

## **eSanté-CARA\_WP9**

### **Interoperability matrix**

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## 1. Goal of the document

The goal of the document is to provide a state of practice (baseline) for radiology information systems (RIS/PACS) in Luxembourg. Through the use of a questionnaire, this document will make an inventory about:

- 1) IHE (Integrating the Healthcare Enterprise) profiles currently available in the areas of patient identification, appointments, radiology reports and associated metadata as well as illustrative and significant images.
- 2) Identify fields for standardization in hospitals to assess their ability to interact with the future eSanté platform.

The document should reflect the current state and the future possibilities of hospital information systems in Luxembourg, especially in the radiology domain. The comparison of the results with the technical specifications (communication protocols, data formats, needed data and metadata) will allow a first evaluation of the size of the gap between each hospital and the future eSanté platform (Gap analysis).

## 2. Introduction

The eSanté team has arranged interviews with hospitals, private laboratories and leading suppliers of information systems used in Luxembourg in order to analyze in detail the possibility of communication with the future eSanté platform for the exchange and sharing of health data.

Radiology has been selected as one of the first domains to implement this approach.

The analysis is done through questionnaires and interviews. A questionnaire has been set up for the RIS / PACS managers and the IT integration specialists of the hospitals, to study each hospital's usage and workflows of their radiology systems. A second questionnaire was prepared for the vendors to assess the overall capabilities of their systems, independent of the particular usage made of them by the hospitals. Complementary interviews have been done with those two groups.

The results of both, questionnaire and interviews, will complete and update previously acquired data, like the ISIS study, and identify important issues related to RIS/PACS which may have an impact on the definition of the eSanté platform.

The questions have been grouped by topic in this document. These topics were:

- Architecture & Environment,
- Patient Identification,
- Appointment,
- Radiology report and related metadata,
- Images (illustrative, i.e. key images, and significant),
- Authentication,
- Electronic signature.

Each topic is organized as follows:

- Short description of the topic,
- Short description of the standards in relation to the issue described,
- Questions.

This questionnaire has been intended for IT vendors present in Luxembourg mostly AGFA Healthcare Belgium and AGFA Healthcare Germany and for the Centre Hospitalier du Nord, which has developed its RIS system internally.

### 3. Synthesis of RIS/PACS used in hospitals

The table below provides an overview of the RIS/PACS currently used in the hospitals in Luxembourg. Four hospitals use standard RIS from vendors. The CHdN has developed his own RIS.

Institution	RIS	PACS	Migration	Vendor
<b>CHEM</b>	Agfa Q-Doc 5.5	<a href="#">Agfa IMPAX 5.2</a>	AGFA IMPAX 6,5	Agfa Belgium
<b>CHL</b>	Agfa Q-Doc 5.6	<a href="#">Agfa IMPAX 5.2</a>	AGFA IMPAX 6	Agfa Belgium
<b>CHdN</b>	Home-made RIS	<a href="#">Agfa IMPAX 5.2</a>	AGFA IMPAX 5.2 to IMPAX 6.5 with compatible home-made RIS (Q3 2011)	Agfa Belgium
<b>FFE- HK</b>	Agfa Q-Doc 5.6	<a href="#">Agfa IMPAX 6.4</a>	none	Agfa Belgium
<b>ZithaK</b>	Orbis *	<a href="#">Agfa Nice (interface pour Orbis) et IMPAX 6.0 for Mammography ** and IMPAX EE R20 V</a>	none	Agfa Germany

\*) Agfa ORBIS software is listed here as an RIS, it combines the functionalities of an HIS and RIS as an integrated software system.

\*\*) Zitha-Klinik also uses Agfa IMPAX 6 for Mammography

## 4. Interoperability Matrix

This document examines the current situation of the existing systems provided by the vendors AGFA Belgium and Germany and the Centre Hospitalier du Nord who developed its own RIS. The information has been collected with the "Questionnaire for RIS/PACS providers", eSanté-CARA WP9\_R1-R2.

The questionnaire for RIS/PACS provider studied seven main functional capacities of RIS/PACS:

- Architecture & Environment
- Patient Identification
- Appointment Management
- Radiological report
- Significative and Illustrative Images
- User Authentication
- Signature

The 3 RIS/PACS providers concerned are:

AGFA BELGIUM

AGFA GERMANY

CHdN - Centre Hospitalier du Nord

The interoperability matrix is the synthesis of the questions analyzed in the next sections. The questionnaire for RIS/PACS providers has been used as a means to structure the table. These questions are colored in orange. The first column provides the number of the requirement, which serves as a reference to retrieve easily the corresponding detailed answer in the next section. Requirements are listed without importance of order.

The interoperability matrix collects the general requirements addressed by each question.

### 4.1. Architecture and Technical Interoperability

This sections aims to describe the general context of the RIS/PACS, its communication protocol and the IHE integration profiles it supports.

The answers reveal the following:

- Heterogeneous environment because of the different systems used. Some migrations are already planned for the CHdN at the end of this year. The new system will be IMPAX 6.5.

The main IHE profiles have been implemented by Agfa Belgium and Germany, other systems don't support IHE profiles explicitly. CHdN has no IHE profile implemented.

- Germany has planned to implement new profiles for next year in the IMPAX EE. In ORBIS they have already planned to implement XDS.b, PAM, PES+ PDS Source and PDQ.

- Most of the different software implementations support DICOM & HL7 V2.x. It seems that this could be the basic communication protocol. IMPAX RIS supports HL7 v2.4; DICOM v3 is implemented in the IMPAX 6.5 & IDC; WADO in IMPAX IDC. IMPAX EE R20 & ORBIS SP08 integrates the HL7 v2, DICOM and WADO.

Summary of questions on Architecture & Environment		RIS				PACS						Answers
		AGFA			C H D N	AGFA						
		Q D O C 5 5	Q D O C 5 6	O r S P i 8		I M P A X 5 2	I M P A X 6 0	I M P A X 6 4	I M P A X 6 5	I M P A X E E R V 2 0	I D C	
1	Actual RIS/PACS in Luxembourg	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗	X - Not Installed ! - Partially planned V - Installed
2	Migrations planned	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	X - Not Planned ! - Partially planned V - Planned
3	Integration of the RIS with the HIS	✓	✓	✓	✓							X - Standalone ! - Dependant of the HIS V - Integrated
4	List of IHE profiles supported	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	X - No IHE profile supported ! - Implemented without integration statement V - Implemented with integration statement
5	List of IHE profiles planned to be implemented	✗	✗	✓	✗	✗	✗	✗	✓	✓	✗	X - No plan ! - Partially planned V - Plan to implement additional IHE profiles
6	List of protocols supported	!	!	✓	!	!	!	!	!	✓	✗	X - WADO, DICOM ! - HL7 v2.x & DICOM V - HL7 v2.x & WADO & DICOM
7	Support of XDS.b IHE Profile	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	X - No support of XDS.b IHE profile ! - Partially supported (1 to 3 actors recommended) V - Fully supported (all the actors)
8	Support of XDS.i Profile	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	X - No support of XDS.i IHE profile ! - Partially supported (1 to 3 actors recommended) V - Fully supported (all the actors plus some options)
9	Support of WADO	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	X - No ! - / V - Yes
10	Support of DICOM Query/Retrieve					✓	✓	✓	✓	✓	✓	X - No ! - / V - Yes

N.B.: The new version of IMPAX EE Server "2.16.0" implements also the XDS.b and XDS.I IHE profiles.

