



PACS in (western) Norway

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PACS history of Norway

- The first commercial PACS system installed and implemented in 1998
- All public and private Norwegian hospitals and institutes were fully digitized by 2005
- The last institution to be digitized was the nationwide mammography screening

Diagnostic
imaging
june/july 2003

HELSE BERGEN
Haukeland University Hospital

CMP
United Business Media

JUNE/JULY 2003

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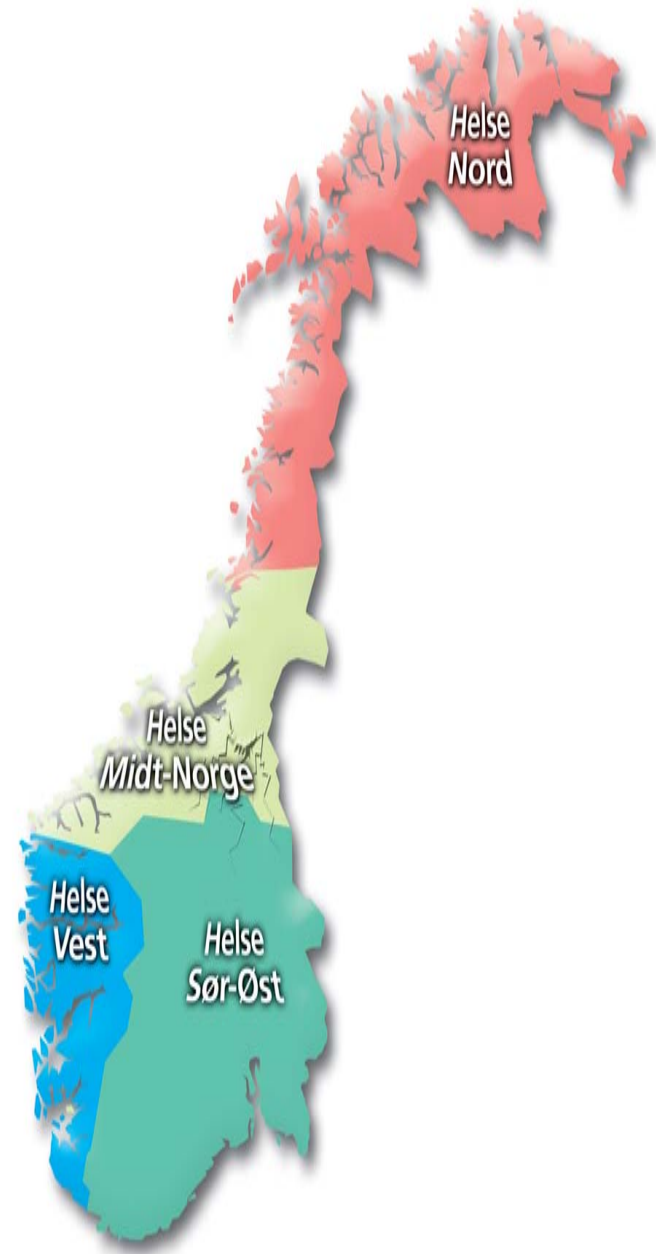
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**Norway
rides
high
with
PACS**



Organisation of specialist health care i Norway

- Four regional trusts
- Within each regional trust several local trusts
- Separate RIS/PACS-systems in each trust



