

# Cloud computing for mobile trauma care

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## ABSTRACT

Cloud computing is the newly evolved next generation's technology , emphasizes on sharing and virtualization concept, carries a solution for providing more secured, economic on air services. Involves software, platform, infrastructure, testing etc, it is to help small medium corporate, government, somehow large enterprises for their short term temporary projects. It's a better solution for distributed services. This paper is about use of cloud computing in the field of trauma care as a mobile trauma care ambulance, maintaining the doctor's facilities for that as well as Datacenter and databases regarding patients. First, the paper describes the cloud computing, its structure and advantages, and then the trauma care solution

## 1 Introduction

Cloud computing is a relatively recent term, which basically defines a new paradigm for service delivery in every aspect of computing. For example, it changes the supporting and managing the computing resources, such as database, storage system, file system etc. Today leading companies such as GOOGLE, MICROSOFT, and IBM provides the cloud infrastructure for services to the customers. It is the next stage of the Internet evolution. A cloud has several different properties such as elasticity and scalability, multi-tenancy, self-managed function capabilities, service, billing and metering function, connectivity interface and technologies.[1][2]

## 2 Cloud Computing

“Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.” [6]

Cloud computing having some broad areas in term of service classification which are being provided over the internet, the services over the networks are like:

(A). Application or software as a service (SaaS):-Provide software or utilities that helps the user to use a customized application or software provided by the service provider.[10] E.g. Google Apps, GT Nexus, Amazone.

(B). Infrastructures as a service (IaaS): - IaaS provide hardware and firmware as resources to the customer so that the customer is not required to purchase the huge amount of resources for their project such as computer hardware including data storage systems, network equipment and system software [8] the user can hire the resources in a flexible and elastic manner . e.g. HP Cloud, Oracle infrastructure.

(C).Platforms as a service (PaaS):-PaaS provides facility for development and execution environments to the programmer for applications development where user can hire this service to get the software for developing its applications. [9]AWS Elastic Beanstalk, Cloud Foundry.

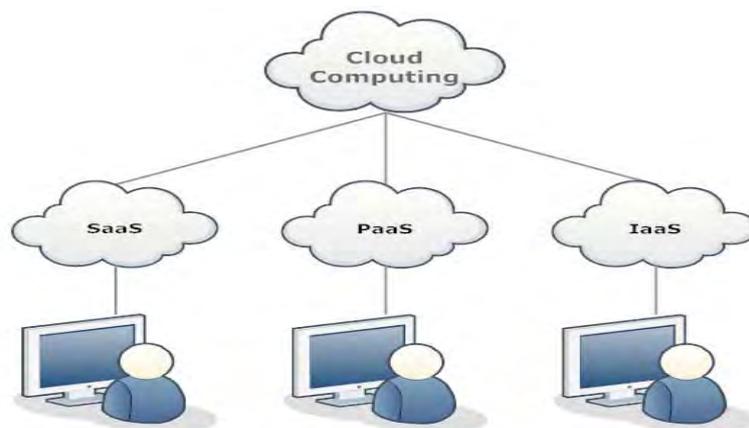


Figure 1 Basic Services [13]

Cloud computing is evolving resources that include infrastructures, software, applications, testing, databases, business processes. Virtualization is a core technology for enabling cloud resource sharing. Cloud computing is

a service-oriented architecture (SOA) provides more flexible, extensible, and reusable services by collaborating SOA and virtualization. [10]

**3. Advantages of cloud computing**

SME (Small Medium Enterprises)for their projects mainly short term projects has to involve enough cost and time regarding software, hardware, maintenance, up gradation and manpower. Cloud computing helps in eliminating these expenditures and can provide better resources in term of infrastructure and services with elasticity, as resources wastage and system crashing is also one of the major issues for SMEs.

**3.1 Availability.**

Cloud-computing system provided by a large service providers like Amazone and Google they have multiple redundant resourcing and redundant equipment which support services almost each and every time and on large scale as compare to individual business enterprises.[11]even if the whole it department of the company goes down or crashes because of some technical issues, the services will be continued by the provider itself. As in case of trauma care it will be proved as very beneficial feature.

