EHE Health Entities Register

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 Health Entities Register enables retrieval, search, storage and updating of data on healthcare providers (healthcare professionals, healthcare organizations and other organizations within the field of healthcare) based on the HL7 FHIR standard [1] and the IHE mCSD integration profile [2][3].

2 Functionality Description

The EHE Health Entities Register includes:

- Healthcare Professionals Register

- Healthcare Organizations Register.

2.1 Healthcare Professionals Register

The main purpose of the Healthcare Professionals Register is to manage data on healthcare professionals, both medical and non-medical personnel.

The Register can be used at the national level, regional level and at the level of a healthcare institution to manage data on health professionals. Depending on the level at which the register is used, it contains data on healthcare professionals within a specific country, a region within the country, or a healthcare organization.

Registers or databases with data about healthcare professionals at the national or regional level which are maintained by the Ministry of Health or other government body are common. However, some healthcare organizations have their own databases on healthcare professionals and manage those databases themselves. That is why the data on healthcare professionals are synchronized with the EHE Health Entities Register via specialized components (developed specifically for each customer project) that semantically and syntactically harmonize data from the data source with the syntax and semantics of the data in the EHE Health Entities Register.

Since the data source is different in each project and various standard and non-standard interfaces are used for retrieving data, such specialized components are developed separately for the needs of each project and are not part of the EHE Health Entities Register. The usual structure of data on healthcare professionals that is retrieved from external sources is as follows:

- Healthcare Professional Identifier

- Data on the role of the healthcare professional (there may be more than one):

    o role (e.g., cardiologist, head of clinic, pediatrician, head nurse, nurse, etc.)

    o the organization (reference to the record in the Healthcare Organizations Register) in which the healthcare professional has a specified role)

    o the period in which the healthcare professional has been active at the specified organization

- Data on the healthcare professional's specialization

    o healthcare professional's specialization (e.g. cardiologist, nephrologist, etc.).

The following functionalities are supported:

- storing and updating data on healthcare professionals in accordance with the HL7 FHIR standard using the following FHIR resources [1]:

    o Practitioner

    o PractitionerRole

    o reference to the Organization resource

    o reference to the Person resource

    Employee data is downloaded from an external source and stored and changed via the appropriate integration module.

- use of data from the Register by other modules through appropriate integration services.

The structure of data on healthcare professionals is shown in Figure 1. This figure also illustrates how this data is stored in the EHE Health Entities Register using FHIR resources.
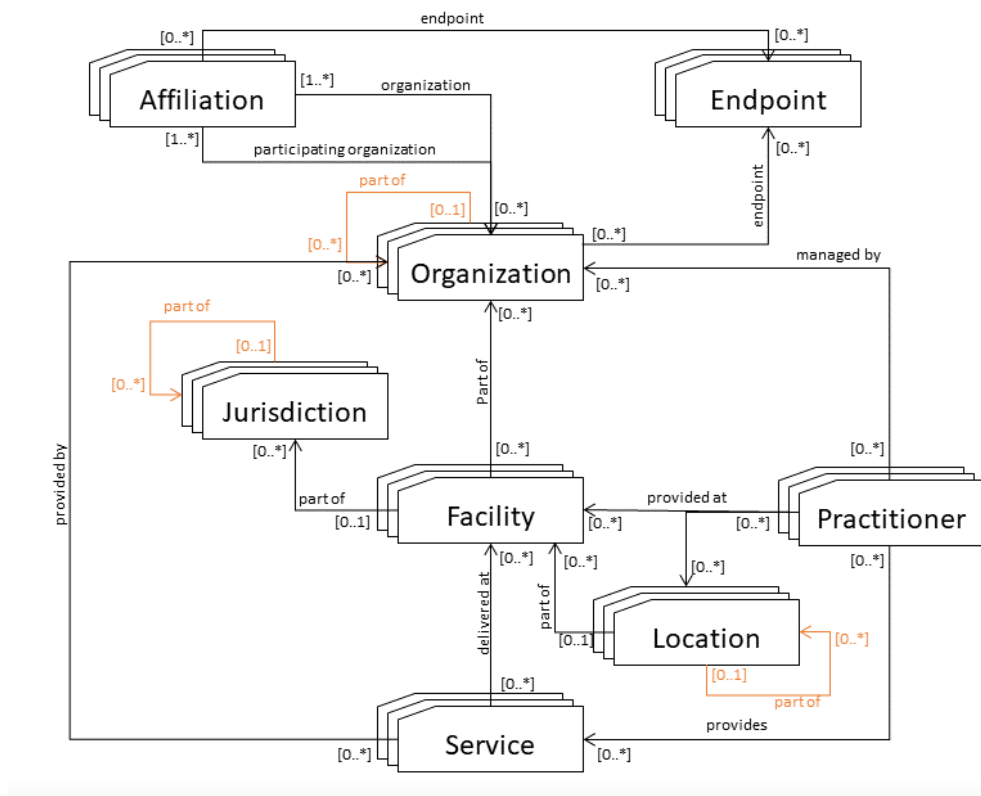
Figure 1 – The structure of data on healthcare professionals and healthcare organizations

