

An Innovative Approach For Exchanging Health Information Using CDA Generation And Integration Based On Cloud Computing

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Abstract: In this project we describe our CDA document generation and integration open API service based on cloud computing through which hospitals are enabled to conveniently generate CDA documents without having to purchase proprietary software. Our CDA document and physicians and patients can browse the data in chronological order. Organization for electronic health record helps us to enhance persistent security and nature of care, yet it has interoperability as an earlier condition between Health data exchange at various healing facilities. To guarantee interoperability between the wellbeing data exchanges at various clinics the CDA built up a center document by utilizing HL7, whereas the center report engendering is basic for interoperability. A portion of the healing facilities are hesitant to embrace the interoperability due its sending cost. The healing centers began utilizing CDA arrange as alternate records are difficult to oversee. Considering the above issue we will portray the CDA document era and Integration Open API benefit in view of distributed computing. This helps the healing facilities to empower advantageously and create CDA record without having any issues in regards to programming.

IndexTerms - Clinical Document Architecture, Health information Exchange, HL7, Saas.

I. INTRODUCTION

Distributed computing alludes to the applications which are conveyed as an administration over the web, equipment and programming frameworks to the server farms. The distributed computing has three noteworthy administrations as said underneath

1. Software as an administration (Saas)- Helps clients and associations in a manner that there is no requirement for them to run a specific application one specific stage. The product upkeep, establishment and support are the principle benefits for Saas.
2. Platform as an administration (Paas)- Cloud gives registering stage where the customer can convey their own particular applications and programming dialects.
3. Infrastructure as an administration (Iaas)-Are the self administration models which are utilized forgetting to, checking and overseeing information structure foundations which have benefits as register, stockpiling and systems administration. Electronic Health record (EHR) is the accumulation of health data about the individual and it can bolster the productive procedures for human services.

For a successful operation of EHR a health data Exchange framework (HIS) must be required. Powerful Health data exchange help to institutionalized and interoperable health data exchange between healing facilities. Health level seven has built up CDA as a standard for clinical reports. Clinical Document design is a report markup standard that has the structure and semantics of "Clinical Documents" for the use of exchange data. The activities embracing CDA have effectively done in numerous nations. There is a need of HIS to bolster CDA and the structure of CDA is substantial where the reports are difficult to accomplish without finish comprehension of the CDA standard. Clinics have the HIS advancement stages for era of CDA records in every healing facility requires a different CDA framework. On the off chance that any vital for arrangement of care, doctor's. A CDA report is recorded the finding is created when patient is touched base to the center. On the off chance that the patient consents to share the CDA document to different facilities and it can create the report. The exchanging of CDA document is as per the following Patient facility report can be shared to different centers and knows the answer from different doctors too. At the point when a patient is in crisis then medicinal history should be audited, yet it postpones the record since more reports are aggravated in various documents. All the CDA records are incorporated into single CDA report to survey the therapeutic history in sequential request. In this paper we introduce a CDA record era framework creates a report on various creating stages and CDA document incorporation framework that coordinates numerous documents in various clinics for every patient. The principle advantage of receiving the framework is to access

through an Open API and designers can work on their engineer stages, for example, java, .NET,C/C#. Hospital framework can broaden the current framework as opposed to supplanting another framework. It is pointless for doctor's facilities to create and incorporate the standard CDA reports. The clouded era produces records in the CDA organize.

II. CLOUD COMPUTING

Cloud computing alludes to both the applications conveyed as administrations over the Internet and the hardware and systems software in the server farms that give those administrations. The client pays charge depending on the amount of resources allotted, such as network, server, storage, applications and services. As of now, three major types of cloud computing service exist:

- 1) Software as a Service (SaaS): This service model provides software.
- 2) Platform as a Service (PaaS): Cloud providers supply a computing platform to its clients where they can deploy applications of its own, program language of its own.
- 3) Infrastructure as a Service (IaaS): Vendor integrates basic infrastructure such as IT systems and database and then rents them to client.

In this paper, we chose a widely used cloud service, Amazon Cloud [20], and provide the CDA generation and integration system as SaaS, etc.