N.B.: The clear-coloured cells mean that the question is not meaningful for the system

## 4.2. Patient ID

The eSanté platform must be able to associate the report sent to the platform to the proper patient. There are several important requirements, which have to be fulfilled for unique patient identification in order to be able to federate patient data from different sources:

- Unique identifier for the institution
- Unique identifier for the patient in the institution (UPID)
- Demographic data of the patient

The examination of the answers shows:

Sharing/Providing of patient demographic data will be needed for de-identification (pseudonymization) process, therefore the exchange of patient demographic data should

- be possible, e.g. using HL7 ADT-PID messages. Although all the hospitals are not able to communicate using IHE PAM/PDQ, they can transmit patient identification data using HL7 v2.

Unique patient identification is an essential issue when sharing medical documents. All of the systems will be able to use internal unique patient identifiers for sharing documents with the platform. This information associated with a patient ID dataset will be needed to provide a unique patient identification inside the eSanté platform.

- Nearly all systems have the capability to distinguish between real patient and test or non-human data. This is important since it must strictly be avoided to transfer non-patient related data to the platform.

- Only the IMPAX EE system can provide an unique institution key for the moment, if this information is available

RIS & HIS can support the usage of number ranges for temporary patient ID; In the planned ORBIS-RIS (Q1 2012) assigning authority is provided in HL7 messages. In IMPAX EE the usage of number ranges is supported only if the issuer is provided in DICOM data, or if the assigning authority is provided in HL7 messages.

Note:

*Patient Administration Management (PAM) enables applications to share accurate patient demographic data within and between acute care settings as well as between those and ambulatory healthcare providers.*

*The Patient Demographics Query (PDQ) Integration Profile lets applications query a central patient information server and retrieve a patient's demographic and visit information.*

Summary of questions on Patient ID		RIS				PACS						Answers
		AGFA			CHDN	AGFA						
		QDDOC5	QDDOC6	Orbis		IM5PA2X	IM6PA0X	IM6PA4X	IM6PA5X	IMEPRV20	IDC	
11	Support of IHE PAM	✗	✗	!	✗	✗	✗	✗	✗	!	✗	X - No support of PAM IHE profile ! - Patient Demographics Consumer actor only or Patient Demographics Supplier only V - Patient Demographics Suppliers and Consumer actors
12	Ability to exchange patient demographic data	!	!	!	!							X - No support of Sharing ! - Sending or Receiving V - Support of Sharing
13	Support of IHE PDQ	!	!	✗	✗	✗	✗	✗	✗	✗	✗	X - No support of PDQ IHE profile ! - Patient Demographics Consumer actor only V - Patient Demographics Suppliers and Consumer actors
14	Support of further information for identifying the patient	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	X - No support of further information ! - Biometrical Data V - Other types of data
15	Use of Unique Institution Key	✗	✗	✗	✗	✗	✓	✗	✗	✓	✓	X - Not applicable ! - / V - Yes applicable
16	Temporary patient ID management	✓	✓	✗	✗	✗	✓	✗	✗	✓	✓	X - No support ! - Support of other criterias V - Support of number ranges

*N.B.: The clear-coloured cells mean that the question is not meaningful for the system*

### 4.3. Appointment Management

The eSanté platform requires that the proposed service must allow a prescriber to visualize, for one period and a given patient, all the appointments of radiological examinations to come.

This section investigates how the systems are managing the appointment data. The answers show that:

The appointments can be synchronized between different systems for each provider.

- Sharing of the appointments is supported by the three vendors by using HL7-SIU messages.

Only CHL with its RIS 5.7 and the ZithaKlinik with ORBIS can support SWF and PIR IHE

- profiles, which permit, for the first one, to manage the appointments, and for the second one, to make the reconciliation of the information if it is linked to one same patient.

With the RIS (since version 5.7) it is possible to use other types of software for this

- service, with the condition that the third party scheduling system is supporting HL7 SIU message inbound specifications.

The communications of the cancellations of appointments is possible via the protocol HL7

- SIU with the IMPAX RIS since version 5.7.

*Note: Scheduled Workflow (SWF) integrates ordering, scheduling, imaging acquisition, storage and viewing for radiology exams. The Patient Information Reconciliation (PIR) Integration Profile coordinates reconciliation of the patient record when images are acquired for unidentified (e.g. trauma), or misidentified patients.*

Summary of questions on Appointment Management		RIS				PACS							Answers
		AGFA			C H D N	AGFA							
		Q D O C 5 .5	Q D O C 5 .6	O r S P I S 8		I M P A X 5 .2	I M P A X 6 .0	I M P A X 6 .4	I M P A X 6 .5	I M P A X E P R V 2 0	I D C		
17	Support of IHE Scheduled Workflow	!	!	!	×	×	×	×	×	×	×	X - No support of SWF IHE profile or not the actor needed ! - Order Placer actor only or DSS/Order Filler only V - Order Placer and DSS/Order Filler actors	
18	Ability to synchronise the appointments between the systems	✓	✓	✓	!	✓	✓	✓	✓	✓	✓	X - No synchronisation ! - Between RIS&PACS only or RIS&HIS V - Between RIS&PACS and RIS&HIS	
19	Support of IHE PIR	✓	✓	✓	×	×	✓	✓	✓	✓	✓	X - No support of PIR IHE profile ! - / V - Support of the PIR IHE profile	
20	Support of other types of software & protocols for the appointment management	✓	✓	×	×							X - No support of types of software ! - Support of i-Calendar V - Other types of software	
21	Support of other electronic ways of communications of appointment cancellations	✓	✓	×	×							X - Not applicable ! - / V - Yes applicable	

*N.B.: The clear-coloured cells mean that the question is not meaningful for the system*

#### 4.4. Radiological Report

The eSanté platform requires that the radiologists submit only validated radiological reports with a format defined by the eSanté-CARA project.

- Access of radiological reports using IHE SINR is not supported by any of the RIS/PACS systems existing in hospitals. Exchanges of the reports between different systems are supported by the three providers by using HL7-ORU messages.

The systems do not support HL7 CDA (Clinical Document Architecture) for their report. Instead PDF is the most commonly used external format, but most of the systems support also other kinds of structured and computer processable formats like DICOM SR.

- For sharing the documents using the eSanté platform some additional metadata of the document are needed, which normally are part of the CDA-Header of the report document. Since they don't support CDA, those additional metadata should be transmitted with the HL7 protocol or must be created/generated at the intermediate communication level (e.g. connector/gateway).

