Cloud Computing: A Rural India Approach

Dr. Joginder Singh Cheema
HOD, Department of Computer Applications,
Baba Budha College, Bir Sahib, Tarntaran

Abstract: Cloud Computing is the revolution in computing domain where the cloud resources are made available whenever needed and they are charged on pay-as-you-go basis. The Cloud Computing will bring the change that is required to bridge the gap between rural India and urban India; and will renovate the Indian rural economy. Rural areas have been neglected since long but the Cloud will bring the change that is required to bridge the gap between rural and urban areas. This new information technology model is called "cloud computing," a network based computing model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction. This paper discusses about the 'cloud computing' paradigm facilitating the rural population in overcoming above said hurdles. This would ultimately lead to the development of rural areas and overall economic progress of the nation.

Keywords: Cloud Computing, Rural India, Cloud application, E-services

I. INTRODUCTION

Cloud computing is a computing for enable effective and convenient, on-demand network access to a shared pool of configurable computing resources.[1].

Cloud computing alters computer processing, data storage, as well as software applications, allowing them to be delivered as a utility. As people tap into existing structure for water or power, companies tap into a variety of services – applications, platforms, raw computing power, and storage – all via the Internet[2] [3].

The Cloud computing is a marvel of computing technology for including low cost and high operational efficiency; elasticity and scalability. The Cloud computing advantage is low start-up cost, ease of management, no concerns about procuring licenses, and device and location independence. The way a Cloud is accessed, could be a desktop; someone else's computer; a smart phone; a solar powered touch pad. This would especially be attractive for the rural India where access to resources needs to be indpenedent. The cloud allows information technology to penetrate into the rural India and make information accessible to the poor to give them a better life by empowering them with knowledge gained through the net book or mobile phone connected to the cloud. The Cloud provides the e- services at an affordable and accessible price. In future, this may prove the solution for abolition of poverty from rural India [4][5].

However, to make it happen, it is required for the stakeholders to get educated in the first phase, the government leaders to be educated in the second phase, and identify the cloud strategy for the citizens in the final phase. If this happens in the right scenario, the cloud will mature into a commodity pushing down prices of the services [6][7][8].

II. ADVANTAGES OF CLOUD COMPUTING FOR RURAL INDIA

[9][10] Cloud computing is helpful in rural areas for the following reasons:

1. **Low cost:** To installing and maintainance cost of the cloud computing is too low compared to its benefits. Everything can be available at very low cost.
2. **High quality:** cloud computing using very high quality software which is auto matically updated the latest technologies.
3. **Availability:** High level of availability to the users. Data can be available all the time.

4. **Jobs:** Establishment of these cloud systems in rural areas provides the job for the rural people.
5. **Online feature:** It provides online communication facility to the users. Internet facility gives the good knowledge to the students.

[11] Some more benefits of cloud computing in rural India

- Cloud computing has low start-up cost making it especially attractive for rural India.
- Cloud computing is easy to manage. There is no need to worry about keeping licenses or, power and air-conditioning to run the data centers or purchasing additional hardware.
- Rapid rural penetration can be made possible with scalability. The number of users and locations can be easily expanded at a low cost.
- Device and location independence is made a reality with Cloud Computing. The way a cloud is accessed can be a desktop; someone else's computer; a mobile phone; or a solar powered touch pad.

Lastly the BSNL broadband project for rural India will provide the data connectivity.

III. MAJOR ADVANTAGES OF CLOUD IN RURAL INDIA

[12][13] The cloud allows information technology to penetrate into the rural India and make information accessible to the poor to give them a better life by empowering them with knowledge gained through the net book or mobile phone connected to the cloud.

The cloud makes the following services affordable and accessible:

- Agricultural Information
- Weather Forecast
- Banking & Money Transfer
- Tele Medicine
- Commodity /Stock Exchange Prices
- KYC and Credit Bureaus
- Citizen Government Interface
- Citizen Benefits
- Citizen Interface Portals
- Knowledge Sharing & E-learning
- Real Time communication

[14][15][16] Explore Three Major Benefits in Field of Education, Agriculture and Healthcare:

A. Education: In Rural education, now we do not need any type of teachers, no institutions required, no to infrastructure also. Here are benefits of cloud computing in education:

1. No cost for expensive textbooks.
2. Updated material is available for the students having the current learning resources.
3. No more expensive hardware required.
4. No more expensive software required.
5. World of new Possibilities for students.

B. Agriculture: Everything is available using the concept of cloud computing like ecommerce to selling and purchasing. Training is totally online using the cloud systems.
Here are benefits of cloud computing in Agriculture:

1. Large database for farmers of the newly agriculture techniques.
2. Very Low cost for the various IT resources.
3. Cloud based Agriculture System established.
4. Farmers Queries handle very effectively.
5. Automation of land records.
6. Updated New Software available all the time.
7. Various data Collection tools and techniques are available.
8. Weather Forecasting for seasonal crops.

C. Healthcare: A web based application informing the facilities offered by NRHM can be deployed on cloud infrastructure which will enable people in rural areas:

[17] Benefits of cloud technology for healthcare - Transforming Service Delivery
The Yankee Group is observing the emergence of new business models based on anytime, anywhere IT services, propelled by end-user creativity and expectations. The Yankee Group states that "anywhere IT" will be the largest technology-enabled transformation seen so far and reaching 3.2 billion people by 2020. The Group also states that this trend represents the convergence and synergy of cloud computing, application mobility, and social media. At the middle of this trend are the companies that design, aggregate, and deliver IT services.
To transform the service delivery through the cloud require the following:

- Capital expenses to be reduced and existing assets uplifted.
- Current development, delivery and operational costs to be controlled.
- Speed and flexibility of current services to be increased and providing new (differentiated) services.
- Customer relationships to be efficiently managed over the cloud (e.g. billing).