III. CDA GENERATION SYSTEM BASED ON CLOUD COMPUTING

Fig. 1 shows the overall architecture of how CDA documents can be generated on the health information systems of different hospitals by using our cloud computing-based CDA generation system. Hospital A and Hospital B are demonstrated to show that it is easy to generate CDA documents on a variety of platforms if done via cloud. The purpose of each of the components is as follows:

- CDA Generation API generates CDA documents on cloud.
- CDA Generation Interface uses the API provided by the cloud and relays the input data and receives CDA documents generated in the cloud.
- Template Manager is responsible for managing the CDA documents generated in the cloud server. Our system uses CCD document templates.
- CDA Generator collects patient data from hospitals and generates CDA documents in the template formats as suggested by the Template Manager.
- CDA Validate inspects whether the generated CDA document complies with the CDA schema standard.

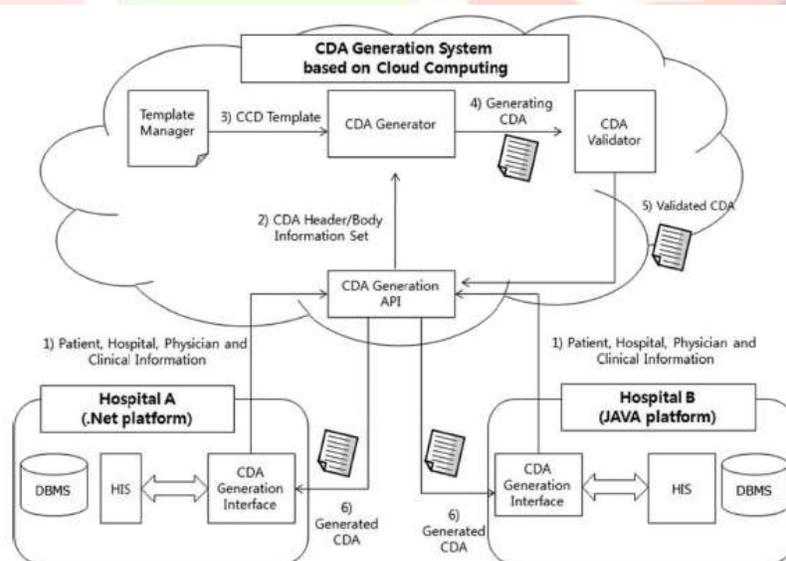


Fig. 1. The architecture of our CDA generation system based on cloud computing

IV. LITERATURE SURVEY

K. Ashish,[1] presented meaningful use of electronic health records the road ahead. For practicing clinicians, the origins and likely effects of this rule may be opaque. It would be helpful to understand the motivation behind the key components of the meaningful use rules, where they are likely to take the US health care system (and the obstacles along the way), and the benefits and risks of a rapid transformation from paper to electronic record systems.

J. D. D'Amore,[2] proposed the promise of the CCD: challenges and opportunity for quality improvement and population health. Interoperability is a requirement of recent electronic health record (EHR) adoption incentive programs in the United States. One approved structure for clinical data exchange is the continuity of care document (CCD). While primarily designed to promote communication between providers during care transitions, coded data in the CCD can be re-used to aggregate data from different EHRs. This provides an opportunity for provider networks to measure quality and improve population health from a consolidated database. To evaluate such potential, this research collected CCDs from 14 organizations and developed a computer program to parse and aggregate them.

M. Armbrust, [3] presented a view of cloud computing which describes cloud computing. Authors goal in this articles to reduce that confusion by clarifying terms, providing simple figures to quantify comparisons between of cloud and conventional computing, and identifying the top technical and non-technical obstacles and opportunities of cloud computing.

S. Lee, [4] proposed clinical document architecture integration system to support patient referral and reply letters. Many Clinical Document Architecture (CDA) referrals and reply documents have been accumulated for patients since the deployment of the Health Information Exchange System (HIES) in Korea. Clinical data were scattered in many CDA documents and this took too much time for physicians to read. Physicians in Korea spend only limited time per patient as insurances in Korea follow a fee-for-service model. Therefore, physicians were not allowed sufficient time for making medical decisions, and follow-up care service was hindered. To address this, we developed CDA Integration Template (CIT) and CDA Integration System (CIS) for the HIES. The clinical items included in CIT were defined reflecting the Korean Standard for CDA Referral and Reply Letters and requests by physicians.

