



EHE Health Integration Gateway

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 Integration Gateway enables safe and reliable connecting of information systems and applications in healthcare, based on IHE integration profiles [2], HL7 FHIR standard [1] and standards in healthcare.

The product consists of the following components:

- API GW
- FHIR Messaging
- Process Engine
- Notifications.

2 Functionality Description

The following subsections describe the components that make up the EHE Health Integration Gateway.

2.1 API GW

API GW is a component that enables the integration of information systems and applications in healthcare and their access to various services that are realized through other components of the EHE portfolio, through specific components developed for the needs of an individual customer or project by Ericsson Nikola Tesla or through components developed by other software vendors in healthcare.

API GW enables the following:

- publication of the solution component services that should be available to information systems
- directing inquiries from information systems to components that realize a specific service
- authorization of access to services (The authorization is carried out together with the EHE Security product that confirms the identity and authenticates the user who sent the request. The user can be an end user of the application, an information system or an application that uses the service.)

- limiting the maximum number of requests to the service in general and per individual client/information system (This is necessary to protect the components involved in delivery of a particular service from overload.)
- temporary interruption of access to the service in case of unavailability of components that participate in the realization of this service
- filtering and directing requests depending on their content.

2.2 FHIR Messaging

FHIR Messaging components enable validation of structure of FHIR messages against FHIR profiles. FHIR profiles for each message are stored in FHIR server. In addition to validation of structure of the message this component can also validate digital signature of message in cooperation with Digital signature management component of EHE Security [4].

2.3 Process Engine

Process engine component consists of two parts, State Machine and Timer Service.

State Machine enables execution of processes based on state machines and validation of state transitions. Services that implement processes based on state machines are for example Encounter Management service within EHE Medical Records Database. Whenever user or some external system requests process state transition this component first executes so called “guards” for requested transition. “Guards” are functions (services) that validate various conditions for specific transition. If guard validation is passed, component validates if requested process state transition is valid according to defined process state machine. If process state transition is allowed component calls so called “action” function. “Action” functions (services) are functions that execute some action after the process transition is done and state of process is changed.

Timer Service enables setting of timers and corresponding functions (services) that need to be executed when timer expires.

2.4 Notifications

The Notifications component enables sending notifications about changes to medical, administrative, and other data in databases, repositories and component registers (e.g., changes in patient data, changes in code lists or registration of a new document).

Notifications are sent to information systems either directly by the Notifications component via push messages or information systems can pull notifications using the services of this component.

3 Interdependencies

The EHE Health Integration Gateway depends on the following components:

- EHE Infrastructure [3]
- EHE Security [4] - It is possible to use an authentication and authorization system compliant with the specifications of the OAuth2 standard and OIDC protocol, as well as the IHE IUA integration profile [5] of other manufacturers. It is also possible to use a system for storing audit records compliant with the IHE ATNA (FHIR) [6] integration profile of other manufacturers.

To implement the EHE Health Integration Gateway, it is necessary to provide a PostgreSQL or Oracle relational database and an Ubuntu Linux operating system.

The components of the EHE Health Integration Gateway can be installed on physical servers, virtual machines, or containers.

4 Free and Open Source Software

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

- Apache Software License 2.0 [7]
- MIT License [8]
- Eclipse Distribution License [9]
- Eclipse Public License [10]
- Creative Commons CC0 [11]
- BSD License (2 clause and 3 clause) [12]
- Bouncy Castle License [13]
- Common Development and Distribution License [14]
- GNU Library General Public License [15]
- Mozilla Public License (MPL) [16]
- Elastic license v2 [17]

5 Version

The current version of the product is 5.1.

6 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] HL7 FHIR (HL7 Fast Healthcare Interoperability Resources) – This 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/>.
- [3] EHE Infrastructure – standard Ericsson Nikola Tesla's product which implements the functions necessary for the operation, internal communication, and monitoring of the components of the solution.
- [4] EHE Security –standard Ericsson Nikola Tesla's product which implements the functions of authentication and authorization of end users and information systems, non-repudiation of transactions and storage of audit records.
- [5] IHE IUA (Internet User Authorization) – profile conveys User Identity, Attributes, and Authorizations to a RESTful service to enable security and confidentiality policy enforcement– specification available at <https://profiles.ihe.net/ITI/IUA/index.html>.
- [6] IHE ATNA (Audit Trail and Node Authentication) – profile defines basic security through functional access controls, defined security audit logging and secure network communications – specification available at https://wiki.ihe.net/index.php/Audit_Trail_and_Node_Authentication.
- [7] Apache Software License 2.0 <https://www.apache.org/licenses/LICENSE-2.0.txt>
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