EHE Document Registry and Repository

Commercial Description

Version 5.1

1 Introduction

Electronic Healthcare Exchange (EHE) is a line of products fulfilling a variety of eHealth system needs, ranging from fundamental ones like infrastructure, security, and integration, over exchange and management of clinical documents and discrete medical information, to advanced functionalities like clinical decision support. Solutions made of different EHE products, alone or through integration with the existing infrastructure, support a wide range of processes in a healthcare system.

The EHE Document Registry and Repository enables the exchange of healthcare documents in a standardized manner in accordance with the IHE MHD integration profile [1][2], the processing of these documents, and the storage of clinical and healthcare documents in a central registry and repository in accordance with the HL7 FHIR standard [3].

The EHE Document Registry and Repository provides the following services:

- storage of documents and corresponding data about them (document metadata)
- changing the metadata of documents that have already been saved in the Document Registry and Repository
- cancellation of documents saved in the Document Registry and Repository
- saving a new version of a document that has already been saved in the Document Registry and Repository
- search for documents in the Registry using metadata about the document as input parameters
- retrieving a document from the repository based on the identifier obtained through search services.

In addition, the EHE Document Registry and Repository ensures the following:

- validating received documents based on the established structure (template) in accordance with the HL7 FHIR standard
- processing received documents in such a way as to extract all FHIR resources from the received document and save them in the EHE Medical Records Database [4]
- enabling retrieval of information about the document from which certain medical data was extracted

- maintaining logical links between the original document and the medical data stored in the EHE Medical Records Database (separate FHIR resources stored in the FHIR server originating from that document in accordance with the IHE mXDE integration profile and enabling:
    - updating logical links between original documents and medical data in case the input document is updated
    - retrieving information about the document on the basis of which medical data is stored in the EHE Medical Records Database in accordance with the IHE QEDm integration profile [9].

The EHE Document Registry and Repository is implemented in central solutions (national, regional or some other level) that support the integration of existing medical information solutions in health centers, hospitals or any other healthcare institutions. The product can be used within large healthcare institutions where several different information systems are implemented, and they need to exchange clinical information. In this way, these solutions can:

- send medical data to the central solution in the form of a document (e.g. a summary of the examination from primary health care, a specialist report, a discharge letter) which will be saved in the form of an original document in the EHE Document Registry and Repository, but also in a structured form (medical data will be extracted from the documents in the form of FHIR resources and saved in the EHE Medical Records Database)
- renew or cancel the same document if the need arises
- search for documents by different criteria and retrieve them in their original form.

2 Technical Aspects

The EHE Document Registry and Repository implements the Document Recipient and Document Responder components in accordance with the IHE MHD integration profile [2], and the following transactions of that profile:

- Provide Document Bundle [ITI-65] – storing documents in the repository and registering document metadata in the register
- Find Document References [ITI-67] – document search and retrieval of those documents' metadata
- Retrieve Document [ITI-68] – retrieving a document from the repository.

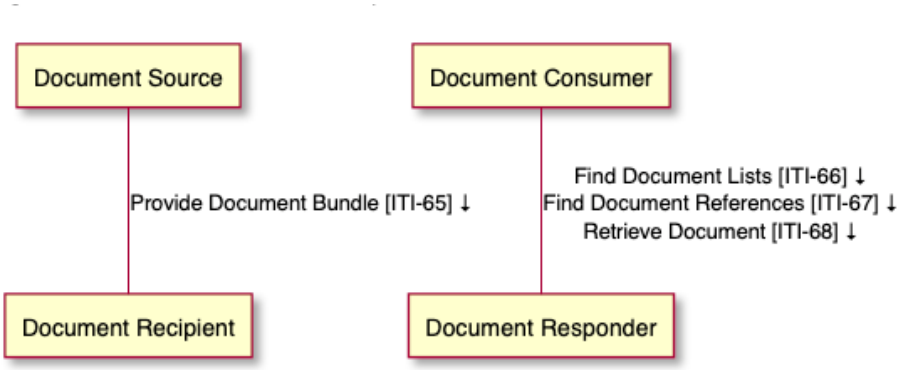

Figure 1 – IHE MHD Integration Profile Components and Transactions

To enable the extraction of medical data in the form of FHIR resources during the processing of the received clinical document, and to enable the traceability of extracted medical data, the EHE Document Registry and Repository implements the Data Element Extractor component in accordance with the IHE mXDE integration profile [8], (Figure 2). Namely, for each extracted FHIR resource, the identifier of the document on the basis of which that FHIR resource was created is saved.

