AN EFFICIENT HIERARCHY BASED E-SYSTEM WITH CLINICAL DOCUMENT ARCHITECTURE IN CLOUD COMPUTING

P.Archana, PG Scholar, Dept Of Computer Science Engineering, Mailam Engineering College, Villupuram.

S.Prasanna, Associate Professor Of Computer Science Engineering, Mailam Engineering College,Villupuram.

Abstract:

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 allows us conveniently to generate CDA documents without purchase of proprietary software. Using CDA document integration system integrates multiple CDA documents per patient into a single CDA document. Both physicians and patient can utilize the clinical data in chronological order. In this paper, the CDA documents integrate into single document and can be browsed as a readable format. It is easy to read and understand for physicians efficiently. Users no need to purchase or deploy any tools to convert the CDA XML document to other format. Converting of CDA XML format to readable format increases the usage of this system and reduces the time for physicians from delay of making decisions.

Keywords: Cloud computing, data sharing, file hierarchy.

1. INTRODUCTION

Electronic Health Records is a great tool for physicians and is about quality, safety and efficiency for health care delivery. In order to ensure successful an operation of EHR, a Health Information Exchange (HIE) system need to be implemented. Health Level Seven (HL7) has established CDA as a major standard for clinical documents. CDA is a document markup standard that defines the structure and semantics of clinical document for the purpose of exchange. The first version of CDA was developed in 2001 and Release 2 came out in 2005.The Generation of CDA document, in each hospital invariably requires a separate Clinical Document Architecture system. So the hospitals are reluctant to adopt the new system. Solution of this problem is adoption of EHR (Electronic Health Record). The amount of exchanged CDA Document increases the time because of more documents that data are distributed in different documents. So all the CDA documents are integrated into a single document, the physician is empowered to review the patient's clinical history with conveniently. Although the Clinical Document Architecture is in XML based format, the physicians can be delay for making decisions. So adopting the system of new CDA architecture can give a elegant and contented file to users. the user enrollment and creates some parameters. Cloud service provider (CSP) is the manager of cloud servers and provides multiple services for client. Data owner encrypts and uploads the generated cipher text to CSP. User downloads and decrypts the interested cipher

text from CSP. The shared files usually have hierarchical structure. That is, a group of files are divided into a number of hierarchy subgroups located at different access levels. If the files in the same hierarchical structure could be encrypted by an integrated access structure.

2. RELATED WORK:

In a hospital, the clinical information of patient, hospital, and physician is entered via CDA Generation Inter-face a d sent to the cloud server via CDA Gene ration API. We utilize SOAP (Simple Object Access Protocol) as transmission protocol for the purpose of enhancing interoperability among different HIS when a hospital sends data t o the cloud. CDA Generation API relays the data in the CDA Header / Body in the list type. The items included in CDA Header are: Patient ID, Birth Date, Gender, Given Name, and Family Name; in CDA Body, the following items are included: Problem, Medication, Laboratory, Immunization, and so on. The data transmitted to the cloud server are put in CD A Header Se t and CDA Body Set and trans mitted to CD A Generator. CDA Generator retrieves a CCD template from Template Manager and fills in the appropriate fields of the CC D template with the data from the CDA Header / Body Sets. The gene rated CDA document is inspected by the CDA Validator whether the CDA standards are being satisfied. It is inspected whether there is any missing element or the for-mat is wrong here. If no error is found, a CDA document is returned to the recipient hospital. Hospitals A an d B are presented to demonstrate that it is possible for different development platform s to extend to generate C DA documents via cloud. results, treatment protocols, and operation notes. Then the patient adopts CP-ABE scheme to encrypt the information$m1$ and $m2$ by different access policies based on the actual need. For example, an attending physician needs to access both the patient's name and his medical record in order to make a diagnosis, and medical researcher only needs to access some medical test results for academic purpose in the related area, where a doctor must be a medical researcher, and the converse is not necessarily true.

3. CLOUD COMPUTING

Cloud Computing provides delivery of computing services are servers, storage, databases, networking, software, analytics and more over the Internet. Cloud services are collecting data and performing calculations throughout their global network and that services can access from anywhere at any time. IT analysts, industry experts and business leaders increasingly believe that cloud computing represent the next phase of internet development and will bring revolutionary innovation to the whole internet industry . The innovation key of cloud computing is transforming computing capability into a service that delivered to customers. There are three kinds of service models in cloud computing such as SaaS, IaaS, and PaaS. It refers a method of processing software programs that originally were installed locally on the user's machine but are now being relocated to the cloud. So users can order to their needs, and payment is decided by the level of service and amount of time needed. It provides users with a software development, execution, management and monitoring environment, allowing these universal and reusable software resources to be delivered from the providers to users online.

