

# The Cloud-Based Health Tracking and Monitoring System with AWS

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## ABSTRACT

Medical care has a basic situation in living souls particularly for the individuals who have some medical conditions and need a down to earth answer for a superior life. As of late, there is a quick ascent in e-wellbeing advances, for example, Electronic Health Records (EHRs) and some crisis location and reaction strategies for that used AWS cloud for storing and retrieving managing records. One of the advances that can deal with a portion of the difficulties of shrewd medical care as far as security, sharing, files for avoid data leakages and illegal access help of encryption and description algorithm addition security are digital signature. The motivation behind this article is to feature the estimation of inescapable processing, particularly cloud-based frameworks in medical services area. We survey the importance and chances of AWS Services in inescapable medical services.

**Keywords :** Cloud Computing, Smart Healthcare, E-health, multi-key search, AWS, DES3.

## I. INTRODUCTION

Data innovation can assume a principal part in medical care administrations as far as electronic wellbeing. Late advances in e-wellbeing can be predominantly characterized as the use of data and correspondence innovations in medical services frameworks [1]. Utilizing web for putting away, getting to and changing medical services data and digitizing a ton of cycles and assignments that are important strides for realizing e-wellbeing, is a certain interaction. For this situation, we have the benefits of e-wellbeing, for example, improvement in the nature of administrations in maturing social

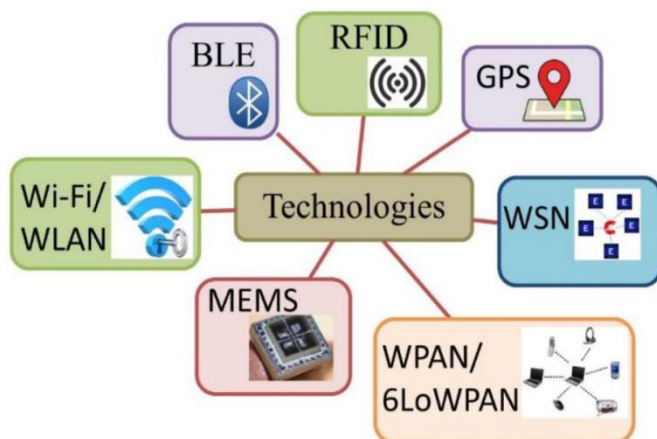
orders; decrease in expense and in clinical blunders and the straight forwardness by which information can be moved to the perfect spot. All things considered, digitizing paper-based records, gathering and putting away clinical data just as absence of appropriate innovation for preventive consideration can turn out to be somewhat testing. For that used as an AWS (Amazon Web Services) is a subsidiary of Amazon providing on-demand cloud computing platforms and APIs to individuals as well as companies.

COVID-19 affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization. The first

known infections from SARS-CoV-2 were discovered in Wuhan, China and within year its get spread all over glob these is because many factor but among those are not proper medicinal treatment. Experts believe the virus that causes COVID-19 spreads mainly from person to person for avoid that scenario that patient and doctor without getting physical involved to get best treatment and with proper time span is “Smart healthcare systems on improving the efficiency of healthcare services”.

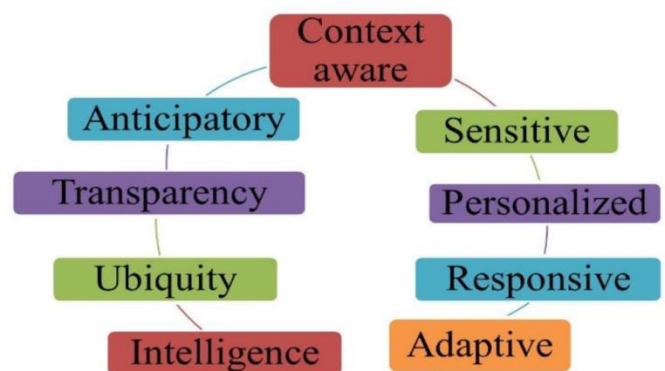
The Cloud market is growing rapidly and has accepted AWS to a great extent in recent years. AWS package has been turned as a huge revenue earner for Amazon as it is being used by most of the companies worldwide for migrating applications over cloud. For Assibilate and security as well many aspect cloud (AWS) is best solution:

- AWS is an Ease of Use, Incredibly Diverse Array of Tools, Unlimited Server Capacity, and Reliable Encryption & Security.
- To provide the Hospital (patient need-preference), e-Blood Bank and Patient Profile(file, daily report) applications to hospitals
- To provide online patient portal for delivery of citizen centric services like online appointment booking, access to lab reports online and blood availability status.



**FIGURE 1.** Different Technologies used to Deploy Smart Healthcare

Cloud-based healthcare system is build a consumer-focused integrated primary health care system; Improve access and reduce inequity; Increase the focus on health promotion and prevention. In health care System we design Cloud and Admin Module screening that maintain Doctor and Patient record information and other some operation to achieve quality, safety, performance and accountability. For example the heart disease core reasons are many but most affective are physical fitness; low or high cholesterol level vary blood pressure that not affect daily routine but cause major problem after average time such as heart attack, to avoid such scenarios that uses cloud computing to treat, manage and control patients. The systems are supported and consisted of different algorithms such as Authentication Algorithms (the process or action of verifying the identity of a patient or process.)For patient record safety and cloud infrastructures (AWS) for store patient data/record, smart devices, and sensors and initiate different service types according to their context and environment.



