HL7 Standard Data and Service Interoperability using Semantic Web

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Abstract

eHealth (electronic health) domain is facing software and technology crisis caused by a rush to embrace new technologies with insufficient collaborative effort among IT and medical professionals. Standardization of domain-knowledge and information communication with the goal of a nation-wide infrastructure for health services has produced overwhelming complexity to the interoperability and integration of legacy and new healthcare and medical systems. One major contributor to such complexity is the lack of close collaboration among IT and healthcare professionals, which is a costly effort. In this paper, we address the complexity of message development for interoperability of healthcare systems using HL7 v3 message development framework. We present two alternative approaches to provide such an interoperability. The first approach aims at addressing new challenges in standard-based interoperability provision while adhering to the existing international standards and guidelines for data and service representations. This approach requires close collaboration of healthcare professionals as domain-knowledge experts. Based on extensive experiences that we gained through this approach with respect to delays and difficulty of the process, we developed a new approach where the domain-knowledge is extracted from standard HL7 v3 messages and encoded into a set of domain contexts. The developed tool uses domain contexts and semantic web techniques to map high-level healthcare scenarios into their relevant HL7 messages that are further used for communication of information among two participating systems. We present a real world case study for integration of a Clinical Decision Support System (CDSS) with the Electronic Medical