International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2015): 6.391

Secure Healthcare for Patients Using Cloud Computing

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Abstract: ***Cloud Computing is no more considered as an emerging technology. Now, it's a reality and this low cost computing power is gaining popularity amongst businessmen, especially medium and small size public organizations. Cloud computing is set of resources and services offered through the Internet. The paper proposes a new cloud computing solution to provide ease to access patient's medical information for hospitals. The main idea of proposing cloud based solution is to reduce the cost of construction and maintenance in healthcare, to reduce data loss risk; however the solution is generic and can be used by government hospitals and community based hospitals. The paper states the idea of using the cloud for storage of patient's medical information. Further the link set up between the (Government) Public Health Centre and hospitals which makes it comfortable and provides ease to patients from rural areas to get the medical facilities from the Hospitals appropriately which will be done using IIS (Internet information system) feature of windows OS which will host the website on Local Area Network. Using Microsoft SQL server database with necessary information of the patient will be available to the hospital profile so that accurate measures will be taken. This becomes easy for hospitals to maintain information according to various Gram panchayat's. Public Health Centre updates patient's information on the cloud and which is accessed easily by the hospitals. So it benefits in saving time of patients from rural areas in transportation. As medical details will be uploaded on the cloud so patient's details are easily available, so no need to diagnose his basic details again and again thus saving on expenditure. This idea will also facilitate hospital services like having doctor's and required staff fo r proper functioning of the setup.***

Keywords: Gram Panchayat- GP, Primary Health Centre- PHC, Personal Computer-PC

1. Introduction

Cloud computing takes the emphasis away from local computers. It is less about the machine in use at home or on the move and more about what happening on computers many miles away. Instead of storing information on PC, smart phone or tablet, data can be kept remotely. It will then be made available to any device that is capable of reading it. The benefit of this is very clear: no one needs to be tied to a computer or phone; all that is needed is a way of accessing the data and that can be done from any machine.

Significant improvement in science and technology has changed our lives and our life styles. Cloud computing, Big data and data mining are the hottest topics or research areas in the fields of Networking and information technology. In contrast to the improvement in other areas, healthcare services are improving.

Cloud assisted health monitoring, which applies the prevailing communication and cloud computing technologies to provide feedback decision support, has been considered a revolutionary approach to improving the quality healthcare service while lowering the healthcare cost. In current hospitals patients have to stand in a queue and fill forms manually. There is no permanent records of the patients and no global accessibility. In emergency doctor needs to diagnose every time, tests, report generations.

Cloud carrier is the intermediary which provides connectivity and transport of cloud services between the cloud provider and the cloud user(gram panchayat and hospital). The study of the cloud carrier is important as the cloud users have no control over the network through which the data transports. This leads to an efficient data exchange between user and server with a tool to search and segregate available data/ options according to user requirement.

2. Methodology

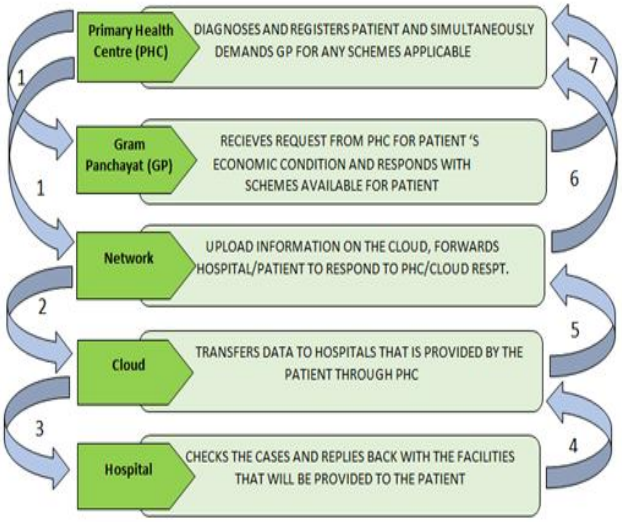


Figure 1: Flow chart of the project

1) The patient approaches the PHC , PHC diagnoses the patient and checks the veracity of medical reports. These reports are then uploaded to the cloud through the network by PHC (chief medical officer) after being authenticated. This information is forwarded simultaneously to the Gram panchayat demanding for the government schemes and facilities for patients.
2) The network which is described as the link setup between cloud and PHC and is responsible for aggregating information from different gram panchayat and forwards this to cloud for generating database.

