

Innovative Use of Cloud Computing in Smart Phone Technology

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Abstract - This paper elaborates the vital and innovative use of Cloud computing in the field of Smart Phone Technology. In the proposed environment there is a cloud server installed at the central place called as cloud center of mobile computing. The function of cloud computing is to accept the request of the end users and process the required applications accordingly. Henceforth this server is fully equipped with all advance ICT infrastructure, mobile communication utilities and full security measure, so that every feature can be used with full security. All users are having equal priority to get connection with the cloud server and use every application as well as each function equally. Due to use of this modern technology the main advantage is that a single entity is being used by many remote users for various requirements at the same time without occupying much space and infrastructure. The resulting new paradigm of mobile cloud computing is being embraced by researchers, professionals and practitioners as an exciting new way to extend the capabilities of mobile devices and mobile platforms. This has the potential for profound impacts on the business environment and people's daily life.

The most salient feature of the system is that by the use of this infrastructure we can perform mobile communication and electronic communication by a single unit and the same communication spectrum. The presented cloud computing technology offers a natural solution for expanding the limited capabilities of mobile devices. This process makes the whole communication system cost effective, efficient, transparent, modular system.

Index Terms - MTSO, IaaS, SaaS, IaaS, NaaS, Virtual Machines Cloud Client, Base Station, Cell Site, PSTN, Mobile Station.

1. INTRODUCTION

Recent advanced researches in 'Mobile Communication Networks' and increasing penetration of smart phones are transforming the 'Mobile Internet' and empowering end users with rich mobile experience. Although having the limited computing utility features, and storage capabilities of mobile devices are affecting the customer mentality, this hampering their abilities to support increasingly demand of sophisticated applications by the end users. As described in [1,2], we know

that communication is a very important process in human's life, so that human being continuously evolving this process day by day and making it simpler and faster. Cloud computing is one of the very latest step in this direction. Cloud computing is the use of computing resources (hardware, software and networking) that are delivered as a service over a network (typically the Internet). The name comes from the use of a cloud-shaped symbol as an abstraction for the complex infrastructure. It represented in system diagram fig.1. Cloud computing entrusts remote services with a user's data, software and computation. Thus it is just like using some applications or facilities by not directly installing in devices as we normally do. This system is the evolved version of remote access. The figure below shows that all applications, infrastructures are present at a centralized location, from there all end users can access these applications and infrastructures.

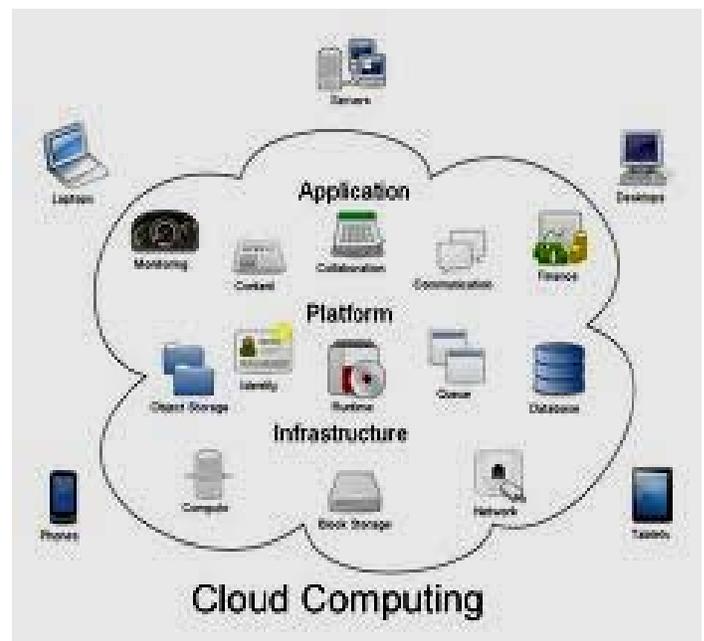


Figure 1: Cloud Computing Architecture

Cellular Communication is one of the old and still growing communicating ways in today's world. Birth of this process is due to Marconi who invented antenna and successfully perform the experiment of transmitting and receiving the electromagnetic wave. From that day wireless communication can't be stopped in communication movement. To make efficient use of antenna in communication many ways are used and finally cellular communication comes into picture. Now a day's cellular communication has become a necessity for communication architecture. As conceptualized in [3], cellular

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system or mobile network is a radio network distributed over land areas called as cells. Each cell is served by at least one fixed-location transceiver, known as a cell site or base station. In a cellular network, every cell uses a different set of frequencies from neighboring cells. It happens to avoid interference and provide guaranteed bandwidth within each cell. When combined together these cells provide radio coverage over a wide geographic area. This enables a large number of portable transceivers (e.g., mobile phones, pagers, etc.) to communicate with each other using fixed transceivers and telephones anywhere in the network, via base stations. Even if some of the transceivers are moving through more than one cell during transmission. Cellular networks offer a number of advantages over alternative solutions as:

- Flexible enough to use the features and functions of almost all public and private networks.
- Increased capacity reduced power use.
- Larger coverage area.
- Reduced interference from other signals.

