Wayamba Journal of Animal Science – ISSN: 2012-578X; P255 - P266, 2012
First Submitted February 20, 2012; Number 1331186993

CLOUD COMPUTING: FUTURE BUZZ FOR RURAL INDIA

Ghasura R. S[1], Patel H. B[2], Dudhatra G. B[2*], Chaudhary G. M[1]
[1]*Department of Animal Husbandry Extension, College of Veterinary Science & Animal Husbandry, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar-385506, Gujarat, India*
[2]*Department of Pharmacology & Toxicology, College of Veterinary Science & Animal Husbandry, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar-385506, Gujarat, India*

Corresponding author: drgvets@gmail.com

The Cloud computing is a marvel of computing technology for encompassing low cost; high operational efficiency; elasticity and scalability. Now a day, India's rural population is 568m; rural literate population: 368m; rural English-speaking population: 63m; rural computer literates: 15.1m; rural (claimed) Internet users: 5.5m; active Internet users: 3.3m (Subramanian, 2011). The Cloud Computing will bring the change that is required to bridge the divide between rural India and urban India; and will transform the Indian rural economy. Availability of connectivity up to Taluka level in India makes data connectivity a reality for rural India. This allows rural India to log on to the Cloud. The Cloud computing advantage is low start-up cost, ease of management, no concerns about procuring licenses, and device and location independence. The way you access a Cloud, could be your desktop. It could be someone else's computer. It could be a smart phone. It could be a solar powered touch pad. Especially this will be attractive for rural India. The Cloud allows information technology to be infused into the smallest hamlet of India and makes access to information available to the poorest of the poor to give them a better life and social empowerment with knowledge derived through the laptop or mobile phone connected to the Cloud. The Cloud makes the many e- services affordable and accessible at a low cost. In future, this may prove panacea for eradication of poverty from rural India.

Key Words: Cloud Computing, Rural India, Cloud application, E-services

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Some 2.5 billion people in the developing world depend upon agriculture for their livelihood. More than 1.5 billion of these are smallholder farmers as defined by the United Nations as working on family farms of less than two hectares or 4.9 acres (UN, 2006). The story is same for our nation. India's 73% of population lives in the rural areas and villages. This rural segment commonly referred to as the 'bottom of the pyramid' has a great potential for commercial as well as developmental opportunity for companies as well as government (G2C) services, state agriculture university (Chappell, 2009). Presently the affordability, up gradation, and licensing of computer based products on regular basis is a great hindrance in adoptability and penetration of digital technology at grass root level in rural India. Also, they need to carry their computer everywhere they go. If a "personal computer" can be made available on cloud accessible from anywhere that too free or at minimal charge (pay-as-you-use), rural people can afford the technology and change their standard of living (White and Maganti, 2010). The Cloud Computing can help the rural population in overcoming the huge

costs incurred on infrastructure, software, maintenance hurdles and it can lead to rural area development and an overall economic progress of the nation. Cloud computing can increase the penetration of knowledge to otherwise, inaccessible rural pockets and can be boom to create a world without poverty. The Internet is often represented as a cloud and the term "cloud computing" arises from that analogy. Cloud computing can be put into words as the dynamic provisioning of IT capabilities (hardware, software or services) from third parties over a network (Pricewaterhouse Coopers Ltd., 2009) . This usually takes form of a remote computer where user with the help of web based tools can access and use through a web browser as it was locally available on his computer.

Thus it not only reduces the cost per terminal for user, but also results in optimal and efficient use of available resources and technologies. Also increased reliability, scalability via dynamic allocation, device and location independence, security due to centralization of data and; maintenance costs get better managed and executed (Ranjith, 2011).

What is cloud computing technology?

The cloud computing is regarded as the Fifth Generation Computing after mainframe, personal computer, client-server computing and web. Cloud computing is a paradigm shift now occurring in the information technology (IT) industry-offers the strong possibility of accelerating social and economic development, even in this time of limited resources. The Cloud computing is a marvel of Gandhi Technology and encompasses low cost, high operational efficiency, elasticity and scalability.

