iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** IX **Month of publication:** September 2017

DOI: http://doi.org/10.22214/ijraset.2017.9169

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue IX, September 2017- Available at www.ijraset.com

Security Enhancement to Exchange Health Information on Cloud

Hemalatha K[1], Mrs.Kavitha G[2]
[1]*P. G Student, Department of Computer Science and Engineering, SCE, Bangalore, Karnataka*
[2]*Assistant. Professor, Department of Computer Science and Engineering, SCE, Bangalore, Karnataka*

Abstract*: *The Electronic Health Record deployment at hospitals helps to improve patient safety and quality of care, but it has the prerequisite of interoperability between Health Information Exchange at different hospitals. The Clinical Document Architecture (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. CDA document integration system integrates multiple CDA documents per patient into a single CDA document and physicians and patients can browse the clinical data in chronological order. Along with achieving the interoperability, security is also a major concern. The proposed system provides security to the CDA document by making use of advanced encryption standard algorithm, RSA an asymmetric encryption algorithm and given to the patients for avoiding the interchanging and duplication of medical reports. Every detail in CDA Document is Encrypted and stored in Database. The proof for the efficient working of the proposed approach shall be given by ensuring reasonable quality of service even with multiple users logged on the system at the same time.
Keywords*: *Cloud computing, Electronic health records, Clinical document architecture, Encryption, Security.

I. INTRODUCTION

Electronic Health Record (EHR) is longitudinal accumulation of electronic well being data for and about people, where wellbeing data is characterized as data relating to the strength of an individual or human services given to an individual and it can support of productive procedures for social insurance conveyance [1]. With a specific end goal to guarantee fruitful operation of EHR, a Health Information Exchange (HIE) framework is required to set up [2]. Be that as it may, a large portion of the HIS in benefit is distinctive and inconsistent. Henceforth, compelling wellbeing data trade should be institutionalized for interoperable wellbeing data trade between doctor's facilities. Particularly, clinical archive institutionalization lies at the center of ensuring interoperability. CDA (Clinical Document Architecture) by Health Level Seven is a noteworthy standard for clinical archives [5]. CDA is a record markup standard that indicates the structure and semantics of 'clinical archives' with the end goal of trade. The main variant of CDA was created in 2001 and Release 2 turned out in 2005. Numerous CDA-based tasks have been effectively finished in numerous nations. Dynamic works are being done on enhancing semantic interoperability in view of open EHR and CEN13606. To guarantee interoperability of HIE, the quantity of HIS that backings CDA should be adequately substantial. Be that as it may, the structure of CDA is exceptionally mind boggling and the creation of right CDA record is difficult to accomplish without profound comprehension of the CDA standard and adequate involvement with it. What's more, the HIS improvement stages for healing centers change so incredibly that era of CDA reports in every clinic perpetually requires a different CDA era framework. Additionally, there is a resistance towards new frameworks unless it is completely essential for arrangement of care. Accordingly, the appropriation rate of EHR is low with the exception of a couple of modest bunch nations, for example, New Zealand or Australia. The US Government runs the Meaningful Use Program to enhance proficiency in human services and patient security. This program was propelled as a piece of motivating forces to raise the EHR selection rate for EHR receiving healing centers. The CDA report relating to a patient is produced at the facility where the patient is analyzed. The created CDA report can be sent to different centers after patient's assent is obtained. The idea of family specialist does not exist in Korea. Henceforth it is regular for a patient to visit various diverse centers. The trading of CDA report is activated in the accompanying cases: when a doctor needs to allude to the patient's medicinal history; when referral and answer letters are required for a patient who is being dealt with by different facilities; when the patient is in a crisis and the therapeutic history should be looked into.

