



***R-Bay;  
Creating an eMarketplace for the transfer of imaging related eHealth services  
in Europe.***

**GRANT AGREEMENT NUMBER: C046207**



---

**Deliverable D2.2  
Market strategy and analysis**

---

Final version 2 (revised)

Date: 01.09.2008

<b>Project Acronym:</b>	R-Bay	
<b>Project Title:</b>	R-Bay; Creating an eMarketplace for the transfer of imaging related eHealth services in Europe.	
<b>Contract Number:</b>	C046207	
<b>Starting Date:</b>	01/08/2007	<b>Ending date:</b> 31/01/2009

<b>Deliverable Number:</b>	D2.2
<b>Title of the Deliverable:</b>	Market strategy and analysis
<b>Task/WP related to the Deliverable:</b>	WP 2- Business Plan
<b>Type (internal, restricted or public):</b>	Public
<b>Author(s):</b>	Hanna Pohjonen, Rosalieco Oy, Claus Duedal Pedersen, RSD and Janne Rasmussen, RSD
<b>Partner(s) contributing:</b>	

<b>Contractual Date of Delivery to the CEC:</b>	30.04.2008 (version 2: 03.09.2008)
<b>Actual Date of Delivery to the CEC:</b>	30.04.2008 (version 2: 03.09.2008)

### **Project Co-ordinator**

*Company name:* Region Syddanmark (RSD)  
*Name of representative:* Claus Duedal Pedersen  
*Address:* Rugaardsvej 15, 2  
 5000 Odense C, Denmark  
  
*Phone number:* +45 65 43 20 30  
*Fax number:* +45 65 43 20 50  
*E-mail:* cdp@medcom.dk  
*Project WEB site address:* [www.r-bay.org](http://www.r-bay.org)

---

## Table of Contents

<b>Executive Summary</b>	<b>4</b>
<b>Strategy</b>	<b>5</b>
Strategy overview	5
Description of the opportunity for the clinical service: characteristics of the potential customer	6
Market enablers	9
Remote reporting companies	11
<b>Market</b>	<b>14</b>
<b>Conclusion</b>	<b>18</b>
<b>Biography and References</b>	<b>20</b>

# 1 Executive Summary

The R-Bay strategy is based on a concept of **connecting** healthcare delivery entities (public or private) which have the need to buy imaging related services with private reporting companies or public healthcare delivery entities which have the capacity to deliver these services as there is no other imaging-related eMarketplace existing in Europe. No radiologists will therefore be hired in the R-Bay set-up. In order to do this, the eMarketplace has to offer added value for the already established point-to-point teleradiology links in order to attract them under the R-Bay umbrella. The report clearly outlines the added-value for customers as well as providers.

Opportunities for the clinical service identify three reasons for which the customers could benefit from the R-Bay service: 1) resource problems, 2) price problem and 3) lacking particular sub-expertise.

Opportunities/added value for the providers include

- opens up the whole customer market
- makes it possible to compete with lower prices
- makes it possible to build other competitive advantages like sub-expertise, availability, correctness of the reports etc.
- makes it easier to integrate the customer and provider systems
- the eMarketplace is taking care of the security and privacy issues
- it is possible to give the reports with your native language even for foreign customers; R-Bay will offer a multilingual structured reporting tool covering most of the anatomical regions. This tool is an additional tool which is made available although not specified in the Technical Annex. It can be seen as a support for the R-Bay eInterpretation service.
- the eMarketplace is taking care of the contracts, payments, etc.
- you can show proven quality via the established quality assurance scheme (transparency of the results)
- back-up in case of illness, vacation etc

Market enablers are identified as players, initiatives and market developments that can make the market more favourable and suitable for the R-Bay services. This involves e.g. EU eHealth initiatives and action plans as well as opportunities and advancements in relevant technology.

We have identified the existing reporting companies – both local and European level – which could potentially join the R-Bay eMarketplace. This means the existing private reporting companies are not our competitors as otherwise stated in the Description of Work.

Examples from a variety of European countries demonstrate the number of opportunities there are for the potential customers and providers but also the aspects that can be perceived as a threat which must be considered.