The most common example of a cellular network is a mobile phone (cell phone) network stated in [3]. A mobile phone is a portable telephone which receives or makes calls through a cell site (base station), or transmitting tower. Radio waves are used to transfer signals to and from the cell phone. Modern mobile phone networks use cells because radio frequencies are a limited, shared resource. Cell-sites and handsets change frequency under computer control using low power transmitters, so that a limited number of radio frequencies can be used by many callers simultaneously with less interference. A cellular network is used by the mobile phone operator to achieve both coverage and capacity for their subscribers. Large geographic areas are split into smaller cells to avoid line-of-sight signal loss and to support a large number of active phones in that area. All of the cell sites are connected with telephone exchanges (or switches), which in turn connect to the public telephone network in cities, each cell site may have a range of up to approximately ½ mile, while in rural areas, the range could be as much as 5 miles. It is possible that in clear open areas, a user may receive signals from a cell site 25 miles away. Since almost all mobile phones use cellular technology, this includes GSM, CDMA, and AMPS (analog). The term "**cell phone**" is in some regions, notably the US, used interchangeably with "**mobile phone**". However, **satellite phones** are mobile phones that do not communicate directly with a ground-based cellular tower, but may do so indirectly by way of a satellite as shown in **fig.2**.

1.1 CLOUD CONCEPTION

Cloud computing is a growing computing paradigm that was innovated to deploy cost effective solutions over Internet. As mentioned in [4], various companies such as Google, IBM, Amazon, Yahoo and Intel have already started providing computing infrastructures for its intended use. Cloud computing is a style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet. It is a scalable service delivery

platform build over Service Oriented Architecture (SOA) and virtualization concepts. The benefit of cloud can be stated in two perspectives as:

- From cloud service provider perspective and
- From cloud user perspective.

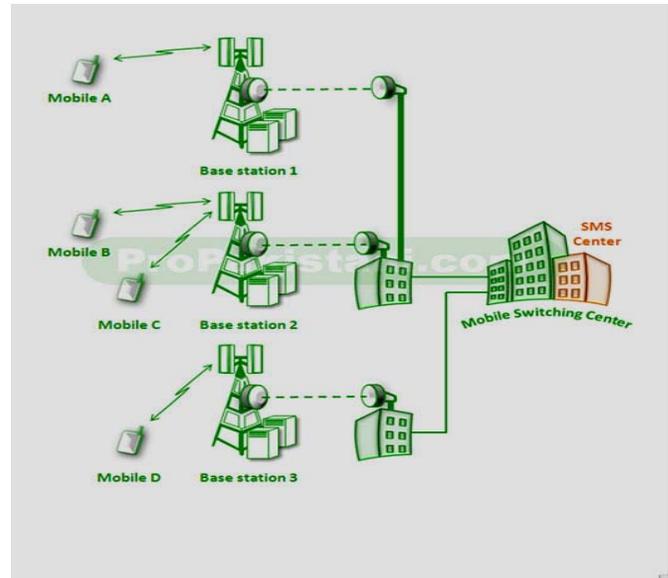


Figure 2

Cloud service providers get benefited with the better utilization of infrastructure they own. Even, they can obtain an improvement in the processing power with minimal additional cost as defined in [7, 8, 9, and 10]. The article [13] have described the various burning issues related to mobile application with cloud computing. Thus, giving way for new business opportunities and speed up existing business processes. Users get benefited by paying only for what they consume and even they need not have insights of the technology infrastructure used in the "cloud" that supports them. Data analytics applications which require processing extremely large datasets while supporting extreme scalability is attracting huge interest towards cloud. The cloud computing generally incorporates combinations of the following:

- Providing servers, software, and office space and network equipment as service.
- Providing computing platform and solution stack as a service.
- Providing an application as a service.