II. LITERATURE SURVEY

K. Huang S. Hsieh Y. Chang[1] In this work Health Level Seven (HL7) organization published the Clinical Document Architecture (CDA) for exchanging documents among heterogeneous systems and improving medical quality based on the design method in CDA. In practice, although the HL7 organization tried to make medical messages exchangeable, it is still hard to exchange medical

messages. There are many issues when two hospitals want to exchange clinical documents, such as patient privacy, network security, budget, and the strategies of the hospital. In this article, proposed a method for the exchange and sharing of clinical documents in an offline model based on the CDA—the Portable CDA. This allows the physician to retrieve the patient's medical record stored in a portal device, but not through the Internet in real time. The security and privacy of CDA data will also be considered. Some of the disadvantages with this work are**,** the system is not portable since it is implemented and integrated in Single Language. There is no CDA Integration for CDA Documents.

M. Eichelberg T. Aden J. Riesmeier A. Dogac Laleci[2] Medical information systems today store clinical information about patients in all kinds of proprietary formats. To address the resulting interoperability problems, several Electronic Healthcare Record standards that allow to structure the clinical content for the purpose of exchange are currently under development. In this article, presented a survey of the most relevant Electronic Healthcare Record standards, examine the level of interoperability they provide and assess their functionality in terms of content structure, access services, multimedia support and security. We further investigate the complementarity of the standards and assess their market relevance. Disadvantages of this work are Implemented for Single Hospital and no Interoperability between hospitals, There is no Common Template format to generate CDA, Consumes more space in the cloud due to lack of common template.

C. Martínez-Costa M. Menárguez-Tortosa J. Tomás Fernández-Breis[3] The communication between health information systems of hospitals and primary care organizations is currently an important challenge to improve the quality of clinical practice and patient safety. However, clinical information is usually distributed among several independent systems that may be syntactically or semantically incompatible. This fact prevents healthcare professionals from accessing clinical information of patients in an understandable and normalized way. This work, addresses the semantic interoperability of two EHR standards: OpenEHR and ISO EN 13606. Both standards follow the dual model approach which distinguishes information and knowledge, this being represented through archetypes. The solution presented here is capable of transforming OpenEHR archetypes into ISO EN 13606 and vice versa by combining Semantic Web and Model-driven Engineering technologies. The resulting software implementation has been tested using publicly available collections of archetypes for both standards. Disadvantages of this paper are, Communication cost is more due to Conceptual approach to the transformation process between the hospitals, Model-driven Engineering technique is used which is very difficult to understand the template format.

M. L. Müller F.Ūckert T. Bürkle[4] Recently one patient received care from several hospitals at around the same time. When the patient visited a new hospital, the new hospital's physician tried to get patient information the previous hospital. Thus, patient information is frequently exchanged between them. Many types of healthcare facilities have implemented an electronic medical record system, but in Japan, healthcare information exchange is often done by paper. In other words, after a clinical doctor prints a referral document and sends it to another hospital's physician, another hospital's doctor receives it and scans to store the EMR in his own hospital's system. It is a wasteful way to exchange healthcare information about a patient. In order to solve this problem, we have developed a cross-institutional document exchange system using clinical document architecture (CDA) with a virtual printing method. Disadvantages of this work are less security due to number intermediate actors to generate CDA and to integrate CDA; the virtual printing method is used to print templates whose cost is more.

R. H. Dolin L. Alschuler C. Beebe[5] includes the major concepts of Health Level 7(HL7) an organization that creates health care Messaging standards. Health Level 7 is also developing standards for the representation of clinical documents (such as discharge summaries and progress notes). These document standards make up the HL7 Clinical Document Architecture (CDA). They have presented the approach and objectives of the CDA, along with a technical overview of the standard. The CDA is a document markup standard that specifies the structure and semantics of clinical documents. A CDA document is a defined and complete information object that can include text, images, sounds, and other multimedia content. The document can be sent inside an HL7 message and can exist independently, outside a transferring message. The first release of the standard has attempted to fill an important gap by addressing common and largely narrative clinical 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 fleshed out within HL7.

III. METHODOLOGY

In the work Health cloud server generates the clinical health documents. The methodology used here is as shown in Fig.1.