Emerging needs of cloud computing technology in rural India

The information technology revolution has played key role in socio-economic development of the world and it has occupied the key place at the heart of global economic growth over the last several decades. No nations either poor of rich; or developing or developed can undermine this fact. The major and only barrier to adopt information technology at rural level in India and world is its' rising direct and indirect costs of IT deployments. This is because IT systems have traditionally been run on an "ownership" model, requiring investment in all the underlying infrastructure, ongoing maintenance of systems, and, every few years, expensive and time-consuming upgrades. This model of deploying IT has been riddled with high costs, long implementation timelines, project overruns, and a high risk of failure (Kenneth, 2009). Under such circumstances, the only and interesting possibilities that can surmount all these limitations are substituting conventional computing with cloud computing.

History and chronology of Cloud computing

In 1960, John McCarthy gave first idea that "computation may someday be organized as public utility. The cloud computing is not a new idea that emerged just recently in 1969. The Kleinrock first conceived the idea of distributed computing service to the finger tips of user like other home service as in case of electricity and telephone, where users enjoys the services and utilities at their home with controlling offices located centrally anywhere at independent location. In early 1990s the term "Cloud" came into commercial use referring to large networks and the advancement of the internet. In mid 1990s, term grid computing was coined allowing computing power on demand. The salesforce.com was first to establish and to provide an on demand SaaS (Software as a service) in 1999 followed by inclusion of SaaS concept in IBM's "Automatic Computing Manifesto" in 2001. The term Cloud computing was given prominence first time by Google's CEO Eric Schmidt in late 2006 (Aymerich *et al*., 2008). Cloud computing was first pioneered in the consumer world by companies such as Google, Yahoo!, and Amazon.com. More recently, Web sites such as Facebook,

MySpace, YouTube, Wikipedia and Twitter have given rise to the phenomenon of social networking, communities, and user-generated content (Kenneth, 2009). No technical skill or expertise is required to use these services. They are easy to personalize, and in fact, they are so easy and painless to use that consumers do not even think of what they are doing as "Cloud computing."

Characteristics of the Cloud

Cloud computing is more than a technology which provides a platform for hosting applications as service, storage services and development environment for IT developers. It is a dynamic provisioning of IT tools and capabilities from third party over an established network. It is a form of remote computer with the help of web based tools can access and use through a web browser as it was locally available on end user's computer. Cloud computing has many distinct characteristics which makes this technology quite different from conventional networking and grid concept. The distinct characteristics have been described here (White and Maganti, 2010):

On-demand self-service

A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service's provider.

Broad network access

Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g. Mobile phones, Laptops and PDAs {Personal Digital Assistants}).

Resource pooling

The world IT industry has gathered huge amount of data having restricted accessibility to the real users. Large companies having those data centres can easily sale these data and computing power on rent basis to other organizations and get profit out of it and also make the same resources available needed for running data centre (like power) utilized properly. Companies having large data centres have already deployed the resources and to provide cloud services they would need very little investment (Ghosh, 2010). The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g. country, state or datacenter). Examples of resources include storage, processing, memory, network bandwidth, and virtual machines.

Rapid elasticity and scalability

Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale up and rapidly released to quickly scale down. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time. Scalability is provided dynamically to the users. Users get as much resources as they need.

Most fitting and handy

Cloud users need not to take care about the hardware and software they use and also they don't have to be worried about maintenance. The users are no longer tied to someone traditional system. Virtualization technology gives the illusion to the users that they are having all the resources available.

Measured Service

Cloud systems automatically control and optimize resource use

by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g. storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported providing transparency for both the provider and consumer of the utilized service. Cloud users can use the resources on demand basis and pay as much as they use. So the users can plan well for reducing their usage to minimize their expenditure.

Types of clouds

Basically, clouds are of three categories. IT organizations can choose to deploy applications on public, private, or hybrid clouds, each of which has its trade-offs. The terms *public*, *private*, and *hybrid* do not dictate location. While public clouds are typically "out there" on the Internet and private clouds are typically located on premises, a private cloud might be hosted at a collocation facility as well (Sun Microsystem Inc., 2009).

Private cloud

The cloud infrastructure is operated solely for one organization. It may be managed by the organization or a third party and may exist on premises or off premises. This is used used solely for their internal purpose. Many companies and corporate are moving towards this setting and this is the first step for an organization to move into cloud.

Community cloud

The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g. mission, security requirements, policy, and compliance considerations). It may be managed by the organizations or a third party and may exist on premises or off premises.