3) The cloud transfers data to hospitals that is provided by the patients through PHC which basically contains patients medical information and reports which is taken by hospitals as a case.
4) After studying the case the hospital reverts back with available resources, schedule , estimated cost and other details to the cloud.
5) Now cloud has information from all the hospitals which are interested to take up the case, which is then forwarded to the network.
6) The network decides where to forward hospitals response depending on the tags and respective gram panchayat ids, to the PHC concerned.
7) Simultaneously hospital responds to PHC regarding the government schemes that the patient is applicable too.

The cloud also provide security to whole network by monitoring the data flow through it. This monitoring is done by third party nobody else than administrator which in server back office keeps a track of data flow, connection establishment and management, network security using firewall, and security from network attacks.

3. Importance and Motivation

The benefit of this is very clear, no one needs to be tied to a computer or phone.

All that is needed is a way of accessing the data and that can be done from any machine.

Like laptops, smartphones, tablets, or any other device capable of accessing data

- To reduce the paperwork of the hospital and patients.
- To reduce time spent over transportation.
- To reduce interdependency of hospitals over patients and vice versa.
- To introduce fast and efficient information sharing and response remedy.
- To increase dependency on technology.

4. Design of the System

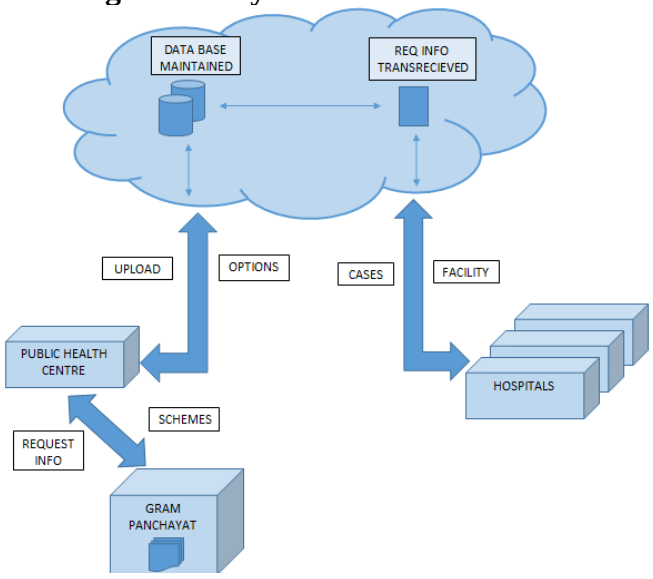


Figure 2: Structure of the project.

The Public Health Centre does the job of uploading the patients health related information on Cloud.

This information on the cloud is further passed to the Hospitals and Gram panchayat which they can access through their log in.

Once the hospital gets the information of the cases related to the patients it replies with the facilities provided by them on the particular disease.

Further the Public Health Centre decides on from the particular hospital which will avail aid to the patient and the Gram Panchayat sends the schemes and government facilities that the patient can avail from the Government.

By using this we can even provide facilities to the village at its particular Gram panchayat center on weekly basis depending on the need of the villagers.

5. Hardware & Software Requirements

Laptop/Desktop
It is required for installation of various software required to generate cloud and different assisting applications. It will act like server and data storage for the cloud. A device compatible for accessing server is required by the host user (Gram Panchayat & hospital) to communicate for data transmission to and from with server.