Cloud contains of large number of servers facilitating distributed computing platform. Each server can have multiple virtual machine instances (VMs) of the applications hosted in the cloud. As customer demand for those applications changes, new servers are added to the cloud or idled and new VMs are instantiated or terminated. A major advantage with cloud is the recoverability in case of disaster. Cloud data is mostly backed up regularly and stored in a different geographic location. This eases the recovery process which otherwise is a very costly feature for companies. Cloud computing infrastructure is totally

different from the current data warehouse infrastructures. Unlike the high-end servers which constitute the current infrastructure, Cloud computing offers the same functionality at low-cost. Since most analytics for an organization use large number of database reads than writes. There is a requirement for new relational database software architecture to efficiently store and retrieve large volumes of data for computation on Cloud. In a cloud, node failures and node changes may occur frequently. Hence the cloud uses a vast numbers of processing units, so the failures may occur in the cloud also. It can be shielded from its users using robust policies to make the cloud as tolerant as required (or requested). The best cloud databases will replicate data automatically across the nodes in the cloud cluster. This would be able to continue running in the event of 1 or more node failures, and be capable of restoring data on recovered nodes automatically—without DBA assistance. Ideally, replication will be “active-active” in that the redundant data may be queried to increase performance. The whole cloud computing is mainly divided into 3 steps as the 3 cloud services are given below:

- a) Infrastructure as a service
- b) Platform as a service
- c) Software as a service

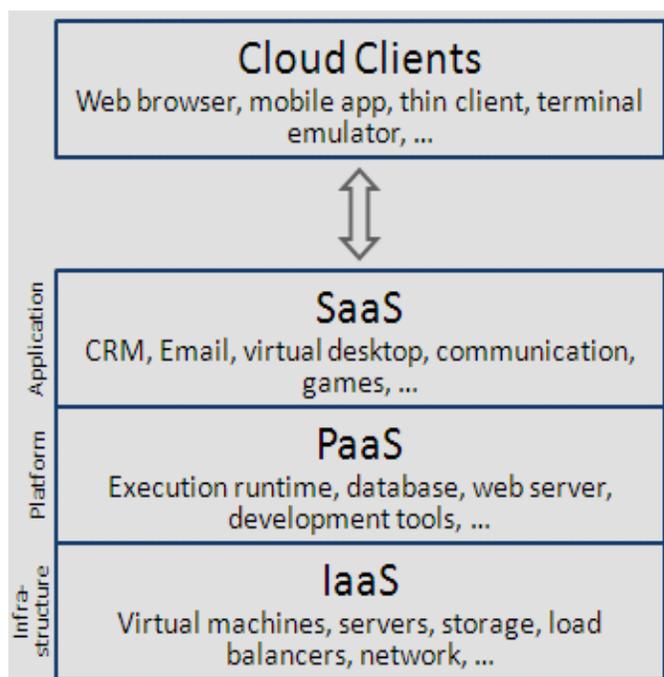


Figure 3

1.1.1 Infrastructure as a Service

It is the most basic service provided by service provider. It broadly contains database, computing server, network, etc. In the most basic cloud-service model, providers of IaaS offer computers - physical or virtual machines - and other resources. Clouds often offer additional resources such as images in a virtual-machine image-library, raw (block) and file-based

storage, firewalls, load balancers, IP addresses, virtual local area networks (VLANs), and software bundles. To deploy their applications, cloud users install operating-system images and their application software on the cloud infrastructure. In this model, the cloud users install and maintain the operating systems and the application software. So by the above explanation we can say that in first step we are developing basic requirement for cloud computing the machines, network, storage, operating system, etc. The service provider will arrange all the basic requirements on a single place and control the whole communication process.

1.1.1. Platform as a Service

Now the next step is an intelligibility step because here the service provider has to use the infrastructure which was collected in first step and is used to make the software run on that infrastructure, so that the desired results can be obtained. In the PaaS model, cloud providers deliver a computing platform typically including operating system, programming language execution environment, database, and web server. Application developers can develop and run their software solutions on a cloud platform without the cost and complexity of buying and managing the underlying hardware and software layers.

1.1.2 Software as a Service

By using above two services the service provider can put various applications in the cloud server which are used by end user. In the SaaS model, cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients. The cloud users do not manage the cloud infrastructure and platform on which the application is running. This eliminates the need to install and run the application on the cloud user's own computers simplifying maintenance and support. What makes a cloud application different from other applications is its scalability. This can be achieved by cloning tasks onto multiple virtual machines at run-time to meet the changing work demand. Load balancers distribute the work over the set of virtual machines. This process is transparent to the cloud user who sees only a single access point. To accommodate a large number of cloud users, cloud applications can be multitenant, that is, any machine serves more than one cloud user organization. So there are many services in the form of software are kept on the cloud network which is used by end user.

1.1.3 Network as a Service

As the name showing, provider uses network to provide the services to the end user, inter network of cloud network. A category of cloud services where the capability provided to the cloud service user is to use network/transport connectivity services and/or inter-cloud network connectivity services. Traditional NaaS services include flexible and extended VPN, and bandwidth on demand. NaaS concept materialization also includes the provision of virtual network service by the owners of the network infrastructure to a third party. Now some special

arrangement must be done like according to the requirement of user, that user must have some minimum hardware and software.