Such challenges show the complex interdependencies required to deliver cloud services. At this time no single service partner can deploy and manage all the services that end users are demanding.
Other Benefits of Cloud Technology for Healthcare

1. Electronic Records are matained.
2. Streamlined Collaboration with hospitals.
3. Saving On Data Storage.
4. Accessing High-Powered Analytics.
5. Combining Efforts for Data Sharing.

6. Advanced Clinical Research.
7. Telemedicine Capabilities.

IV. CHALLENGES AND OPPORTUNITIES IN IMPLEMENTATION

Though Cloud Computing is the advanced tool to tackle the challenges in rural development, it still has to address enormous challenges in implementing cloud in rural areas. [18][19] Following are the challenges for implementation:

- Strong network establish with internet services are key challenge
- High bandwidth required
- English language problem exist
- Illiteracy of rural people is concern
- Private organisations feel insecure to inest.
- Training required to use
- Motivational requirements
- Social and cultural obstacles

Following are the opportunities from different perspective.

- Government already clear the companies to work for rural development
- Telecommunication industries has already reached in rural areas
- Number of IT companies increased day by day in rural areas
- Computer education already started in the schools
- Graduates already working in their rural areas as BPO employee
- Private organisations mointoring people
- Laptops are provided by state Govt.

V. CONCLUSION

Cloud Computing model is an efficient tool to be used for promoting the development of rural India. It is a simple idea with a major impact on society and can improve the lifestyle of people. 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.

REFERENCES

[1] G. Gruman, "What cloud computing really means", InfoWorld, Jan. 2009

[2] Börje Ohlman, Anders Eriksson and René Rembarz. What Networking of Information Can Do for Cloud Computing. Proceedings of 18th IEEE International Workshops on Enabling Technologies: Infrastructures for Collaborative Enterprises,2009,pp.78-83.

[3] Kenneth, I. J. (February 2009). Cloud Computing Can Close the Development Gap.
http://www.salesforce.com/assets/p df/misc/IT-development-paper.pdf

[4] R. Buyya, Rajiv Ranjan, and Rodrigo N. Calheiros. Modeling and Simulation of Scalable Cloud Computing Environments And the CloudSim Toolkit: Challenges and Opportunities. Proceedings of the 7th High Performance Computing and Simulation (HPCS 2009) Conference, Leipzig, Germany,June 21 - 24, 2009.

[5] www.joyant.com, Performance and scale in cloud computing, A Joyant white paper, 2010

[6] M. Hori, E. Kawashima, T. Yamazaki, "Application of Cloud Computing to Agriculture and Prospects in Other

Fields", Fujitsu Scientific & Technical Journal, 46(4), 2010.
5. Dr. G Sahoo, Dr. Shabana Mehfuz and Rashmi Rai, "Applications of Cloud Computing for Agriculture Sector", Technical trends, www.csi-india.org

[7] Aymerich, F. M., Fenu, G. and Surcis, S. (August 2008). An approach to a cloud computing network. Applications of Digital Information and Web Technologies, 2008. ICADIWT, Pp. 113.

[8] Lamba, H. and Singh, G. 2011. Cloud Computing future Framework for E-management of NGO'S. International Journal of Advancements in Technology, 3: 400-408.

[9] Shaily Malik et al., "Cloud Computing - A Hope For The Rural India", International Journal of Computer Applications (0975 - 8887) Volume 1 – No. 20,2010

[10] Dr C. Chandramouli, Registrar General & Census Commissioner, India. censusindia.gov.in/2011-prov-results/india/Rural_Urban_2011.pdf.

[11] Gujarat Informatics Ltd. (JuneJuly, 2010). Cloud Computing. An e-Governance Bulletin Vol.7 No. 9. http://www.gujaratinformatics.com /pdf/Cloud%20Computing.pdf

[12] Jake Gardner, "Benefits of Cloud Computing," http://www.logicworks.net/blog/2012/10/the-benefits-of-cloud-computing.

[13] Peter Mell and Tim Grance, ― The NIST Definition of Cloud Computing, NIST Report, July 2009 Recommendations of National Institute of Standards and Technology.http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf

[14] Chappell, D. (December 2009). Introducing windows azure. HTTP://GO.MICROSOFT.COM/.

[15] Madanmohan Rao., "Internet growth, impacts and success," yourstory.com/2015/02/internet-india-2018.

[16] Demers, A. J., Petersen, K., Spitzer, M. J., Terry, D. B., Theimer, M. M., and Welch, B. B. The bayou architecture: Support for data sharing among mobile users. In Proceedings IEEE Workshop on Mobile Computing Systems & Applications (Santa Cruz, California, August-September 1994), pp. 2.

[17] Indrajit Bhattacharya, Reformation of Healthcare Services through Workforce Development in Healthcare IT, available at http:// ehealthonline.org

[18] Ghosh, A. 2010. Report on Cloud Computing, IIT Mumbai Department of Computer Science and Engineering, Indian Institute of Technology, Mumbai-400076. http://www.cse.iitb.ac.in/alumni/~abhirup09/Docs/cloud_co mputing_f inal_report.pdf

[19] McConnell, S. 2001. Connecting with the unconnected: Proposing an evaluation of the impacts of the Internet on unconnected rural stakeholders. Mc Connell International. http://www.mcconnelinternational. com/evalnation.html