The Register provides a service based on the FHIR standard for storing and managing data on healthcare professionals (FHIR resources *Practitioner* and *PractitionerRole*).

For retrieving data on healthcare professionals, the Register provides a service compliant with the IHE mCSD integration profile [3]. The Register implements the Care Services Selective Supplier component and the Find Matching Care Services Request [ITI-90] operation of that profile.

2.2   Healthcare Organizations Register

The main purpose of the Healthcare Organizations Register is to manage data on healthcare organizations, their internal structure, and the connection among healthcare organizations and/or parts of healthcare organizations (clinics, departments, etc.) and healthcare professionals.

The Register can be used at the national or regional level as a register of healthcare organizations and services provided by these organizations. The Register can also be used at the level of a healthcare organization to manage data on its structure (clinics, departments) and on healthcare services provided by the organization, i.e., its clinics and departments.

Registers or databases in which data on healthcare organizations, their structure, and healthcare services they provide are stored and maintained at the national, regional, and healthcare organizations level is common. Those data are synchronized with the EHE Health Entities Register via specialized components that semantically and syntactically align the data from the data source with the syntax and semantics of the data in the EHE Health Entities Register.

Since the data source is different in each project and various standard and non-standard interfaces are used for retrieving data, such specialized components are developed separately for the needs of each project and are not part of the EHE Health Entities Register product.

The usual structure of data on healthcare organizations that is retrieved from external sources is as follows:

- organization identifier

    o multiple identifier types are supported

- full name of the organization

- short name of the organization

- category of the organization

- type of the organization

- address

- contact information (email, phone)

- data on a constituent part of the organization (department, clinic, etc.)

    o identifier(s)

    o full name

    o short name

    o category

    o type,

    o address,

    o contact information (email, phone)

    o reference to the constituent part of the organization to support the hierarchical structure, for e.g., department, within the department, within the clinic, within the organization.

The following functionalities are supported:

- storing and updating data on organizations in healthcare according to the standard HL7 FHIR using the FHIR resource *Organization* [1]

  Data on organizations are retrieved from an external source, stored, and changed via the corresponding integration module.

- use of data from the Register by other modules via appropriate integration services.

The structure of healthcare organization data is shown in the Figure 1. This figure also illustrates how the data are stored in the EHE Health Entities Register using FHIR resources.

The Register provides a service based on the FHIR standard for storing and managing data on healthcare institutions (FHIR resource *Organization*).

For retrieving data on healthcare organizations, the Register provides a service compliant with the IHE mCSD integration profile [3]. The Register implements the Care Services Selective Supplier component and the Find Matching Care Services Request [ITI-90] operation of that profile.

