

Chapter 8

Semantic Interoperability– Enabled Architecture for Connected Health Services

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ABSTRACT

With the increasing availability of connected health organisations, key medical information is expected to be accessible at the point of care. However, the high sensitivity of the clinical data and the large heterogeneity in health information systems pose a great interoperability challenge, including solutions that rely solely on the use of data exchange standards. Due to low adoption of these standards, such solutions will not sufficiently scale to achieve this objective. This chapter presents a service-based approach that utilises domain models combined with extensible problem models, enriched with domain terminology and knowledge services to enable autonomous data governance and semantic interoperability. The chapter addresses the resulting requirements, describes the proposed a solution and reports the results from the prototype of the approach.

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INTRODUCTION

The increasing availability of connected health, demand on healthcare to be present at each point of care has become a normal expectation. To achieve, it requires health institutions to share medical data for both delivering and improving healthcare, and facilitating clinical research [Stead W. et al (2000), Garde, S. et al (2007), Taweel, A. et al (2006), Taweel, A. et al (2004)]. The need for integrated systems that can provide up-to-date information about patients and their healthcare is not only critical to the day-to-day running and delivery of health functions but also potentially means saving lives. It is increasingly expected that patient health information is available at the point of care irrespective of its location. This expectation is driven by rapid developments in information technology, alongside their increasing dominance at the heart of individual healthcare institutions, through the use of data-intensive electronic health records systems (EHRs) that drive the health care process. One of the primary visions of eHealth has been to achieve a technology supported, seamlessly integrated health service that ensures the delivery of the right information about the right individual to the right person at the right time (Stead et al., 2000; Taweel, et al., 2006). This vision, however, present many challenges, including:

- The heterogeneity of health systems and their data representations across health institutions, not just across the health domain as whole but even within individual clinical domains, e.g. secondary care, primary care etc.
- Delivery of complete clinical information at the point of care, potentially requires health information exchange across geographically distributed health centres, thus creating a massive scalability challenge that puts demands on networking and distributed system architectures.
- Legacy and proprietary systems and the lack of, or at best, slow pace adoption of standards make exchanging clinical data more difficult and hampers the chances of integrated healthcare. This puts demands on knowledge representation methodologies that must cope with the complexity of (heterogeneous) health information, whilst remaining easy to deploy and use by system providers.
- The requirements of patient privacy and confidentiality that require strict data governance policies. These policies vary across institutions to include a variation of access constraints that observe strict ethical rules to maintain patient confidentiality at all times. This requires secure yet configurable independent data sharing policies that reflect the needs of the participating organizations within the domain.

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