MySQL
MySQL is a popular choice of database for use in web applications, and is a central component of the widely used LAMP open source web application software stack (and other "AMP" stacks)..it is a software that will be used to manage the database for the cloud.

Microsoft SQL Server
Microsoft SQL Server is a relational database management system developed by Microsoft. As a database server, it is a software product with the primary function of storing and retrieving data as requested by other software applications which may run either on the same computer or on another computer across a network (including the Internet). Microsoft markets at least a dozen different editions of Microsoft SQL Server, aimed at different audiences and for workloads ranging from small single-machine applications to large Internet-facing applications with many concurrent users.

Visual Studio
Microsoft Visual Studio is an integrated development environment from Microsoft. It is used to develop computer programs for Microsoft Windows as well as websites, web applications and web services. Visual Studio uses Microsoft

software development platforms such as Windows API, Windows Forms, Windows Presentation Foundation, Windows Store and Microsoft Silverlight. It can produce both native code and managed code. Visual Studio includes a code editor supporting IntelliSense (the code completion component) as well as code refactoring. The integrated debugger works both as a source-level debugger and a machine-level debugger. Other built-in tools include a forms designer for building GUI applications, web designer, class designer, and database schema designer. It accepts plug-ins that enhance the functionality at almost every level—including adding support for source-control systems (like Subversion) and adding new toolsets like editors and visual designers for domain-specific languages or toolsets for other aspects of the software development lifecycle (like the Team Foundation Server client: Team Explorer).

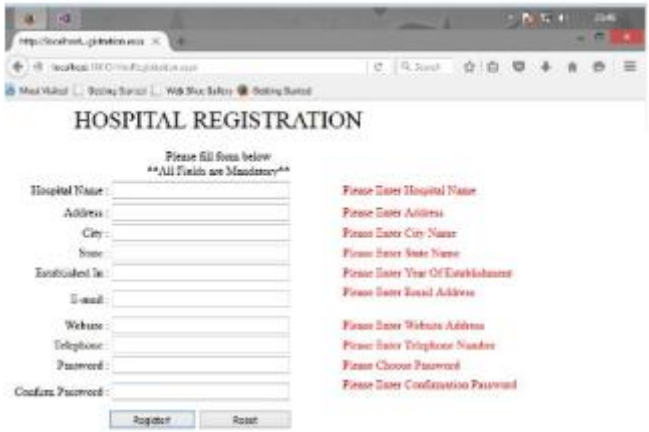
6. Work Done

Web page development and database storage is done**.** The project is working few webpages are as below:

Home Page

Gram Panchayat Login Page

Hospital Login Page



Hospital Registration Page

7. Conclusion

This saves the time of the patient in travelling to the hospitals in the cities.

The information accessed through the cloud server in the hospitals will state the health of any patients and treatment facilities can be availed for the same.

This project can be implemented for betterment of people mostly in Rural areas.

This will make sure that the doctors and hospital staff will be made available in that locality. For proper and efficient functioning of the resources provided.

8. Future Scope

First level security is provided in the form of user id and password for individual Gram Panchayat, Primary Health Centre and Hospital, it can be further improved by installing firewalls.

For efficient working we can use biometric authentication government hospitals and maintain attendance for doctors and staff.
Medicinal and vaccination supply can be regularly checked and maintained in rural area.

Emergency beacons in the form of shortcuts can be provide which will call for closest ambulance.

Database generated can be maintained which will digitize medical status of the patient and can be utilized for future medical issues of the same person.

Database if maintained properly will also support other governmental programs like Census etc. and governmental schemes like sarvashiksha abhiyan, pradhan mantri jan dhan yojana etc.

This procedure saves time, money and efforts of a patient to travel to several hospitals at different locations for various facilities.

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This project can be implemented for betterment of people mostly in rural areas.
This will make sure that the doctors and hospital staff will be made available in that locality. So for proper and efficient functioning of the resources provided.

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