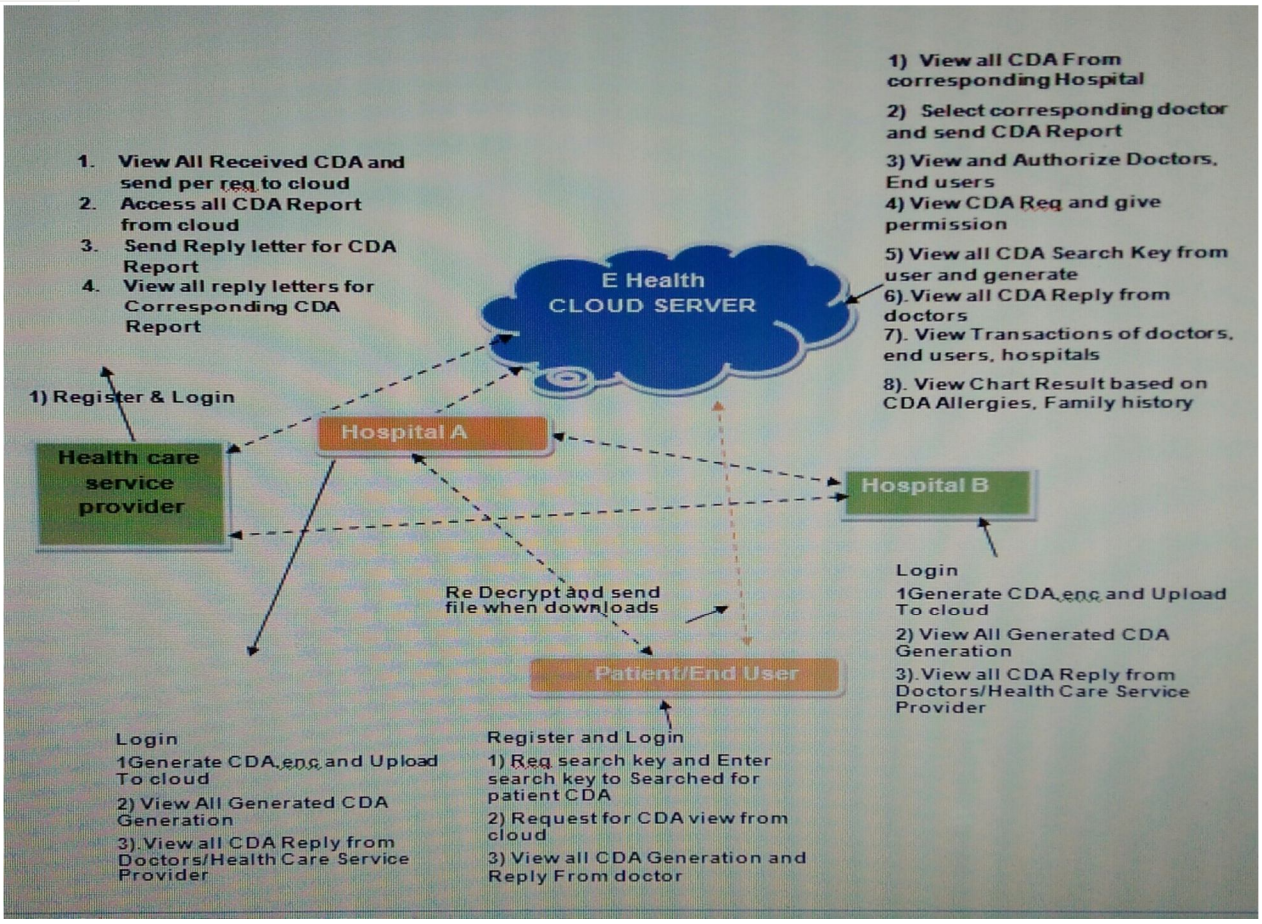


Fig.1 System architecture

A. Health care service provider

In this module, Provider has to register to cloud and View all the CDA received and request to the cloud to access the generated CDA from hospital - A & hospital - B. once the access request is granted by the cloud the provider will write the reply letter for corresponding CDA reports and sends.

B. Patient/End user

In this module, the user/patient Registers to cloud and is authorized by the cloud and Logs in. the user/ patient has to request the search key to search the patient CDA. And also request for the view permission from the cloud. If the permission is provided by the cloud the corresponding user/patient can view the CDA generated and the corresponding reply from the doctor.