*Note: Single Image and Numeric Report (SINR) Profile specifies how Diagnostic Radiology Reports (including images and numeric data) are created, exchanged, and used.*

Summary of questions on Radiological Report		RIS				PACS							Answers
		AGFA			C H D N	AGFA							
		Q D O C 5	Q D O C 6	O r S P i 8		I M P A X 5 2	I M P A X 6 0	I M P A X 6 4	I M P A X 6 5	I M P A X 2 0	E P R V 0	I D C	
22	Support of IHE profile SINR	X	X	X	X	X	X	X	!	!	!	X - No support of SINR IHE profile ! - Partially supported (1 to 3 actors recommended) V - Fully supported (all the actors)	
23	Support of DICOM SR					X	✓	✓	✓	✓	✓	X - No ! - / V - Yes	
24	Support of CDA					X	X	!	!	✓	!	X - No ! - Via conversion from DICOM SR V - Yes	
25	Type of Creation of the CDA format					X	X	!	!	X	!	X - No ! - Via conversion from DICOM SR V - Natively made	
26	Exchange of the radiological report between the systems	✓	✓	!	!	✓	!	✓	✓	!	✓	X - No support ! - Between 2 systems only V - Between RIS&HIS, and HIS&PACS	

*N.B.: The clear-coloured cells mean that the question is not meaningful for the system*

#### 4.5. Significant and Illustrative Images

The prescriber of the examination must have access to the illustrative images (key images) of the diagnosis. For this purpose the radiologist must be able to mark one or more images produced during the examination, which he wants to associate to the radiological report to make them available to the prescriber, but also to other potential recipients of the report. On the other side, it could be interesting for a radiologist or another medical specialist to obtain the significant images via the eSanté-platform.

This section studies the protocols used for sharing/exchanging the significant and illustrative images. The answers to the questions show:

The KIN profile, which enables a user to flag one or more images in a study as illustrative by referencing them in a note linked with the study, is partially implemented in the systems. Only the Acquisition Modality actor is not implemented. Evidence Creator is

- implemented in IMPAX 6.5 and IDC Viewer by Xero 1.1, Image Manager & Image Archive are implemented in IMPAX 6.5 and IDC 2.0 and Image Display is implemented in IMPAX 6.5 and IDC Viewer by Xero 1.0. IMPAX EE R20 supports also the above cited actors.
- At least for the moment, only Agfa Belgium RIS/PACS have the ability to associate the illustrative images to the radiological report.

The XDS.I profile, which is an extension of XDS.b specific to images, is fully implemented. IDC and IMPAX 6.5 systems can support the Imaging Document Source and Consumer actors with the option Retrieve Images, Retrieve KIN and WADO

- Retrieve; IMPAX EE can support the Imaging Document Source actor with Set of Dicom Instances option and the Imaging Document Consumer actor with PDF report, Retrieve Images, Retrieve KIN and WADO Retrieve options. These two last options are supported by IMPAX EE R20.

The DICOM Q/R, which is a standard that allows to send a request towards a PACS for receiving the significant and/or illustrative images for a given patient, is supported by all the provider's systems.

- WADO is also supported by the IMPAX EE R20 system which is installed in the ZithaKlinik.

Summary of questions on Significant & Illustrative Images		RIS				PACS						Answers
		AGFA			C H D N	AGFA						
		Q D O C 5	Q D O C 6	O r S b P i 8		I M 5 P A 2 X	I M 6 P A 0 X	I M 6 P A 4 X	I M 6 P A 5 X	I M E P R V 2 0	I D C	
27	Ability to associate of illustrative images to report	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	X - No ! - / V - Yes
28	Support of KIN IHE Profile	✗	✗	✗	✗	✗	✗	!	!	✓	!	X - No support of KIN IHE profile ! - Partially supported V - Fully supported (all the actors)

## 4.6. User Authentication

The platform requires that users are strongly identified.

This section aims to understand the user authentication scheme of the system. The examination of the answers shows:

Many of the RIS/PACS systems have username and password for authentication, and some systems are able to use stronger authentication credentials than username and password like smartcards with X.509 certificates (Agfa Belgium). The CHdN RIS/PACS can also support biometrical authentication. All RIS/PACS can also support external system authentication like Kerberos or LDAP.

- Agfa systems (IDC 1,0, IDC V 1,0, IMPAX EE R20 & ORBIS) provides security functionalities as defined by the IHE ATNA profile. ATNA and XUA will be basic profiles, which should be used by the eSanté platform. But XUA and EUA profiles are not supported by the systems currently existing, and for the moment they are not planned by the vendors.

- For the module which can manage claims about authentication principals towards the platform, none of the vendors is able to provide it. For the module which can manage centralized user authentication, only IMPAX since 6.0 has LDAP plug-in implemented and IDC has JAAS Custom Ticket Handler implemented.

### Note:

*JAAS: Java Authentication and Authorization Service*

*The Audit Trail and Node Authentication (ATNA) Integration Profile establishes security measures which, together with the Security Policy and Procedures, provide patient information confidentiality, data integrity and user accountability.*

*Cross-Enterprise User Assertion Profile (XUA) - provides a means to communicate claims about the identity of an authenticated principal (user, application, system...) in transactions that cross enterprise boundaries. To provide accountability in these cross-enterprise transactions there is a need to identify the requesting principal in a way that enables the receiver to make access decisions and generate the*

*The Enterprise User Authentication (EUA) Integration Profile defines a means to establish one name per user that can then be used on all of the devices and software that participate in this integration profile. This profile leverages Kerberos (RFC 1510) and the HL7 CCOW standard (user subject). User authentication is a necessary step for most application and data access operations and it is a workflow improvement for the users.*

Summary of questions on User Authentication		RIS				PACS							Answers
		AGFA			CHDN	AGFA							
		Q5 D O C	Q5 D O C	O r S P i s 8		I M P A X	I M P A X	I M P A X	I M P A X	I M P A X	E E R V 2 0	I D C	
29	Support of ATNA IHE profile	!	!	!	×	×	×	×	×	!	✓	X - No support of ATNA IHE profile ! - Partially supported V - Fully supported	
30	Support of authentication mean	!	!	!	✓	!	!	!	!	!	!	X - No authentication mean ! - Username and password and/or certificates V - Username and password and Card or fingerprint	
31	Support of external system for authentication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X - No ! - / V - Yes	
32	Support of XUA IHE profile	×	×	×	×	×	×	×	×	×	×	X - No support of XUA IHE profile ! - Partially supported V - Fully supported	
33	Management module of claims about authenticated principals towards the platform	×	×	×	×	×	×	×	×	×	×	X - No ! - / V - Yes	
34	Support of EUA IHE profile	×	×	×	×	×	×	×	×	×	×	X - No ! - / V - Yes	
35	Management module of centralized user authentication	×	×	×	×	×	×	✓	✓	×	✓	X - No ! - / V - Yes	

### 4.7. Electronic Signature

Each document sent to the platform must be signed electronically by the author. This section aims to understand the user signature scheme of the vendor systems. The answers show:

- The systems support the validation of radiological reports for the internal needs of the systems. However, for sharing reports with the platform, the usage of an electronic signature must ensure non-repudiation and prove the validity of the report outside of the systems. None of the systems provides such functionality or the required workflow integration.
- The DSG profile, dedicated to electronic signature of document, has been planned to be implemented in the ORBIS system; in the other systems it has not been implemented yet.