1.1.4 Cloud Client

In cloud computation end user is called cloud client. So the cloud client must fulfill some minimum requirement. User access cloud computing using networked client devices, such as smartphones. Some of these devices (cloud client) rely on cloud computing for all or a majority of their applications so as to be essentially useless without it. Examples are thin clients and the browser-based clients. Many cloud applications do not require specific software on the client and instead use a web browser to interact with the cloud application. Some legacy applications (line of business applications that until now have been prevalent in thin client Windows computing) are delivered via a screen-sharing technology as studied from [6]. Finally, on the basis of all above explanation we come to know that this whole arrangement is centralized in providing the services and control the communication.

1.2 Cellular Mobile Communication

There are many reasons for the development of mobile communication over conventional telephone system. These are limited service capability, poor service performance and inefficient frequency spectrum utilization, etc.

1.2.1 Basic Cellular System

A basic cellular system consists of three parts: a mobile unit, a cell site and a mobile telephone switching office (MTSO) is presented in fig.4.

A mobile unit contains a control unit, a transceiver and an antenna system. Mobile unit is the basic unit of cellular mobile communication. It is operated by end users. This is the device by which the end user can avail the facilities and communicate to other end user. As the technology is growing this basic unit has also evolved too much. Now a day's smartphone has replaced the most basic mobile phone. A mobile phone contains a central processing unit which performs the most basic function of communication i.e. modulation and demodulation. This unit contains a transceiver system to perform modulation and demodulation for transmitting and receiving the data/information. Finally, a mobile unit must contain an antenna to radiate and receive the radio waves which contains the information transmitted in wireless communication process. Here in this study mobile unit is smartphone. Smartphone is a mobile unit with a dedicated operating system with very advanced computing abilities, advance connection capabilities than a normal phone. Smartphone is a combination of PDA (personal digital assistant), normal mobile phone, functionality of portable media players, low end compact digital cameras, pocket video cameras, and GPS navigation units to form one multi-use device.

1.2.3 Cell Site

The cell site provides a interface between the MTSO and the mobile units. It has a control unit, radio cabinets, antennas, a power system and data terminals. Cell site is a mediator because of cell site only a connection can be established. This contains a central processing unit which is responsible for making the connection of a mobile unit with MTSO; it is also responsible for basic requirement of communication. This CPU have to do many tasks like establishing connection, handoff, maintaining the signal strength, etc. The next part of cell site is radio cabinets. These are used to control the radio waves, which are finally used in communication. The next part is antenna, it is very important part of a cell site to maintain proper signal strength and low noise communication then antennas plays a very big role in these areas, so selection of proper antenna is required. This whole system is named as base station. Over this the designing of cell site is also very important to achieve the good communication process. The designing also plays a very important role to save bandwidth, spectrum, power, etc. As drawn in fig.5.

1.2.4 Mobile Telephone Switching Office(MTSO)

The switching office, the central coordinating element for all cell sites, contains the cellular processor and cellular switch. It interfaces with telephone company zone offices; controls call processing and handle billing activities. It is the main soul of whole cellular communication process because it switches the connection between one end user to another end user by making connection with another MTSO through wire or satellite. It records billing, call records, data usages and all information of an end user like registration id, address, etc., as shown in [5].

