

Cloud-Implementation of E-Healthcare Framework

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Abstract: *Healthcare Systems are gaining ground around the world, seeking to provide viable and affordable healthcare to all sections of society. With the recent advancements in the Information and Communication Technology (ICT) around the globe, the Healthcare Frameworks can be made more robust with the use of more novel techniques and modern-day technologies. With the rise of Mobile Cloud Computing resources and easy availability of smartphones and net services, a proposed framework referred to as “Cloud Implementation of E-Healthcare Framework” built upon a Cloud Framework authenticated by personal biometrics would allow the agencies at work to store a patient’s credentials and medical history on the Cloud which will then be accessible throughout the network which will be a significant shift from the Paper-Based Record System as well as the new and more modern Electronic-Based Record Systems. Our proposed framework is expected to enhance administrative machinery in Healthcare agencies, a more robust data frame to store patient’s credentials and also time-saving procedures to provide the necessary treatment to the patient.*

Keywords: *Healthcare, Cloud Framework, Biometrics, Information and Communication Technology, E-Healthcare*

I. INTRODUCTION:

Our proposed framework relies on the concept of Cloud Computing and Biometric Authentication to function and implement so that patients can be easily verified and their personal data can be stored and stacked safely in a cloud which can then be easily accessible throughout the network with biometrics available to secure the data in the cloud which will prevent lapses like data leaks or data misuse. With the Digital Revolution in India among many countries, the E-Healthcare system can be a fruitful realization, and a new methodology to settle many other issues with the modern-day implementation of the healthcare systems like loan issues and can also be used for tracking the health of patients suffering from high-risk diseases by using Internet-of-Thing (IoT) tools which can collect data from the patient in real-time and upload it on Cloud to be analyzed. This Healthcare-Framework will be a two-way service: The patient or a general user will be using a Mobile (Android/iOS) Application which can be accessed using a password or by generating a

One-Time Password on the E-Mail/Phone Number that has been registered and then through biometrics like a Fingerprint Scan or Face Recognition through which the user can track his issues and manage his bills. The healthcare agencies can track the patient’s data on the cloud and draw inferences from it which can then be passed onto healthcare providers thus establishing a streamline communication inflow between agencies without any loss of generality.

Cloud Computing is an internet-based computing technology which allows the users to upload a large amount of data onto a “cloud” which is then easily accessible and can be processed by using third-party software. In our proposed framework, we will be relying on the Cloud Computing to set up a cloud for Healthcare data storage and dissemination and also to generate a data inflow between the concerned authorities.

II. E-HEALTHCARE SETUP:

E-Healthcare is the proposed framework in this paper which envisions for the establishment for a cloud framework to store a patient’s credentials and medical record which is then secured through the means of patient’s biometrics which can then be accessed only by the patient and the concerned authorities. To make the framework viable, we need to set-up the required infrastructure and to explore the technologies that we need which have been detailed below:

- (1) **Mobile Application:** The User/Patient must have a Smartphone (Android/iOS) which he would use to access the Mobile Application through which he can access the Mobile Cloud Computing resources. He would need to register for the service through his UIDAI Number which is a 12-digit unique code assigned to every Indian citizen which can be used to avail any governmental service. After this, he needs to pass his biometrics which will include a Fingerprint Scan and a Face Scan which will finally register his application with his login credentials sent on his Phone Number/E-Mail ID he had registered.
- (2) **Healthcare Node:** One Healthcare Node will be established in every district of the area that the Healthcare agency is covering which will be tasked with digitizing the medical records of the user/patient and upload it on the cloud which can then be accessed by concerned authorities and the user. Every time, the user would need to access the data, he would need to request a token which can then be used to download viable data from the cloud.

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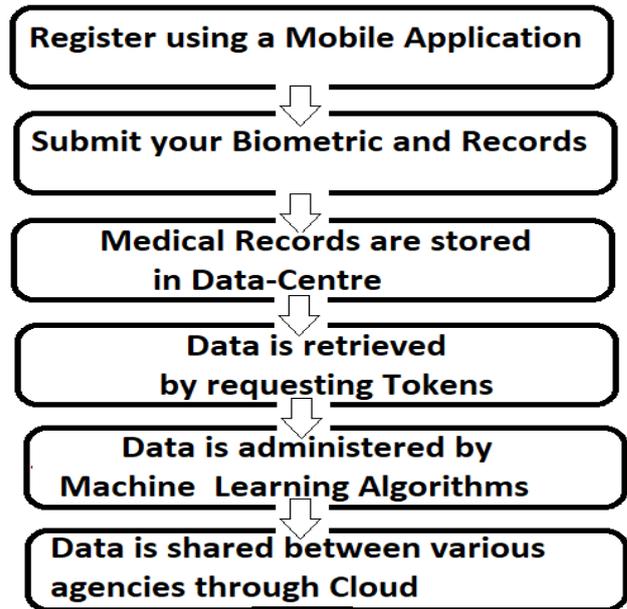
- (3) **Data-Centre:** Data-Centres need to be established by the Healthcare Agencies which can store the data and the medical records of the patients all year round and can be easily and efficiently accessed. A Database server will be the most important access to the implementation of such a framework as this will allow the data to be easily inferred from.
- (4) **Health Data Management System:** The Health Data Management System will allow the Healthcare agencies to infer from the patient's data and medical records, any upcoming trends or complications by means of Machine Learning algorithms.
This will allow the Healthcare administration to provide timely help and services to the patient as required.
- (5) **Biometric Authentication System:** The Biometric Authentication System will help to verify the user/patient by using his biometrics which will include his Fingerprint and Face Recognitions using the data that was collected during the registration phase. This will avoid any data lapses and data misuse and will allow only the registered user to access his/her data from the cloud. Biometrics are being increasingly used in industries to secure the log-in process by enforcing data security.

