Uniform, Multi-Landscape Technology-Independence and Interoperability in the HL7 Development Paradigm

Information Technology (IT) services and allied infrastructure have become a veritable fixture in the investment plans of healthcare provider facilities worldwide. The need for cutting-edge, superlative, and smart computer systems to support the healthcare industry is commensurate with the related requirement for the regulation and standardization of systems globally, enabling meaningful exchange. Broadbasing the use of these standards across geographical and socio-economic boundaries maximize the *Return-On-Investment* (ROI) from such ventures. *Semantic Interoperability* (SI) which is the meaningful exchange of healthcare information with homogenous understanding amongst participating enterprises, is therefore key. *Extrapolated* to a universal sense, it is termed herein as *International Interoperability*. *Health Level Seven* (HL7) *v3* is a global healthcare standard which supports *SI*. It consists of an *Upper Ontology*, *Reference Information Model* (RIM), and the three paradigms of *Messages*, *Clinical Document Architecture* (CDA), and *Services*. The *Upper Ontology* consisting of *functionally-diverse sub-ontologies*, is *HL7*'s foundational structure. The *RIM* is the encyclopedic reference for the vocabulary schema in all *HL7* implementations. The current *manifestation v3* of *HL7 however*, is difficult to implement and maintain. Core design and operational issues have arisen from the newly-inserted *RIM*. These logical and ontological flaws have affected efficient, *compliant* system implementations. Poor-calibre finalized specifications have lead to difficult system implementations. Compounding the problem is the non-uniformity in the modelling vocabulary. The *upper ontology* is represented in *Web Ontology Language* (OWL), whilst the *RIM* and the three paradigms are *modelled* using the *Extended Markup Language* (XML). This non-uniformity in representation in linked phases of the development process results in a segmented vocabulary *universe*, requiring translation at the various interfaces. Phasewise interoperability, stakeholder communication, quality of specifications generation, and overall development efficiency are all affected. Our proposed solution remodels all *OWL* and *XML* artifacts using the newly-devised, *techno-platform independant Unified Data Atom(UDA*$^{+}$) representation, either first-hand or as a single-step transliteration creating *overarching homogeneity* across all five *HL7 landscapes*. The *UDA*$^{+}$-modelled artifacts achieve true inter-phase *interoperability* promoting high-quality specifications development. They exhibit simplicity, brevity, and versatility over the previous representations. Principally significant is that *analysis and design interoperability* amongst all stakeholders also derived actualizing overarching, ubiquitous exchange.