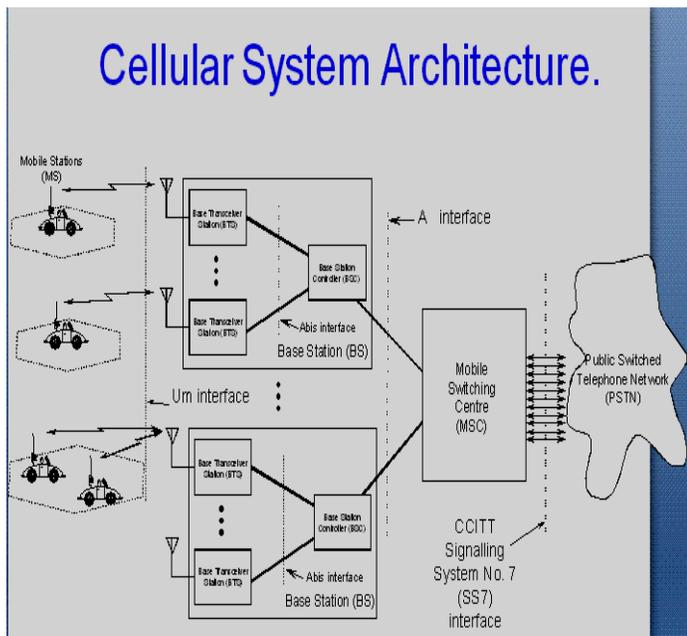


Figure 4

1.2.2 Mobile Units

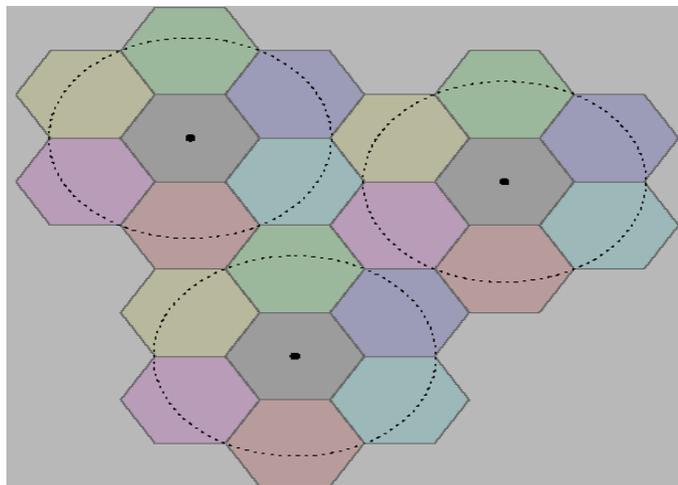


Figure 5

2. SMART PHONE TECHNOLOGY

Actually a smart phone is nothing but a mobile phone built on a mobile operating system with more advanced computing capability connectivity than a feature phone. The first smart phone combines the functions of a personal digital assistant (PDA) with a mobile phone. Now a days many modern smart phones also includes high resolution touch screens and web browsers that display standard web pages as well as mobile optimized sites. High speed data access is provided by Wi-Fi and mobile broad band. In recent years the rapid development of mobile application market has been drivers of smart phone adoption. One of the significant differences is that the advanced application programming interfaces (APIs) on smart phones for running third party applications can allow those applications to have better integration with the phone's OS and hardware than is typical with features phones. A Smart Phone is one device that can take care of all required hand held computing and communication needs in a single small box. This study explores what makes a smart phone and what we can do with it. As cell phones and PDAs are the most common handheld device now, a smart phone is usually either a phone with added PDA capabilities or a PDA with added phones capabilities. A list of things which a smart phone can do is as:

- 1) Send and receive mobile phone calls some smart phones are also Wi-Fi capable.
- 2) Personal information (PIM) including notes, calendar and to do list.
- 3) Communication with Laptop or desktop computers.
- 4) Data synchronization with applications like Microsoft outlook and Apple's ical calendar programs
- 5) E-mail
- 6) Instant messaging
- 7) Application such as word processing or video games

Smart phones have recently gained significant popularity in heavy mobile processing while users are increasing their expectations towards rich computing experience. However resource limitations and current mobile computing advancements hinder this vision.

3. CLOUD COMPUTING

Everything may be hosted in the clouds, it is a large group of interconnected computers. Users need not have knowledge of expertise in or control over the technology in cloud. Various scripts [14, 15, and 16] advocates the generalization of automatic cloud computing and cloud engine architecture. Let us see how cloud computing works with a smart phone. You can use the entire capacity of the hand device for music or apps, because you can store your documents online and access them. No matter where you are you can even buy an application for your business and share it with your colleagues by using one of these services, but your client has to limit himself/herself to smart phones only. You can take advantage of all of these things from home by using your tablet, since it is running on the same Operating System as your smart phone. Technology like this will give users more device choices while simplifying its provisioning duties and maintaining security of corporate data assets in place of physical phones. It would manage and provision virtual machine profiles that execute on phones purchased by employee. Now a days user are making such heavy use of cloud based services that local storage has become something of an afterthought. As a result, we have less data to store on our phones. We look at the mobile device features with storage as secondary concern, so vendor could save money on storage costs and invest it on other hardware features. As a result traditional bottlenecks could be alleviated and the overall hand set experience could be improved.

4. WORKING SYSTEM METHODOLOGY

Script [12] expressed a new concept as NEC enables smartphone access to work environment on the cloud as secure access to office data from smartphones. In this mechanism the employee access their work while away from the work station by virtualization of smart device such as smart phone and tablets.

In past few years smart devices have become broadly utilized through the world and an unavoidable need has raised by employee to easily access work information from their smartphone when far away from the office. Henceforth introduced a cloud based smart phone access to work station. By using this facility the NEC cloud Smart phone users can safely and securely access office data from remote locations with these smart phones, since there is no risk of leaking information from a lost device. By viewing this fact I have applied the similar approach in the field of cloud oriented smartphone process.