4. ELECTRONIC HEALTH RECORD WITH CDA

Electronic Health Record (EHR) is a collection of patient and population electronically is stored the health information through systematized in digital format. It is a digital version of a patient's paper chart

[5]. The records are shared through different healthcare settings. The authorized providers can be created and managed of an EHR is that health information in a digital format capable shared with other providers across more than one health care organization. The EHR has the capacity to generate a complete record of a clinical patient come across, as well as supporting other care related activities directly or indirectly via interface. The important note is, EHR is generated and maintained within an institution, like a hospital, integrated delivery network, clinic, or physician office. The patient receives those service from an auxiliary department are created as an electronic record.
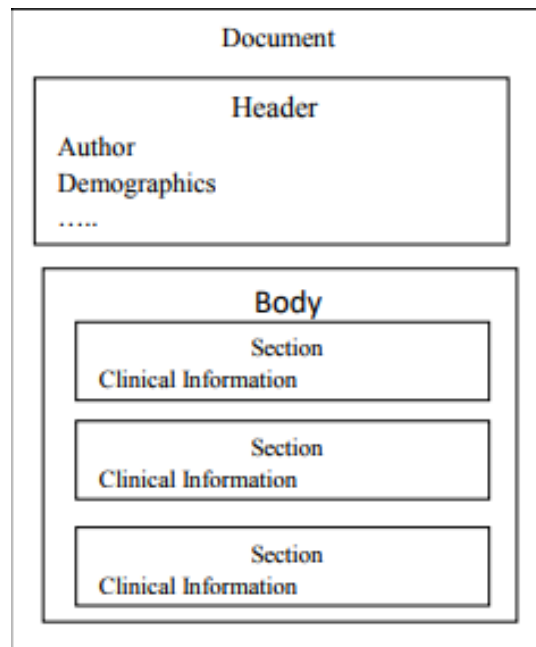

Fig.1. CDA Structure

Clinical Document Architecture is in XML based format. It is classified from the HL7 RIM(Reference Information Model) and uses HL7 version 3 data types. The documents contain any relevant information to a healthcare provider or government entity and all information about a patient's medical history, such as allergies, medications, insurance information or lab results [6]. Each piece of clinical data is allocated a section and given a code as defined in the Logical Observation Identifiers Names and Codes (LOINC) [7]. For the integrated CDA document, we chose the Korean Standard for CDA Referral and Reply Letters format as the number of clinical documents generated when patients are referred and replies made, is large [8][9]. The CDA is divided into two categories such as Header and Body in Fig 1. In CDA Header that includes Patient ID, Birth Date, Gender, Given Name, and Family- Name. In CDA Body, the items are included as Problem, Medication, Laboratory, Immunization, and so on. Different subcategories are inserted in a CDA document depending on the purpose of the document, and chose the Continuity of Care Document (CCD) [10] because it contains the health summary data for the patient and it is also widely used for interoperability.