Public cloud

The cloud infrastructure is made available to the general public or a large industry group on demand basis and is owned by an organization selling cloud services. Services are provided to the users using utility computing model.

Hybrid cloud

The cloud infrastructure is a composition of two or more clouds (private, community or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g. cloud bursting for load-balancing between clouds). This type of cloud is composed of multiple internal or external clouds. This is the scenario when an organization moves to public cloud computing domain from its internal private cloud.

Architectural Models of Cloud Computing

The services offered by cloud providers are classified into three groups; software as a service, platform as a service, and infrastructure as a service.

Software as a Service (SaaS)

It provides the ability to customers to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a web browser (e.g. web-based e-mail). The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings. Consumers gain the privilege to use the provider's application running on a cloud infrastructure. Cloud providers maintain applications with low coast and

human resources and earn much profit from the investment as compared to conventional hosting. E.g. Salesforces.com, Google doc.

Cloud Platform as a Service (PaaS)

PaaS owner or producers might produce a platform by integrating an OS, middleware, application software, and even a development environment that is then provided to a customer as a service. PaaS provides the consumer the ability to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations. Users can build his/her own applications that run on the provider's infrastructure that support transactions, uniform authentication, robust scalability and availability. E.g. Google App Engine.

Cloud Infrastructure as a Service (IaaS)

Provides the consumer the ability to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems; storage, deployed applications, and possibly limited control of select networking components (e.g. host firewalls). Users handle the workload that ranges from simple computing application to high-performance computing application to end users. Commercial examples of IaaS include Joyent, whose maintains the series of virtualized servers that provide a highly available on-demand infrastructure.

Benefits of Cloud Computing

There was a time when every household, town, farm or village had its own water well. Today, shared public utilities give us access to clean water by simply turning on the tap; cloud computing works in a similar fashion. Just like the water from the tap in your kitchen, cloud computing services can be turned on or off quickly as needed. Like at the water company, there is a team of dedicated professionals making sure the service provided is safe and available on a 24/7 basis. Best of all, when the tap isn't on, not only are you saving water, but you aren't paying for resources you don't currently need. Cloud computing can help to increase the pace of innovation. The low cost of entry to new markets helps to level the playing field, allowing start-up users to deploy new products quickly and at low cost. This allows small users to compete more effectively with traditional organizations whose deployment process in enterprise data enters can be significantly longer. Increased competition helps to increase the pace of innovation. Cloud computing provides Internet-based services, computing, and storage for users in all markets including financial, healthcare, and government. This new approach to computing allows users to avoid upfront hardware and software investments, gain flexibility, collaborate with others, and take advantage of the sophisticated services that cloud providers offer (Trusted Computing group, 2010).

Economical

Cloud computing is a pay-as-you-go approach to IT, in which a low initial investment is required to get going. Additional investment is incurred as system use increases and costs can decrease if usage decreases. In this way, cash flows better match total system cost. Additionally, cloud users need not to purchase any infrastructure, so cost is controlled and capital investment is zero Applications are developed more by assembly than programming. This rapid application development is the norm, helping to reduce the time to market, potentially giving organizations deploying applications in a cloud environment a head start against the competition.

Flexible

IT departments that anticipate fluctuations in user load do not have to scramble to secure additional hardware and software. With cloud computing, they can add and subtract capacity as its network load dictates, and pay only for what they use.

Rapid Implementation

Without the need to go through the procurement and certification processes, and with a near-limitless selection of services, tools, and features, cloud computing helps projects get off the ground in record time.

Consistent Service

Network outages can send an IT department scrambling for answers. Cloud computing can offer a higher level of service and reliability, and an immediate response to emergency situations.

Increased Effectiveness

Cloud computing frees the user from the finer details of IT system configuration and maintenance, enabling them to spend more time on mission-critical tasks and less time on IT operations and maintenance.

Energy Efficient

Because resources are pooled, each user community does not need to have its own dedicated IT infrastructure. Several groups can share computing resources, leading to higher utilization rates, fewer servers, and less energy consumption.