• North

- Finnmark: Agfa
- Tromsø: Agfa
- Bodø: Agfa

• Mid-Norway

- All trusts: Sectra

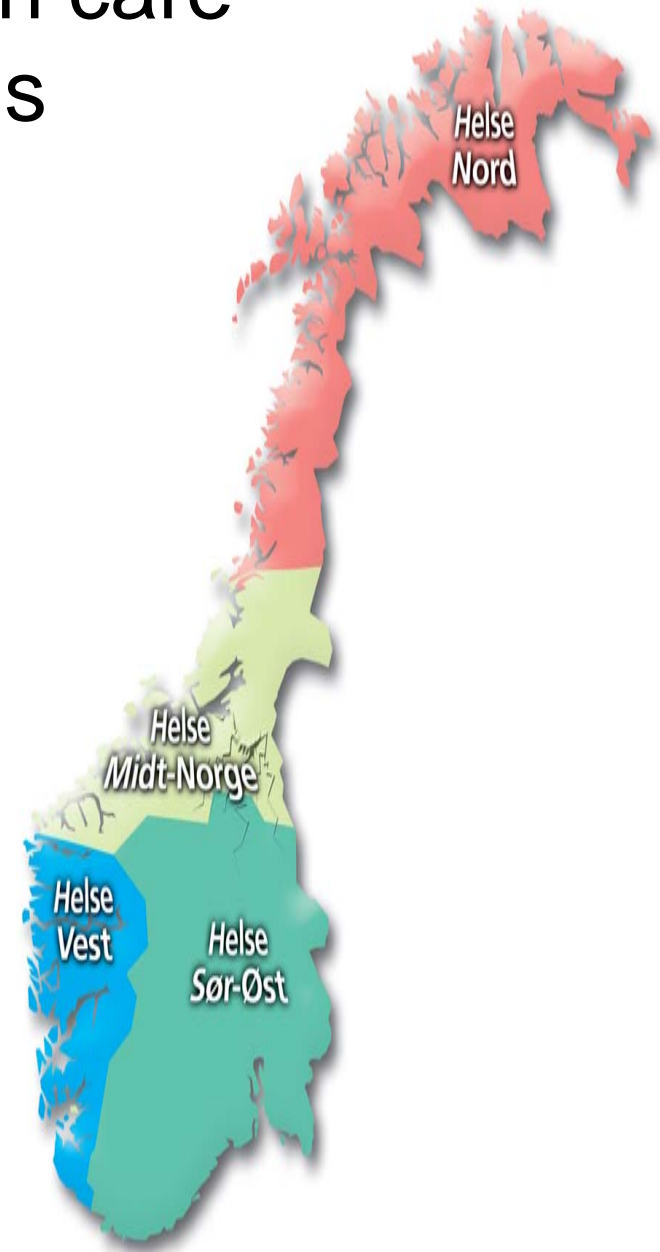
• Western

- Bergen: Agfa
- Fonna: Siemens
- Førde: Siemens
- Stavanger: Carestream

Pacs in health care regions

• South-east

- Oslo: Sectra, Siemens, Agfa
- Vest-Viken: Siemens, Carestream



Norway fully "PACS-ified"

What's next?

Today's challenges

- Integration of PACS and RIS into regional networks
- Integration of other “o”logies
- PACS as a tool in open surgery and minimal invasive surgery
- Integration of PACS and RIS into hospital EPR systems

Teleradiology and integration into regional networks:

Three different solutions

1. Pushing examinations from one hospital to another
2. Integrating different PACS/RIS systems (XDS-I)
3. Designing regional PACS-systems

Europacs 2010 (Geneva)

- Several papers on integration with IHE XDS-I solution
 - Shanghai, China
 - Leuven, Belgium
 - Bergen, Norway
 - Pittsburg, US
 - HongKong, China
 - Groningen, Netherlands

Advantages for integration in Norway as compared with other countries

- Infrastructure
 - Norwegian health care network (Helsenett), owned and run by the government
 - Provides all health care institutions with a common broad band network with Gbit capacity and cryptation
- Unique, national 11-digit personal identifier
- Almost all specialist health care institutions have one owner (Government)
- Uniform financing and much resources spent on health care
- Equal spending on health care throughout the country
- High IT-competence in health care

Disadvantages

- Norwegian legislation
 - Pushing examinations between hospitals: **OK**
 - Looking into another hospital's database is allowed only with great restrictions
 - That means that designing a system according to XDS-I standard is difficult and must be done with great care for patients' secrecy and privacy