Conclusively, the Market Strategy and Analysis report outlines the overall R-Bay strategy, demonstrates the opportunities for the clinical service, identifies the market enablers and the remote reporting players on the existing teleradiology scene, and describes the market for R-Bay.

## 2 Strategy

### 2.1 Strategy overview

Our strategy is based on the following:

- We aim to connect 1) healthcare delivery entities (public or private) which have **the need to buy** imaging related services and 2) private reporting companies or public healthcare delivery entities which have **the capacity to deliver** these services.
- We do NOT aim to hire radiologists as part of the coming commercial R-Bay eMarketplace.
- The existing private reporting companies are NOT our competitors (note the change after writing the technical annex).
- There is no other imaging-related eMarketplace existing in Europe.
- The eMarketplace has to offer added value for the already established point-to-point teleradiology links in order to attract them under the R-Bay umbrella. The added value has to be clear for both the customers and providers of the imaging related services. **These existing teleradiological links is our target number 1 –both on the provider and customer side.**
  - The added value for the customer side:
    - opens up the whole market with more choices
    - makes it possible to compare prices and take the best price available
    - makes it possible to compare availabilities and response times for the reports
    - makes it possible to select sub-specialists from a wider pool
    - makes it easier to integrate the customer and provider systems
    - the eMarketplace is taking care of the security and privacy issues
    - it is possible to get the reports with your native language even in an international reporting environment; R-Bay multilingual structured reporting tool covering most of the anatomical regions
    - the eMarketplace is taking care of the contracts, payments, etc.
    - the eMarketplace is taking care of the quality assurance and certifications
    - 24/7 cover through multiple providers
    - Provides access to low-cost short or long time storage
    - pay as you go –service particularly good for smaller volume end-users
  - The added value for the provider side:
    - opens up the whole customer market
    - makes it possible to compete with lower prices
    - makes it possible to build other competitive advantages like sub-expertise, availability, correctness of the reports etc.
    - makes it easier to integrate the customer and provider systems

- the eMarketplace is taking care of the security and privacy issues
  - it is possible to give the reports with your native language even for foreign customers; R-Bay will offer a multilingual structured reporting tool covering most of the anatomical regions. This tool is an additional tool which is made available for use although not specified in the Technical Annex. It can be seen as a support for the R-Bay eInterpretation service.
  - the eMarketplace is taking care of the contracts, payments, etc.
  - you can show proven quality via the established quality assurance scheme (transparency of the results)
  - back-up in case of illness, vacation etc
- We have identified the characteristics of the potential customer (see later in the text) and analysed the market in chosen countries in order to estimate the market potential. We have especially focused on the type one customers (customers with a resource problem) because this represents most of the reachable volume. **We have estimated the maximum teleradiological reporting volume in the country based on the number of examinations produced and the truly available and needed number of radiologists in order to report them all. This is the target volume for R-Bay. However, in the coming two years we aim at getting 5 % of this target.**
  - We have identified the existing reporting companies – both local and European level – which could potentially join the R-Bay eMarketplace. Marketing of the R-Bay concept will most probably accelerate forming of similar companies or establishing reporting via public healthcare delivery entities.
  - Besides the need for the service there are multiple ‘enablers’ that can make a particular market more favourable and suitable for R-Bay services.
    - National eHealth programmes according to the EU eHealth initiative and action plan
    - National infrastructures for image archiving or even more preferably for all medical data (general purpose archiving)
    - Increasing private sector activity and capacity in both reporting and imaging examinations in conventional and advanced radiology
    - High deployment of PACS on the local level
    - Adoption of international standards and IHE standard profiles for document sharing, especially XDS (cross-enterprise document sharing) and XDS-I (sharing of images)
    - Adoption of streaming technology to improve security and enable usage of low-bandwidth networks
    - Adoption of the ASP (application service provider) model for purchasing
  - The eMarketplace is a broker getting paid according to transactions via the eMarketplace (ASP-model, ‘pay as you go’). There is also a connection fee both on the customer and provider sites.