Going Green

Clouds principally allow reducing the consumption of unused resources (down-scaling). It reduces the number of hardware components to run the application on the organization's internal data center and replacing them with cloud computing systems reduces energy for running and cooling hardware. By consolidating these systems in remote centers, they can be handled more efficiently as a group. Other advantages of cloud computing is that it promote telecommuting techniques, such as remote printing and file transfers, potentially reducing the need for office space, buying new furniture, disposing of old furniture, having your office cleaned with chemicals and trash disposed, and so on. They also reduce need for driving to work and the resulting carbon dioxide emissions (White and Maganti: www.mbrmart.com). Users of cloud computing are more likely to reduce significantly the carbon footprint (Winenans and Brown, 2009).

In addition to these striking benefits, many long term and indirect benefits from cloud computing include acceleration of innovation, transformation of R&D, increasing contribution to GDP, creation of new jobs and employment, empowerment of rural citizen, level playing field for remote rural population and sustainable rural growth and

availabilities of leapfrogging opportunities.

Disadvantages of Cloud Computing

Though the cloud users can avail many of advantages of the technology, they have to bear the additional cost of data transfer. The end users do not have control over the remote servers, their software, or their security. Cloud providers have recognized the cloud security concern and are working hard to address it. In fact, cloud security is becoming a key differentiator and competitive edge between cloud providers. By applying the strongest security techniques and practices, cloud security may soon be raised far above the level that IT departments achieve using their own hardware and software.

This environment is a new model which cannot be well protected by traditional "perimeter" security approaches. Understanding the fundamentals of trusted computing technology is first step to address the security issues (Trusted Computing Group, 2010). Your data is at the mercy of a third-party company (you better make sure you trust them. The lack of trust on the cloud provider is a burning issue in implementation and adoption of this technology. It also needs to enforce strict security policies, requiring additional trust in the clients. To improve the mutual trust between consumer and cloud provider, a well-understood trust foundation needs to be in place (Trusted Computing Group, 2010). It may be difficult (or even impossible) to migrate massive amounts of data from the provider.

Confidentiality, integrity and availability of user's data is exclusively in cloud provider's hand. So protecting data with own intention and attitude is impossible. The member users of cloud may interfere with each other maliciously or unintentionally causing networking nuisance and this may lead to reduced acceptability and efficacy of cloud performance. The data storage may be restricted tightly and it become inaccessible making user's helpless in many critical moments. Malicious attack by any one user may cause loss of reputation of entire cloud. When cloud provider makes exit or merges with other, the fate of user's data and application remains undefined. Placement of data in the cloud does not exclude an organization's need to abide by legal and regulatory requirement. Users need free and fast access in the event of investigations, audits or other inspections. There may be conflict of sharing under such circumstances. Users need technical help for such a task. (Gujarat Informatics Limited, 2010).

Cloud computing: Hope for rural development

Development to all and everywhere through access to information is the central theme of all organization. It is recognized as a key to healthy and dynamic rural economy to ensure participation of all in development. The challenge lies in ensuring easy flow of public information to rural citizens irrespective of caste, class, gender and literacy level. The satisfaction of information needs of the rural communities is challenging but possible. The most under-served the rural poor live in the most expensive to serve areas, and they are often unable to afford these services at a market price. The cloud technology and innovations have opened up new era of information dissemination and connectivity to rural area for improving and securing their life. The cloud computing has greater and interesting possibilities in money and resources for IT implementation in governance and citizen services at remote rural pockets of developing country like India. Suitable policy designing and precise implementation in infrastructure, application development, and data-warehousing areas collectively can transform rural governance and public life at grass root level in rural India (ICTD, 2006). The delivery of services to rural people in health care, agricultural commerce and trading, education, disaster management, microfinance and credit availability, animal health care and natural resources management sector are several areas where this technology can prove its

marvel through principle of serve all and serve everywhere. The potential application of cloud computing in various sectors in rural India is discussed here.

1) E-Agriculture Commerce Services

Cloud technology as an ICT-based agricultural development services focus on enhancing the skills and knowledge of smallholder farmers and enabling smallholder value chains to improve their competitiveness and flourish. They can build these insights by synthesizing five areas of analysis:

Agricultural value chain analysis helps to identify the value chain issues to be addressed and the size of the opportunity for improvement.

Service value chain analysis determines the financial viability of the ICT services and identifies the ecosystem partners who are willing to invest and deliver those services.

Knowledge delivery, including access to information, e-learning, and advisory services.

Farm planning to help create efficiencies in agribusiness operations (Cyber Extension Services).

Procurement portals that facilitate input commerce and output trading exchanges.

