

Interoperability Specifications and Conformance Testing Services Made Available on the Tukan Platform

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Abstract

In 2018 Polish health IT community faces critical challenges related to the national eHealth agenda. The mission of HL7 Poland is to establish a community around interoperability standards and integration profiles with health IT vendors, medical providers and public authorities. One of the activities that would support this goal is providing tooling for specification publication and implementation validation. HL7 Poland has started a project to create a central hub for specifications and tools. The Tukan is an online platform dedicated to Polish healthcare IT community, where national specifications for interoperability are published together with a set of testing tools supporting their implementation. The platform is based on software components originating from various sources: open source release of IHE Gazelle components,

development tooling of Polish National Implementation Guide of HL7 CDA, ART-DECOR platform software components, HAPI FHIR reference implementation for FHIR STU3 standard and Central Authentication Server (CAS) software components. Tukan platform is ready to be used as an environment supporting peer-to-peer testing in connectathon-like events. The pilot phase of Tukan platform has shown that there is a significant interest in testing services, especially when there are official specifications of interoperability standards published. In 2018 the first Polish connectathon will be held by HL7 Poland on Tukan platform in cooperation with national and regional projects.

Keywords

Tukan platform; Connectathon; IHE Gazelle; Polish HL7 CDA IG; Interoperability testing; Validation; HL7 CDA; HL7 FHIR; IHE profiles

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1 Introduction

In 2018 Polish health IT community faces critical challenges related to the national eHealth agenda. The pilot of central ePrescription system, the official recommendation of IHE profiles use and continuous development of the Polish National Implementation Guide for HL7 CDA [1], all of them shape the national perspective of eHealth for the next years. For the first time, Polish vendors have shown quite substantial interest in HL7 FHIR® [2] standard. HL7 Poland, in cooperation with national and regional authorities as

well as key organizations of health IT vendors and medical providers, put an effort to supply of tools supporting implementation of interoperability standards.

2 Objectives

The mission of HL7 Poland is to establish a community around interoperability standards and integration profiles with health IT vendors, medical providers and public authorities for the purpose of boosting standards adoption and implementation. One of the activities that would support this goal is providing tooling for specification publication

and implementation validation. This tooling should be open and easily accessible for HL7 Poland members, and for the rest of interested parties in some extent. This platform of support should leverage HL7 standards and IHE profiles in a great extent and use globally approved tooling, configured to local requirements, to help especially those vendors, who are not able to participate in official events like connectathons organized by IHE or HL7. It should be collaborative effort to build a trusted environment for regional, nation-wide and international interoperability testing.

3 Methods

To secure a consistent approach to standards and their national specifications, HL7 Poland has started a project to create a central hub for specifications and tools. The Tukan is an online platform dedicated to Polish healthcare IT community, where national specifications for interoperability are published together with a set of testing tools supporting their implementation, to serve as focus point of all the efforts of vendors and regulators. The platform is ready to be used as an environment supporting peer-to-peer testing in connectathon-like events.

The Tukan platform is based on software components originating from various sources:

- Open source release of IHE Gazelle [3] components,
- Development tooling of Polish National Implementation Guide of HL7 CDA,
- ART-DECOR [4] platform software components,
- HAPI FHIR [5] reference implementation for FHIR STU3 standard,
- Central Authentication Server (CAS) [6] software components.

IHE Gazelle base components are used to support basic communication platform to allow secure, SSL-based, IHE ATNA [7] conformant service endpoint publication and reliable proxy-based peer-to-peer testing. As far as IHE profiles are concerned, we have focused on IHE XDS.b [8], as a key architectural concept in clinical document cross-enterprise exchange. For that reason, we have used XdsTools [9] component, which has been developed by NIST and as well is a part of IHE Gazelle platform, to expose the simulator of XDS.b conformant API.

Regarding validation of HL7 CDA [10] conformant documents, we have used the tool created during development process of Polish National Implementation Guide of HL7 CDA. The component is based on validation artifacts generated from ART-DECOR environment and is deployed on the same eXist XML database engine as DECOR services. The reason why we have used our own tool instead of IHE Gazelle EVS Client is the better integration with the different versions of the Polish specification. The next step in development of the Tukan platform

will be customization of the IHE Gazelle ObjectsChecker for Polish realm related clinical document validation.

As a form of promotion of the HL7 FHIR standard, we have built the STU3-conformant reference server instance using HAPI FHIR implementation. We have imported and published all conformance resources related to definition of the base structures, v2 code tables, v3 vocabulary domains and FHIR value sets. We have also imported additional terminology resources in the form of value sets derived from DECOR specification of Polish National Implementation of HL7 CDA. It was done for the purpose of initial launching of the FHIR-based terminology service.

Despite the validation and integration testing functionality, the Tukan is also designed to be specification publication platform. ART-DECOR environment and FHIR server are the key components in that field.

From the technical perspective, having extensibility and scalability in mind, all Tukan platform services are deployed as isolated, Docker-based containers [11] in the Linux environment. The platform itself is the main repository of the container images. Any service can be easily replicated to many computing nodes if needed, and effortlessly deployed to other infrastructure, including various cloud service providers.

4 Results

The project started in June 2017 and the first Tukan services have been made available online in September 2017. 28 organizations, mostly software vendors, but also some medical providers, universities and local authorities, for 6 weeks were able to participate in the pilot phase. HL7 CDA validator attracted most teams; several hundreds of test CDA documents were validated. Till March 2018 the total number of organizations, that use Tukan, reached 40 and Tukan have been chosen as a platform for nation-wide connectathon-like event, that will take place in Warsaw in autumn of 2018. Some regional projects have also shown their interest in using Tukan as independent platform of reference.

5 Conclusion

The pilot phase of Tukan platform has shown that there is a significant interest in testing services, especially when there are official specifications of interoperability standards published. It is the best way to improve the quality of implementations and to increase maturity of the specifications. We have established Polish community interested in interoperability standards and integration profiles. The Tukan platform will expand to provide increasing number of validation services, with collaborative effort of HL7 Poland members.

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