3   **Technical Aspects**

To enable the retrieval of data on healthcare organizations and healthcare professionals, the EHE Health Entities Register implements the Care Services Selective Supplier component in accordance with the IHE mCSD integration profile [3], and the following transaction of that profile:

- Find Matching Care Services [ITI-90] – retrieving data on healthcare organizations, healthcare professionals and connections among healthcare professionals and healthcare organizations.
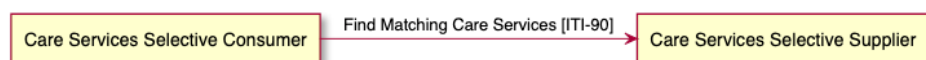

Figure 2 – The IHE mCSD Integration Profile Components and Transactions

According to the Figure 2, systems and components that want to retrieve data about healthcare organizations and professionals have to implement the Care Services Selective Consumer component in accordance with the IHE mCSD integration profile.

To store and update data on healthcare professionals and healthcare organizations, the Register implements a standard REST interface in accordance with the FHIR standard.

4 Interdependencies

The EHE Health Entities Register depends on the following components:

- EHE FHIR Repository [4] – It is also possible to use a data repository compliant with the FHIR R4 standard of other suppliers.
- EHE Terminology Services [5] – It is possible to use a terminology repository and terminology service provider compliant with the FHIR R4 standard and IHE SVCM [6] from other suppliers.
- EHE Infrastructure [7].

To implement the EHE Health Entities Register, it is necessary to provide the Ubuntu Linux operating system.

The components of EHE Health Entities Register can be installed on physical servers, in virtual machines or containers.

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 [8]
- MIT License [9]
- Eclipse Distribution License [10]
- Eclipse Public License [11]
- Creative Commons CC0 [12]
- BSD License (2 clause and 3 clause) [13]
- Bouncy Castle Licence [14]
- Common Development and Distribution License [15]
- GNU Library General Public License [16]
- Mozilla Public License (MPL) [17].

6 Version

The current product version is 5.1.

7 References

[1] HL7 FHIR (Fast Healthcare Interoperability Resources) – It is a standard describing data formats and elements and the application programming interface for the exchange of electronic health records, created by Health Level Seven, an international health standards

organization. The specification is available at
https://www.hl7.org/fhir/.

[2] IHE (Integrating the 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).

[3] IHE mCSD (Mobile Care Services Discovery) – IHE (Integrating the Healthcare Enterprise) a profile that supports use cases for discovering service providers and care services using FHIR - specification available at https://profiles.ihe.net/ITI/mCSD/.

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

[5] EHE Terminology Services – Ericsson Nikola Tesla's standard 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.

[6] IHE SVCM (en. *Sharing Valuesets, Codes and Maps*) – profile defines a lightweight interface through which healthcare systems may retrieve centrally managed uniform nomenclature and mappings between code systems based on the HL7 FHIR specification – specification available at https://profiles.ihe.net/ITI/SVCM/.

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

[8] Apache Software License 2.0 https://www.apache.org/licenses/LICENSE-2.0.txt

[9] MIT License https://opensource.org/licenses/MIT

[10] Eclipse Distribution License https://www.eclipse.org/org/documents/edl-v10.php

[11] Eclipse Public License https://www.eclipse.org/legal/epl-v10.html, also https://www.eclipse.org/legal/epl-2.0/

[12] Creative Commons CC0 https://creativecommons.org/publicdomain/zero/1.0/

[13] BSD License https://opensource.org/licenses/BSD-2-Clause, also https://opensource.org/licenses/BSD-3-Clause

[14] Bouncy Castle Licence https://www.bouncycastle.org/licence.html

[15] Common Development and Distribution License https://opensource.org/licenses/CDDL-1.0

[16] GNU Library General Public License https://www.gnu.org/licenses/old-licenses/lgpl-2.0.html

[17] Mozilla Public License (MPL)
https://www.mozilla.org/media/MPL/2.0/index.48a3fe23ed13.txt