Supply chain planning to reduce cost and create visibility for logistics (Popet *et al*., 2009).

2) Animal Health Care and Delivery Services

Now a day, cloud computing has emerged as a front line technology and it can be seen as a social infrastructure that serves the society including people and companies. The cloud computing can fulfill desire of people to obtain knowledge and wisdom that can be extracted as a result of information processing. It can serve as a social infrastructure of knowledge that stores knowledge and wisdom in itself and delivers it in same way as electricity and tap water. Clouding can improve veterinary services through data linking between sophisticated veterinary hospital and regional or local veterinary hospital to client or owner of animals (Minami and Imabayashi, 2011). Cloud services based application would deliver an integrated telemedicine information services for farmers and their livestock and also help dairy co-operatives and private dairy enterprise they would provide health care services easy way and affordable time at door step level. It would simultaneously automate the process from data collection to information delivery as a cloud technology. Blue tooth compliant monitoring stations near cattle density, live stock tracking system and animal state of health monitoring system, use of radio telemetry sensors system are several approach which are under trial and have shown the ways of interesting possibilities to improve veterinary services for welfare of global population. Incorporation of cloud computing into such network based technology can be miracle tomorrow for whole world (Warren *et al*., 2011).

3) Tele-Medicine

Advancing the quality of healthcare is a key development objective in developing countries. In fact, three of the eight MDGs adopted by the United Nations pertain to healthcare combating HIV/AIDS, malaria, and other diseases; improving maternal health; and reducing child mortality (UN, 2006).

In developing countries and rural areas, a high percentage of healthcare complications and child mortality, zonootic diseases, maternal fatalities arise out of medical errors, misdiagnoses, and the lack of basic knowledge and expertise because now a day our country face shortage of medical professionals in rural and tribal area. This would take the current practice of telemedicine to the next level, creating a network that goes beyond the one-to-one, patient-to-doctor or doctor-to-doctor interactions. The Internet, as an open, global communications network, provides a mechanism to facilitate such exchanges. Tele-medicine (cloud technology) is helping tool to poor rural community to facing healthcare problems to solve health care issues (Popet, 2009).

4) Microfinance Institutions

United Nations announced in 2000 to Millennium Development Goals (MDGs) with range of target set 2015 to achieve broad and multi-faceted and address all elements of desirable sustainable development in our world (McConnell, 2001). Poverty reduction is major objective MDG in UN. Thus, over the last decade, microfinance has proven to be a great catalyst for small-business entrepreneurs in India.

Despite the buzz around microfinance, the reality is that there are significant challenges in scaling this financing model. Microfinance institutions have a hard time managing their portfolio of loans-tracking collections, monitoring overdue accounts, and making sure loans are used appropriately (Meera, 2002). Cloud computing can enable microfinance institutions to utilize easy-to-deploy IT solutions that create efficiencies and lend transparency to their financial management and performance.

5) Disaster Management

India is geographical high prone of natural calamity in world. Every year millions of people become affected directly or indirectly in flood, earthquake, cyclone, tsunami, etc. Natural calamity directly and indirectly affects growth, social, sustainable development and foreign direct investment in our country.

A number of NGOs involved in disaster recovery, including the Red Cross and the United Nations World Food Programme, are already piloting IT solutions running on cloud computing infrastructure to help with mission critical activities such as procurement and distribution of food and supplies during natural disasters. As emergency management agencies and NGOs work together to build a best practices blueprint for managing disasters, they should standardize on such solutions that can be deployed instantaneously when disasters occur. Cloud computing also helpful in state and central level authorities to easy rehabilitation program in disaster affected area in our country. The most important advantage of cloud technology is about pooling of experienced information and sharing it to all who are in urgent need at the time of disaster. Cloud based information serves critical needs for planning and execution of disaster relief and rescue operation and reduces the replication of human efforts and budget spending. The greater coordination between agencies conducting relief and rescue operation will enhance the efficiency and speed of operation which is of prime need for any disaster management policy.