## 2.2 Description of the opportunity for the clinical service: characteristics of the potential customer

### 1) Customer with a resource problem

- This customer group is our main target and the calculations on the market are based on these data.
- A private or public healthcare delivery entity which has a **resource problem** in radiology.
- The number of radiologists currently working in the European countries is between 60 and 250 per one million inhabitants. Healthcare delivery entities in countries with low number of radiologists (shortage of radiologists) are potential clients for our service (e.g. UK and Holland).
- The required figure for radiologists per one million inhabitants is at minimum **100**. The radiologists report on average **10 000** examinations per year.
- Also rural (less populated) areas in countries with high number of radiologists can have a need for remote eInterpretation (e.g. the Lappish area in Finland or Estonia).
- The resource problem varies country by country and even region by region.
- **Countries over 100** radiologists per one million inhabitants: Czech Republic, Estonia, France, Austria, Germany, Norway, Sweden, Finland, Iceland, Spain, Belgium and Luxembourg
- **Countries less than 80** radiologists per one million inhabitants: Poland, Denmark, UK, Bulgaria, Switzerland, Portugal and Holland.
- As an example there are more than twice as many radiologists per one million inhabitants in Estonia than in Denmark and more than four times as many as in UK.
- **Concrete leads (already identified cases):**
  - 200 customers for East-Tallinn Central Hospital already now using their services in a point-to-point/traditional way
    - there is a negotiation going on to get these customers under the R-Bay umbrella -> decision November 2008
  - Turku University Hospital in Finland which has hired Estonian radiologists to work physically there; could be turned into remote reporting
    - Turku willing to use the radiologists remotely if they are the same ones already worked in Turku on-site -> actions needed to connect Turku to the R-Bay portal
  - Funen Hospital, which has a point-to-point remote reporting contract with East-Tallinn Central Hospital, will be directed through R-Bay portal

- The contract exists and there is a mutual understanding that the R-Bay portal will be used. The implementation of a new PACS in Funen has slowed the process. The PACS project has been delayed by one year.
- 5 hospital districts in the Lappish area of Finland already using their own internal eConsultation portal (provided by Mawell as well). There are e.g. over 1200 consultations per month performed by the Oulu University Central Hospital to the other more rural hospitals. They have used the consultation portal over 14 months now. Oulu University Central Hospital is also in the R-Bay project and the aim is to have their internal portal to be connected to the European one.
  - The regional and national portals will be connected, negotiations on details on-going. Between Oulu and Tallinn there is the pilot up and running already today.
- Private healthcare delivery entities reporting remotely to NHS England (so called Wave 2 diagnostics bidding - completed by NHS - where they outsourced substantial amount of imaging procedures and reporting).
- Private reporting companies like European Telemedicine Clinic already having contracts with these UK private healthcare delivery entities.
  - The existing teleradiological companies which do remote reporting to UK on a daily basis have been contacted including European Telemedicine Clinic, which has got the biggest contract at the moment. We need a pilot case in which a private provider is involved in order to show the benefits. Both Telemedicine Clinic and Eurad Consult are very interested in the multi-linguality that R-Bay offers. Telemedicine Clinic uses an Estonian subcontractor which is the reporting resource of East-Tallinn Central Hospital as well.
- TMC and Region of Central Jutland
  - A hospital in Århus is sending mammography images to a hospital in Stockholm, Sweden through the Baltic Health Network. The arrangement is quite new and the details are not known at this stage.

## 2) Customer with a price problem

- Usually this is much related to the resource problem; e.g. in UK - which has the worst situation regarding radiologist resources - the prices are very high and the healthcare delivery entities are very keen on searching for more economical solutions. An example: in 2006 reporting of an extended MRI examination cost 5 times more in UK than in Estonia.
- During the last couple of years the economics has changed however: the Eastern European countries have increased their prices and the pricing as a motivation is not so lucrative any more.
- On the other hand: Sweden - with the highest amount of radiologists per one million inhabitants - has always had high prices despite the extra resources; the same applies to Finland. One explanation is the Nordic culture: the radiologists do reports a lot less than their US colleagues for example. In the Nordic countries radiologists participate in the clinical meetings, tutor the junior ones, do double reading of the reports etc. This may explain the figures partly.

