Managing the Canadian Framework for eHealth to Construct a Software as a Service Cloud Identity

David Chartash, Dipl. IB, B.Eng.Sc, EIT, M.H.Sc (C)
The University of Toronto, Toronto, Ontario, Canada

May 12, 2012

1 Software as a Service within the eHealth Cloud

Based on the Canadian eHealth Architecture Model (see Figure 1), the architecture of services delivered to a variety of health professionals is designed as a layered bus based approach. This model, as typified in the associated figure, can be easily constructed in the Software as a Service (SaaS) method, providing each point of service with a software interfacing with data services and databases through multiple layers via the Health Information Access Layer (HIAL) communication bus.

This architecture’s design specifies several common services (as illustrated in Figure 2), all of which are required to interface through the HIAL to all data storage locations and services. In particular, these services provide for the enhanced features of an Electronic Health Record (EHR) that are often specified by clinical requirements as well as current laws regarding health information in Ontario (such as privacy and interoperability services). Within the architecture map, these services are not specifically identified or exploded (as such as the documents specifying operation of a virtual medical record by Health Level 7 International [1]). In providing the common services identified by Canada Health Infoway (CHI), it is important to note that these services at point of service operate to improve clinical practice via informatics support. Said informatics support allows for clinical decision support, alarms and alerts, as well as interoperability with medical devices and other components of the service architecture layers (as is illustrated by the HL7 document above [1]).

Beyond understanding that the layered architecture specifications of the pan-Canadian EHR architecture, and translating this architecture to a SaaS architecture, a clear understanding of the point of service interfaces to the data services is important. For this reason, the operating process is detailed in Figure 3 to a limited extent, in which some of the associated actors are detailed at point of activity. Complementing this figure is Figure 4, which details the final point of interaction between one actor’s service (built as a software tool), the EHR viewer and the data and other registries.

In the aforementioned paragraphs, the architecture and services are illustrated as identified by CHI, the framework and structural guidance non-profit for the pan-Canadian EHR network. These services, built as software components of an abstraction layer, are manageable as cloud SaaS operationalized components for integration into actor practice in each point of communication with the HIAL communication bus. Therefore, describing the entire model for EHR architecture with an understanding that the entire architecture is intended to be provided by software as services to integrate with all data systems and registries at the hospital or provider level. From the aforementioned backbone, building a SaaS model is trivial, additionally, providing these services by a distributed cloud model allows for a simplification of the concept across multiple providers and multiple operators.

2 Virtualized Desktops as a Cloud-based Hospital Informatics Platform

Following the architecture identification mentioned above, building SaaS cloud based system requires a link to the cloud services on each computer accessing the system. At the physician or provider level, this would require extensive support for a complex series of software and hardware linkages. Building virtualized desktops to provide for a software based solution (and accompanying support) to access the cloud services allows for configurability and modularity as for the device ecosystem at point of care, particularly given the wellspring of mobile computing and hybrid general and fixed purpose computing devices. In order to develop virtualized desktops, particularly those that offer a SaaS deployment, careful consideration of the services provided and deployment culture will ensure adoption and in healthcare, safe and meaningful use of the equipment. For this reason, adherence to the meaningful use guidelines [2, 3] developed in the United States, as well as advice from clinical partners to develop informatics solutions that capture not only EHR efficiency, but clinical efficiency to improve hospital understanding of the usefulness of Health Information Technology (HIT) services.
Figure 1: Health Information Access Layer

Figure 2: Health Information Access Layer Common Services
Figure 3: Health Information Access Layer Operating Process

Figure 4: Health Information Access Layer EHR Viewer Interface Operation
3 Business Intelligence in the eHealth Sphere

With the above in mind, eschewing traditional business intelligence, a more important component of building a cloud based framework in ehealth is the introduction of more complex business intelligence. Said complexity is proposed as a method to integrate cloud-based health IT infrastructure into the framework of health quality and evidence produced by the Ministry of Health and Long Term Care, as a method of improving adoption and ensuring that provincial scientists and policymakers deem HIT as a major benefit to their practice (subsequent institutionalization of the services provided will ensure continued adoption and maintenance). The standard of evidence has yet to be developed, although briefly the points of consideration that should be built while watching the entry of new technologies into the market (and Health Quality Ontario’s push for a greater amount of evidence based medicine contributing the deployment assessments) will follow. In the device market, this evidence primarily consists of utility measures to qualify cost/benefit ratios for incremental deployment adjustments. For clinical informatics, this appears to be initially constructed by building an indexed searchable database of all elements of care, from text based notes and discharge summaries to vital signs, orders and diagnoses. Once a formal structure for health quality evaluation is established for informatics solutions in the “post-EHR” market, particularly via the expansion of technology assessment units providing cost-effectiveness and cost-utility analyses at both the market and hospital level, we will see a coherent strategy for specific points of business intelligence to be realized. In the interim, focusing in the market criteria displayed in the American Meaningful Use Criteria will ensure that some level of business intelligence functionality is realized prior to the market changes expected in the future.

References