**FIGURE 2:** Characteristics of Smart Healthcare.

## II. LITERATURE SURVEY

### A. Cloud Computing (CC)

There are many recent new technologies including mobile computing [1] [2], Cloud Computing, and wireless communications changed people lives

everywhere the world and made it easier [3][4]. The concept of Cloud Computing (CC) relies on a network-based resource sharing to extend resource availability and reduce financial and management costs [5].

There are several examples for emerging Cloud computing infrastructures/ platforms like Microsoft Azure, Amazon EC2, Google App Engine, and Aneka [6]. Cloud Computing utilizes a good range of various computing technologies, and involves distributed systems, virtualization, storage, networking, security, management and automation, service oriented architecture (SOA), and service-level agreement (SLA). Furthermore, CC helps companies improve the IT services, develop applications to realize unlimited scalability and automaticity on demand services of the IT infrastructure, and increase their revenues.

There are many advantages for adopting the cloud environment like [5]: Storage, Backup and Recovery: Location Flexibility: Time Efficiency and price saving.

## B. Mobile Cloud Computing

The development and therefore the spread of mobile devices allow the users to profit from wide selection of useful services and mobile applications at any time and from anywhere within the world. People use mobile devices to accomplish sort of daily tasks like online shopping, business management, educating and also health monitoring.

Mobile Cloud Computing (MCC) integrates mobile devices to utilize the cloud unlimited service and to enable information access for mobile devices users [7]. The Cloud Computing depends on network-connected resources pooled to maximise their utilization leading to reduced management and capital costs. Many sectors can enjoy MCC including the cloud-healthcare system. As an example, there's a MCC healthcare system that was built to watch and analyse real time biomedical signals (such as ECG) for users in multiple locations. A customized healthcare application is installed on the mobile device, and

health data are being synchronized into the healthcare cloud computing service to be stored and analysed [8].

There are many limitations facing portable mobile device that prevent taking advantage of their portability feature in many sectors including the healthcare. First, portable devices are restricted by their short battery lifetime, computational and storage capacity, which prevents them from performing complicated tasks, computation-intensive applications, and image processing, in social networking and organize meeting. Second, portable devices are operated on heterogeneous wireless networks, which cause the difference of network bandwidth capacity and communication quality; device mobility further affects the network connectivity and cloud resource availability [9]. In other words, MCC increases the capabilities of the mobile devices and overcomes their limitations, therefore the users won't worry about the specified CPU power and memory size to run intensive tasks.

To mitigate the requirements of mobile devices in computing capacity and resources, the mobile cloud computing (MCC) paradigm allows the computing, data storage and mass information science be offloaded to the cloud platform for enhancing the reliability and availability of services while minimizing the energy and computational requirements in mobile devices [10].

There are other challenges associated with storing data on the cloud, essentially is about data privacy and deny unauthorized access and malicious attacks. The supply of the owners' data in the least times for any request is challenge. Also, the integrity of the info and stop alternation or modification on the info by intruders is another issue. These information security concerns might be solved by using cryptographic techniques [11].

Although all the good features of the MCC, the MCC faces some challenges like the delay between the mobile device request and cloud service response especially when there's a far distance between the

cloud and therefore the mobile device. Also, there are inherited challenges of wireless network like variable data rates and fewer throughputs.

A cloudlet may be a recent concept that would be considered an answer for a few of the challenges facing the normal mobile cloud computing model. A cloudlet is little resource rich equipped cloud to be placed between the enterprise cloud and therefore the mobile device, to scale back the connection latencies and mobile power consumption [12]. The subsequent section highlights the cloudlet concept.

### C. Cloudlet

The cloudlet's concept may be a closer cloud with many advantages and capabilities to avoid several limitations of the remote cloud. It's believed that the cloudlet scheme which is taken into account as a middle stage between the enterprise cloud and therefore the mobile device has a superb chance to beat the challenges related to MCC like power consumption and latencies [8].

But, in some cases, the mobile user has got to connect on to the EC even when it's connected to the cloudlet. This happens when:

The mobile device must update files stored within the Enterprise Cloud. So, the mobile device sends the request for the precise file, then the file is going to be downloaded from the EC to the Cloudlet, and therefore the mobile device can process it.

Requesting specific services that aren't available within the Cloudlet. Motivated by the cloudlet concept, the authors in [12] proposed a mobile cloud system for university applications.

Their system uses different sensors to hold out many tasks. They introduced and implemented two main applications in traffic management and fire detection inside a university whereas the info from sensors is processed within the mobile cloud system.

