

A Survey Paper on Cloud Computing Based CDA Generation and Integration system for exchanging Health Information

Miss. Rohini A. Dhote

Department of Computer Science & Information Technology
HVPM, COET Amravati, Maharashtra, India

Mr. Vinod S. Gangwani

Asst. Professor in P.G. Department of Computer Science &
Information Technology
HVPM, COET Amravati, Maharashtra, India

Abstract: The Healthcare Industry is one of the world's largest and quickest developing enterprises, devouring more than 10 percent of total national output (GDP) of most created countries, and majorly affects any nation's economy. Electronic Health Record helps to improve the safety and quality care of every individual patient details, is Necessary that of to be maintained by the clinic, through the interoperability of Health Information Exchange (HIE) differing from hospital to hospital. The CDA document generated and integrated Open API service based on cloud computing permits us advantageously to generate CDA documents without purchase of proprietary software. Utilizing CDA document integration system incorporates various CDA documents per patient into a single CDA document. Both physicians and patient can utilize the clinical data in sequential order.

In this paper, our arrangement of CDA generation and integration depends on distributed computing and the administration is offered in Open API. Designers utilizing Distinctive stages in this way can utilize our framework to build interoperability.

Keywords: CDA, cloud computing, Open API.

1. INTRODUCTION

With the fast improvement of the Internet and the World Wide Web, the PC to-PC trade of Business archives in an organized, predefined standard organize has turned out to be increasingly critical. This trade has been enormously encouraged by the advancement of extensible organized markup language, for example, XML. A comparable requirement for the electronic trade of clinical archives exists in healthcare. Until recently, however, standards for clinical document exchange among clinical Systems covered messaging of fielded data but did not meet the need for semantic processing of hierarchical, structured, clinical documents. This has now been tended to by the Clinical Document Architecture (CDA).

ANSI/HL7 CDA R1.0-2000 is the principal broadly confirmed XML-based standard for medicinal services. It has been produced by Health

Level 7 (HL7), an ANSI accredited Models Developing Organization working in the medicinal services field. HL7's main goal is to empower clinical interoperability through the arrangement of models for the trade, administration and reconciliation of information that supports clinical patient care and the administration, conveyance and assessment of human services administrations."

The Clinical Document Architecture has been in advancement since 1996, initially as the Kona Design. Then as the Patient Record Architecture (PRA), and now as the CDA. It is a document markup standard for the structure and semantics of exchanged "clinical documents". A CDA document is a defined and complete information object that can exist outside of a message and can include text, images, sounds, and other multimedia content.

2. MATERIAL AND METHODS

2.1 CDA Document

The HL7 Version 3 Clinical Document Architecture or CDA is "a document markup standard that specifies the structure and semantics of clinical documents for the purpose of trading between healthcare providers and patients." It intends to give Persistence, Stewardship, Potential for confirmation, Context, Wholeness, and Human Readability to a clinical report. It is a XML-based determination and utilizations HL7's Reference Inference Model (RIM) to speak to wellbeing ideas

Since CDA is generally utilized as a part of trading medicinal data in the universal group, we can discover a considerable measure of usage in view of

CDA. In 2010, [5] Che-Ju Lin and Der-Ming Liou accomplished interoperability utilizing CDA Standards. They executed an apparatus to produce and alter CDA records. The instrument gave interfaces to produce and alter a CDA format depending upon the kind of clinical document in play and a mapping engine that basically mapped CDA components from an inheritance data table.

Another huge usage was seen around the same time when [6] Huang, Ean-Wen et.al., accompanied a Web-based framework called Standardized Clinical Document Generation System tapping the energy of the HL7 CDA Standards.