As an end user switch on the mobile station, the initialization work starts. The frequencies which are used here are mainly 450MHz, 950MHz, 1800MHz, 2100MHz. Mobile station must tune to the strongest dedicated control channel within few seconds. If it cannot complete this task on the strongest dedicated control channel, it attempts to the second strongest channel and again if this task is not completed then mobile station search for third channel and so on. When the end user starts to access application then an access timer is set for

origination maximum 12 second, page response maximum 6 second, an order response maximum 6 second, registration maximum 6 second. Now access channel is scanned by mobile station and tuned to the strongest channel. When tuning is done then the mobile station is authenticated by the base station. In authentication base station verify the identification of the user by comparing the information already present with base station. After verification, base station acknowledges the mobile station. The mobile station gets the acknowledgement then only user is able to avail the services provided by the service provider. This whole process is too fast that user is not able to notice it. As soon as user accesses the service the mobile station sends the service request to the base station in response to request base station. This acknowledges the mobile station to inform the mobile station that it is able to access that service. Base station will make connection to the MTSO at the time of installation and this connection is maintained forever. The connection of base station and MTSO is mostly wireless through satellites. The main work of base station is to enhance the communication process in mobile communication by correlating the high frequencies used in satellite communication with low frequencies used in normal wireless communication. Now base station will forward the mobile station's request to the MTSO through satellite. After receiving the signal from base station MTSO also acknowledges the base station. Now the request is processed in server of MTSO so that the requested service can be provided. After computing on request the server locates the nearest possible virtual machine so that the requested service can be provided. The reverse way to the end user is from MTSO to base station through satellite communication, base station to mobile station through normal wireless communication. This whole responding process is also very fast while the end users are unable to notice it. This whole process will be same for all users who want to access the service.

In the present study the application of cloud computing is associated with smart phone technology. We have implemented the above two strategies together to form as a unique communication system i.e. mixing of cloud computing and cellular mobile communication. This can be done by combining MTSO and Cloud Server. Because of this, intelligibility of MTSO will be enhanced by the use of IaaS, PaaS, SaaS services of cloud computing. Thus the connection process is too much simplified as well as easier that the service provider gets the full control over whole communication process. Mobile network also help the cloud computing by providing very large established network. To maintain uninterrupted cellular communication the entire network is well planned and designed.

5. RESEARCH ELEMENT OF CLOUD COMPUTING

Cloud computing consists a wider range of controls, technologies and policies used to protect the existing infrastructure, applications and data. Security issues experienced by end user or by cloud suppliers is of prime concern. Henceforth cloud providers must make sure that what

they are offering is secure and customer's applications as well as data are protected. Simultaneously the client on the other hand must ensure that the cloud supplier has the appropriate security measures in order to protect his data and applications. Generally cloud computing elements come into four categories:

1. **Legal Issues:** End users and cloud vendors have to negotiate about liability, end-of-service and both must agree about the degree of liability of each party.
2. **Compliance:** Cloud computing providers must be able to provide audit trails and logs. System must be maintained, secured properly and be accessible in case of forensic investigation takes place.
3. **Privacy and security:** Cloud data center must be maintained in such a way that they adhere to compliance requirements in term of privacy.
4. **Identity Managements:** Every user must have his identity management system in order to access computing and information resources. Cloud providers must able to provide such system to their users. They should ensure that users can easily access their application and data as and when they require.

On the basis of latest research work there are several elements of cloud computing based on smart phone. Out of those the value types are as follows:

- **Economic Element:** Economic value of cloud is an alignment of time and size of the investments. You make with the value you receive referred to as 'pay as you go' and 'pay as you grow'.
- **Architectural Element:** The architectural value of cloud is associated with consistent abstract environment presented to developers and operations folks that hides a lot of complexity, making it much simpler and quicker to develop and deploy applications.
- **The Strategic Element:** The strategic value of cloud is a platform which helps you to focus on what makes your organization more effective and different.
- **Type of Cloud Service:** Development PaaS-Programming environment IaaS. Servers Software and Spaces Web Services Utility Computing, Software as service Access to an application via API.
- **Barriers Technical Issues:** Business Model issue, Internet issue, Security issue Compatibility issue ,Social issue.
- **Who should not Use:** The Internet-Impaired, Offline workers, the security Conscious.
- **Who Benefits from Cloud Computing| Collaborator:** Share your documents, Road warrier, Access it from anywhere, lost conscious, user/IT Department user with increasing needs.
- **Disadvantages:** Requires a contact Internet connection, Does not work well with low- speed connectivity, Stored data might not be secured if the cloud loses your data.
- **Advantage:** Data safety, Improved Compatibility between operating systems, Can connect the windows computer to the cloud and share the documents with computers running Apple's Mac OS, Linux, Unix, Remove the device

dependency, Lower cost Computing for users, Improved performance of lower IT infrastructure, Unlimited storage capacity.