### 3) Customer without particular sub-expertise

- These needs are usually ad-hoc seeking for a second opinion even if the responsibility of the reporting task is still with the requestor.
- Clinical areas with rare cases and few specialists fall under this category as well. There is e.g. a Nordic paediatric network on child neurology (brain tumour especially) as the disease is rare and there are few specialists. But this type of specialist networks are unorganised and established through network and communication is based emails etc., meaning no security measurements and no integration.
- These customers represent a lot smaller volume and the requests come usually from the Eastern European countries i.e. the countries which can report more ordinary examinations for the Western world.
- Generally there is no systematic approach, security consideration or financial incentives to these sub-expertise networks.

### 2.3 Market enablers

Besides the need for the service there are multiple ‘enablers’ that can make a particular market more favourable and suitable for R-Bay services:

- National eHealth programmes according to the EU eHealth initiative and action plan
- High deployment of PACS on the local level; a digitised imaging environment or even preferably an electronic patient record architecture should be in place at the customer site
- National infrastructures for image archiving and for all medical data (general purpose archiving). A national patient data repository would boost remote reporting/second opinions by helping in sharing patient data including images and relevant priors as well as in establishing networks of expertise.
- Adoption of international standards and IHE standard profiles for document sharing, especially XDS (cross-enterprise document sharing) and XDS-I (sharing of images); XDS is being adopted gradually by vendors and customers and will facilitate standards based patient data sharing in an open environment.
- Adoption of streaming technology to improve security and enable usage of low-bandwidth networks
- Adoption of the ASP (application service provider) model for purchasing

The facilitators for R-Bay are discussed in the following.

### **EU eHealth initiative and action plan – a key driver for national procurement processes**

In spring 2004 an eHealth initiative was launched by the European Commission. The purpose of the initiative is to improve healthcare Europe-wide through the use of information and communication technology. It was accompanied by an eHealth action plan, which formulates the practical steps how to get there. The eHealth action plan has proven to be one of the key drivers to change the procurement process in healthcare IT market in Europe.

Since the early 1990s, 500 million euros have been spent by EU to eHealth R&D projects; now it is time to focus on how these results are implemented in the practice in large projects that have sufficient impact on the European level – not just locally as they used to. It has been estimated that a new eHealth industry with a turnover of 11 billion euros is emerging in Europe and up to 5 % of health budgets will be invested in eHealth systems and services by 2010.

The concrete aims and actions defined in the action plan include the following

- By the end of 2005, member states develop their own road maps for eHealth
- By the end of 2005, a EU public health portal to provide one-stop access to health information
- By the end of 2006, healthcare networks should be interoperable and able to exchange patient information
- By the end of 2008, healthcare information networks should be commonplace, delivering services over fixed and wireless broadband networks and making the most of networks within grids to boost computing power and interaction

The implications of this can be summarized as

- There will be regional and national projects rather than hospital-wide projects
- Projects will be driven by high level governmental decision makers
- Purchasing will be focused on entire solutions and services (ASP & managed imaging service) rather than software and hardware components
- PACS is not a stand-alone system; integration to national level healthcare record summaries is needed
- The storage element of PACS will be fused to general-purpose archiving solutions.
- New EU countries have financial resources and they are likely to make a technology jump
- **Images and related data will be utilized across boundaries**; there will be trans-national eServices and needs for technical and semantic interoperability

### **SOS (Smart Open Services)**

The European Commission is financing an eHealth initiative to improve the safety and quality of care to people who require medical assistance while travelling or living abroad. The SOS project, cofunded by the European Commission, is supported by 12 Member States and their industry players, to demonstrate the benefits of such interoperability. It will enable health professionals to access specific medical data such as current medications of patients from other EU countries. In an emergency, sharing of medical information could save many patients' lives.

The project will strive to ensure compatibility of electronic medical information regardless of language or sophistication of technology, without having to establish a common system throughout Europe. This will allow health professionals to electronically access the data of a patient from another country, in their own language, using different technologies and systems.

## General purpose archiving and XDS

**The EU eHealth initiative and action plan is the driver for sharing of patient information and networking of expertise across different institutions and countries.** Sharing of patient data is changing dramatically: from 'point-to-point' to 'many-to-many'. The recent IHE XDS and XDS-I profiles for cross-enterprise document and image sharing are being applied in several eHealth projects in Europe and Canada. In this architecture IT systems like PACS act sources and consumers for information. The data are stored in a repository and published in the metadata registry: this is how we separate IT systems from data and data from metadata. Consolidation of patient centric data in a common archiving solution is a growing trend in the healthcare IT market. The new **general-purpose archiving** solutions allow any type of fixed content data including images, laboratory results, EPR summaries etc to be stored in one architecture.