5. IMPLEMENTATION

For health concepts representation, CDA uses HL7's Reference Information Model (RIM), which puts data in a clinical or administrative context and expresses how pieces of data are connected. The health information system can be generated as a CDA document through CDA Generation and Integration on cloud computing Open API. The world widely adopted HL7 CDA standards and is based on XML (Extensible Markup Language). Common for a patient to consult a number of different clinics. When a physician needs to study a patient's medical history which are cared for patient by multiple clinics. In this case, the generation of multiple CDA documents that integrates into single document in CDA Generation and Integration of Open API on cloud.
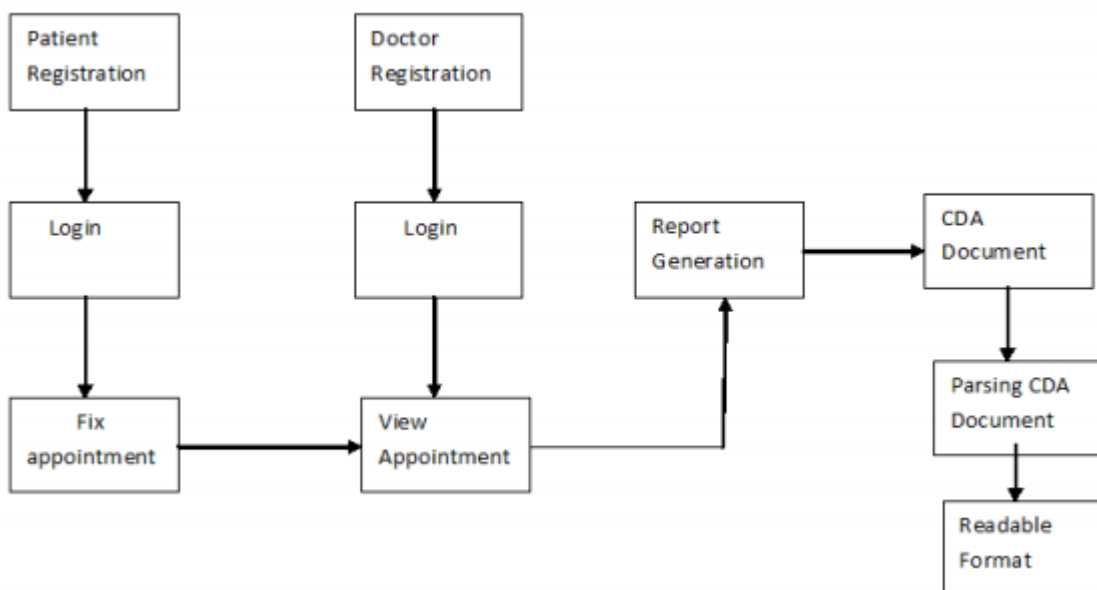

Fig.2. Process flow

The result of the CDA document is in XML based document. For the physician it should be as uncomfortable to read and understand and take time to get conclusion. So the health information of the CDA document that is converted to readable format through API. The steps should be following as: The health information that includes patient, Hospital, Physician, and Clinical Details care send to Generation and Integration of API through interfaces. The CDA Document produced after generate and integrate process. Output of the document can be validate and returned to parser. Using java API, the parsed documents send for conversion to receive the readable format. Result can be send as a output to the recipient of the hospital. When the physicians need to make quick decision's the readable format can be as a flexible and efficient to their knowledge. Using API, CDA document can change to other format.

CONCLUSION

The CDA document format a clinical information standard hospitals, a large number of HIE projects that use the Clinical Document Architecture format have been undertaken in many countries [14]. So the

health information records are Generated and Integrated as a clinical document XML based file format in chronological order on cloud. The hospitals are not ready to buy licensed software to generate and integrate CDA documents. Since the upgradation of the software and supporting software's are to be purchased in regular intervals. The service can applicable to various developer platforms because the CDA document generation and integration system is drive by open API. With cloud server the document can provide easy access with CDA. Increases of HIE based on the CDA documents, achieves its interoperability. But physicians get inconvenient to refer multiple documents. So multiple CDA documents are integrates into one through CDA Integration system. Final result of CDA Document is based on XML format. In the proposed system, the CDA XML based document converted to readable format using the API.

REFERENCES

1. M. Eichelberg, T. Aden, J. Riesmeier, A. Dogac, and Laleci, "A sur- vey and analysis of electronic healthcare record standards," ACM Comput. Surv., vol. 37, no. 4, pp. 277–315, 2005.

2. R. H. Dolin, L. Alschuler, C. Beebe, P. V. Biron, S. L. Boyer, D. Essin, E. Kimber, T. Lincoln, and J. E. Mattison, "The HL7 Clin- ical Document Architecture," J. Am. Med. Inform. Assoc., vol. 8, pp. 552–569, 2001.

3. R. H. Dolin, L. Alschuler, S. Boyer, C. Beebe, F. M. Behlen, P. V. Biron, and A. Shabo, "The HL7 Clinical Document Architecture," J. Am. Med. Inform. Assoc., vol. 13, no. 1, pp. 30–39, 2006.

4. Kevin marks, Social Media Expert at Google, Kevin, Kelly 2016.

5. K. Ashish, D. Doolan, D. Grandt, T. Scott, and D. W. Bates, "The use of health information technology in seven nations,"Int. J. Med. Informat., vol. 77, no. 12, pp. 848–854, 2008.

6. J. Walker, E. Pan, D. Johnston, J. Adler-Milstein, D. W. Bates, and B. Middleton, "The value of health care information exchange and interoperability," in Proc. Health Aff., pp. 10–18, 2005.