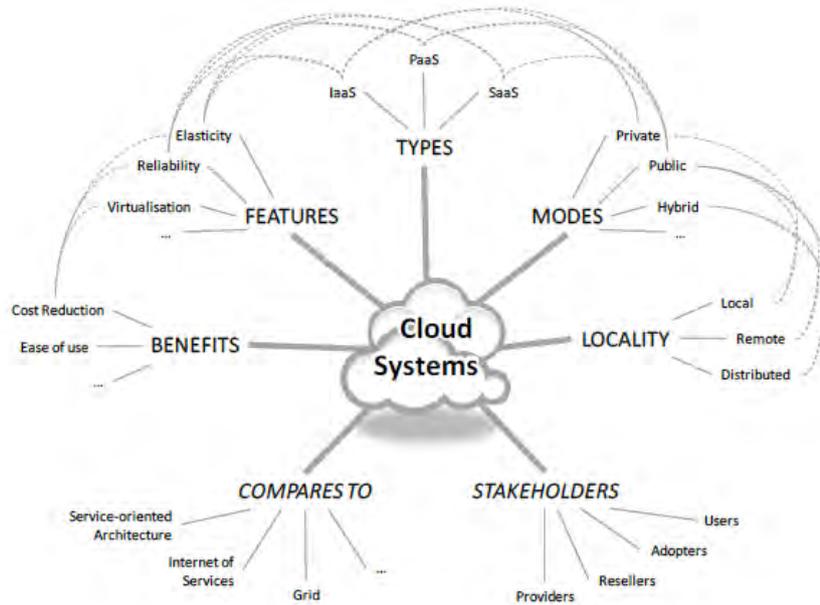


Figure 2: The Future of Cloud Computing [14]

**3.2 Application integration and support.**

According to the Salesforce.com director of platform research Peter Coffee. “The systems generally use SOAP, the Web Services Description Language (WSDL), and other nonproprietary Web service protocols, many XML-based. This enables easy interaction with and support of legacy resources and other infrastructure services”.[15]It is easier and compatible if SME or any customer uses many services over single integrated platform, it may help in using resources in cost effective and efficient manner and will help in working over more complex application

**3.3 Flexibility.** The users may change their resource preference and use other resources as per the changing requirements provided by the cloud or may also change their service provider. This makes cloud computing a good way to get the extra resources needed for activities such as testing new services or products. [5]

**3.4 Elasticity** The cloud services can be used on any scale and the scale can be shifted to small, medium or large [12] for example if the customer is availing infrastructure services to connect its 100 users in future he can have the same type of services for 1000 users or so.