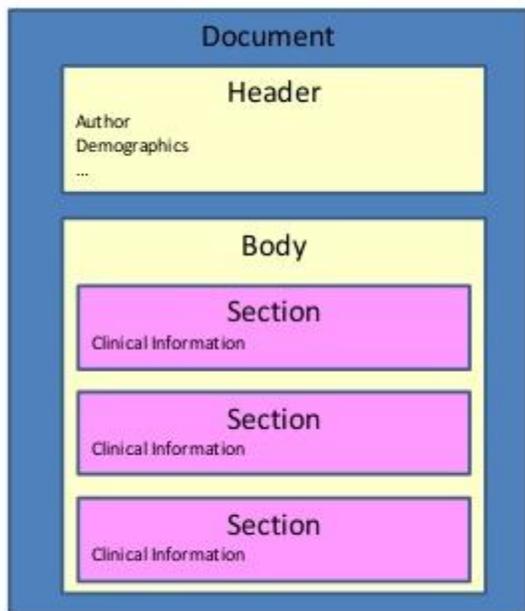


Figure 2.1.1 CDA Header

2.2 Cloud computing

The term Cloud refers to a Network or Internet. In other words, we can say that Cloud is something, which is present at remote location. Cloud can provide services over network, i.e., on public networks or on private networks, i.e., WAN, LAN or VPN. Applications such as e-mail, web conferencing, customer relationship management (CRM), all run in cloud. Cloud Computing refers to manipulating, configuring, and accessing the applications online. It offers online data storage, infrastructure and application.

2.2.1 Deployment Models

Public Cloud: The Public Cloud allows systems and services to be easily accessible to the general public. Public cloud may be less secure because of its openness, e.g., e-mail.

Private Cloud: The Private Cloud allows systems and services to be accessible within an organization. It offers increased security because of its private nature.

Hybrid Cloud: The Hybrid Cloud is mixture of public and private cloud. However, the critical activities are performed using private cloud while the non-critical activities are performed using public cloud

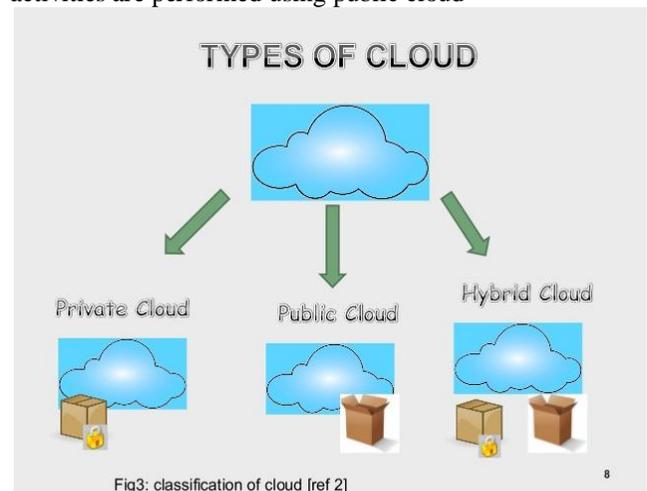


Fig3: classification of cloud [ref 2]

Figure 2.2.1.1 Deployment Models

2.3 Cloud Based CDA Generation and Integration

Figure shows the Architecture of Cloud based CDA generation system that generates CDA document with the help of CDA Generator

CDA integration system shows how multiple CDA documents are integrated into one in our CDA Document Integration System.

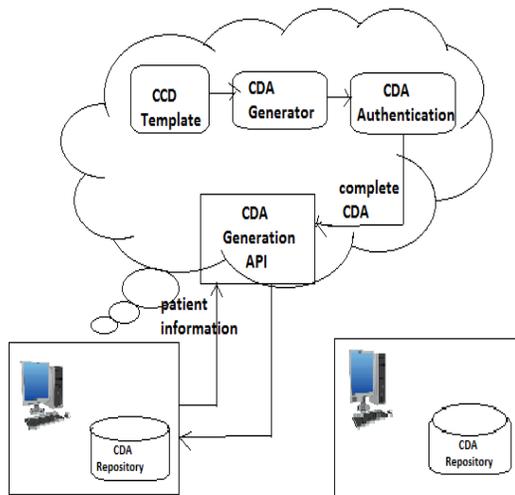


Figure 2.3.1 CDA Generation System

3. EXISTING SYSTEM

The advantages of embracing this framework are as per the following.

- In the first place, the framework is available through Open API and designers are allowed to utilize their most loved developing platform, for example, java, .NET, and C/C++. The majority of the Hospital frameworks can take the choice to develop their current framework.
- Second every Hospital system is empowered to create standard-agreeable CDA documents without to find out about the standard. The cloud CDA era administration is intended to give just CDA records, which has been endorsed by the National Institute of Standards and Technology.
- Third, if this administration is given for free to Hospital systems, existing HER will probably consider appropriation of CDA in their practices.

4. PROPOSED SYSTEM

To guarantee interoperability of HIE, the quantity of HIS that backings CDA should be adequately huge. In any case, the structure of CDA is exceptionally mind boggling and the generation of right CDA archive is difficult to accomplish without profound comprehension of the CDA standard and adequate involvement with it. Furthermore, the HIS advancement stages for healing facilities fluctuate so enormously that era of CDA era framework. Likewise, there is a resistance towards new

frameworks unless it is totally vital for arrangement of care. Thus, the appropriation rate of HER is low aside from a couple of modest bunch nations, for example, New Zealand or Australia. The US Government runs the Meaningful Use Program to enhance effectiveness in medicinal services and patient security. This program was propelled as a piece of impetuses to raise the HER reception rate for HER embracing doctor's facilities.