The traditional images-only archives are being replaced by new generation enterprise archives which are configured as network-attached systems and they allow a set of standard interfaces and protocols – not just DICOM. The future repositories will form a GRID linked together via nation-wide registries; the European Health Insurance Card (EHIC) will be used to access this GRID data in the coming years.

The archives are changing from separate IT system attached silos to common shared architectures, but at the same time to eHealth platforms: the core is still archiving, but there are data privacy and security services, messaging services, patient's informed consent, coding services etc as well. The same platform can also be used for teaching and research.

## Emerging ASP models

New models for acquiring a PACS (picture archiving and communication system) are emerging, especially in Europe. Traditionally, PACS hardware and software components were bought outright by the end-user enterprise, managed and upgraded by the healthcare institution or the radiology department and serviced in-house. A totally different and innovative concept is the ASP model. With ASP, the PACS application is provided as a 'service' that is more or less comprehensive depending on the requirements of the users.

Another new business model that has also emerged is the so-called *managed imaging service*. In this model, the PACS components are purchased by the end-user, but a third-party company is used to integrate and take the total responsibility of the imaging services. The common feature of these two innovative procurement approaches is the 'service' element, which can be called upon to a greater or lesser extent or exploited to the full, according to the requirements of the customer. The vendor is committed to service level agreements and the customer pays per transaction, stored MByte or examination.

## Streaming technology

Today, several vendors offer holistic **web-based solutions** for radiologists, radiographers and clinicians - a single platform for all users. These solutions provide the radiologists with diagnostic tools, advanced image processing methods as well as meeting folders all in web. Besides traditional web, **streaming technology** is also emerging to the radiological practise in order for adding

security and enabling the use of low network bandwidths; in many cases such bandwidth usage is more efficient than with traditional web-based solutions. Because data can be prevented from being downloaded to local clients, and only streamed for interactive viewing, an additional level of data security can be provided. Additionally, streaming requires only a single copy of data to be stored, which is accessed as needed, rather than maintaining multiple copies in order to meet distribution demands. **This is a clear facilitator for teleradiology – especially in the countries like UK that does not want the examinations to be sent physically abroad.**

## **2.4 Remote reporting companies**

- As stated earlier there are no competitors for R-Bay existing in Europe. The other teleradiology companies are potential providers that could be connected to the R-Bay eMarketplace to serve their existing customers and also new ones introduced through the eMarketplace.
- We have to demonstrate the added value for the teleradiology companies in order to get them working through the R-Bay eMarketplace instead of their own links. The added value for the provider side has been summarised as:
  - opens up the whole customer market
  - makes it possible to compete with lower prices
  - makes it possible to build other competitive advantages like sub-expertise, availability, correctness of the reports etc.
  - makes it easier to integrate the customer and provider systems
  - the eMarketplace is taking care of the security and privacy issues
  - it is possible to give the reports with your native language even for foreign customers; R-Bay multilingual structured reporting tool covering most of the anatomical regions
  - the eMarketplace is taking care of the contracts, payments, etc.
  - you can show proven quality via the established quality assurance scheme (transparency of the results)
  - back-up in case of illness, vacation etc
- Most of the existing providers are local consisting of a couple of radiologists who work in the public healthcare delivery entities in the day-time. They usually use their own native language only and there is no possibility to get the reports with a foreign language. This is why they often lack cross-border reporting totally. The connections are tailored point-to-point set-ups between the provider and the customer.
- There are only two remarkable European level private reporting companies that do cross-border work: European Telemedicine Clinic and Eurad Consult. These companies do point-to-point consultations only with no multilingual reporting templates. We have discussed with both of them and they are very keen to co-operate mainly because of the opening market and the structured reporting tool. The pricing structure of R-Bay is still unclear and needs to be discussed. Thereafter we can continue the negotiations with these providers.