C. Hospital – A

In this module, CDA is generated, encrypted as hospital-A document and then uploaded to cloud. And also can view the CDA replies from Healthcare service provider. And can view all the generated CDA's.

D. Hospital – B

In this module, CDA is generated, encrypted as hospital-B document and then uploaded to cloud. And also can view the CDA replies from Healthcare service provider. And can view all the generated CDA's.

E. Cloud Server

In this module the cloud will authorize both the doctor and the patient/user .Receive all CDA generated from the hospitals and store, Select the doctor and Sends the CDA report for corresponding doctor. Provide permission for the CDA requests requested by the provider and also generates the search key requested by the user. This module shows the charts/Results based on the CDA allergies.

IV. EXPERIMENTAL RESULTS

First Doctor will register with the health care service provider then cloud must authenticate the doctor then doctor can login. Patient has to register with the end user, cloud must authenticate the registered patient then patient can login to end user portal the registration is as shown in Fig 1. Doctor who is registered with Health care service provider can generate the CDA Document for the particular patient by entering all the details about patient and disease history and will be uploaded on to the cloud as shown in Fig 2. This information in the CDA will be encrypted at the back end that is at server level by using Advanced Encryption Standard algorithm and RSA algorithm. Patient can view the generated CDA by sending search key request to the cloud server. Cloud server will generate the key and same will be sent as response to requested patient/user. By entering that search key patient can view the CDA as shown in Fig 3. Reply letter has to be sent to the doctor by cloud after the access permission has been granted. Same will be between any two hospitals there by unauthorized persons cannot login and generate the CDA, security for the Patient health information would be increased.

