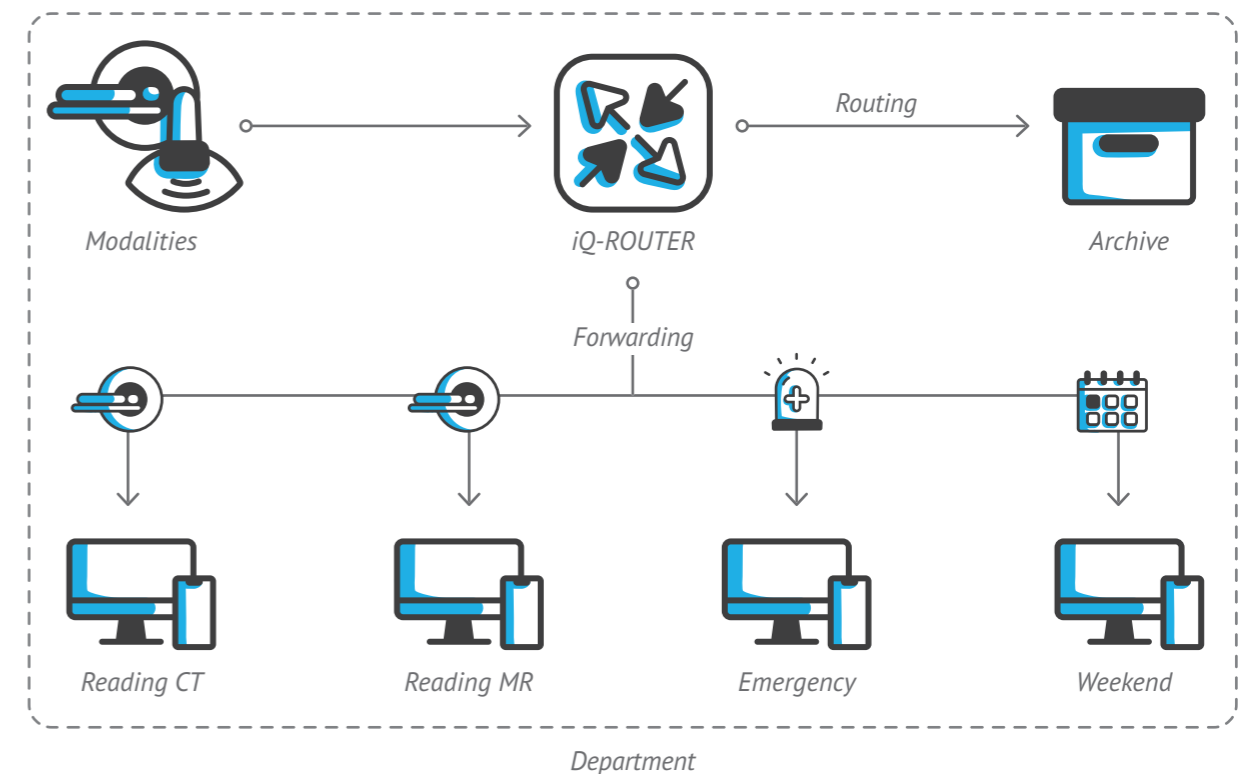
FLEXIBLE FORWARDING

All editions also allow data forwarding based on specific rules or even a combination of them, for example,
to forward all incoming CT scans of the skull to a specific workstation. In addition, forwarding tasks may be scheduled at a predefined time or day of the week.
This facilitates the setup of comprehensive, fully automatic workflow procedures as they are frequently used in teleradiology. Of course, individual patient information within the forwarded data can be pseudonymized and/or sent as encrypted data in accordance with existing data protection laws. Upon receipt, the data is then decrypted.
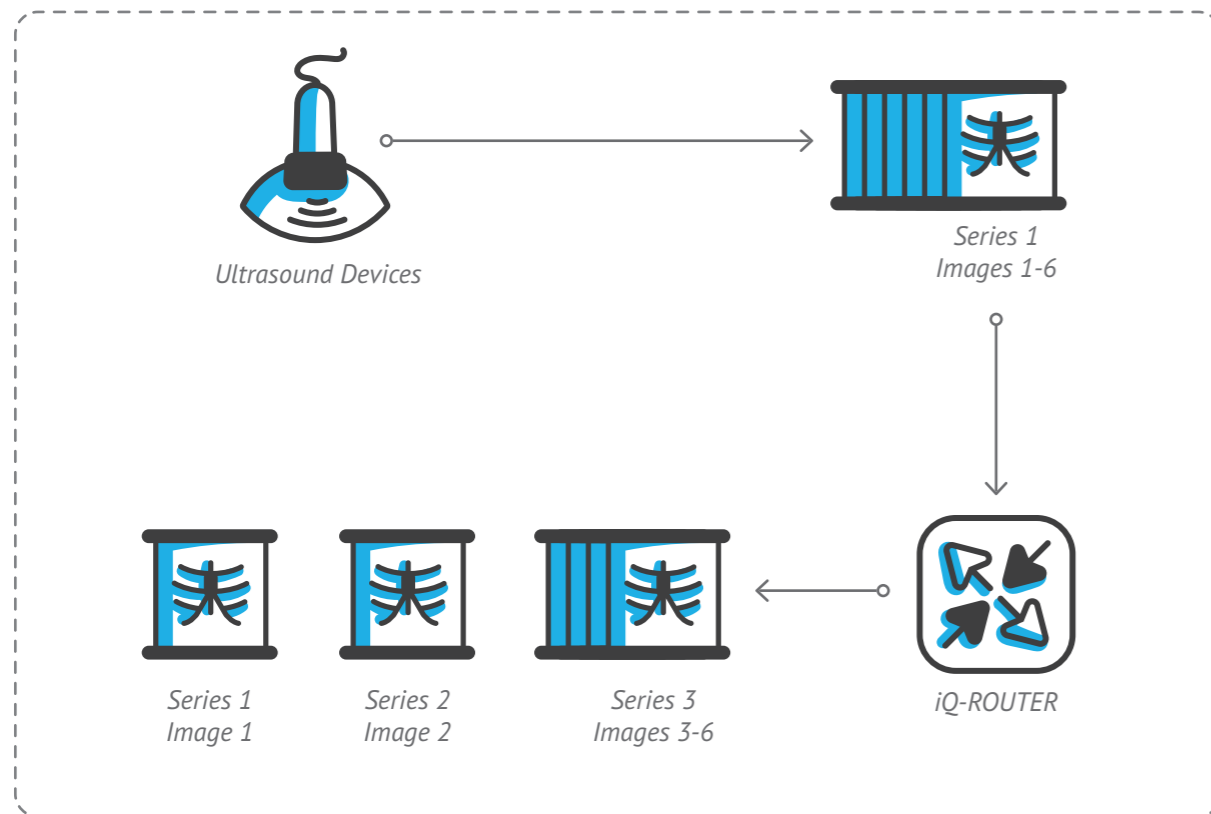
1. SCENARIO: SECURE DATA ROUTING

iQ-ROUTER   Compression / Encryption   iQ-ROUTER   Reading Station e.g. iQ-VIEW

Modality   Archive   Reading Station e.g. iQ-VIEW

Location 1   Location 2

2. SCENARIO: FORWARDING BASED ON RULES

Modalities   iQ-ROUTER   Routing   Archive

Forwarding

Reading CT   Reading MR   Emergency   Weekend

Department

3. SCENARIO:
REGULAR EXPRESSIONS

AUTOMATED PREFETCH
OF RELEVANT PRIOR STUDIES

Ultrasound Devices

*Series 1
Images 1-6*

iQ-ROUTER

*Series 1
Image 1*

*Series 2
Image 2*

*Series 3
Images 3-6*

WHERE CAN REGULAR EXPRESSIONS HELP?

USE CASE 1:
Most ultrasound devices deliver all images of a study in one single series, mixing both single and cine images. Consequently, it can be difficult to manage common ultrasound studies in a PACS. iQ-ROUTER separates the image objects into sorted series allowing to review them in a structured way.