Summary of questions on Electronic Signature		RIS				PACS						Answers
		AGFA			C H D N	AGFA						
		Q D O C 5 .5	Q D O C 5 .6	O r b i s 8		I M P A X 5 2	I M P A X 6 0	I M P A X 6 4	I M P A X 6 5	I M P A X E R V 2 0	I D C	
36	Support of electronic signature of medical documents	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	X - No ! - / V - Yes
37	Support of certificates	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	X - No ! - / V - Yes
38	Support of DSG IHE profile	✗	✗	!	✗	✗	✗	✗	✗	✗	✗	X - No support of DSG IHE profile ! - Planned V - Fully supported
39	Link of the electronic signature with the document	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	X - No link ! - Embedded via attached document V - Stored in a separate file
40	Format of document which can be electronically signed by the RIS	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	X - None ! - CDA or PDF V - Both CDA and PDF
41	Support of XaDES	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	X - Not supported ! - / V - Supported
42	System configuration for PKI	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	X - Not configurable ! - Partially configurable V - Fully configurable

## 4.8. Main Conclusions

During the questionnaire session, we asked the vendors about their current and future support for the implementation of IHE profiles. One reason for that was that the implementation of the eSanté platform will be based on IHE profiles (e.g. XDS.b, XDS-I.b with extensions), with the hope that the vendor's software would be as compatible as possible when implementing the appropriate profiles. The second reason was to be able to have a objective measurement to compare the capabilities of the different software products, without the need to compare every single feature, which is often not feasible due to the differences in implementation. Nevertheless, in some cases it was necessary to compare the details.

Based on the structure of the previous chapters, we will now give our conclusion about every main topic.

### Architecture and Technical Interoperability

The IT-Infrastructures that embed the software products analyzed in the questionnaire have been designed for a usage inside of hospitals, with well-known users, who are all registered in the local area network. Some of the systems have an integrated HIS/RIS, like ORBIS or the in-house software developed and used by the CHDN; other systems are based on separate components for the HIS, the RIS and the PACS.

HL7 V2.x and DICOM are the protocols provided by the vendors for communication purpose between different systems. Additionally, Agfa's IDC and IMPAX EE Server PACS systems provide WADO access to stored images.

The systems that are currently used in the hospitals do not provide the functionality that has been proposed for the communication with the eSanté platform, which are the XDS.b and XDS-I.b profiles from IHE.

Agfa's IDC system is the only PACS we analyzed as a migration step of the current systems, which is able to provide the functionality specified by these IHE profiles. This product is commercially placed and intended to be used as a system for sharing radiology images and reports between closely linked institutions, e.g. between groups of hospitals working together.

As these systems are basically designed to be used within a homogenous institutional environment, it will be a question of time and of the vendor's business strategy if functionality for sharing medical information across different institutions, private and public, will be integrated into a broader range of their products.

Additionally it is expected that even though IHE profiles for sharing radiology reports and images will eventually be implemented by the vendors, the security-related requirements of the future eSanté platform has also to be taken into account by their implementation. This could only happen if these requirements would be shared with the IHE community, and recognized as officially agreed options for the implementation of IHE actors.

## Patient Identification

All systems are able to provide the patient identifying data that are required for the De-Identification/Pseudonymization process of the planned eSanté platform. For sharing this patient demographic data, usually the HL7 V2.x protocols PID segment is used by all systems. For the Patient De-Identification/Pseudonymization function of the eSanté platform (located in eSanté's Trusted Third Party, or TTP) a unique identifier for the institution must also be provided, as well as the local patient identifier of the institution, in addition to the patient's demographic data. This institution identifier, although not yet defined at the national level (e.g. as OID's), must be shared with the TTP, together with the patient's demographic data. A result of the questionnaire was that so far only one product is capable of providing a unique institution key with the messages.

Communication of updates, merges, links of patients identities and so on from the primary systems to other systems is provided by triggering the appropriate HL7 V2.x events.

The patient demographics related IHE profiles are supported by some products. E.g. the PIX profile, which is intended to be used in the context of a master Patient Index (MPI), is supported by Orbis and IDC. Nevertheless, the direct communication with the TTP will not be possible with any of the current systems.

## Appointments

The appointments are managed inside the RIS/PACS via HL7 SIU messages. All the hospitals are currently using it and are able to communicate with other systems.

Bringing this to a national level is not foreseen for the moment. It is not planned to have a software system for the scheduling of appointments that go beyond a single institution. Instead, the intention is to provide the health professionals with the list of all radiology exam appointments for a patient, past and future.

## Radiology Report

Nearly all current systems, and none of those planned by the hospitals to be installed during the next migration step, are capable of providing CDA R2 compliant radiology reports. Instead all systems seem to be able to create or manage structured reports specified in DICOM SR. The systems are able to export these radiology reports as PDF documents, which seems to be currently the primary format for sharing and archiving textual reports. DICOM SR, although not used yet by the hospitals, could indeed be a good base for the creation of CDA documents, according to the DICOM supplement 135, which specifies possible transformation from DICOM SR to CDA. For hospitals that are using the products from Agfa, third party software can be acquired for CDA creation. Only those hospitals who use Orbis as the integrated HIS/RIS will be able to export CDA directly. To enable the CHdN in-house developed HIS/RIS to create and export CDA documents, an extension of the current software has to be implemented.

Although the platform specification requires at least CDA R2 Level 2 documents, we expect that this will not be provided by the vendors in a foreseeable period of time. Instead, a valid approach in the first step could be to share CDA R2 Level 1 documents containing an embedded PDF document.

## Significant and Illustrative Images

The current system of the ZithaKlinik is capable of marking images as significant for a diagnosis, but that feature does not actually seem to be used so much by the radiologists. With the other hospitals' current systems it is not possible to tag an image as significant. With IDC system of Agfa it will be possible. The Key Image Note IHE profile (KIN) is the one that describes how to mark images inside the systems.

High-resolution images provided by PACS should stay there, but access to these images from systems outside of the institutions' networks will probably not be allowed, because it introduces additional security risks. Instead, low-resolution images could be included directly as part of the reports, but these pictures can not be used for medical findings.

IMPAX IDC is one solution which was developed for sharing DICOM objects between different institutions. Such a system could be used for example for a national archive (as it is planned by EHL) and could also be a good element for the integration with the eSanté platform (additional effort is needed, see final comment).

## User Authentication

All systems checked during the analysis support the "Username and Password" authentication scheme. Therefore primarily the integrated user management of the systems is used. Some of the systems support the usage of external databases or LDAP for authentication of users on the LAN, too. Strong authentication, which means at least the usage of some kind of hardware token or biometric information together with a secret (two-factor authentication) is not supported natively, although the Agfa systems support the Single Sign-on using Kerberos together with the MS Windows operating system authentication.