- **Cloud Services:** Web based services offered via cloud computing, Accessed by browser, if PC crashed it does not affect either the application or documents, Access from anywhere.
- **Cloud Storage:** Primary use of clouds, multiple third party services as used rather than on the traditional dedicated servers.
- **Virtual Services:** Appears as if data stored in a particular place with a specific name but that place does not exist in reality. Cheaper than dedicated physical resources, secure from accidental erasure or hardware crashes.

Characteristics of Cloud Computing:

User Centric- Data in the cloud belongs to user and can share.

Task Centric- Focus is shifted from what it can do to what you need done. You can retrieve more information as many parallel computers are running your application

Intelligent- Data mining and analysis are very much in need as a very large set of data stored on the computers in cloud system.

Programmable: Cloud's computers must be under the supervision of IT experts so that tasks performed in cloud system can automate the redistribution and data can be locally shared.

6. SYSTEM SECURITY

Security is a basic concern in the system because end user is using the infrastructure of service provider. Considering the latest challenges of data corruption, data stealing, data threatening all the advance security measures are adopted. These measures are to implement the latest firewall facility, latest version of, antivirus, malware protection features, opening of only required communication ports, updating of latest patches and preventive maintenance and many more, as mentioned in [17]. So that end user trusts on the service provider that his/ her data is safe. By following the said precautions our cloud oriented smartphone computing system is reliable and trust worthy

7. FACILITIES GETTING THROUGH THIS SYSTEM

The facilities that can be obtained by using cloud computing with smartphone technology will be uncountable but same major benefits are:

- Area of communication is increased by combining these different cellular communication as well as Internet communication technologies. It can enhance the cumulative properties of both.
- Video conferencing has become fast and convenient.
- Everyone gets equal opportunity to access all the data and every facility.
- Calling, sms, mms, chat, etc. has come on a single platform and available to all.

- Security features can be applied centrally to the whole network with an ease and those features will be technically advanced.
- Progress in any field will benefit the whole communication system.
- Control and management of whole arrangement will be easy and very fine.

8. SYSTEM OUTCOME

The main motive of enhancing any technology is to get best outcome of those enhancement that change the attitude of society and influence all the sectors of the society like education, health, agriculture, economy, trade and industry and day to day human life requirement. Some enhancements of this modular infrastructure are:

8.1 Social Outcome

Very first outcome that must be checked is social impact, it is very important to study the in reference of society welfare. Now a day's smart phone technology is playing a dynamic role in the society. Some few impacts are given below:

- Common chances to everyone to communicate and access to data bank/data resources.
- Equal rights to everyone in communication and utilization of human resources.
- After the implementation of this system worldwide there is no distance between everyone.
- Communication among the society is fast, transparent and reliable
- Equal right and chance for anyone in the society.
- Detection of crimes/frauds is very easy.
- Useful tool to increase the business related activities.
- Can become a major developing key factor for trade and industry,
- Best media to extend the information and messages
- Cost effective media for communication and transmission of information, data etc.
- Transmitting and receiving the emails.
- Receiving and sending the public welfare related policies, procedures and protocols.

8.2 Educational outcome

As education is a very important and powerful skill in this world and as time passes the level and system of education is also changes now technologies playing a very important role in enhancement of this system. This arrangement can bring revolution in the field of education, so there is an impact over education system. So few impacts are:

- Improvement in distance learning.
- Enhancement in interactive learning.
- Best for tutorial learning.
- Provide access to vast library globally.
- Improvement in practical learning by accessing wide laboratories.
- Best knowledge bank can be formed with ease.

- Education could be provided to everyone without any difficulty.
- Powerful internet learning tools.
- Knowledge strengthen by web surfing.
- Knowledge sharing with international universities and institutions.
- Knowledge networking of GIS worldwide.

8.3 Economical outcome

Now the most important impact is on economy because to grow any society in all respect economy has to also growth in every field. So by this arrangement economic benefits must be considered for the growth of this technology and society. Some impacts on economy are:

- Money can be saved, because when these two technologies are combined, progress in any one field will serve to both and finally budget on communication process will be reduced.
- Infrastructure requirements are low due to which space use is reduced.
- As infrastructure is low so maintenance expenditure is low.

Now a day's communication has become so simple and easy due to cellular mobile communication that even languages can't form any barrier in communication. In today's world smartphone is so common that every second person is having it. So it has become one of the basic necessities due to this only communication is easy and fast.