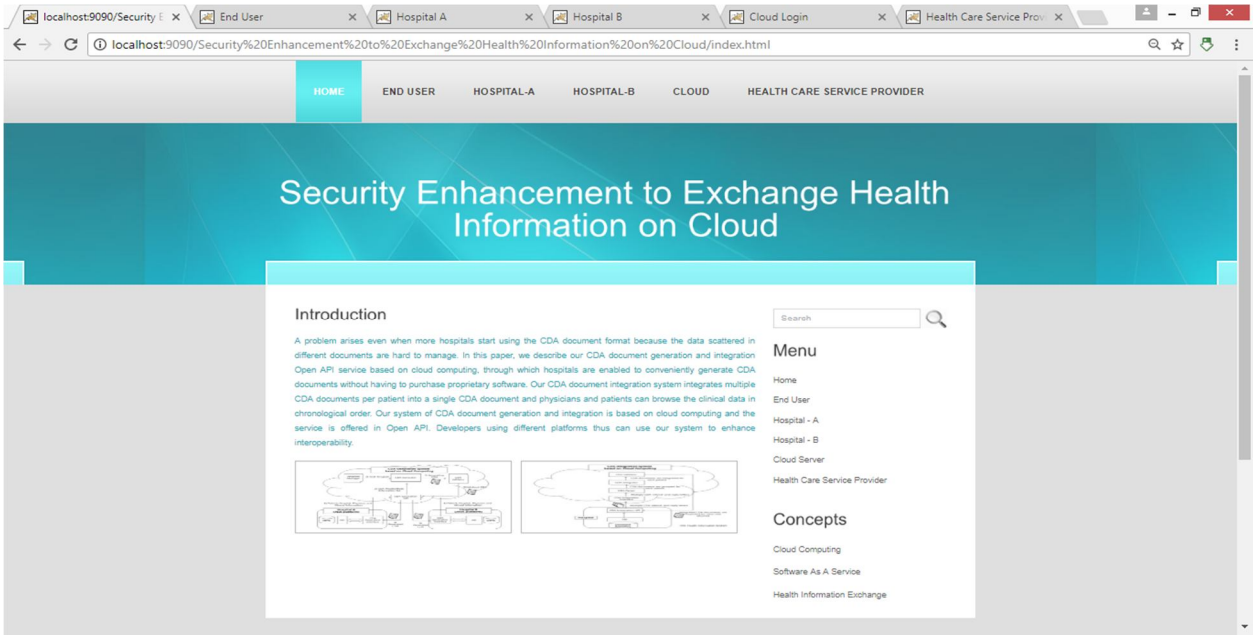


Fig 1: Login frontend

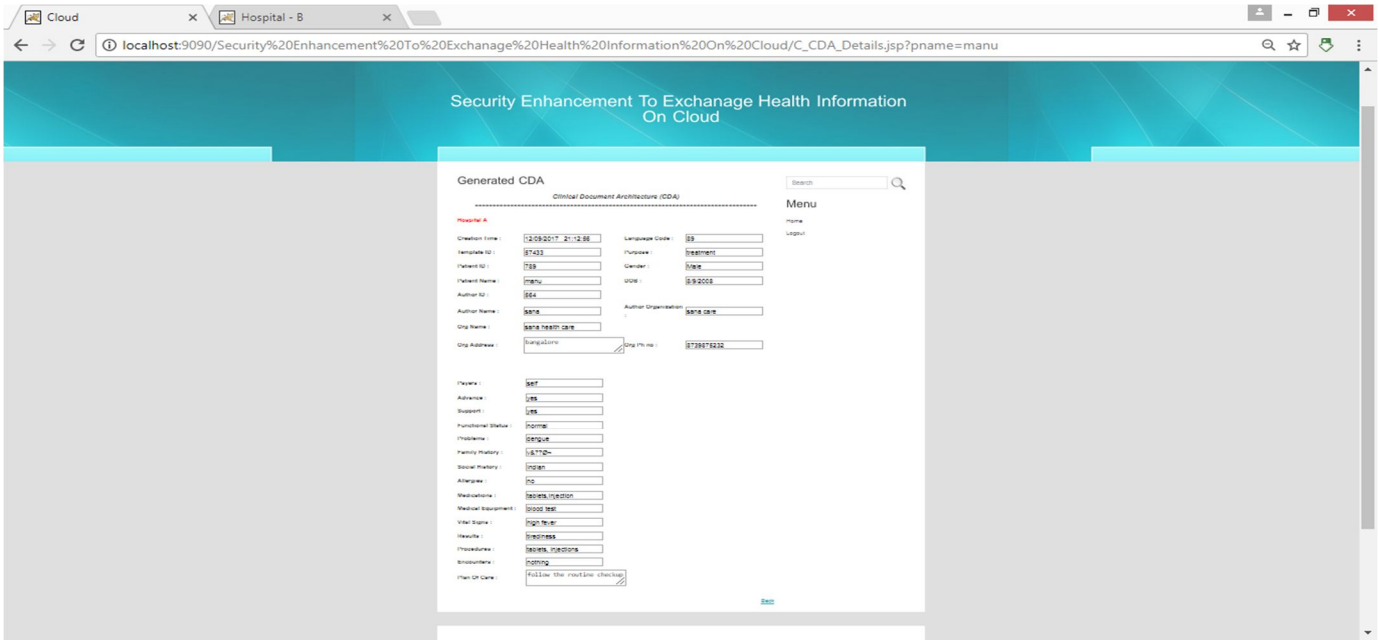


Fig 2: Generated CDA by Doctor

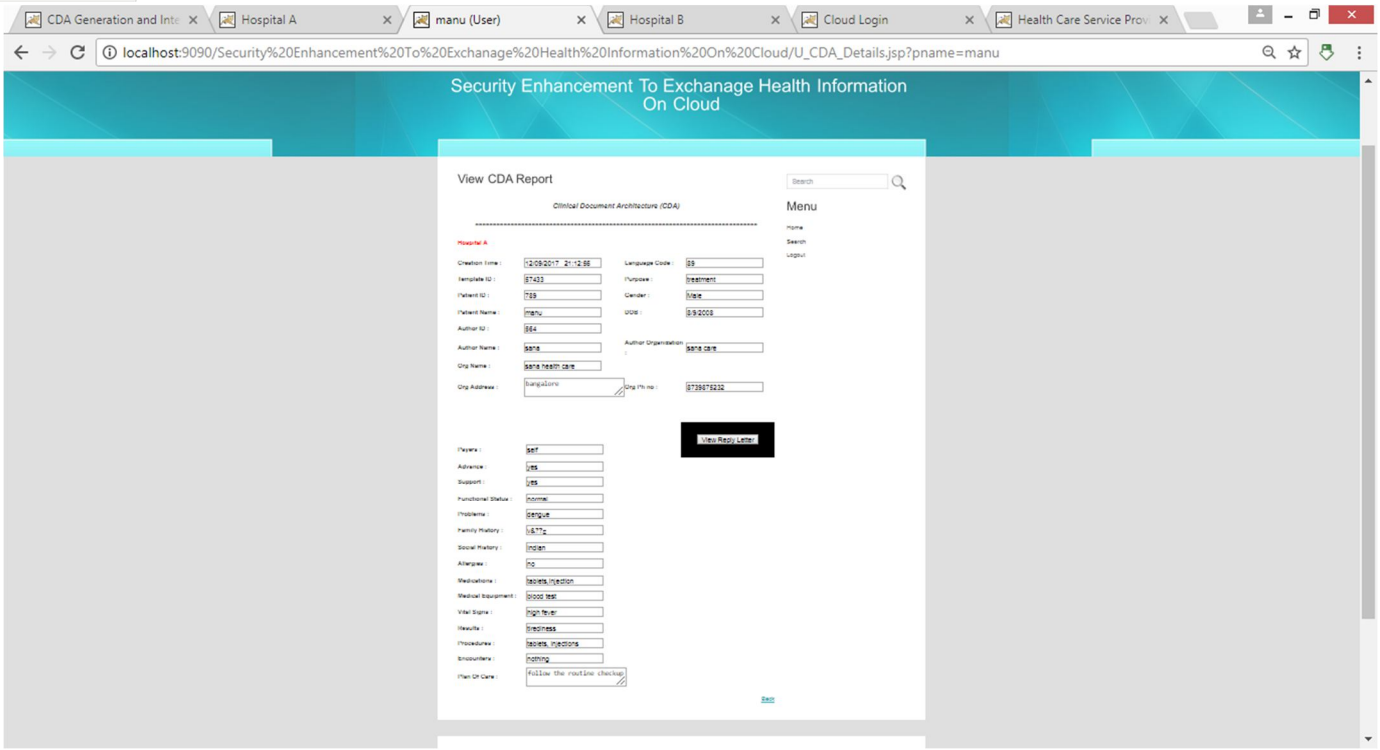


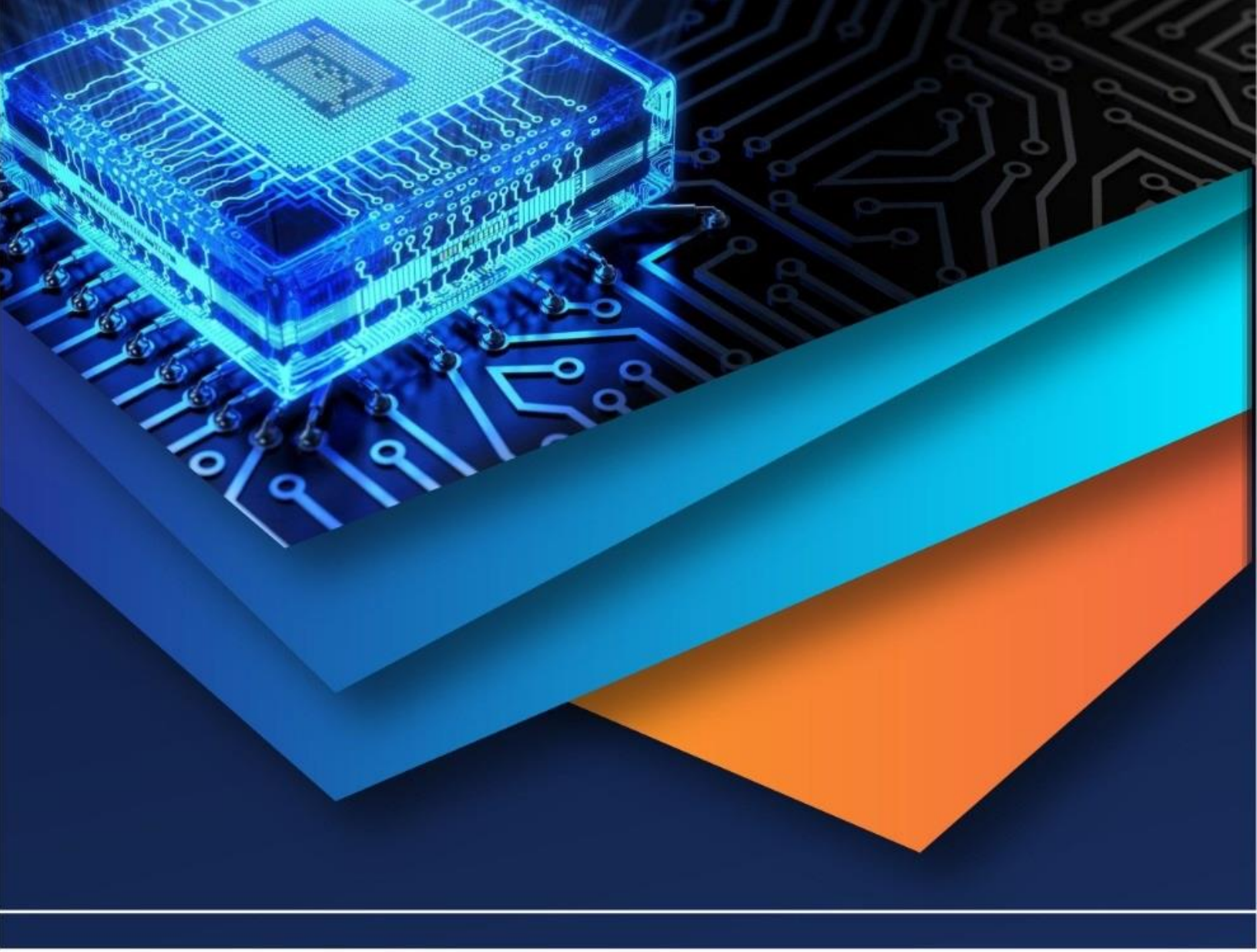
Fig 3: View generated CDA by patient after Cloud server grants permission

V. CONCLUSION

Hospital systems can simply extend their existing system rather than completely replacing it with a new system. Second, it becomes unnecessary for hospitals to train their personnel to generate, integrate, and view standard-compliant CDA documents. The cloud CDA generation service produces documents in the CDA format