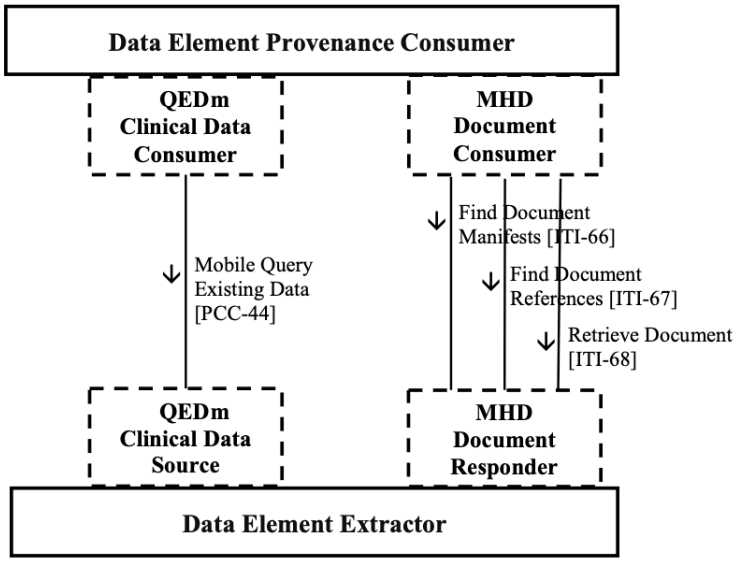

Figure 2 – IHE mXDE Integration Profile Components and Transactions

As indicated in the figure, the Mobile Query Existing Data transaction [PCC-44] of the IHE QEDm integration profile is used to retrieve the extracted medical data and clinical documents. This integration profile is implemented by the IHE QEDm service component of the EHE Medical Records Database product.

3 Interdependencies

The EHE Document Registry and Repository depends on the following components:

- EHE Medical Records Database [4] - It is also possible to use other providers' repository of medical data conforming to the FHIR R4 standard. The internal structure used to store medical data does not have to comply with the FHIR R4 standard, but it is important that the interface for accessing and managing data in the repository complies with this standard.
- EHE FHIR Repository [5] – it is also possible to use other providers' data repository compliant with the FHIR R4 standard
- EHE Terminology Services [6] – it is possible to use other suppliers' terminology repository and terminology service provider compliant with the FHIR R4 standard and IHE SVCM integration profile
- EHE Infrastructure [7].

For the implementation of EHE Document Registry and Repository, it is necessary to provide a PostgreSQL or Oracle relational database and the Ubuntu Linux operating system.

The components of the EHE Document Registry and Repository product can be installed on physical servers, in virtual machines or containers.

4 Certificates

Document Recipient and Document Responder component has successfully passed IHE MHD profile certification at IHE Connectathon.

5 Free and Open Source Software

This product uses free and open source software (FOSS) components with the following licenses:

- Apache Software License 2.0 [10]
- MIT License [11]
- Eclipse Distribution License [12]
- Eclipse Public License [13]
- Creative Commons CC0 [14]
- BSD License (2 clause and 3 clause) [15]
- Bouncy Castle License [16]
- Common Development and Distribution License [17]
- GNU Library General Public License [18]

- Mozilla Public License (MPL) [19]

6 Version

The current product version is 5.1.

7 References

[1] IHE (Integrating Healthcare Enterprise) – This is a joint initiative of healthcare professionals and industry with the aim of improving the way in which information systems and applications in healthcare exchange information by defining integration profiles that determine standards to solve common integration tasks in healthcare (https://ihe.net).

[2] IHE MHD (Mobile Access to Health Documents) – IHE (Integrating the Healthcare Enterprise) a profile defining a standardized interface for the exchange of health documents – specification available at https://profiles.ihe.net/ITI/MHD/index.html.

[3] HL7 FHIR (Fast Healthcare Interoperability Resources) – This is a standard describing data formats and elements and an application programming interface for the exchange of electronic health records. It was created by Health Level Seven, an international health standards organization. Specification available at https://www.hl7.org/fhir/

[4] EHE Medical Records Database – standard Ericsson Nikola Tesla's product which enables the management and storage of health and clinical data in accordance with the HL7 FHIR standard and the IHE QEDm integration profile.

[5] EHE FHIR Repository – standard Ericsson Nikola Tesla's product which enables data management and storage based on the HL7 FHIR standard.

[6] EHE Terminology Services – standard Ericsson Nikola Tesla's product which enables the use of terminologies, terminological operations and management of terminologies (code lists, concept groups, concept maps) based on the HL7 FHIR standard and the IHE SVCM integration profile.

[7] EHE Infrastructure – standard Ericsson Nikola Tesla's product which implements the functions necessary for the operation, internal communication and monitoring of the solution components.

[8] IHE mXDE (Mobile Cross-Enterprise Document Data Element Extraction) – a profile that defines the way to access data elements extracted from shared structured documents – specification available at https://profiles.ihe.net/ITI/mXDE/index.html.

[9] IHE QEDm (Query for Existing Data for Mobile) – profile that defines the search and retrieval of clinical data elements (FHIR resources such as Observation, Condition, Medication...) - specification available at

https://wiki.ihe.net/index.php/Query_for_Existing_Data_for_Mobile_(QEDm).

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