Having only the user authentication of the hospitals' internal systems for accessing documents from the eSanté platform seems not to be sufficient. As long as the functionality for retrieving documents from the platform is not directly embedded in the hospitals' systems, an additional authentication step against the systems of the eSanté platform will be necessary. If the systems provide higher security features against "identity steeling" and "bad administrators" as described above by using strong authentication, it could be assumed that a trustful relationship will be established with exchange of security tokens, to seamlessly authenticate against the platform (federated security).

## Electronic Signature and Encryption

Electronic signature of radiology reports is not possible with any of the currently available systems. Agfa has planned to integrate such a feature in future ORBIS HIS/RIS releases. Even though DICOM has specified and foreseen special elements for the signature of even parts of a DICOM object, no vendor has implemented this yet. Electronic signature of radiology reports is not available right now.

Document encryption for radiology reports, which would provide the ability to establish an end-to-end security when sharing these documents, is not foreseen, neither.

## General Conclusion

Protocols and standards like HL7, DICOM WADO and IHE are already provided in the actual systems, but they may not be used at the moment. The IHE profiles recommended to function with the eSanté platform are mostly integrated in software protocols which are not currently installed in the hospitals of Luxembourg.

If we want to start now, there will be a lot of work to be done, mainly because of the different solutions currently installed in the hospitals. If the hospitals work together and use a centralized archive for their radiology images (as it is planned by the EHL), the complexity of external accesses to radiology images for health professionals will be significantly reduced, and hospitals do not have to open their internal systems to outer networks, especially to the Internet. Concerning radiology reports, which could also be stored inside such a centralized PACS, it would make more sense to share these with the Repository and Registry of the national platform, as it is planned for other medical documents. Reference files to the images stored in a centralized PACS, so called DICOM KOS manifest files, could be stored in the national archive too, but because of communication and transactional reasons it would make more sense to share them using the eSanté platform's Repository and Registry.

In order to facilitate the current hospital systems to share their medical data over the eSanté platform, we recommend that a kind of EAI software, a so called "Connector" or "Gateway" could fill the relatively large gap between the currently available functionalities of the hospital systems and the planned eSanté platform. Some efforts on both sides, hospitals and vendors, will also have to be done.

## 5. Detailed answers

### 5.1. How to read the table




The CR SANTEC designed a model table to analyse each answer from the two questionnaires. The eSanté-CARA team regrouped in a model table the answers of the questionnaire collected during the interviews in order to analyse each answer from the two questionnaires.

The first row indicates the general requirement related to the question and the second row is a reminder of the question.

Then the third row resumes the answers collected. When possible, in same row is placed some individual indicator of the impact of the current situation of the hospitals or the RIS/PACS vis-à-vis the eSanté platform. A legend of this criteria is placed just below these individual assessments.

The fourth row is a general description of the impact that informs at glance the complexity of change that the RIS/PACS in general will require to be compliant with the platform.

This table is represented below with each field described.

<b>Requirement #</b>	Here is the general requirements described in this block		
<b>Question(s)</b>	Here is the reference to the question answered		
<b>Synthesis of the current implementation</b>	Here is the description of the state of practice regarding the requirements.	<b>CHdN</b>	<b>AGFA BELGI UM</b>
			
<b>Effort to implement</b>	 Here is described the general effort of the field to reach eSanté requirement.	<b>Criteria</b>	
<b>Comment</b>	Additional information		

The three pictograms used to describe the general complexity of change of the actors mean:





No change is needed.


Some changes have to be planned.


Changes are required.

## 5.2. Architecture and technical interoperability

Requirement 1	Actual RIS/PACS in Luxembourg			
Question(s)	Q0.1 Among your systems, which are the systems installed in Luxembourg?			
Synthesis of the current implementation	CHEM: RIS 5.5 & IMPAX 5.2 - FFE-HK: RIS 5.5 & IMPAX 6.3 - CHL: RIS 5.7 & IMPAX 5.2 - CHdN: IMPAX 5.2 - ZK: ORBIS & IMPAX EE R20 V	AGFA BELGI UM	AGFA GERMA NY	CHdN
Effort to implement		✓	✓	✓
Comment		Criteria	x- Not installed ! - Partially installed ✓- Installed	

Requirement 2	Migrations planned			
Question(s)	Q0.2 Among your systems, which are the migrations already planned for Luxembourg?			
Synthesis of the current implementation	IMPAX 6.5 :CHdN Q3 2011	AGFA BELGI UM	AGFA GERMA NY	CHdN
Effort to implement		✓	✗	✓
Comment		Criteria	x- Not planned ! - Partially planned ✓- Planned	

Requirement 3	Integration of the RIS with the HIS			
Question(s)	Q 0.3 Is your RIS-System a standalone solution or is it a part of the hospital information system?			
Synthesis of the current implementation	Agfa Germany RIS system is a standalone solution and dependant of the HIS, so integrated. Agfa Belgium RIS system is a standalone solution. For CHdN, their internal RIS is dependant of the HIS.	AGFA BELGI UM	AGFA GERMA NY	CHdN
Effort to implement		✗	✓	!
Comment		Criteria	x- Standalone ! - Dependant of the HIS ✓- Integrated	

Requirement 4	List of IHE profiles supported			
Question(s)	Q 0.4 Have you joined with your software the IHE Connectathon for testing the connectivity with other systems. If yes, could you provide the Integration Statement document for the software version where this questionnaire relates to?			
Synthesis of the current implementation	CHdN did not integrate any IHE profile.	AGFA BELGI UM	AGFA GERMA NY	CHdN
Effort to implement		✓	✓	✗
Comment	for the other systems tested: see AgfaHealthCareConnectathonResult.pdf & IHE integration Statement of IMPAX EE & for ORBIS IHE Integration Statement: ORBIS SP8 1.0 IHE Integration Statement	Criteria	x- No IHE profile supported ! - Implemented without integration statement	

Requirement 5	List of IHE profiles planned to be implemented					
Question(s)	Q 0.5 Do you plan to implement additional IHE profiles and if so which and until when?					
Synthesis of the current implementation	For Agfa Germany only : IMPAX EE : XDS-Registry Q2 2012; ORBIS : ITI XDS.b, PAM PES+PDS Source & PDQ are planned.			AGFA BELGI UM	AGFA GERM ANY	CHdN
Effort to implement				✗	✓	✗
Comment				Criteria	x- No plan ! - Partially plan ✓ - Plan to implement additional IHE profiles	

Requirement 6	List of protocols supported					
Question(s)	Q 0.6 Which protocols (e.g., HL7, DICOM, WADO) and in which specification level are supported by your applications?					
Synthesis of the current implementation	Agfa Belgium: IMPAX RIS with HL7 v2.4; DICOM v3 in IMPAX 6.5 & IDC; WADO in IMPAX IDC. Agfa Germany: IMPAX EE R20 & ORBIS SP08 integrates the HL7 v2, DICOM and WADO.			AGFA BELGI UM	AGFA GERM ANY	CHdN
Effort to implement	HL7 v2 is already used as protocols in the systems. DICOM and WADO also. Only CHDN does not have them in their own system.			✓	✓	✓
Comment				Criteria	x- Other Standards (WADO, DICOM) ! - ✓ - HL7 v2.x	


