

Open Infrastructure for Standardization of HL7[®] FHIR[®] Implementation Guides in Austria

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Abstract. Background: HL7 Austria is a non-profit association dedicated to improving electronic data communication and interoperability in healthcare using the HL7 international standards. Objectives: We aim to provide an open infrastructure to develop, manage, and maintain HL7 FHIR implementation guides. Methods: We utilize state-of-the-art open-source tooling developed by the FHIR community to support continuous integration. Results: The implementation guides can be published as static HTML websites and maintained using GitHub. Conclusion: The solution supports all steps of a standard's lifecycle, from drafting and reviewing to balloting, publishing, and maintenance.

Keywords. Health Level Seven, Electronic Health Record, Reference Standards

1. Introduction

The Health Level 7 (HL7) Austria Technical Committee (TC) for Fast Healthcare Interoperability Resources (FHIR) [1] coordinates and defines required localizations in the context of the HL7 FHIR specification and offers guidance for FHIR-compliant interfaces. To accomplish this goal and to ensure interoperability of FHIR solutions, the TC FHIR created a governance for FHIR standardization work in the Austrian realm: How to develop FHIR profiles, FHIR extensions and how to create FHIR implementation guides (IG) including an HL7-compliant balloting process. It focuses on FHIR IG authors as well as on user groups applying FHIR IGs. Furthermore, the TC FHIR provides an open-source infrastructure for creating and hosting FHIR artifacts.

This work introduces an open infrastructure and its underlying implementation process for the creation of standards and to harmonize interfaces for interoperable data exchange. The advantage of this infrastructure is a tool-driven support for a continuous integration of FHIR IGs. Adopters of medical healthcare standards in Austria can use this infrastructure to facilitate the proposed implementation process of HL7 Austria, specifically for FHIR, and to provide feedback in a public forum.

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2. Approach

The presented infrastructure is based on the open-source tooling provided by the FHIR community and is hosted on the GitHub repository of HL7 Austria (<https://github.com/HL7Austria>, last access: 20.3.2022). IGs are written in FHIR Shorthand (<https://hl7.org/fhir/uv/shorthand>, last access: 20.3.2022). The resulting artifacts are packaged into a FHIR IG and rendered as HTML webpages. All FHIR IGs in the Austrian domain can be hosted and developed there in coordination with the HL7 Austria TC FHIR.

The implementation process is open, thus everyone in the community may open feature requests or bug reports for a particular hosted IG repository. Each feature is worked on in a branch, which is automatically built using GitHub Actions and published to *fhir.hl7.at* as a public draft. This allows a direct quality assurance on a technical level, as well as a manual verification of the content by the community. Ballots are conducted the same way, and every ballot comment is publicly triaged, discussed and implemented.

As a first proof of concept, the *HL7 AT FHIR Core* IG was developed, containing the *AustrianPatient* profile and corresponding extensions (cf. <https://github.com/HL7Austria/HL7-AT-FHIR-Core-R4>, last access: 20.3.2022). The profile and the extensions were harmonized with existing representations in the Austrian domain, such as the ELGA CDA guidelines. The ballot for this IG has been finished in February 2022. It was conducted based on our open infrastructure.

3. Discussion

According to Benson and Grieve **Fehler! Verweisquelle konnte nicht gefunden werden.**, ensuring interoperability is one of the most challenging tasks in connected healthcare. The HL7 FHIR community has spent considerable efforts over the last years to provide guidance, methods, and tools to support solving this task. The presented infrastructure builds upon this foundation and is tailored towards the authors and user groups applying FHIR solutions. The open architecture and its underlying process serve both as a blueprint and an invitation for the FHIR community in Austria to apply to their FHIR profiling activities.

In particular, the infrastructure for standardization of FHIR IGs solves the following issues: First, it provides a seamless integration with popular open-source tools, e.g., SUSHI. As a result, alterations or additions to a FHIR IG are rendered as web page under the URL <https://github.com/HL7Austria/HL7-AT-FHIR-Core-R4>. Second, it offers public access, thus allowing to efficiently contribute to FHIR profiling activities as an open community effort.

Other projects already started to use the infrastructure, e.g., Process Intelligence and Conformance Auditing (PICA, <https://fhir.hl7.at/r5-pica-5-deployment>, last access: 20.03.2022), that aims to specify standardized process analytics interfaces for health information systems.

For future work TC FHIR wants to improve the process considering the community's feedback. Furthermore, we hope this work draws attention towards using the infrastructure for current FHIR profiling activities in the Austrian FHIR community.

References

- [1] T. Benson, G. Grieve, *Principles of Health Interoperability*. Springer, Cham, 2021.