- There are also many radiologists who are waiting for the concrete offering from the R-Bay side (e.g. in Czech Republic and Finland). They are willing to discuss when the terms and conditions are concrete and we can describe the details of the offered package. These radiologists usually commute physically to the customer sites and do their work there.
- Examples of local providers:
  - Lodestone
    - UK based
    - been for 11 years
    - uses UK and Australian radiologists
  - Medica
    - UK based
    - on-demand services
  - other smaller in the UK: Nano Imaging, Expert Eye, E-locum, Wide-Open MRI
  - Curagita
    - Germany based, established in 1999
    - around 30 employees, not all for remote reporting
    - also some attempts in Sweden and UK
  - Mammograaf
    - Estonia based
    - 15000 examinations per year (mammography and MRT)
    - 5 part-time employees
  - Balti Radiodiagnostika
    - Estonia based
    - 2500 examinations per year (X-Ray and CT)
  - SCANREAD
    - Denmark based
    - 5000 examinations per year
    - 10 employees
    - current customer: Odense University Hospital
- European cross-border companies
  - Eurad Consult (Belgian)
    - established in 2001, expanded in 2003
    - customers in Belgia, Holland, Switzerland and England
    - lost the Wave 2 Diagnostics bid with NHS (through Alliance Medical)
    - >40 000 MRI examinations per year
    - sub-specialty readings for musculoskeletal, neuro, spine, head&neck, abdominal, thoracic
    - also virtual colonoscopy readings and insurance-related diagnosis and second opinions
  - European Telemedicine Clinic (Spanish)
    - established in 2002
    - Spanish and Swedish radiologists
    - Estonian radiologists as subcontractors
    - NHS England the biggest customer

- 
- Through the link to the national network of Sweden can get access to 95 % of the Swedish hospitals
  - Holland also a target country
  - has also a few contracts in Denmark
  - reports over 100 000 examinations per year
  - over 80 employees; 25 are reading radiologists in Madrid, rest in 6 countries including Estonia
  - altogether about 60 hospitals as customers
- Examples of non-European ones aiming at the European market
    - 4-Ways (Indian)
    - Wipro Technologies (Indian)
    - Nighthawk (US)

### 3 Market

In the following we discuss the chosen countries which are potential customers or providers for the R-Bay:

- Denmark
- UK
- Holland
- Finland
- Estonia
- Lithuania
- Czech Republic

This group of countries contains nearly only the participating countries (all but UK) which are the primary target group for R-Bay deployment following the project phase. R-Bay will build a sustainable business plan on these specific countries and consequently expand the efforts to other national markets when these are established.

The country-specific opportunities and threats are being discussed.

The data which is being used in our calculations are based on interviews with the hospital partners and a report on benchmarking radiological services in Europe by EAR/UEMS. In our analysis we have made two **assumptions**:

1. The radiologists report on average **10 000** examinations per year. This figure of course depends on the type of examinations and also on the other work duties he/she might have (teaching, tutoring etc).
2. The required figure for radiologists per one million inhabitants is at minimum **100**.

In the following a summary table is presented showing the maximum potential in reported examinations in the countries involved. Every country is discussed in more detail later.

Country	Need for extra radiologists	Extra radiologists	Outsourcing opportunity (exams/y)	Outsourced today (per y)	Extra reporting capacity (exams/y)	Initial R-bay target (5 %)
Denmark	125		1 250 000	100 000		62 500
UK	1000		10 000 000	1 250 000 (Wave 2 program)		500 000
Holland	640		6 400 000	about 2000 (1200 from Nijmegen)		320 000
Finland		200		72 000	2 000 000	
Estonia		40			400 000	

Lithuania		39			390 000	
Czech Republic		100			1 000 000	

## Denmark ('customer')

### Opportunities

- 63 hospitals; most of them lacking radiologist resources
- 4.2 million examinations produced annually, roughly need for 125 radiologists more. One radiologist reports on average 10 000 examinations per year
- OPPORTUNITY = 1 250 000 examinations per year
- 100% PACS and RIS penetration in the whole country; the last implementation in South Denmark still under implementation however.
- After the political reform (reducing the number of county councils into 5 regions) there will be an extensive consolidation of IT systems and archiving in the new regions; this will make it easier to share examinations and other patient data in the regions, across the whole country and across the borders.
- There is a national coordination of the EPR project is on its way
- There is an extra demand for resources in the rural areas, especially on the small islands
- The national healthcare data network handles the security needed
- In Denmark there is a National Cancer Plan
- The country also has a waiting list guarantee

