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Cloud Computing

Manya Sangal, Aman Rajiv Mathur

Computer Science Engineering Third Year, SRM University
Kattankulathur 603203, Kancheepuram Dist., Tamil Nadu, India.

1. ABSTRACT

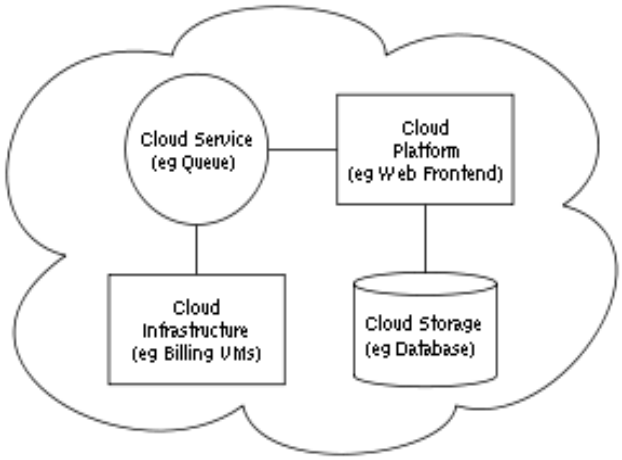
Cloud computing, is a computing platform for the next generation of the Internet. Cloud computing refers to the use and access of multiple server-based computational resources through a digital network. *InJect* is a futuristic project which uses cloud computing's SaaS in the domain of Healthcare and Medicine.

Key words: *InJect, clouds, SaaS, scalability.*

2. INTRODUCTION

Clouds can primarily be defined as the platforms that allow execution in various forms across multiple resources. To be more specific, a cloud is a platform or infrastructure that enables execution of code (services, applications etc.).

In cloud computing, applications are provided and managed by the cloud server and data is also stored remotely in the cloud configuration. Users do not download and install applications on their own device or computer; all processing and storage is maintained by the cloud server.



The general **architecture** of a cloud consists of:

- **Front end platform:** The front end includes the client's computer (or computer network) and the application required to access the cloud computing system
- **Back end platform:** On the back end of the system are the various computers, servers and data storage systems that create the "cloud" of computing services
- **A central server:** A central server administers the system, monitoring traffic and client demands to ensure everything runs smoothly.

The **services** that clouds generally provide are:

- **SaaS: Software as a service : :** SaaS is a complete operating environment with provisioned applications, management, and the user interfaces. Through SaaS companies can access applications and large amounts of virtual computing power without buying it.
- **IaaS: Infrastructure as a service:** Infrastructure as a Service is a provision model in which an organization outsources the equipment used to support operations, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it.
- **PaaS: Platform as a service:** PaaS provides virtual machines, operating systems, applications, services, development frameworks, transactions, and control structures. It is a category of cloud computing

services that provide a computing platform.

General aspects of cloud computing:

- Elasticity
- Reliability
- Quality of Service
- Cost reduction
- Pay per use.
- Virtualisation
- Security, Privacy and Data Management

3. OUR PROPOSAL-*INJECT*

Healthcare lags behind in the adoption of technology. Most healthcare organisations depend on workflows that consist of paper medical records, duplicate tests, and handwritten notes.

Cloud computing has various applications in the domain of Healthcare and medicines. More and more service providers are offering healthcare solutions and services such as telemedicine, electronic medical records and patient management that can be integrated to a cloud.

