Cloud Computing and E-Governance: Advances, Opportunities and Challenges

P. Sasikala, Department of New Media Technology, Makhanlal Chaturvedi National University of Journalism and Communication, Bhopal, India

ABSTRACT

Cloud computing provides a new service consumption and delivery model inspired by Consumer Internet Services. Cloud computing drives down costs and accelerates cost reduction benefit. Cloud is making rapid inroads in several sectors and e-Governance is the latest in this direction. e-Governance with cloud computing offers integration management with automated problem resolution, manages security end to end, and helps budget based on actual usage of data. At a global level, Cloud architectures can benefit government to reduce duplicate efforts and increase effective utilization of resources, helping the government go green and reducing pollution and effective waste management. In this paper, the authors describe how this newly emerged paradigm of cloud computing can be helpful for e-Governance. It also describes the role of cloud computing standards and architectures in framing a good e-Governance strategy to realize e-Government. Governments have been slower in realizing the potential benefits of the Information Technology to provide e-services. E-services are delivering cost-effective services, which can drive the growth of the economy and government productivity.

Keywords: Cloud Computing, e-Governance, e-Services, Green Computing, Grid

INTRODUCTION

The grid or cloud computing are large scale distributed systems (Buyya & Broberg, 2011). The essence of large scale distribution can only be realized if the services are rendered to common man. The only organization which has exposure to almost every single resident is the respective governments in every country. As the size of population increases so the need for a larger purview arises. The problem of having a large purview can be solved by means of large scale grid for online services (Reese, 2011). The government services can be rendered through fully customized Service-oriented Clouds (Wikipedia, 2011). The success of the forthcoming endeavors of human civilization depends on the proper utilization of the resources which are becoming scarce day by day (http://cloudcomputing.qrimp.com/portal.aspx). It is observed that while some places have plenty of resources, other places suffer from the lack of it. This discrimination can be wiped out by a proper management and strategy adopted by the Governments of different countries in the form of a properly implemented and managed e-Governance. It is beyond doubt that e-Governance can smoothen the working procedure of Government machinery by pro-
viding transparency, effective working, instant response and availability of information of Government machinery to end users, time to time (GoI, 2011). The existing e-Governance is very much server centric, cost effective in nature and finds itself unable to address all categories of users starting from rural urban to metropolitan citizens (Sasikala, 2011b). The success of e-Governance lies on wiping out of this discrimination by providing accessibility of different web services of e-Governance irrespective of geographical and language barriers. Accessing the different web services of e-Government by using sophisticated laptop or desktop are beyond the reach for a large number of users even in developing countries like India. In India, 70% of the total population earn less than Rs 80 per day and cannot afford expensive laptop or desktop etc to get the facilities of e-Governance. Hence e-Governance facilities are confined within limited inhabitants and remain unsuccessful. Governments around the world are actively looking into cloud computing as a means of increasing efficiency and reducing cost. In continuation of our work on cloud computing (Sasikala, 2011a, 2011b, 2011c, 2011d) we present in this paper the realities and the possibilities of the role, cloud computing can impart in the e-Governance process.

CLOUD COMPUTING

What is Cloud Computing?

Cloud computing is a model for enabling ubiquitous, 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 (Sasikala, 2011b).

Delivery Models (Sasikala, 2011c)

- **Software as a Service (SaaS):** The consumer uses an application, but does not control the operating system, hardware or network infrastructure on which it’s running.
- **Platform as a Service (PaaS):** The consumer uses a hosting environment for their applications. The consumer controls the applications that run in the environment (and possibly has some control over the hosting environment), but does not control the operating system, hardware or network infrastructure on which they are running. The platform is typically an application framework.
- **Infrastructure as a Service (IaaS):** The consumer uses “fundamental computing resources” such as processing power, storage, networking components or middleware. The consumer can control the operating system, storage, deployed applications and possibly networking components such as firewalls and load balancers, but not the cloud infrastructure beneath them.

Deployment Models (Sasikala, 2011a)

- **Public Cloud:** In simple terms, public cloud services are characterized as being available to clients from a third party service provider via the Internet. The term “public” does not always mean free, even though it can be free or fairly inexpensive to use. A public cloud does not mean that a user’s data is publicly visible; public cloud vendors typically provide an access control mechanism for their users. Public clouds provide an elastic, cost effective means to deploy solutions.
- **Private Cloud:** A private cloud offers many of the benefits of a public cloud computing environment, such as being elastic and service based. The difference between a private cloud and a public cloud is that in a private cloud-based service, data and processes are managed within the organization without the restrictions of network bandwidth, security exposures and legal requirements that using public cloud services might entail. In addition,
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