### Threats

- Difficult to find consensus in the new regions -> slow decision making in R-Bay type of services as well
- Slow adaptation of HL7 in Denmark -> more difficult integrations to the R-Bay platform

## UK ('customer')

(England, Scotland, Wales, Northern Ireland)

### Opportunities

- The lowest level of radiologists per one million citizens, very high reporting prices
- UK is understaffed in radiography as well
- There is a constant backlog of images to be reported on, and images are often NOT reported at all.
- The current demand is about 1000 radiologists more; the future needs to meet service expansion are still about 3000 more radiologists.
- CURRENT OPPORTUNITY = 10 000 000 examinations
- FUTURE OPPORTUNITY = 40 000 000 examinations
- England:

- 100 % PACS in the whole area (National programme for IT)
- Wave 2 Diagnostic bidding happened in 2005 by NHS resulting in huge amounts of outsourced imaging and reporting procedures. Most of the winners were private healthcare hospital chains using either UK or foreign radiologists as subcontractors. Some of those radiologists sit in Spain, Estonia etc.
- NHS Care Records Service program on its way as well
- Wales:
  - National Informing Healthcare (IHC) programme going on. As a part of it the diagnostic imaging services are being improved by establishing an integration platform to share examinations between the sites. The procurement will happen late 2008.
- Northern Ireland:
  - National HPSS ICT Programme on-going
  - National PACS procurement going on, decision summer 2008.
  - National patient identifier program on-going
  - National patient administration system procurement starting, probably followed by the EPR procurement
- Scotland
  - National Delivering for Health programme on-going
  - National PACS roll-out has started in all hospitals
  - General purpose archiving being discussed (extension of the image archive)

## Threats

- Specific GMS registration needed for the remote radiologists before they can practice
- Reluctance re foreign remote radiologists
- England:
  - even if saturated with PACS, almost no data sharing happens because of the separate islands for PACS and the lack of deployment of data sharing standards
- Wales:
  - Local PACS exist but several vendors, not all compliant with document sharing standards. There can be a challenge to upgrade.
  - There is a threat that a proprietary infrastructure will be built - not interoperable with the international sharing profiles.
- Northern Ireland:
  - Long decision processes, PACS procurement process started already 2003, still on-going
  - National EPR still lacking
- Scotland
  - Capability to extend the vision to general purpose archiving to share all data?
  - National EPR still lacking

## Holland ('customer')

### Opportunities

- 10 000 000 examinations per year
- Besides about 920 000 mammography examinations per year (double read)
- Need for extra 640 radiologists

- OPPORTUNITY = 6 400 000 examinations + possible mammo cases
- Teleradiology very rare today, mainly only through Eurad Consult
- Some already established teleradiology links, e.g. between Nijmegen and Eurad Consult (private Belgian teleradiology company)
- National healthcare IT programme on-going by NICTIZ to exchange medical data nation-wide
- One of the central elements is a national switch point (NSP) which provides a reference index for routing, identification, authentication, authorisation and logging.
- PACS widely deployed
- The national digital mammography screening infrastructure is being built allowing reporting of examinations all over the country

## Threats

- Adoption of XDS not clear, also proprietary regional registries exist in parallel with the NICTIZ programme
- Policy between different regions of Holland can hinder the co-operation

## Finland (mainly ‘provider’)

### Opportunities

- Capacity to deliver remote radiologists, about 200 radiologists more than the minimum figure needed. This means extra CAPACITY of 2 000 000 examinations per year.
- On the other hand: rural areas lack radiologists. Helsinki and Turku University Hospitals also lack resources.
- Almost 100 % of PACS and EPR in the country
- The national patient data repository and registry under implementation to share patient data in a secure and trusted way (with the patient’s informed consent)
- National data privacy and security services, patient’s informed consent, coding service etc
- Digital certificates for professionals and citizens

### Threats

- The national infrastructure does not follow XDS fully, ‘XDS like’
- Difficult local integrations still undone to many EPR systems
- Slow decision making
- eHealth is very technology driven
- The reporting prices more than in the Eastern market