Integration of PACS into regional networks (2003)

- PACS systems were designed to serve one or a few hospitals
- RIS systems are complicated (much more complicated than PACS systems) and are also designed to serve only one hospital
- PACS vendors have little interest in integration (they want to sell their own solutions)

Western Norway health care region

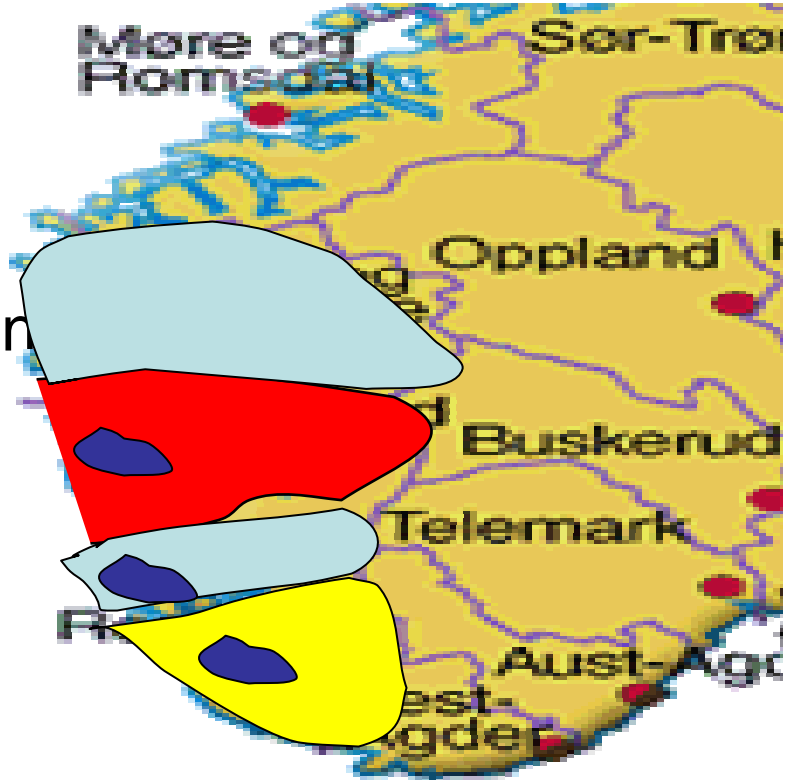
Challenge :

- One health region
- 4 public trusts
- 2 private trusts
- All different RIS-PACS
- No funding for a regional PACS

Solution : Integration/communication
platform created for cross
enterprise document sharing
(XDS-I)

Goal :

- Shared, distributed and seamless
regional radiology for information
interchange



