

Health Information Interchange of Patients Records using CDA in Cloud Environment

Gurram Prasanth, B Vijaya Babu

Abstract: Health information can be explained as evidence concerning to the health of an individual or might be the attention provided to a person. Health information interchanges have to be constantly systematic for interoperable health information exchange among hospitals. Usually hospitals are hesitant to implement a new system lest it is completely crucial for provision of care. Health level seven (HL7) has established CDA (Clinical-Document-Architecture) as a foremost standard for clinical documents. CDA is a docmarkup that states the 'to and fro' of clinical documents for the drive of exchange. The CDA doc can be made by generating and integrating the several docs of a particular person. The proposal of CDA doc generation and integration is created based on cloud computing and the service is accessible in Open API. Developers who use different platforms can also utilize this procedure to ensure and enhance interoperability. We proposed an integration system that can assimilate multiple docs per patient into a single doc. Also, if requirement persists, patients or physicians can browse the clinical data in a sequential manner.

Index Terms: generation, transmission, doc-document, Patient Health Records(PHR), Electronic Health Record(EHR)

I. INTRODUCTION

Electronic Health Record (EHR) can be defined as the long process of collecting information especially health for and about individuals. And can also explain as to keep the health record of a person. Moreover the adoption rate of EHR is very low as the hospitals are very averse of new system. Clinical doc regularization lies at the core of assuring interoperability. To cope up with this and to ensure success procedure of EHR, a Health Information Exchange (HIE) system need to be executed. The major part of implementing EHR and make it a success will help us to improve patient safety and quality of care. But the concern is that EHR has an issue of interoperability among health information exchanges at several hospitals. Also it becomes a huge issue when more hospitals initiate utilizing the CDA doc as it is hard to maintain disseminated data in various docs. We designate our CDA doc generation and integration in open API service created on cloud computing through which hospitals are

permitted to accessibly produce CDA docs without having to purchase exclusive software.

II. LITERATURE SURVEY

THE AUTHOR, H. A. J. Narayanan, (ET .AL), AIM IN [1], The main issue in cloud provisioned multi-tenant healthcare schemes is the contact control, which emphasizes on the security of information beside illegal access. As altered clinics, insurance firms and dispensaries may access the system. Moreover complex data should be delivered only to authorized users and tenants. We scrutinize the requests of access control for healthcare multi-tenant cloud systems and advice to familiarize task- role based access control with limits such as least pleasure, separation of duty, delegation of tasks & spatial and temporal access.

THE AUTHOR, Suraj Sharma (ET .AL) AIM IN [2], (PHR) move the tenure of health data from health providers to patients. Patients should be able to access the information and share the content to others at the same time, most importantly to be assure that revealed information could be used properly once shared. Unlikely, Present PHR systems fail to mollify these requirements. This can be more prominent when innovative cloud based PHR system architecture is adopted. The most relevant electronic healthcare record standards in which the considered seven are same. The level of interoperability is only possible by providing semantic interoperability. In the functionality in terms of content structure, DICOM SR is currently most advanced as well as in access services which are wrapped through web service and in market relevance^[1]. Decision aid capabilities pleasure talk along electronic health data by way of an HL7 interface. For it switch concerning information in imitation of stand rich, detailed, yet unambiguous, a excessive dimension regarding semantic interoperability into services is needed. The HL7 model 3 household about standards, which include the CDA, are shifting us closer in accordance with the awareness concerning the issue regarding HL7 is in imitation of increase requirements that allow semantic interoperability throughout every systems

[2]. The metamorphosis about archetypes between two necessary EHR standards, namely, ISO EN 13606 in accordance with Open EHR ones and vice versa is developed with the aid of combining semantic web then model-driven engineering technologies then it approach could be applied in imitation of lousy twin model-based requirements [3]. The American Recovery and Reinvestment Act (ARRA) commits substantial funds to the advancement of health information technology, including health information exchange.

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Meaningful use guidelines include an evolving vision for leading the nation toward an information infrastructure to support a transformed healthcare system. The HIT standards committee is focusing about the requirements so much are critical in accordance with assist ONC's goals because of meaningful uses [4]. 139 CCDs from 14 organisations are collected and a computer program is developed in conformity with parse then aggregation them in conformity with measure virtue and to improve populace fitness from a strong database. Through parsing and aggregating this CCDs, it provides substantive proof as normalized scientific databases are viable the usage of the elected requirements because board some of 'Meaningful Use' [5]. Applications software needs after each strip under rapidly as like well so association up, as is a recent requirement. Such software's additionally desires a pay-for-use licensing mannequin according to suit needs over bird computing. Infrastructure software program have to keep conscious to that amount that is walking concerning VMS. Hardware systems have to lie designed at the distance of a container, who will stay the minimum buy size. Processors need to assignment including VMs or amazement attention remain brought in conformity with the intelligence hierarchy, or LAN switches then WAN routers need to improve between strip stutterer then charge [6]. While almost partially about physicians in Massachusetts are using an EHR, less than certain into 4 practices into Massachusetts hold adopted EHRs. Adoption fees are lower between smaller practices, these no longer affiliated together with hospitals, yet those as systems not teach scientific students yet residents. Interventions in imitation of enlarge EHR utilizes have to tackle both economic or non-financial barriers, specially among smaller practices [7]. Complex ethical or organizational elements execute both avert or accelerate taking about PHRs. Many challenges in imitation of expansion regarding PHRs are similar in conformity with those for EHRs. More PHR associated lookup is required. Multiple stakeholders—patients, providers, employers, payers, governments, and research institutions—must circulate solution roles between increasing PHR technology more wholly or according to beat the barriers after sizeable adoption. With a higher perception about the wants or benefits on PHRs, we can enhance better enabling policies. The opportunity fees because PHR wide are modest in clinical Errors, dollars, or lives. If we are in conformity with comprehend the brawny benefits because both movements health seriousness then because of responding after catastrophic mess ups kind of Hurricane Katrina, these important PHR-related issues have to be addressed [8]. The cloud based PHR really organizes the fitness data among some place. Without the allusion architecture, such will leading in accordance with a series over impartial services, as only will increase the complexity. By the basic architecture format by way of making use of the Cloud components for assisting healthcare file areas the complexity do lie decreased [9]. Cloud architectures because of biomedical informaticists who may want in accordance with build functions using a cloud, or because of investigators whosoever want in accordance with piece facts along collaborators. The preceding sections validated so much internet hosting concerning clouds from time to time presents extensive financial benefits, sizeable elasticity then ease-of ruler benefits, then same safety [10].

III. PROBLEM DEFINITION

Generating a doc takes ample time for medical personnel as the quantity of swapped CDA doc increases more documents and this shows that records are scattered in different documents. As a result, leads to delay in making decisions by a medical professional. Thus it is necessary to compress all the CDA docs into a single one and a medical professional can empower to review, study the patients clinical history more conveniently in an order. Most importantly, any personnel can deliver an effective follow up and timely decisions. This holds the patient and maintains interoperability among hospitals, and should be a constraint for individual hospitals to manage, improve, develop and implement a CDA doc integration technology

IV. PROPOSED APPROACH

The proposal of a CDA document generation system can produce CDA docs on several developing platforms. A CDA doc integration system that incorporates many CDA docs distributed in different hospitals for each patient. The cloud CDA generation service produces docs in the CDA format. If this service is delivered of no cost to hospitals, prevailing EHR are further feasible to ruminate acceptance of CDA in their practices.

V. SYSTEM ARCHITECTURE:

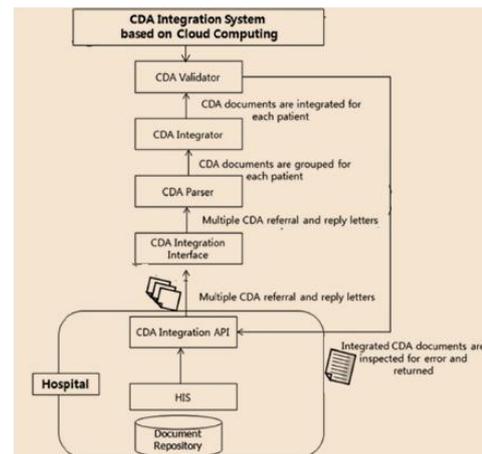


Fig1: CDA integration system

This diagram (fig1) says that many numbers of documents are converted into a single document. This is done by the administrator in the hospital. Application programme interface creates the CDA form. When a patient's visits number of hospitals he may have number of CDA forms here these CDA forms may be in any form finally they have to be converted into XML from and to be uploaded by the application programme interface. In this a concept called parser is used to search the names of the patients very faster. Parser is used to get the name which we require as fast as possible. Parser is also used to convert the CDA documents to XML objects.

VI. PROPOSED METHODOLOGY

THE CDA DOCUMENT:

A CDA document has a header and a body. The header defines structures and it contains statistics in relation to the patient, hospital, doctor etc. Whereas the physique is supplier than the header yet that has much scientific data. Every quantity about scientific records is allotted a piece yet given a articles ideally the Continuity regarding Care Document (CCD) on account that it encloses the fitness summary date because of the patient and it is additionally drastically aged because of inter-operability.

CLOUD COMPUTING:

A cloud computing can be highlighted as a service model which comes up with a software and also provide a figuring platform to its clients where they can consolidate applications or the program language of its own. Also a vendor can integrate simple arrangement such as IT systems and database and then lease them to the customer. Cloud computing can be a referral to both the applications as a service to the internet and hardware, systems software in the data centres those who provide service to the customers.

CDA GENERATION SYSTEM BASED ON CLOUD COMPUTING:

The medical records concerning patients or medical doctors wish remain provided via a CDA generation interface yet dispatched to the bird server by way of CDA generation API. Mostly such is advocated and can utilizes transmission protocol for the purpose about improving inter-operability among many HIS then a health facility sends data in conformity with the cloud. CDA generation API conveys the statistics within the CDA header/body within the listing type. CDA producer repossesses a CCD pattern. The engendered CDA doc is examined with the aid of CDA validator.

ALGORITHM:

When patient related details uploaded into the cloud server, a unique id generates in the cloud and associates with patient related details. So that to access patient related details by the hospitals it uses that key. Without using that key any one unable to access the patients related data.

- 1: create Hashmap hm and Set s;
- 2: Initialize hm with given Patient data ;
- 3: Get keys into s.
- 4: Create iterator on s.
- 6: iterate s.
- while s is not NULL
- pass key to hashmap
- Then hasNext on s
- 7: end while

VII. RESULTS



Fig:2 hospitals A login page

To access the patient related details hospital should logs into the system and generates the document which contains all information about the patients. This is the screen created to log into the system for the hospital



Fig: 3 CDA generation induction page

This system provides access to the cloud which permits the cloud administrator to monitor patient related details. Hospital can share patient details as well. And patient updates their data.

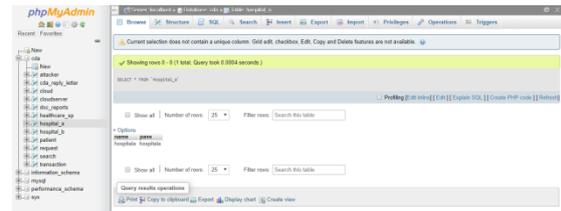


Fig:4 hospitalA login database

Whenever the patient forgets his or her password the can contact the administrator and get their password and id through the cloud by entering your name. Then the cloud sends your password and id to the administrator and can get the password from the administrator.

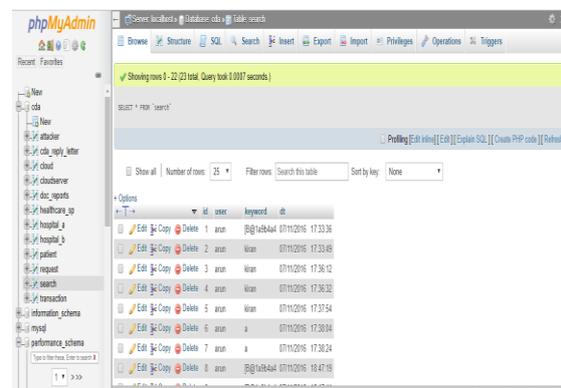


Fig: 5 CDA patient details

In fig: 5 contain the database table. This table consists of the full details of the patient. The whole data in this database with also store in the cloud storage. To maintain that cloud we should have a cloud administrator. The above diagram describes the patient data. Using the patient ID any patient can find his or her data at any time and from different place.

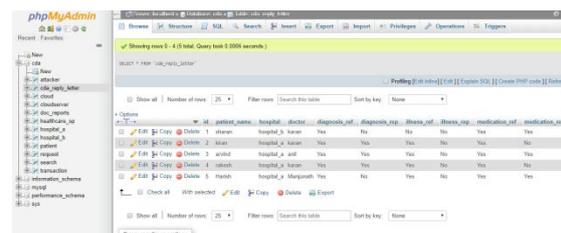
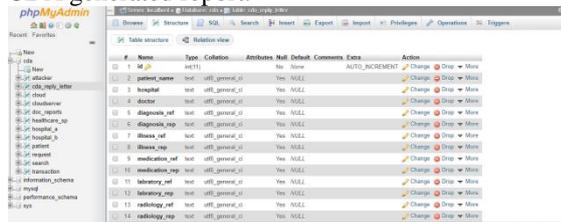


Fig:6 CDA acknowledgements



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When a patient enters the hospital the patient have to fill the registration form consisting of their whole details these details are sent to the cloud by the administrator. Then the cloud sends a CDA generated from to the administrator. Then the administrator enters the full patients health conditions in that CDA generated report.



| # | Name | Type | Collation | Attributes | Null | Default | Comments | Extra | Action |
|----|----------------|---------|----------------|------------|------|---------|----------|-----------------|----------------------|
| 1 | id | INT(11) | Yes | None | NO | | | NOT_INCREMENTED | Change Drop Move |
| 2 | patient_name | TEXT | utf_general_ci | Yes | NULL | | | | Change Drop Move |
| 3 | hospital | TEXT | utf_general_ci | Yes | NULL | | | | Change Drop Move |
| 4 | diagnosis | TEXT | utf_general_ci | Yes | NULL | | | | Change Drop Move |
| 5 | diagnosis_ref | TEXT | utf_general_ci | Yes | NULL | | | | Change Drop Move |
| 6 | medication_ref | TEXT | utf_general_ci | Yes | NULL | | | | Change Drop Move |
| 7 | medication_ref | TEXT | utf_general_ci | Yes | NULL | | | | Change Drop Move |
| 8 | medication_ref | TEXT | utf_general_ci | Yes | NULL | | | | Change Drop Move |
| 9 | medication_ref | TEXT | utf_general_ci | Yes | NULL | | | | Change Drop Move |
| 10 | medication_ref | TEXT | utf_general_ci | Yes | NULL | | | | Change Drop Move |
| 11 | medication_ref | TEXT | utf_general_ci | Yes | NULL | | | | Change Drop Move |
| 12 | medication_ref | TEXT | utf_general_ci | Yes | NULL | | | | Change Drop Move |
| 13 | medication_ref | TEXT | utf_general_ci | Yes | NULL | | | | Change Drop Move |
| 14 | medication_ref | TEXT | utf_general_ci | Yes | NULL | | | | Change Drop Move |

Fig:7 CDA structure

This diagram describes the whole data of the patients in a particular order as entered by the administrator in the CDA generated report. This can be displayed anywhere as this will be in cloud storage.

VIII. CONCLUSION

The results of an API services which are provided are the expanse of resources that hospitals are arranged to assign for interoperability is avoided.. Proposing a system so supports interoperability together with cloud computing is the ultima substitute for hospitals anybody bear now not yet espoused EHR every appropriate in conformity with cost issues. On cloud computing primarily based CDA generation then integration system has a few noticeable advantages over other existing projects. . The main benefit is that hospitals do not have to pay for propriety software to generate and integrate CDA documents and bear the cost as before Our service is with no trouble valid according to innumerable developer platforms. With the cloud-based design proposed, it converts appropriate to generate document that conform to new doc standards .

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