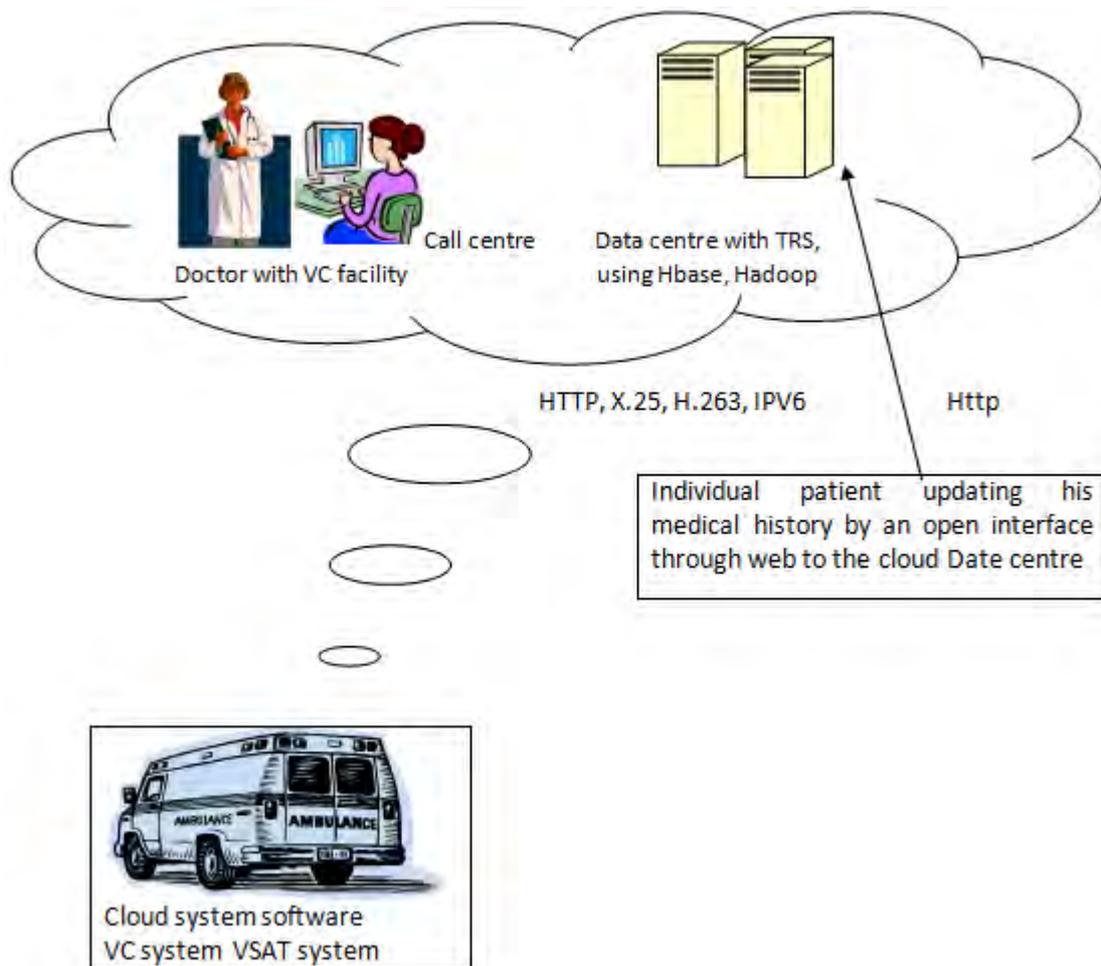


Figure 3: Cloud Based Trauma Care Mobile Architecture

## 5 A PROPOSED SOLUTION TO HEALTH SECTOR FOR MOBILE TRAUMA CARE AMBULANCE

Here we will compare the MOBILE TRAUMA facility provided by a health care enterprise or hospital and provided using the cloud based health care service architecture.

5.1 Table 1: Traditional Mobile Trauma Care Vs Cloud Based Trauma Care

	<b>Health care enterprise server or hospitals</b>	<b>Cloud based health care service.</b>
1	Trauma ambulance is connected with the specialist Doctor in the particular hospital through the hospital intranet or on mobile.	Can provide facility to hire any specialist Doctor service available on cloud.
2	Video conferencing facility will require higher bandwidth and if the bandwidth will be purchased, will prove a costly affair.	Video conferencing facility may be provided on demand on hire bases using Voice over IP ,Hyper text transfer protocol
3	GPS and Real time traffic reporting system has to be purchased as an additional service from the internet provider	GPS and real time traffic reporting system for searching the shortest and lowest traffic path, nearest possible hospital can be used as one elastic service.
4	Services from the entrepreneur hospital or group of Hospitals can be used.	Services of any cloud based remote hospital can be used.
5	The patient previous record may or may not be on the hospital's server.	Patient previous data can be accessed by the large data centre available in the cloud for example either the patient is having any diabetics or thyroid or similar history , and accordingly better trauma care can be provided.
6	The hospital has to manage the complete call centre including employee and management team with the different servers and software for the trauma ambulance services.	The cloud IaaS and SaaS services can be availed, the elastic nature of cloud service will be proved as cost effective and reliable solution.
7	During the period of disaster recovery or management the trauma care centre or hospital may be damaged and in that case no support will be available in the ambulance.	While in Disaster Management case the cloud service will be proved as a silver bullet and secured because of its virtual nature

## 6 Conclusions and future scope

Cloud computing has gained significant attention in recent years as it changes the way of computation and providing the services to the customers. Virtualization is a core technology for enabling cloud resource sharing. Cloud computing is a perfect tool for mobile trauma care further on experimental basis the mobile trauma ambulance launched with cloud computing facilities may be run to experience the benefit of cloud.

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