USE CASE 2:
iQ-ROUTER can adjust incorrectly coded image acquisition parameters or number formats (e.g. remove leading zeros in UIDs).

USE CASE 3:
By using regular expressions, iQ-ROUTER can delete or replace blank spaces in Patient IDs or correct date formats. (05.09.2019 -> 20190905)

- Automatic search for relevant prior studies in connected archives considering the human anatomy
- Automatic body part matching, e.g. to search for a previous study of a chest CT, taking into account all lung x-rays, thorax CTs and cardiac CTs to accompany the study for the remote reading physician to immediately read the complete case without time-consuming searches for previous studies and without human error
- Customizable prior study relevance range e.g. 2 years

PACS A

PACS B

PACS C

Current Study

Prior 1

Prior 2

iQ-ROUTER

*Current Study
+ Priors*

*Remote Reading
Physician*
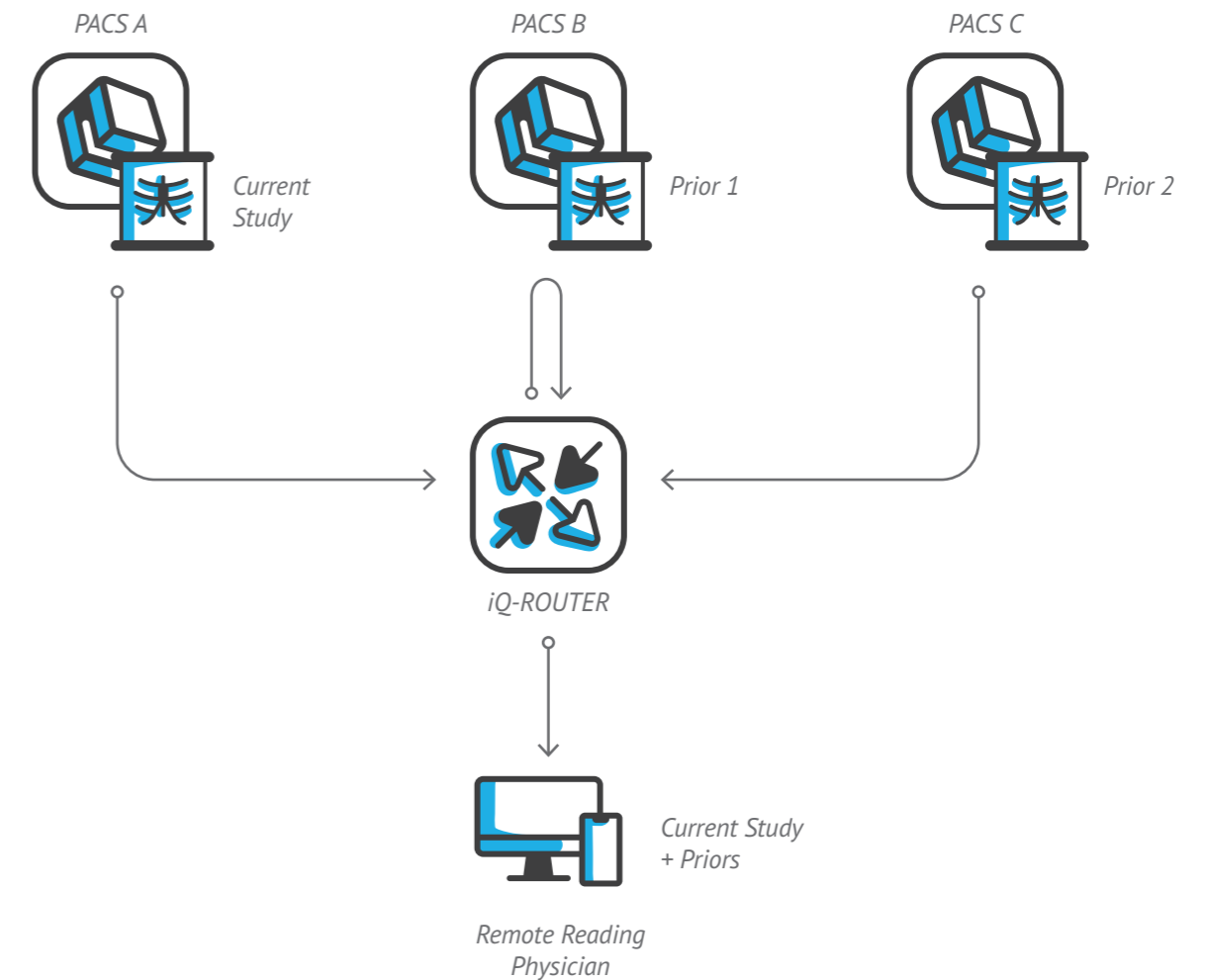
WORKFLOW AND TECHNICAL FEATURES*

