

International Interoperability Through Unified Universal HL7 v3 Green Messaging

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Abstract - Health Level Seven (HL7) is the most popular, global healthcare standard in use today. Introduced in 1987 by the HL7 International Inc., the current version 3 has been promoting Semantic Interoperability (SI) which is two or more computer systems exchanging valued healthcare information with homogenous understanding. Thus, efficient implementation for optimal, high-end SI entails the abridgement of verbose v3 Message paradigm representations, whilst strictly maintaining their semantic nuance and flavour. The resulting economised structures termed Green Messages, have to be truly universally overarching, affording and facilitating International Interoperability. Aligned with this core Greening requirement is the demand for secured, efficacious exchange of data and information "in the wire", promoting overall efficiency.

This paper outlines conclusive research on all greening fronts, and underscores sound methodologies to realize true International Interoperability and superlative efficiency, as appraised by the ten, archaic System Performance Indicators (SPIs) used.

Keywords - International Interoperability, Semantic Map, Semantic Blending.

I. INTRODUCTION

The concept of *Green Clinical Document Architecture (CDA)*, the *Document* paradigm in the HL7 standard, has been the focus of many recent fora and literature [1]. We however believe that a conceptual extension to the *Messages* realm is indeed possible and more profitable, and is the driving requirement for true *International Interoperability*. *Mushrooming pockets of green CDA* environments operate well within national boundaries but subvert *International Interoperability*. The obvious parsing and interpretation issues arising from exchanging country-specific *green CDA artifacts*, sabotage universal *semantic interoperability*. This pivotal research examined this *anomaly* and its *deleterious* effects on system

performance. We propose the *Unified Universal Green Messaging* solution as the panacea for these ills; *messages* being the mobile element in the *tri-paradigmatic* HL7 standard.

This paper addresses the research question "How to achieve true International Interoperability and performance augmentation through enhanced HL7 structure and processes". The proposed *greening* solution encompasses figments of the *International Organization for Standardization's (ISO) Open Systems Interconnection (OSI) Transport* layer 4 and *Session* layer 5, in redefining and enhancing current *HL7-TCP/IP* interactions, in addition to pruning v3 message structures(OSI layer 7). Related recent research conducted by Li et al [12] enunciates *Semiotic Interoperability* which is *signs-and-symbols-oriented interoperability* for systems integration. Six levels of *sequentially-integratable* interoperability were defined, in bottom-to-top order *Physical, Empiric, Syntactic, Semantic, Pragmatic, and Social*. The proposed bi-threaded *greening* approach presented herein is kindred, seamlessly overlapping to provide a pragmatic, practical, and overarching *interoperability* solution.

The rest of this paper is organized as follows. Section II presents the *Enhanced Green Messaging* approach for *International Interoperability*. Section III improved on the current *HL7-TCP/IP* functionality, and Section IV winds up with the Conclusion section.

II. ENHANCED GREEN MESSAGING FOR INTERNATIONAL INTEROPERABILITY

All HL7 v3 messages can be broadly classified into three, according to [5] :

- i. Messages with *no payload*, with only 2 wrappers, *Transmission* and *Control Act Event*, eg., ACK, Trigger Event Requests.
- ii. Messages of *Query/Response Interaction Type* consisting of the 2 wrappers, and the *Query by Parameter/Query Response* body.

25
/74