6) E-Education/E-Learning

Illiteracy can bring down even the most powerful nations down. So if we are to become a developed nation, the government should first remove the problem of illiteracy by introducing effective programme (E-Education) with proper implementations in rural as well as remote area in our country. In present scenario the e-learning is getting popularity and this application in cloud computing will surely help in the development of education offered to poor people which will increased quality education offered them. Cloud based education will help the students, staff trainers, institutions and also the learners to very high extent and mainly student from rural parts of the world will get an opportunity to get knowledge shared by professor and other part of the world (Subramanian, 2011). The school in rural hamlet will become global school by linking to cloud. Students made presentations and animations can be hosted on cloud encouraging student community to learn more and represent themselves on global platform. There will be multiplying output of education and teaching materials from different section of world. This is possible with the aid of cloud computing with greater reliability and availability (Ghosh, 2010).

7) Rural Cyber Youth Entrepreneurs

Cloud computing through will be creating in Rural ICT Business Hub (RICTBH) initiative in rural areas. The main objective is at moving from mere livelihood support to promoting rural prosperity, increasing rural non-farm

incomes and augmenting rural youth employment. The Rural BPO programme provides subsidies to private companies and entrepreneurs in order to incentivize them to set up BPO centers in rural areas which would provide employment to rural citizens (Narula and Sharma, 2008). The cloud based BPO can be developed as home industry in rural area making the growth more sustainable, inclusive and environment friendly. The programme is aimed at generating additional sources of employment for people belonging to the lower income groups to allow them to attain a better standard of living as well as to create trained manpower. In future, this will dissolve rural youth migration issues to urban area and ICT technology will create new entrepreneurial community of skillful youth. Cyber enterprises providing internet browsing and telecom services reaching across the people will pose no longer difficulties. Advances in ICT have made the world mini villages. So much that people to people interaction and cultural ties increased dramatically and enabled cross border trade in services resulting in business processing outsourcing boom. The use of ICT (Cloud computing technology) with more outsourcing jobs to rural areas is a opportunity and would benefit multiple stake holders (Lamba and Singh, 2011).

8) E-Panchayat

"People's voice is the key driver of a democracy, and listening to that voice is the key test of Good Governance". This is the mantra of rural governance and development. To infuse the spirit of this mantra, Cloud computing and rural networking is the best possibility for future. There are 2.5 lakhs panchayat members in 626 districts in our country (www.e.govonline.net). The E-Panchayat programme is the solution for a two way clear and transparent communication between the top level and local level and also between the citizens and Panchayt. The Cloud technology is easy to sending data transfer reduce the cost of ICT infrastructure in district levels, and secure and easy access to government and rural citizens. The Technology can create transparency, accountability in rural India's peoples (IIIT Hyderabad, 2010). Gujarat has taken lead in establishing the e-gram service to all its 13685 Gram Panchayat where villagers can have e-access to land records, status of government project and scheme, birth and death certificate, certificate of residence, bona fide certificate, various applications and forms for project/scheme and other information concerned to various department of state government. All 25 district Panchayat and 224 taluka Panchayat of Gujarat are connected through Gujarat State Wide Area Network (Panchayat Department, Government of Gujarat, 2011).

Challenges in Cloud Computing in rural India

Language Barrier: Regional languages preferred.

Establishing a network of computers with internet access rural areas.

As it applies at grassroots level, the e-learning process and capacity building of farmers are not being adequate enough.

Private company (Cloud based) they fear to invest in rural area ICT sector because cultural and social obstacles. Profit making is delayed.

Adoption and educational level of rural areas peoples are law compare to urban areas (Kailash, 2011).

CONCLUSION

IT could be used as a powerful tool for fostering and promoting much needed inclusive growth in rural India. Digital inclusion for socioeconomic development had become a strategic goal of our countries today. The ultimate aim of such a move will to make IT cheaper, easier to use and more accessible to the masses. Cloud computing will be another cutting edge technology with a wide range of capabilities which could help to make inclusive growth a reality with bridging in digital divide between urban and rural atmosphere.

Recommendations

Successful nations will execute on a roadmap that covers the broadband infrastructure, a rural service delivery infrastructure, and the platform of services that enables rural, agriculture-based transformation. The public sector created the backbone infrastructure to deliver a nationwide Internet service of up to 2 Mbps to within 10 miles of most villages. Each of these elements depends on the following critical success factors:

A shared computing architecture to reduce the cost and complexity of technology.

New business models that attract private investment for deliberately targeting those who live on less than $ 2 a day.

Active collaboration among a complex global ecosystem of stakeholders to turn vision into reality.

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