GENERAL

- 64-bit application with enhanced transfer and (de)compression of large datasets
- Flexible configuration, monitoring and logging tool
- Optional reconciliation plugin available for an enhanced workflow

DICOM SUPPORT

- Bidirectional DICOM interface with DICOM store, query/retrieve, verification
- Patient root and study root model support for DICOM queries
- Support of all DICOM-defined "specific character sets" including Asian languages and Unicode UTF-8
- Multi-threaded processing (with parallel connections within the network)
- Support of all DICOM store classes including non-image classes like Structured Reports

SECURITY/PRIVACY

- Transport Layer Security (≤ TLS/SSL 1.3) support with latest updates to meet cyber security requirements
- Flexible service access control for all DICOM stations within the network
- Restriction for query requests
- Automatic pseudonymization of patient data

LICENSING

- Single (PC-based) or concurrent (floating user) licenses

CERTIFICATION

- iQ-SYSTEM PACS (incl. iQ-ROUTER) is registered according to:
  - › MDR (EU) 2017/745, class IIb (v1; iQ-ROUTER UDI-DI (EEA): +B403IQROUTER5001)
 - › FDA 510(k), class II (version 1.9; UDI-DI: +B403IQS190C)

FORWARD MANAGEMENT

- Asynchronous forward management (multi-threaded)
- Significant speed-up of long-distance, encrypted DICOM data transmissions through customizable simultaneous threads per association `NEW`
- Automatic rule-based forwarding of DICOM data to multiple destinations
- Support of multiple conditions for each rule
- Support of wildcards for all text fields in rules and conditions
- Support of data forwarding based on called or calling AE title, time or day of the week and any DICOM header information for rules and conditions
- Storage of forward jobs in SQL data base to automatically retry them after restart or manually resend them after failures
- Processing of forwarding jobs within a customizable time frame e.g. for night shifts
- Possibility to limit simultaneous forwarding to the same destination to prevent jobs from blocking each other
- Sending or removing of multiple forwarding jobs at once for easy go-live after a long communication failure

ROUTING/ TELERADIOLOGY

- Transparent routing of all requests
- Support of all common transfer syntaxes (JPEG-LS, JPEG/JPEG 2000 lossy or lossless compression) with adjustable compression ratio for all lossy compressions
- Sending DICOM images without further compression or decompression
- Support for long latency time and low bandwidth connections, e.g. satellite lines; support for VPN, dynamic IPs and firewalls
- Automatic correction of transferred DICOM standard compliant objects
- Automatic changes of AE titles (AE mapping)
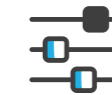
ATTRIBUTE MANIPULATION

- Rule-based modification of DICOM attributes
- Definable conditions to set the rules, e.g. attributes, calling AE, called AE
- Possible modifications of attributes, e.g. add, replace, copy, delete, add prefix or suffix
- Regular Expressions for fully automatic correction of any image and data errors or DICOM inconsistencies

* Detailed information on iQ-ROUTER's system requirements is available in the iQ-ROUTER Administration Guide or the iQ-SYSTEM PACS Hardware Purchasing Guide.

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