In the same context, the researcher in [8] introduced an efficient cloudlet MCC model during which the mobile users communicate on to the cloudlet rather

than the enterprise cloud. Their model is applicable in many environments including hospitals were saving and processing big amounts of knowledge. There's a replacement concept of massive Data that's associated with the large amounts of stored/obtained data thanks to the advances in several technologies including cloud computing, social media, and wireless communication [13].

On the opposite hand, processing of massive amount of knowledge might be offline or real-time operation of some applications like healthcare applications where the info analysis and extracting the proper decisions make a difference between patient's life and death [14]. Figure 2 shows a general plot for the thought of using Mobile cloud computing for healthcare big data applications [15]. During this MCC model, the cloudlets are placed nearby the hospital and canopy a neighbourhood which will be accessed by authorized people that can access the patients' information and monitor their status remotely.

### D. Cloud-based Healthcare Systems

The healthcare sector and usually many other areas like transportation, finance industry, etc. have skilled a rapid climb recently thanks to the exponential growth in ICT.

The increasing role and benefits of ICT in healthcare are getting visible within the enhancement and emergence of technologies like health informatics, epidemiology, bioengineering and Healthcare Information Systems (HIS). we will now imagine a near future where healthcare providers can port powerful analytics and decision support tools to mobile computing devices (smartphones, tablets, laptops, etc.) aiding clinicians at the purpose of care helping them with synthesis of knowledge from multiple sources, optimization of clinical workflows, and context-aware deciding . the gang sourcing technologies also are coming to healthcare augmenting people in their deciding processes for his

or her wellbeing though the complexity of such a setting in healthcare domain, including appropriate models (reimbursement, who holds the liability), are posing challenges [16].

Aminian and Naji (2013) [17] propose a hospital healthcare monitoring system supported wireless sensor networks. Specifically, the monitoring system monitors physiological parameters from multiple patient bodies through a coordinator node attached to the patient's body that collects the signals from the wireless sensors and sends them to the bottom station. A presented mobile healthcare application in [18] to manage patient health records and medical images. The mobile application is developed using Android OS. The Amazon's S3 cloud service is employed during this mobile application. Authors in [19] discussed networked healthcare and the way mobile cloud computing could enable it. They presented the motivation and development of networked healthcare applications with the adoption of cloud computing. They described a usable cloudlet-based mobile cloud-computing infrastructure for dedicated healthcare applications. They utilized the cloud model in building fall detection system for elderly people.

In [20], the authors discussed EHR sharing and integration in healthcare clouds and related concepts. They analyzed the critical security and privacy issues in EHRs accessing and managing. An EHR security reference model was described to manage healthcare cloud security issues. They presented HER security reference model through a use-case scenario and described the corresponding security countermeasures and state of the art of applicable security techniques which will be primary security guards.

As an infrastructure for assistive healthcare, the Mobile Cloud for Assistive Healthcare (MoCAsH) is proposed in [21]. MoCAsH deployed intelligent mobile agents, context-aware middleware, and collaborative protocol for efficient resource sharing. MoCAsH deployed P2P paradigm to federate cloud to

manage security issues like data protecting and data ownership preserving.

Authors in [22] proposed a framework for secure health data system supported big data analytics in mobile cloud computing environment. This framework provides a high level of integration, availability, interoperability, and sharing of healthcare data among healthcare stakeholders. Thanks to the huge size of healthcare data and therefore the complexity of healthcare data types, the proposed framework employs big data analytics to assist physicians take critical decision at the proper time.

The authors in [23] proposed a Real-time face recognition acceleration architecture that integrates mobile devices, cloudlets, and cloud servers. They utilized the features of cloudlet-mobile cloud model and developed Cloud-Vision system to reinforce the vision related operations. Their results showed improvements in real-time face recognition by reducing the reaction time during face recognition process.

The authors in [24] proposed a Cloudlet based MCC system getting to reduce the facility consumption and therefore the network delay while using MCC. The MCC concepts are merged with the proposed Cloudlet framework and propose a replacement framework for the MCC model. The author of [25] presented an efficient software based mobile cloud computing which will be utilized in many useful different applications including: education and healthcare.

A Scalable Cloudlet-based Mobile Computing Model is proposed in [26]. The model utilizes the scalability feature where the number of deployed cloudlets can be adjusted based on the design requirements and the number of users in the region to be covered. The authors in [27] proposed a solution to automate patients' vital data collection by using sensors attached to existing medical equipment. These data are transformed to cloud for processing. The authors

in [28] proposed a framework for the unified middleware over heterogeneous networks.

### III. CONCLUSION

There are also a lack of research on the various issues of this area as in recent studies showed. Generally speaking, cloud-based pervasive healthcare is a new paradigm in healthcare sector and has many potential and beneficial features, but there are still several problems and challenges that need to be addressed by researchers in the future. These can be summarized into the following open research directions that should be focused upon in the future:

- As we described above, there are various service types in healthcare sector, such as monitoring, daily life assistance, medical assistance, pervasive access, emergency management and smart hospital. Designing a functional healthcare system for managing emergency situations or assisting medical cares is very important.
- Access to private context types like patient medical information by illegal persons should be banned. Security and privacy for sharing health records and access rights for both patients and professionals are other essential issues.

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