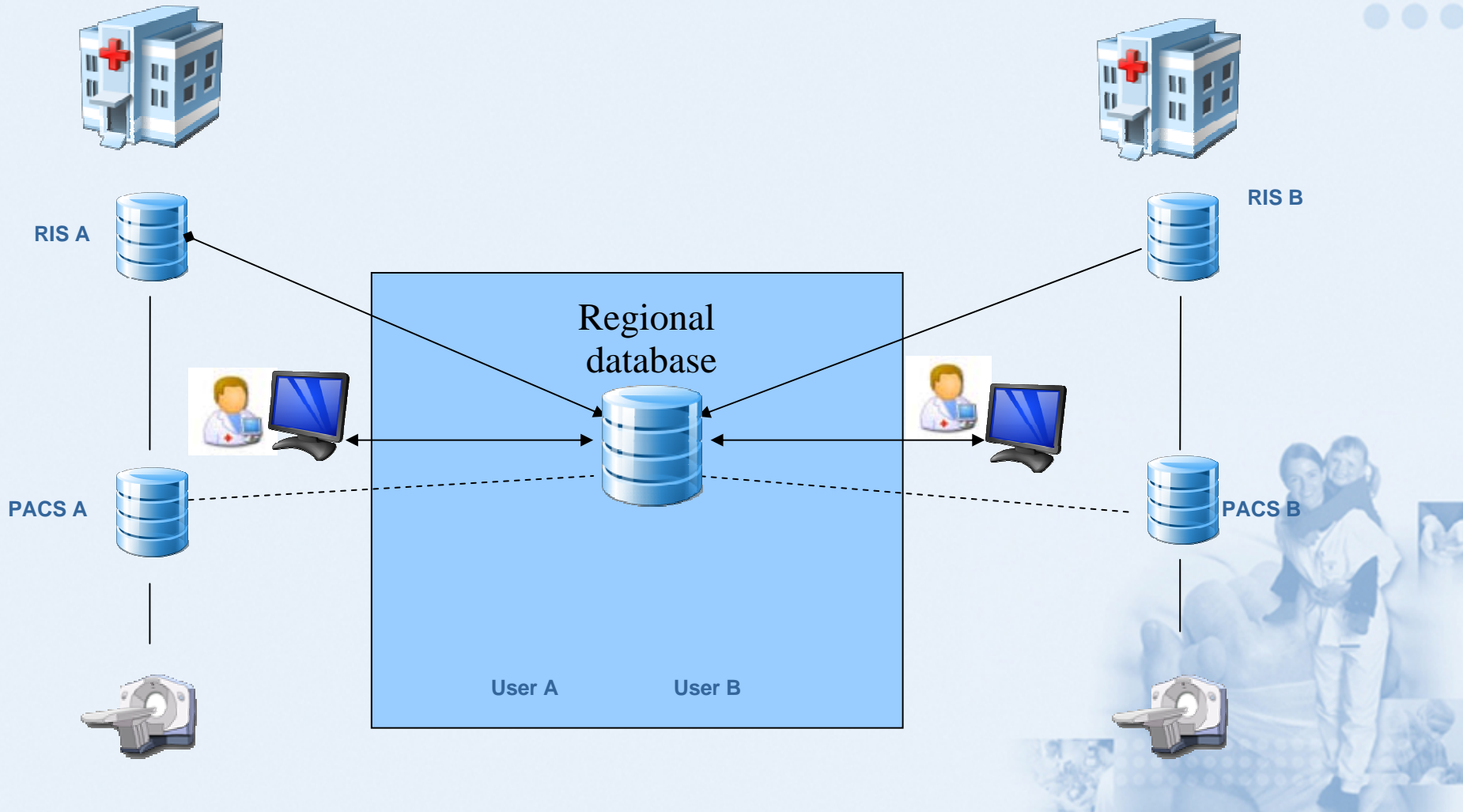
Our achievement

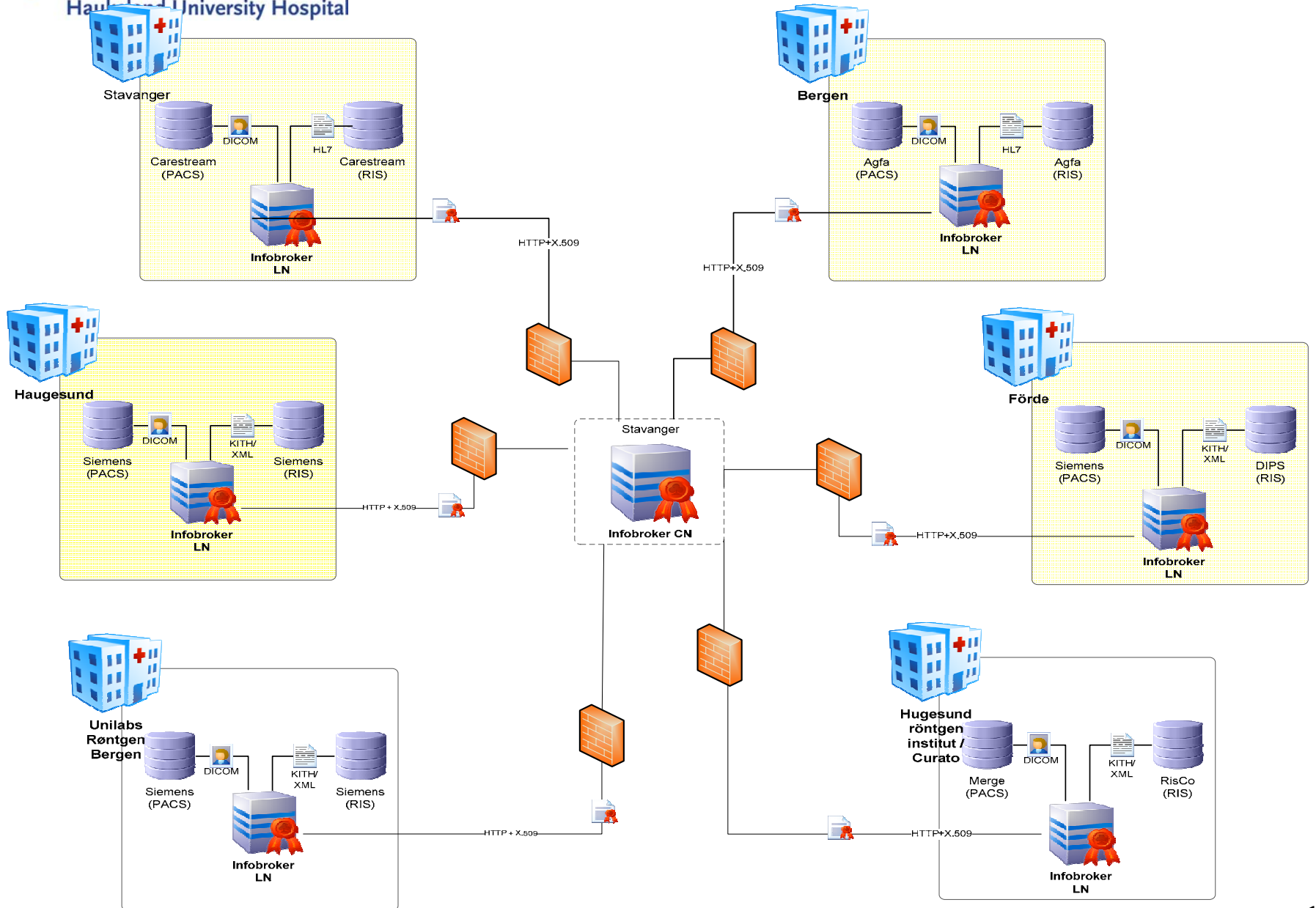
- Together with commercial companies (Agfa and Mawell™) we have developed a solution (Infobroker™) that is able to both:
 - linking PACS/RIS systems for the radiologists to be able to look into another hospitals` PACS system (XDS-I)
 - pushing examinations automatically from one RIS/PACS system to another with minimal secretary work-load

Integration and information platform

Hospital A

Hospital B



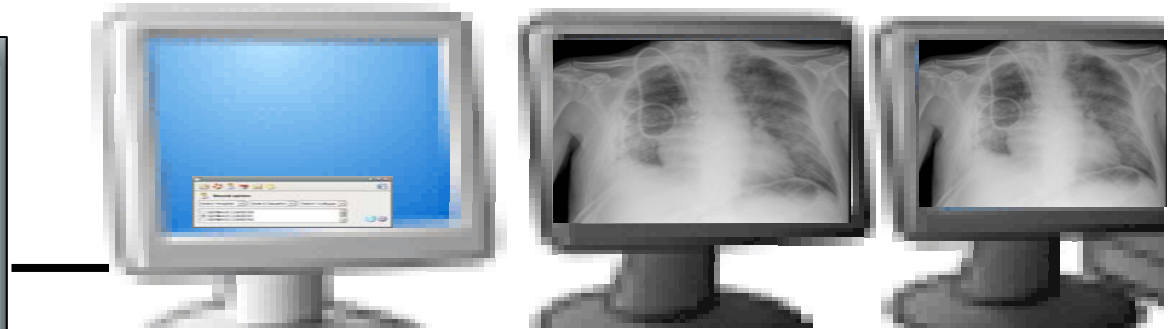


The user interface I



A screenshot of a web application window titled "Patient list". The window has a standard Windows-style title bar with minimize, maximize, and close buttons. Below the title bar is a toolbar with several icons representing different functions. The main content area contains a table with the following data:

RIS-ID	Efternavn /	Förnamn	Sjukhus	Datum
C2-1109046	Bäckwall	Peter	Örebro Unive...	1997-03-03
C2-1109045	Bäckwall	Peter	Örebro Unive...	1997-03-03
C2-1109043	Bäckwall	Peter	Örebro Unive...	1997-03-02
C2-1109042	Bäckwall	Peter	Örebro Unive...	1997-03-02
C2-1109040	Bäckwall	Peter	Örebro Unive...	1997-03-02
C2-1109041	Bäckwall	Peter	Örebro Unive...	1997-03-02
C2-1109044	Bäckwall	Peter	Örebro Unive...	1997-03-02
C2-1191385	Bäckwall	Peter	Örebro Unive...	2003-04-06



The streaming web viewer

- Identical patient in RIS and in InfoBroker
- From the overview you can display request and report
- From "request and report window" you can display images
- Display in the streaming web-viewer
- Retrieve examinations in own RIS/PACS

The screenshot displays a complex medical software interface. At the top left, a window titled 'TMPAX 6.0 Radiologist' shows a chest X-ray. The interface includes a menu bar with 'List', 'Configure', and 'Users and Roles'. Below the menu is a toolbar with various icons for navigation and viewing. The main area is divided into several sections:

- Patient Information:** 10-09-2006, Nuklearlab, Test hospital, 195101289830, Müller, Hans, 55 years, male.
- Images:** 0 Series.
- Text/Report:** A large text area containing medical descriptions in Swedish, such as "redning. Rör sig troligen om avfösning av stort proc. styloideus" and "Höger framfot visar usurer i caput till metatarsalben 1 i dig 1. Leddistansen i dig 1 är sänkt mellan dessa benstrukturer. Inga artritförändringar."
- Date List:** A vertical list of dates on the right side, including 97-03-03, 97-03-02, 03-04-06, 03-06-16, 03-05-30, 03-05-20, 97-10-02, 03-07-26, 03-07-26, 97-12-21, 98-01-01, 97-09-04, 03-10-13, 97-10-06, 04-06-28, 97-12-16, 97-09-02, and 97-09-02.

Information transfer between hospitals/systems

Send or fetch examinations
195101289830
Müller, Hans, 55 years, male New patient

★ Second opinion ★ First opinion ★ Send images

Step 3 of 3. Choose recipient. Write message

Hospital: Test hospital
Department: Test unit
Receiver: Nothing selected
Priority: NORMAL

Question and anamnesis

Status	Date	Study	Images	Department	Comment
svar skrevet	2006-09-12 16:16:1...	Nuclear Magnetic R...	0	Nuklearlab	
svar skrevet	2006-09-12 16:16:1...	Nuclear Magnetic R...	0	Nuklearlab	
svar skrevet	2006-09-12 16:16:1...	Nuclear Magnetic R...	0	Nuklearlab	

Previous Send

Status by August 2010

- The system (Infobroker™) is operating in 2 of 4 public trusts, and it has been stable for 1 year
- The remaining trusts will be linked to the system within 6 months

Conclusion: PACS in (western) Norway

- Norway has reached uniformly far beyond the implementation of initial PACS systems
- Third and fourth generation PACS-systems are about to be installed
- Today's challenge:
 - creating and implementing a technical and organisational solution for regional and national cooperation between radiologists in teleradiology networks