9. PROPOSED RESEARCH TOOL

Tool which are being used in this study are:

- Google docs, it is used to provide service to end user to create documents, manuscript, presentation, spreadsheets, etc. Which help end user to provide office utilities without any installation of any special office software.
- Mindmeister, it is used to draw mindmaps, schematic diagrams which help in designing networks which can be used in building networks for communication purpose.
- Mendeley, it is an online sharing application which helps in building online research libraries.
- Rational suite with some advancement may be implemented to enhance the cloud server.
- Really simple syndication (RSS) is also a major tool to strengthen the cloud based mobile computing network system.

10. CONCLUSION

Finally, by viewing the contents of the manuscript we can observe that the combination of these two technologies will influence the whole world and after some time it is impossible to differentiate between people on the basis of language. Communication has become much simple, better and fast globally. Huge saved money may be utilized for other developmental activities of the society. Knowledge banks are ready to provide the knowledge data to everyone without barrier easily. Educational problems can be resolved easily

through this configuration form society and we are dreaming a better future, better society, etc. As communication is so easy and efficient then latest technologies is easily available to common man with less infrastructure. Mobile computing is become a basic requirement of human being.

11. FUTURE SCOPE

The work can be further extended by applying the security measures which will be developed by studying the loop holes in the proposed system. One way is to develop the application for this system which must be light and user friendly or develop the more easy and advance ways for communication with the application of mobile cloud computing.

NOTE

The author of this paper is BE in Electronics & Communication from Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal and involved in various research and developmental activities.

REFERENCES

- [1]. V. S. Rana, 'An Innovative Use of Information and Communication Technology (ICT) in Trade Facilitation in India', BVICAM's International Journal of Information Technology, BIJIT, Issue 8: (July - December, 2012 Vol.4 No.2)
- [2]. Avijit Dutta, 'Digital Communication and Knowledge Society India', BVICAM's International Journal of Information Technology, BIJIT, Issue 8: (July - December, 2012 Vol.4 No.2)
- [3]. Ashema Hasti, 'Study of Impact of Mobile Ad hoc Networking and its Future Applications', BVICAM's International Journal of Information Technology, BIJIT, Issue 7: (January-July, 2012 Vol.4 No.1)
- [4]. Rajiv and Manohar Lal, 'Web 3.0 in Education & Research', BVICAM's International Journal of Information Technology, BIJIT, Issue 6: (July-December, 2011 Vol.3 No.2)
- [5]. B. V. Ramanamurthy, K. Srinivas Babu and Mohammed Shafruddin, 'Dynamic Data Updates for Mobile Devices by Using 802.11 Wireless Communications', BVICAM's International Journal of Information Technology, BIJIT, Issue 5: (January-June, 2011 Vol.3 No.1)
- [6]. 'Mobile Cloud Computing' available at: http://en.wikipedia.org/wiki/Mobile_cloud_computing
- [7]. 'Future prospects of Mobile Cloud Computing' discussed at http://www.comsoc.org/files/Publications/Magazines/wc_i/cfp/cfpwcm0613.htm
- [8]. 'Application and benefits of mobile cloud computing' available at http://readwrite.com/2009/08/04/why_cloud_computing_is_the_future_of_mobile
- [9]. 'Cloud computing' presented at http://en.wikipedia.org/wiki/Cloud_computing

- [10]. 'Trends in Mobile Cloud Computing' introduced at <http://www.ibm.com/developerworks/cloud/library/cl-mobilecloudcomputing/>
- [11]. 'Mobile Cloud computing in small business management' discussed at <https://www.brighttalk.com/webcast/1141/29233>
- [12]. 'NEC Enables Smartphone Access to Work Environment on the Cloud' available at <http://www.nec.com/en/press/>
- [13]. 'Mobile Application with cloud computing', International Journal of Scientific and Research Publications, Vol.2, Issue 4, April 2012 ISSN 2250-3153
- [14]. S. Pandey, D. Karunam and R. Buyya, "Workflow Engine for Clouds" Clod Computing: Principles and Paradigm, Wiley, 2011.
- [15]. R. Ranjan, R. Buyya, and M. Prashar, "Automatic Cloud Computing: Technologies, Services and Applications, Concurrency and Computation: Practice and Experience, 24(9):935-937, Wiley Press, New York, USA, June 2012.
- [16]. J.O. Kephart and D.M. Chess, The Vision of Automatic Computing, Computer, 36(1):41-50. IEEE, Jan. 2003.
- [17]. M.H. Sqalli, F. Al-Haidari, and K.Salah. EDoS-Shield- A two-stp mitigation technique against EDoS attacks in Cloud Computing, Processing of the 4yh International Conference on Utility and Cloud Computing (UCC 2011), Melbourne, Australia, 2011