III. EXISTING MODEL:

In India, it is the responsibility of the respective State Governments to provide Healthcare services to the local population and is currently considering the set-up of a National eHealth Authority (NeHA) to digitize the health records of the patients. However, the programme is still far from realization as the Central Government struggles to implement a digitized system and the Healthcare Systems in India, are still marred by ineffective Paper-Based Record Systems. The existing model reliance on Paper-Based record systems which are not easily available and can be damaged or lost makes it inefficient and also more ready to be replaced and augmented by a more effective "Cloud Implementation of E-Healthcare Framework" which we propose in this paper.

IV. PROPOSED FRAMEWORK:

Our proposed framework named as "Cloud Implementation of E-Healthcare Framework" puts to use the robust nature of the Cloud Computing which would allow the medical records of the user digitized and biometric authentication to verify the patient. This Cloud Implementation of the E-Healthcare Framework will allow Healthcare agencies to draw inferences from the user's data thus bringing the framework to a fruitful realization.

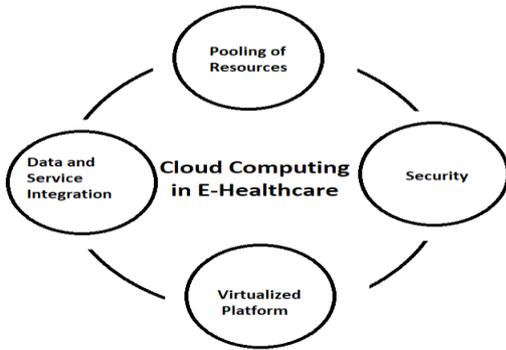


- (1) **Registration Phase:** The User/Patient must download the prescribed Mobile Application (Android/iOS) on his Smartphone to avail the Mobile Cloud Computing services and must register for an account using the 12-digit unique identification rendered to him by the Unique Identification Authority of India (UIDAI). This phase will register his account in the Data-Centre and will await further instructions by the Healthcare Node where the User must register his biometrics and medical records.
- (2) **Authentication Phase:** The User who had registered for an account must visit a Healthcare Node to submit his biometrics which will register his unique identity in the database. The medical records are also submitted which are in turn digitized and stacked away in the database for future reference.
- (3) **Storage Phase:** The user's data is stored onto the cloud and is secured using biometric access and encryption algorithms to prevent the misuse of data and lapses in the Cloud Framework. This will allow the healthcare agencies around the nation to access the data as per required by requesting a token which we discuss in the next step.
- (4) **Data Retrieval:** Whenever the user needs to access the data, he/she must apply for a token with a registered healthcare agency to ensure the data does not fall into the wrong hands and no security lapses are there. The token is activated after a proper biometric authentication which ascertains the user identity and provides access to the required data as requested by the user and the healthcare agency. This will allow multiple healthcare agencies to access the data and will also the user to apply for a medical loan as needed.

- (5) Data Administration: The data uploaded by the user will be disseminated by Machine Learning and Artificial Intelligence algorithms to identify trends in the health of the user and notify him/her in case of a complications and also to divulge this information to healthcare agencies which will be established by long-term administration to enhance the healthcare services provided to the individual.

V. ADVANTAGES OVER EXISTING MODEL:

The advantages of our proposed model over the existing model:



- (1) Security: Our system uses Biometric Authentication for Log-In purposes which makes it more secure than traditional methods of security and also prevents data lapses which beef up the security of the system.
- (2) The pooling of Resources: The implementation of a Cloud Framework allows for a better pooling of resources as all the medical records are digitized and stored on the cloud which can then be accessed by requesting for a digital token.
- (3) Data and Service Integration: The proposed model provides more flexible Data and Service Integration as the data is disseminated by Intelligent Algorithms which then allows the Healthcare agencies to take better care of the patient in a real-time manner. This integrates the Data and the services associated with it in a suitable manner.
- (4) Virtualized Platform: A Cloud-Computing Framework has given an incentive for a virtualized platform of dissemination of Data and Trends and provides better services to the end-user by digitizing the medical records. It also provides a common infrastructure which allows us to access data from anywhere, anytime.

VI. CONCLUSION:

In our paper we discussed our proposed framework “Cloud-Implementation of E-Healthcare Framework” which aims at the implementation of a Cloud-based infrastructure to allow healthcare agencies to store and analyze the health records of a patient and to provide him immediate medication as needed, along with an implementation of a Biometric Authentication System which brings in a more robust data security mechanism in the cloud. This system is expected to bring in multiple advantages along with interoperability between various healthcare and governmental agencies. In our proposed framework we have implemented well-proven approaches and technologies like Cloud computing and

biometric authentication to achieve a shared infrastructure as well as data security.

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