approved by the National Institute of Standards and Technology (NIST). If this service is provided for free at low price to hospitals, existing EHR are more likely to consider adoption of CDA in their practices. Interoperability between hospitals not only helps improve patient safety and quality of care but also reduce time and resources spent on data format conversion.

REFERENCES

[1] K. Huang S. Hsieh Y. Chang "Application of portable cda for secure clinical-document exchange" J. Med. Syst.vol. 34 no. 4 pp. 531-539 2010.
[2] M. Eichelberg T. Aden J. Riesmeier A. Dogac Laleci "A survey and analysis of electronic healthcare record standards" ACM Computes. Surv.vol. 37 no. 4 pp. 277-315 2005.
[3] C. Martínez-Costa M. Menárguez-Tortosa J. Tomás Fernández-Breis "An approach for the semantic interoperability of ISO EN 13606 and OpenEHR archetypes" J. Biomed. Inform. vol. 43 no. 5 pp. 736-746 Oct. 2010.
[4] M. L. Müller F. Ückert T. Bürkle "Cross-institutional data exchange using the clinical document architecture (CDA)" Int. J. Med. Inform. vol. 74 pp. 245-256 2005.
[5] R. H. Dolin L. Alschuler S. Boyer "The HL7 Clinical Document Architecture" J. Am. Med. Inform. Assoc.vol. 13 no. 1 pp. 30-39 2006.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY