

TermX: A Game Changer in the Healthcare Interoperability

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Abstract. The necessity for robust, enduring, and relevant healthcare interoperability is universal across all clinical domains. However, we identified a gap in the availability of open-source, no-cost, high-quality tools that offer multilingual support and an advanced graphical interface. To address this, we developed TermX, an open-source platform to harmonise terminology and support interoperability between healthcare institutions and systems. TermX incorporates a terminology server, a Wiki, a model designer, a transformation editor, and tools for authoring and publishing. TermX is designed to develop terminology and implementation guides for healthcare systems at both the national and regional levels. It aims to ensure open, standardised access to published data and guarantee semantic interoperability based on the FHIR standard.

Keywords. TermX, Terminology server, FHIR, Model designer, FML editor

1. Introduction

Robust interoperability standards in healthcare promote patient safety, foster innovation, improve sustainability and enable seamless data exchange [1]. Interoperability developers require appropriate software tools [2]. However, many of the interoperability software tools available in the market demand extensive human expertise. Typically, these tools operate in isolation, lacking integration into a unified digital ecosystem.

2. Method

In developing and evaluating the solution for the interoperability of terminology and data communication protocols, we used the Design Science [3] methodology. It consists of the problem investigation, solution design and solution validation phases. Analysis of existing ecosystems and terminology servers revealed a problem: a lack of open-source, no-cost, high-quality tools with multilingual support and an advanced graphical interface [4]. We designed and implemented a novel, innovative, game-breaking TermX platform (termx.org) to support healthcare terminology and interoperability. Finally, we have validated TermX in collaboration with TalTech, the private sector and national standardisation agencies in Lithuania, Estonia, Uzbekistan, Belgium and the Czech Republic.

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3. Results

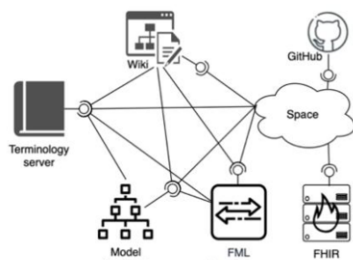


Figure 1. TermX platform.

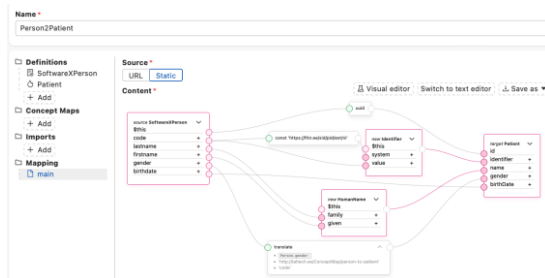


Figure 2. TermX FML editor.

TermX provides the platform (Figure 1) for terminology unification, simplifies data model design, and facilitates data transformations between models and data communication protocols. The **terminology server** supports the FHIR terminology module and CTS2[5]. The **model designer** implements the FHIR StructureDefinition specification [6] and enable informational model management. TermX's **FML Editor** (Figure 2) simplifies the use of the FHIR Mapping Language (FML) by visually representing transformations between informational models and hiding the language's complexity, thereby facilitating quick adaptation. A **publisher** facilitates structuring terminology, models, and wiki pages into logical spaces. It enables resource synchronisation over GitHub and syndication with other terminology servers.

4. Conclusions

This paper describes TermX, a platform for developing healthcare terminology and data exchange protocols. TermX contributes to the advancement of healthcare interoperability. Providing specialised modules and integrating them with existing solutions ensures a robust and adaptable platform that fosters collaboration, ensures consistency, and reduces maintenance costs. It revolutionises daily practices by enabling precise definition and management of medical terms, improving data quality and interoperability across institutions. Its user-friendly interface and data exchange capabilities boost efficiency in terminology communication. TermX reduces the time required to learn the terminology basics, optimises human resources, and simplifies the development process. It supports the evolution, quality, and shared understanding of medical terminology, enables process automation and publishing of implementation guides.

References

- [1] ISO. Sector: Health. <https://www.iso.org/sectors/health> (accessed 16.03.2024)
- [2] Schmitz KD, Straub D. Successful terminology management in companies. Terminological Aspects of Text Production Handbook of Terminology Management. 2010.
- [3] Wieringa RJ. Design science methodology for information systems and software engineering. 2014.
- [4] Ivanova M, Bossenko I, Piho G. The comparison of the terminology servers. Springer. 2024
- [5] HL7. HL7 Common Terminology Services. Release 2; 2022.
- [6] HL7. FHIR StructureDefinition. <https://hl7.org/fhir/structuredefinition.html> (accessed 16.03.2024)
- [7] HL7. FHIR Mapping Language. <http://hl7.org/fhir/mapping-language.html> (accessed 16.03.2024)