5. FLOW OF SYSTEM

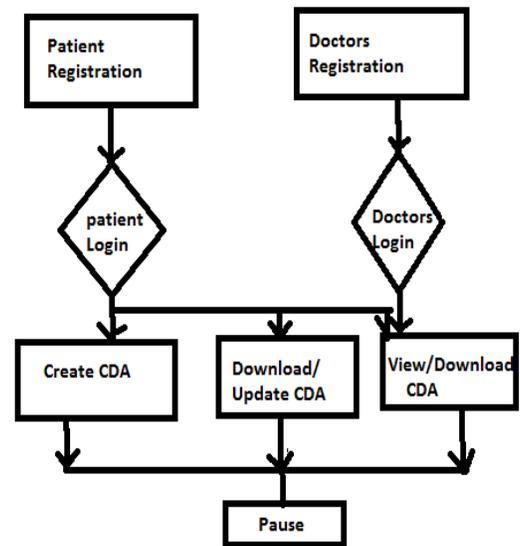


Figure 5.1 flow of system

6. CONCLUSION

The first release of the ANSI-approved HL7 CDA represents the culmination of close to four years of effort. With this standard, HL7 has entered the realm of defining the structure and semantics of clinical documents. This first standard has attempted to fill a huge gap by standardizing common clinical notes such as history and physicals, discharge summaries, and progress notes. It deliberately leaves out certain advanced and complex semantics both to foster broad implementation and to give time for these complex semantics to be flushed out in the RIM. Health Level 7 is currently balloting the new version 3 messaging specifications; as a result, considerable energy is going into refining the RIM. It is expected that future releases of CDA will include deeper layers of the architecture that encode richer semantics and that the current standard will serve as a stepping stone, allowing users to implement these releases progressively.

REFERENCES

- [1] Health Level 7. HL7 Web site. Available at: <http://www.hl7.org>. Accessed Oct 12, 2001.
- [2] Beeler GW Jr. Taking HL7 to the next level. *MD Comput.* 1999;16(2):21–4. [PubMed]
- [3] Dolin RH. Advances in data exchange for the clinical laboratory. *Clin Lab Med.* 1999;19(2):385–419. [PubMed]
- [4] Alschuler L, Dolin RH, Boyer S, Beebe C (eds). HL7 Clinical Document Architecture Framework, Release 1.0. ANSI-approved HL7 Standard, Nov 2000. Ann Arbor, Mich.: Health Level Seven, Inc., 2000.
- [5] Dolin RH, Alschuler L, Boyer S, Beebe C. An update on HL7's XML-based document representation standards. *Proc AMIA Annu Symp.* 2000:190–4. [PMC free article] [PubMed]
- [6] Dolin RH, Alschuler L, Behlen F, et al. HL7 document patient record architecture: an XML document architecture based on a shared information model. *AMIA Annu Fall Symp.* 1999:52–6. [PMC free article] [PubMed]
- [7] Lincoln TL, Essin DJ, Anderson R, Ware WH. The Introduction of a New Document Processing Paradigm into Health Care Computing. A National Institute of Standards and Technology Center for Advanced Information Technology White Paper. Gaithersburg, Md.: NIST, 1994.
- [8] Essin DJ, Lincoln TL. An information model for medical events. *Proc Annu Symp Comput Appl Med Care.* 1994:509–13. [PMC free article] [PubMed]
- [9] Essin DJ. Intelligent processing of loosely structured documents as a strategy for organizing electronic health care records. *Methods Inf Med.* 1993;32:265–68. [PubMed]
- [10] World Wide Web Consortium (W3C). XHTML 1.0: The Extensible HyperText Markup Language—A Reformulation of HTML 4 in XML 1.0. Recommendation, Jan 26, 2000. Available at: <http://www.w3.org/TR/xhtml1/>. Accessed Oct 12, 2001.

Authors Details:-

Miss. Rohini A. Dhote student of ME 2nd Year (CSIT) at HVPM COET Amravati, Maharashtra (India)

Mr. Vinod S. Gangwani is Asst Professor in P.G. Department of Computer Science & Information Technology HVPM COET Amravati, Maharashtra