Requirement 7	Support of XDS.b IHE Profile					
Question(s)	Q4.3-1IHE profile Cross Enterprise Document Sharing XDS.b					
Synthesis of the current implementation	Agfa Belgium RIS systems have implemented the Document Source, Consumer and the Document Repository is supported by IDC; Agfa Germany IMPAX EE has implemented the Document Source in IMPAX EE R20 and IMPAX EE supports the Document Consumer and Repository.			AGFA BELGI UM	AGFA GERM ANY	CHdN
Effort to implement	Agfa Belgium and Germany have both systems where are implemented the XDS.b profile but not all the actors are implemented.			!	!	✗
Comment				Criteria	x- No support of XDS.b IHE profile ! - Partially supported (1 to 4 actors recommended) ✓ - Fully supported (all the actors plus some options)	


Requirement 8	Support of XDS.i Profile					
Question(s)	Q 4.3-2 IHE profile Cross Enterprise Document Sharing for Imaging XDS.I					
Synthesis of the current implementation	Agfa Belgium IDC systems have implemented the Imaging Document Source and Consumer actors with the option Retrieve Images, Retrieve KIN and WADO Retrieve; Agfa Germany IMPAX EE Server 2.16.0 has implemented the Imaging Document Source actor with Set of Dicom Instances option and the Imaging Document Consumer actor with PDF report, Retrieve Images, Retrieve KIN and WADO Retrieve options. These two last options are supported by IMPAX EE Server 2.16.0.			AGFA BELGI UM	AGFA GERM ANY	CHdN
Effort to implement	Agfa Belgium and Germany have both systems where are implemented the XDS.I profile.			✓	✓	✗
Comment				Criteria	x- No support of XDS.I IHE profile ! - Partially supported ✓ - Fully supported (all the actors plus some options)	


Requirement 9	Support of WADO			
Question(s)	Q 5.3-4 Does your system support the fonctionnality "Web Access to DICOM Object"?			
Synthesis of the current implementation	AGFA BELG IUM	AGFA GERM ANY	CHdN	
Effort to implement	✓	✓	✗	
Comment	AGFA Belgium: WADO as Imaging Document Source is supported in the current version of IDC: IDC 1.0; AGFA Germany IMPAX EE R20 supports also the WADO standard.		Criteria	
	AGFA Belgium: WADO as Imaging Document Source is supported in the current version of IDC; WADO as Imaging Document Consumer will be supported in the next version of IDC		x- No ! - / ✓ - Yes	


Requirement 10	Support of DICOM Query/Retrieve			
Question(s)	Q 5.3-5 Does your system support the fonctionnality "DICOM Query/Retrieve"?			
Synthesis of the current implementation	AGFA BELG IUM	AGFA GERM ANY	CHdN	
Effort to implement	✓	✓	✓	
Comment	All the providers have implemented this standard in their systems.		Criteria	
			x- No ! - / ✓ - Yes	


### 5.3. Patient ID


Requirement 11	Support of IHE PAM			
Question(s)	Q 1.3-1 Patient Administration Management (PAM) profile for sharing patient demographic and encounter data			
Synthesis of the current implementation	AGFA BELGIUM	GERMANY	CHdN	
	✓	✓	✗	
Effort to implement				
Comment	<b>Criteria</b> ✗- No support of PAM IHE profile ! - Patient demographics consumer only ✓- Patient demographics suppliers			

Requirement 12	Ability to exchange patient demographic data			
Question(s)	Q 1.3-2 Does your system support the sharing (sending/receiving) of patient demographic data with other systems (e.g. HIS)?			
Synthesis of the current implementation	AGFA BELGIUM	GERMANY	CHdN	
	✓	✓	✓	
Effort to implement				
Comment	<b>Criteria</b> ✗- No support of sharing ! - Sending or receiving ✓- Support of sharing			


Requirement 13	Support of IHE PDQ			
Question(s)	Q 1.3-3 Does your system support the IHE – Patient Demographics Query (PDQ) profile for sharing patient demographic and encounter data and if so, which actors and options?			
Synthesis of the current implementation	AGFA BELGIUM	GERMANY	CHdN	
	✓	✓	✗	
Effort to implement	 The RIS providers have implemented or plan to implement the PDQ profile. This profile could be useful to see patient identification data when looking for radiological results from other hospitals on the platform.			
Comment	<b>Criteria</b> ✗- No support of IHE PDQ ! - Patient demographics consumer only ✓- Patient demographics suppliers and consumer			


Requirement 14	Support of further information for identifying the patient			
Question(s)	Q1,3-4 Does your system support further informations for patient identifying, maybe fields to better identify the patient, for example based on additional data e.g., biometrical data?			
Synthesis of the current implementation	There is no support of further informations in the system implemented.	AGFA BELGI UM	GERM ANY	CHdN
		✗	✗	✗
Effort to implement	 The systems existing are not using other informations like biometrical data to identify the patients.	Criteria	x- No support of further information ! - Biometrical data ✓- Other types of data	
Comment				


Requirement 15	Use of Unique Institution Key			
Question(s)	Q 1.3-5 Is your system able to provide a unique institutionkey (e.g., like the homeCommunityId in IHE-XCA) as part of a message?			
Synthesis of the current implementation	For Agfa Germany, the PACS can handle this information if it is provided, for the other providers the systems are not supported it.	AGFA BELGI UM	GERMA NY	CHdN
		✗	✓	✗
Effort to implement		Criteria	x- Not applicable ! - / ✓- Yes applicable	
Additional comment				


Requirement 16	Temporary patient ID management			
Question(s)	Q1.3-6 Does your system support the usage of number ranges or other criteria to distinguish real patient IDs from temporary/test or non-human patient IDs?			
Synthesis of the current implementation	Agfa Belgium systems can provide the usage of number ranges; Agfa Germany too: in their planned RIS (Q1 2012), assigning authority is provided in HL7 messages. In their PACS, only if the issuer is provided in DICOM data or assigning authority is provided in HL7 messages. For the HIS cf to RIS.	AGFA BELGI UM	GERMA NY	CHdN
		✓	✗	✗
General effort to implement the requirement		Criteria	x- No support ! - Support of other criteria ✓- Support of number ranges	
Comment				


### 5.4. Appointment Management

Requirement 17	Support of IHE Scheduled Workflow			
Question(s)	Q 2.3-1 IHE Profile Scheduled Workflow for the appointment management			
Synthesis of the current implementation	Agfa Belgium RIS 5.8 supports Order Placer actor and RIS 5.7 DSS/Order Filler actors. Agfa Germany ORBIS HIS supports Order Placer actor with the Appointment Notification option; ORBIS RIS supports DSS/Order Filler actor with the Appointment Notification option	AGFA BELGI UM	AGFA GERMA	CHdN
Effort to implement		✓	✓	✗
Comment	Belgium: IHE SWF profile support for following actors: Order Placer: partial: in the road map to be fully supported in 2012 in IMPAX RIS/i-Plan;	Criteria	x- No support of SWF IHE profile ! - Order Placer only ✓ - Order Placer & DSS/Order Filler	


Requirement 18	Ability to synchronise the appointments between the systems			
Question(s)	Q 2.3-2 Does your product manage the synchronisation of the appointments between different systems?			
Synthesis of the current implementation	Agfa Belgium: Between RIS & PACS from the same or different providers and between RIS & HIS from the same and different providers; Agfa Germany: between RIS & PACS from the same or different providers and between RIS & HIS from the same provider only; CHDN: between RIS & HIS from the same provider.	AGFA BELGI UM	AGFA GERMA	CHdN
Effort to implement	 The synchronisation for the appointment management between RIS and HIS is existing for the 3 providers.	✓	✓	!
Comment		Criteria	x- No synchronisation ! - Between RIS&PACS only ✓ - Between RIS&PACS and RIS&HIS	


Requirement 19	Support of IHE PIR			
Question(s)	Q 2.3-3 Does your system support the IHE – Patient Information Reconciliation?			
Synthesis of the current implementation	Agfa Belgium RIS 5.7 and Agfa Germany ORBIS are supporting this profile	AGFA BELGI UM	AGFA GERMA	CHdN
Effort to implement		✓	✓	✗
Comment	Here the actors were not necessary to be precised because we just want to have the profile implemented for reconciliating the data of the patient.	Criteria	x- No support of IHE PIR ! - / ✓- Support of the profile	


Requirement 20	Support of other types of software & protocols for the appointment management			
Question(s)	Q1,3-4 Does your system support other types of software for the appointment management?			
Synthesis of the current implementation	Agfa Belgium: RIS: which any 3rd party scheduling system that supports our HL7 SIU inbound specifications	AGF A ✓	BEL GIU ✗	AGF A ✗
Effort to implement	 Agfa Germany and CHDN is not supporting other types of software which can manage the appointments like i-calendar....	<b>Criteria</b> x- No support of types of software ! - Support of i-calendar ✓- Other types of software.		
Comment				


Requirement 21	Support of other electronic ways of communications of appointment cancellations			
Question(s)	Q 2.3-5 Does your system support other electronic ways of communications of the appointment cancellations?			
Synthesis of the current implementation	For Agfa Belgium, via the protocol HL7 SIU	AGFA BELGI UM ✓	AGFA GERMA ✗	CHdN ✗
Effort to implement		<b>Criteria</b> x- Not applicable ! - / ✓- Yes applicable		
Comment				


### 5.5. Radiological report

Requirement 22	Support of IHE profile SINR			
Question(s)	Q3.3-1 Does your system support IHE profile Single Image and Numeric Report?			
Synthesis of the current implementation	AGFA BELGI UM	GERMA NY	CHdN	
	!	!	X	
Effort to implement				
Comment	<b>Criteria</b> x- No support of SINR IHE profile ! - Partially supported (1 to 3 actors recommended) ✓ - Fully supported (all the actors)			


Requirement 23	Support of DICOM SR			
Question(s)	Q 3.3-2 Does your product support the DICOM SR ?			
Synthesis of the current implementation	AGFA BELGI UM	GERMA NY	CHdN	
	✓	✓	✓	
Effort to implement				
Comment	DICOM Structured Report (SR)			
	<b>Criteria</b> x- No ! - / ✓ - Yes			


Requirement 24	Support of CDA			
Question(s)	Q 3.3-3 Does your product support the CDA format? At which level?			
Synthesis of the current implementation	AGFA BELGI UM	GERMA NY	CHdN	
	X	X	X	
Effort to implement	 None of the providers is able at this day to support the CDA standard.			
Comment	Agfa Belgium: CDA is not available in AGFA Portfolio but can be realised via 3rd party CDA conversion tool;			
	<b>Criteria</b> x- No ! -Via conversion from DICOM SR ✓ - Yes			

Requirement 25	Type of Creation of the CDA format			
Question(s)	Q 3.3-4 Is the creation of the document in a CDA format made natively or by converting the DICOM SR?			
Synthesis of the current implementation	CDA is not supported by none, and no conversion by DICOM SR is possible.			
Effort to implement	 High effort to implement CDA is necessary			
Comment	Agfa Belgium: CDA is not available in AGFA Portfolio but can be realised via 3rd party CDA conversion tool;			
	AGFA BELGI UM	GERMA NY	CHdN	
	X	X	X	
	Criteria			x- No ! - Via conversion from DICOM SR ✓- Yes


Requirement 26	Exchange of the radiological report between the systems			
Question(s)	Q 3.3-5 Does your product support the exchanges of the reports between the systems HIS and RIS/PACS? On which standard is it based?			
Synthesis of the current implementation	Agfa Belgium: Between RIS&HIS, between PACS&HIS by using HL7_v2 ORU messages. Agfa Germany: Between RIS&HIS only and for CHDN it is possible between their own system called 'Dossier Patient' via database links.			
Effort to implement	 The exchanges of the reports between the systems is existing.			
Comment				
	AGFA BELGI UM	GERMA NY	CHdN	
	✓	!	!	
	Criteria			x- No support ! - Between 2 systems only ✓- Between RIS&HIS, and PACS&HIS


### 5.6. Significant and Illustrative Images


Requirement 27	Ability to associate of illustrative images to report			
Question(s)	Q 5.3-1 Does your system allow to associate to the report, one or more illustrative images (key images) with non DICOM format?			
Synthesis of the current implementation	For Agfa Belgium: In the RIS/PACS reporting rich layouts are supported, inclusion of images is possible, however if reports are converted to SR, the rich layout is lost.	AGFA BELGI UM	AGFA GERMA	CHdN
Effort to implement		✓	✗	✗
Comment		Criteria	✗- No ! - ✓- Yes	

Requirement 28	Support of KIN IHE Profile			
Question(s)	Q 5.3-2 Does your system support IHE profile Key Image Note KIN?			
Synthesis of the current implementation	AGFA Belgium: Evidence Creator is implemented in IMPAX 6.5 and IDC Viewer by Xero 1.1, Image Manager & Image Archive are implemented in IMPAX 6.5 and IDC 2.0 and Image Display is implemented in IMPAX 6.5 and IDC Viewer by Xero 1.0. AGFA Germany: IMPAX EE R20 supports also these 4 actors quoted.	AGFA BELGI UM	AGFA GERMA	CHdN
Effort to implement	 Only Acquisition Modality actor is not implemented in the systems quoted before.	✓	✓	✗
Comment		Criteria	✗- Not supported ! - Partially supported ✓- Fully supported	

### 5.7. User authentication

Requirement 29	Support of ATNA IHE profile			
Question(s)	Q 6.3-1 Does your system support the IHE profile Audit Trail and Node Authentication ATNA?			
Synthesis of the current implementation	AGFA BELGIUM	M	GERMA NY	CHdN
	✓		✓	✗
Effort to implement	 ATNA is fully implemented in Agfa Belgium and Germany systems.			<b>Criteria</b> ✗- No support of ATNA IHE profile ! - Partially supported ✓- Fully supported

Requirement 30	Support of authentication mean			
Question(s)	Q 6.3-2 Which kinds of user authentication does your system support?			
Synthesis of the current implementation	AGFA BELGIUM	M	GERMA NY	CHdN
	✓		!	✓
Effort to implement	 Each provider is able to provide a mean for user authentication.			<b>Criteria</b> ✗- No authentication mean ! - Username and password ✓- Username and password and Card or fingerprint
Comment				

Requirement 31	Support of external system for authentication			
Question(s)	Q 6.3-3 Does your system support linking with external systems for authentication and for some kind of Single Sign-On?			
Synthesis of the current implementation	AGFA BELGIUM		AGFA GERMANY	CHdN
	✓		✓	✓
Effort to implement	 Each of the providers supports a kind of link with external systems for authentication.			<b>Criteria</b> ✗- No ! - ✓- Yes
Comment	Agfa Belgium for the External Authentication Service: An authentication ticket or token must be issued by an external authentication service. The IDC application will connect to the external auth. Service in order to validate the ticket, and to identify the user.			


<b>Requirement 32</b>	<b>Support of XUA IHE profile</b>		
<b>Question(s)</b>	Q 6.3-4 Does your system support IHE profile Cross Enterprise User Assertion XUA?		
<b>Synthesis of the current implementation</b>	AGFA BELGIUM	AGFA GERMANY	CHdN
	X	X	X
<b>Effort to implement</b>	None of the providers have implemented this profile.	<b>Criteria</b>	x- No ! - ✓- Yes
<b>Comment</b>			


<b>Requirement 33</b>	<b>Management module of claims about authenticated principals towards the platform</b>		
<b>Question(s)</b>	Q 6.3-5 In the case the XUA is not implemented, is your system able to provide a module which will handle the claims about authenticated principals towards the platform?		
<b>Synthesis of the current implementation</b>	AGFA BELGIUM	AGFA GERMANY	CHdN
	X	X	X
<b>Effort to implement</b>	None of the providers have implemented a module which could manage the claims about authenticated principals toward the platform and that could replace the IHE profile XUA.	<b>Criteria</b>	x- No ! - ✓- Yes
<b>Comment</b>			


<b>Requirement 34</b>	<b>Support of EUA IHE profile</b>		
<b>Question(s)</b>	Q 6.3-6 Does your system support IHE profile Cross Enterprise User Assertion EUA?		
<b>Synthesis of the current implementation</b>	AGFA BELGIUM	AGFA GERMANY	CHdN
	X	X	X
<b>Effort to implement</b>	None of the providers have implemented this profile.	<b>Criteria</b>	x- No ! - ✓- Yes
<b>Comment</b>			


<b>Requirement 35</b>	<b>Management module of centralized user authentication</b>			
<b>Question(s)</b>	Q 6.3-7 In the case the EUA is not implemented, is your system able to provide a module for the management of centralized user authentication?			
<b>Synthesis of the current implementation</b>	Agfa Belgium IMPAX since version 6.0 has LDAP plug-in implemented; and IDCV has JAAS Custom Ticket Handler implemented since 1.0.	AGFA BELGIUM	GERMANY	CHdN
		✓	X	X
<b>Effort to implement</b>	Agfa Germany and CHdN have to implement this module if the authentication will be centralized.	<b>Criteria</b>	x- No ! - ✓- Yes	
<b>Comment</b>			MPAX 6.x supports Microsoft Integrated Windows Authentication (Windows Sso); Please refer to the External Authentication Service that has been described in response to Q6.3-3	


## 5.8. Electronic signature


Requirement 36	Support of electronic signature of medical documents		
Question(s)	Q 7.3-1 Does your system support the electronic signature of medical documents, reports, images?		
Synthesis of the current implementation	None of the providers systems are supporting electronic signatures of documents.	AGFA BELGIUM	AGFA GERMANY
		✗	✗
Effort to implement	 A strong effort has to be provided by RIS/PACS provider	Criteria	✗- No ! - / ✓- Yes
Comment			


Requirement 37	Support of certificates		
Question(s)	Q 7.3-2 Which kinds of certificates does your system support?		
Synthesis of the current implementation	None of the providers systems are supporting certificates.	AGFA BELGIUM	AGFA GERMANY
		✗	✗
Effort to implement	 A strong effort has to be provided by RIS/PACS provider to add a signature functionality.	Criteria	✗- No ! - / ✓- Yes
Comment			

Requirement 38	Support of DSG IHE profile		
Question(s)	Q 7.4-3 Does your system support the IHE Profile "Document Digital Signature"?		
Synthesis of the current implementation	Agfa Belgium has not implemented this profile and Agfa Germany has planned it for ORBIS.	AGFA BELGIUM	AGFA GERMANY
		✗	!
Effort to implement	 This fonction has to be implemented in the future in the RIS/PACS systems by the providers to get the possibility to have electronically signed documents.	Criteria	✗- No support of DSG IHE profile ! - Partially supported ✓- Fully supported
Comment			

Requirement 39	Link of the electronic signature with the document			
Question(s)	Q 7.4-4 How is the electronic signature linked to the document?			
Synthesis of the current implementation	Neither Agfa Belgium nor Agfa Germany nor CHDN have electronic signature linked to document.	AGFA BELGIUM	AGFA GERMANY	CHdN
		X	X	X
Effort to implement	 A huge effort has to be done by RIS/PACS provider to add a signature functionality	Criteria	x- No link ! - embedded via attached document ✓- stored in a separate file	
Comment				

Requirement 40	Format of document which can be electronically signed by the RIS			
Question(s)	Q 7.4-5 Which document format can be electronically signed by the RIS?			
Synthesis of the current implementation	Neither Agfa Belgium nor Agfa Germany nor CHDN have document format that can be electronically signed by the RIS.	AGFA BELGIUM	AGFA GERMANY	CHdN
		X	X	X
Effort to implement	 A huge effort has to be done by RIS/PACS provider to add a signature functionality	Criteria	x- None ! - CDA or PDF ✓- Both CDA and PDF	
Comment				

Requirement 41	Support of XaDES			
Question(s)	Q 7.4-6 Does your software support the XML Advanced Electronic Signature (XaDES) standard for signature creation?			
Synthesis of the current implementation	Neither Agfa Belgium nor Agfa Germany nor CHDN have systems which support the standard XaDES.	AGFA BELGIUM	AGFA GERMANY	CHdN
		X	X	X
Effort to implement	 A huge effort has to be done by RIS/PACS provider to add a signature functionality	Criteria	x- Not supported ! - / ✓- Supported	
Comment				

Requirement 42	System configuration for PKI			
Question(s)	Q 7.4-7 Is your system configurable to integrate with an existing Private Key-Infrastructure?			
Synthesis of the current implementation	Neither Agfa Belgium nor Agfa Germany nor CHDN have systems configurable to integrate with an existing Private Key Infrastructure.	AGFA BELGIUM	AGFA GERMANY	CHdN
		X	X	X
Effort to implement	 A huge effort has to be done by RIS/PACS provider to configure their system that they can integrate private Key Infrastructure.	Criteria	x- Not configurable ! - Partially configurable ✓- Fully configurable	
Comment				

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