S. R. Simon, [6] presented correlates of electronic health record adoption in office practices: A statewide survey in which despite emerging evidence that electronic health records (EHRs) can improve the efficiency and quality of medical care, most physicians in office practice in the United States do not currently use an EHR. We sought to measure the correlates of EHR adoption.

V. PROPOSED METHODOLOGY

In proposed framework we presented a CDA documents generation framework and integration framework that produces CDA records. Distinctive engineer stages through API will be actualized by CDA document generates on various frameworks. For information we utilize patient subtle elements and by those points of interest we can get to the information for CDA document generation [12]. The JAVA based HIS of our API asking for a CDA record generates for a theoretical clinic that utilizations java as its designer stage [10]. Same as the JAVA based HIS of CDA record that utilizations# as its stage. At the point when the customer catch 'create CDA' the initially transmitted to CDA generation API in the cloud server by means of CDA generation interface and CDA record is produced. It has a specialist to guarantee CDA record to approve the CDA report by utilizing the API at our cloud server. Two customer created with JAVA and C# they attempt to finish the test. The upsides of an API benefit as our own are at assets that help doctor's facilities need to apportion for interoperability is least. Distributed computing is decent option for doctor's facilities that have not yet embraced EHR in light of cost issues. An expansive number of HIE ventures that utilization the CDA record arrange have taken by such a variety of nations. Distributed computing based CDA generation and combination framework has a couple articulated points of interest over existing activities. To start with healing facilities don't need to buy legitimacy programming to produce and coordinate CDA documents and bear the cost as some time recently. CDA is a flexible standard that can be read by both humans and processed by a machine. It makes it possible to display a patient's entire medical history in one document. And it can be reduced in multiple applications. Finally it aims to eliminate message variability that HL7 V2 is prone to. The complete understanding of the CDA document and the structure of the document is complex and application cost is more.

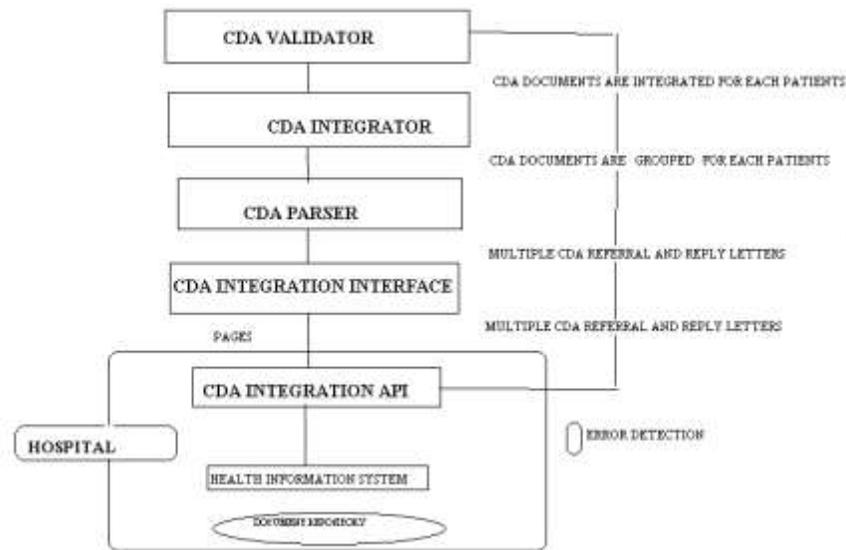


Fig. 2 The architecture of CDA integration system based on cloud computing

VI. CONCLUSION

The methodology Interoperability between hospitals not only helps ameliorate patient safety and quality of care but also minimize time and resources spent on data format conversion. Interoperability is act toward more important as the number of hospitals participating in HIE increases. As the number of HIE based on CDA documents increases, interoperability is accomplished. We proposed a CDA document generation system that generates CDA documents on different developing platforms and CDA document integration system that integrates multiple CDA documents scattered in different hospitals for each patient. The CDA document format a clinical information standard planed to guarantee interoperability between hospitals. CDA document generation and integration system based on cloud server is more helpful over existing services for CDA document if the variety of CDA document increases.

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