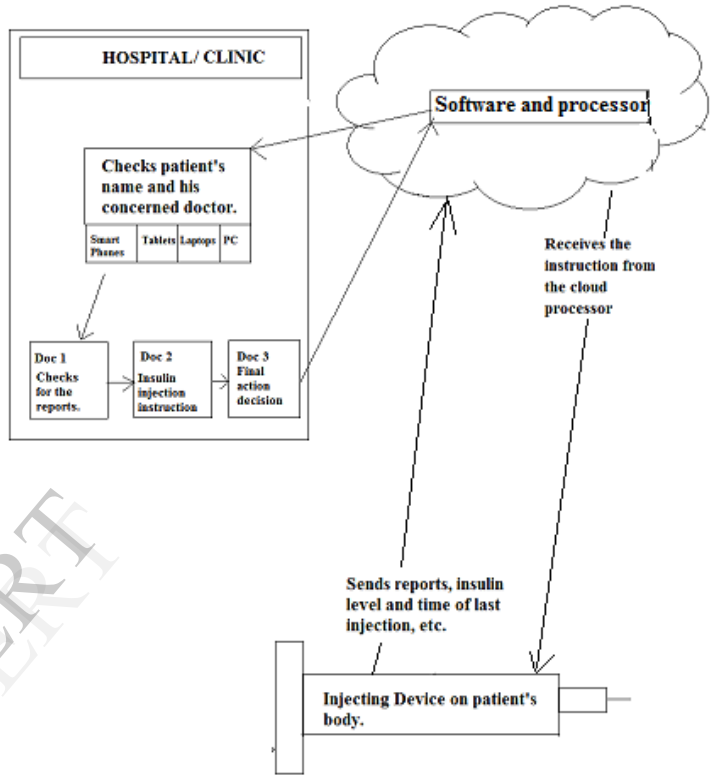
Cloud can enable service providers to rapidly and cost-effectively integrate their applications, and operations capabilities into a set of cloud services that can be deployed to customers, in our case patients, using a wide range of network connections (fixed and mobile). In many cases these services can be composed of existing applications and infrastructure anywhere in a cloud configuration to a set of patients that can either be permanently or temporarily connected into the cloud. The service connections can provide high levels of security and can be monitored precisely to enable accurate billing and usage information for the individual services.

Inject is a futuristic project which will use an application stored on the cloud and send and receive data from patients and their doctors.

The initial stages of the project is aimed at serving diabetic patients. This project will be helpful for patients who cannot afford to lose time and reach out to the doctor personally due to busy schedule, distance, old age or other unavoidable reasons.

4. ARCHITECTURE

Fig.1 InJect Architecture



Architecture of Inject consists of three divisions:

- The Glucometer device
- Software configured into the cloud
- Doctor's device (Smartphone, tablet, laptops or PC).

4.1 The Glucometer device

The glucose meter or glucometer is a medical device for determining the approximate concentration of glucose in the blood. It is a key element of the so called home blood glucose monitoring system (HBGM)

A small drop of blood, obtained by pricking the skin with a *lancet*, is placed on a disposable test strip that the meter reads and uses to calculate the

blood glucose level. The meter then displays the level in mg/dl.

Features that will be added to existing models of glucometers for InJect are:

- **Data transfer**: Meters will have sophisticated data handling capabilities. They will be able to send the recorded data to the *InJect* software on the cloud through Wi-Fi technology or Cellular data transfer.

- **Testing schedule**: This data will be recorded by the device and tests will be performed on the time scheduled by the doctor.

This is all the information that this device needs to have, rest all will be handled by the software on the cloud. All that is required is uninterrupted data transfer from the glucometer device to InJect software and vice-versa.

Recent advances in cellular data communication technology have enabled the development of glucose meters that directly integrate cellular data transmission capability, enabling the user to both transmit glucose data to the medical caregiver and receive direct guidance from the caregiver on the screen of the glucose meter.

4.2 INJECT AS SOFTWARE

The main component of this project is this software which is going to handle and manipulate the data, process it, make it readable and send it to the concerned doctor's device.

Functionality of the software would be as follows:

- To receive the data from the glucometer.

- Tabulate the data and form a presentable report for the doctors to read.

- It may also be required that this software has to compare the previous reports of the patient with the current report in order to do a comparative study.

- It will also form comparative graphs about the patient's condition based on previous reports.

- All this information will be organised and will be displayed with a *GUI* (graphical user interface) at the doctor's end.

- When all the data is organised, it will be sent to the doctor on his device.

4.3 DOCTOR'S DEVICE

- The doctor can receive the information stored in the cloud on his hardware device like iPad or a laptop through internet access.

- He, after analysing the reports will store his feedback (that whether the patient should be injected with insulin or not) into the cloud through his device.

4.4 INJECT BACK INTO ROLE

- Now the cloud forwards the information to the glucometer device in form of binary digits 1(for injecting the insulin) and 0(for not injecting the insulin).

- Now the glucometer reads the signal and the patient is injected accordingly.

5. ADVANTAGES

This device will not only bring relief to the patient but also the doctor, who generally have a very tight schedule.
Further, we have many other advantages such as follows:

1. Doctors can monitor patients more effectively.

2. Reduce spending on technology infrastructure. Maintains easy access patient's information.

3. Everything is stored in the cloud, data can be accessed no matter what happens to a machine.

4. Patients can send/receive data from home, on holiday or to and from work. If doctors need access to your data, they can connect to the cloud, quickly and easily.

5. REFERENCES

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