## Estonia (mainly ‘provider’)

### Opportunities

- Capacity to deliver remote radiologists, about 40 radiologists more than the minimum figure needed. This means extra CAPACITY of 400 000 examinations per year
- The national eHealth programme started as an aim to exchange medical data throughout the whole country

- A central repository for EPR summaries and registry to get the data which has been stored locally
- A national platform for sharing images via a proprietary link directory; smaller hospitals still unconnected to this platform. Part of the platform need up-grading
- A small installation for general purpose archiving exists.
- A good network in the capital region

### Threats

- The proprietary parts of the imaging infrastructure
- Difficult politics between the regions
- The reporting price will not be as lucrative any more

## Lithuania (mainly ‘provider’)

### Opportunities

- Capacity to deliver remote reporting, about 39 radiologists more than the minimum figure needed. This means extra CAPACITY of 390 000 examinations per year.
- National healthcare IT programme in place ‘eHealth Strategy for 2005-2010’
- Lithuania has completed the national eHealth platform
  - modern architecture (XDS, SOA, web services, HL7 CDA R2), very similar to the Finnish one
  - no maintenance service
  - data privacy and security services
  - messaging services
  - nation-wide booking system (can be used directly by small GP practises or can be integrated to the local ones)
  - coding services (professionals, medication, EPR terminology, diagnostic codes, etc)
  - master patient index (even if a unique national number exists)
  - document registry and repository, XDS like
    - for summary data only
    - based on HL7 CDA R2

### Threats

- Only four PACS in the country; does not have any influence if Lithuania stays as the clinical provider however
- Only one EPR in the whole country (Santariskes); Lithuania completed a document repository and there is hardly any information stored because of the lack of EPR systems in the country

## Czech Republic (mainly ‘provider’ in the future)

### Opportunities

- Capacity to deliver remote reporting, about 100 radiologists more than the minimum figure needed. This means extra CAPACITY of 1 000 000 examinations per year

- Ministry of Informatics in charge of the development of a national action plan for information society ([www.uvis.cz](http://www.uvis.cz)): National action plan eEurope+ CR
  - Subsection Zdravotnictvi on-line 2001-2005
  - Target outputs: registers, telemedicine, medical documentation
- Coherent actions with eEurope+: building of health telematic infrastructure connecting primary and secondary health care providers, interconnecting of databases
- MoH in charge of eHealth projects ([www.mzcr.cz](http://www.mzcr.cz))
- 0.4 % investments into health telematics as part of the total health expenditure (7.24 % of GDP)
- IZIP – medical record online project to place the medical database of the insured patient into the public Internet (selected parts)
- The market is favourable for ASP solutions in imaging: they have 21 ASP PACS currently running in the country

### Threats

- Images cannot be stored outside the healthcare deliveries themselves (according to the law); will this hinder effective data sharing?
- Economical resources available

## 4 Conclusion

- We aim to connect 1) healthcare delivery entities (public or private) which have **the need to buy** imaging related services and 2) private reporting companies or public healthcare delivery entities which have **the capacity to deliver** these services.
- There is no other imaging-related eMarketplace existing in Europe. We have identified an added value for the already established point-to-point teleradiology links in order to attract them under the R-Bay umbrella.
- We have identified the characteristics of the potential customer and analysed the market in chosen countries in order to estimate the market potential. We can clearly identify the opportunity (i.e. the amount of the potentially outsourced reports) and the capacity to report in the chosen countries. The already existing reporting companies have also been identified – both local and European level – which could join the R-Bay eMarketplace. Marketing of the R-Bay concept will most probably accelerate forming of similar companies or establishing reporting via public healthcare delivery entities.
- Besides the need for the service there are multiple ‘enablers’ that can make a particular market more favourable and suitable for R-bay services. These have been studied in the chosen markets as well.

---

## Biography and References

R-Bay Annex I – "Description of Work" Project Final Version, v4 (20/08/2007)

<http://www.lodestone.co.uk/businesspartners.htm>

<http://www.curagita.net/>

<http://www.eurad.biz/>

<http://www.telemedicineclinic.com/>

<http://www.4whc.com/>

<http://www.wipro.com/bpo/hls/cpo.htm>

<http://www.nighthawkrad.net/>