Cloud Based E-Government system- A Critical Study

Dr. Vivek Jaglan

Amity University, Manesar, haryana

Abstract: **Despite significant efforts to initiate electronic government projects, developing countries are still struggling to reap the benefits of using e-government services. An effective implementation of e-government infrastructure is necessary to increase the efficiency and transparency of the government services. There are several studies that observed causes like lack of infrastructure support, lack of payment gateway and improper e-government service delivery channel as main barriers to a wider adoption of e-government services. The main contribution of this research is to propose a cloud-based G2G (Government-to-government) e-government framework for a viable e-government solution from the perspective of developing countries. We have introduced a list of concepts and a systematic process to guide the implementation of e-government project based on the government's vision, goals, chosen services through the service delivery channel to the appropriate cloud service and deployment model. We have used Nepal as a context of the case study and applied the framework to a real e-government project of driving licensing department using action research methodology. The results from the study show that the G2G approach of e-government implementation would be the best for providing effective government services to the stakeholders of developing countries. The proposed framework also supports a smooth integration of government services and reduces the time of the overall project.**

Keywords: Pension Policies, Social Security

1. Introduction

The phenomenon of e-government in the past couple of decade has taken the government service delivery approach to the next level. The advancement in technology has brought such a dramatic change that almost every government service could be delivered and acquired electronically in the developed countries [1]. This trend has attracted many developing and less developed countries to implement e-government solutions in order to enhance the government service delivery approach that would save government resources. However, e-government projects in developing countries suffer a poor success rate in that only 30 percent of e-government projects manage to sustain the actual delivery stage [2]. Al-Hujran et al. [3] found that e-government users in developing countries have minimal access to the ICT tools that ultimately restricts access to the offered e-government services. Among the various reasons for e-government failure, the lack of adequate ICT infrastructure, payment gateway and e-government service delivery channels are some of the major issues [4]. Beside this, the lack of attention to e-government adoption while designing and implementing e-government projects is one of the major contributors to e-government project failure. Lessa et al. [5] found that governments put a high emphasis on the sophistication of the technology for e-government implementation while the adoption part is often overlooked, creating a gap in the implemented service and user strength to adopt those services. Therefore, merely having an online portal and offeringgovernment services through this portal is not enough to gain citizen participation [6]. Symasuddin [7] found that the government approach for initiating an e-government in the government-to-citizen (G2C) dimension is

problematic for developing countries especially when e-government systems are not integrated. Farzali et al. [8] also identified that the lack of integrated e-government systems makes the offered services incomplete and discourages users from getting involved. In the context of aforementioned scenario, it is imperative to develop a viable e-government implementation solution that supports governments to effectively implement and integrate existing e-government systems to better align them with citizens need. The novel contribution of this paper is a framework that: (i) supports a cloud-based government-to-government (G2G) e-government solution that would provide a strategic roadmap for successful e-government implementation from the perspective of developing countries; and (ii) includes several concepts and a systematic process that are necessary for e-government implementation and justifies different service delivery channels and transaction processing models to deliver e-government services through a more citizen-centric approach. The proposed framework has been validated for its usability and adoptability in the context of developing countries and the impact it would bring in the government service delivery. The framework further supports to identify various e-government service delivery channels and payment processing models for the citizen-centric services. We have adopted participatory action research in order to evaluate the framework and the findings show its positive impact in line with the aim and objective of this paper.

2. Cloud Computing

Cloud computing have various definitions which some have been brought here. The definition of the national institute of

standard and technology of America is as follows [1]. "Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction." On other common & acceptable definition is of Mater et al. [1]-[2] "A very exact scalable instrument, capable of technology-enabled service, which is available easily on the internet when needed."

Following the definition of cloud computing, we should comprehend their important features, developed models, the way of using services and also the way of protecting it, in order to know well and accept it [3]. Here are the five key features of cloud computing and automation

- Service demanding by it. Using this feature when needed the customer can easily and automatically access to computing facilities like server, net, storage and soon from any provider.
- Network access. It implies that the facilities are accessible on the net and they can be used following standard methods. The methods which support weak and strong clients like laptop and mobile phones. Place -independent resource center. This features pools different customers needed resources in the same place dynamically by the providers. These resources can include the storage, memory, the bandwidth of net and virtual machines.
- Flexibility. Using this feature, the facilities can be provided rapidly and with high elasticity and can be expanded or release fast. In other words the services can always be updated and improved and accessible for the users.
- Result service. This feature enables monitoring, control and reporting of the resources, and can apparently control and report the amount and quantity of resource using for both customer and the provider of the Development models include the aim and identity of cloud and development models are of the following four types [1].
- Public cloud: The substructure of public cloud is for the public use and accessible to all in which the resources, applications and web-services are provided through internet and public organizations help to provide and supply the substructures [4]. Indeed a cloud service provider organization owns the public cloud.
- Private cloud: Private cloud is for the exclusive use and only for an organization, so everyone in the organization can access data, services and applications but others out of organization can't [4].
- Mix cloud: The last models are Hybrid ones which are combination of two or more (public, private and community) clouds. It is in fact an environment which Uses some internal and external cloud providers [4]. In this section the definitions of cloud computing, cloud models and types of services provided by it have been

described. In the next section the concept of egovernment will be introduced to give the opportunity to discuss the challenges facing the implementation of egovernment with cloud computing with a proper Automation.

3.   Challenges In E-Government And Cloud Computing

An effective e-government system should be Reliable, economical and easy maintenance [12]. The government can use the powers and abilities of cloud to cover some communication gaps, especially relation to those of the citizens who reside in remote areas. Cloud can also be used to increase collaboration between different organizations within the government, reduce data redundancy and track and monitor the effectiveness of government plans. Sharing the computational resources between the central government and the states will lead to a reduction in infrastructure costs. Transparency in government can quickly be achieved through the adoption of cloud. Cloud has a lot of potential in this section and its benefits will come not only to themselves but also to the millions of people [12]. E-government automatically provides an integrated management with cloud computing by solving resolution problems and helps to reduce the budget based on the actual use of the data. The cloud architecture can help the government to reduce repetitive operations and increase the effective use of resources, in the global arena. These matters in their turn have an effective aid to create a green government, reduce pollution and waste management. Currently companies and small businesses are using the benefits of cloud based on pay-as-you-use service model which is available in a wide scale [12]. Effective challenges in e-government are classified into three groups that include social, economic and political barriers [14]. These barriers limit the scope of policymakers' activity for effective use of new technologies. There are number of technical challenges such as data scaling, auditing and logging, replication and migration, disaster recovery, management policies, system integration, legacy software, Obsoleted technologies and migration to new technologies [18]. Cloud computing is appropriate to respond to these challenges. Cloud Database provides on-demand and high scalability. Which holds a large number of records that is the basic need in government. Cloud provides the ability to audit event, Login and report information about the tenant and based on program which recognizes fraud and corruption in government agencies. This can help in creating mechanisms for security increasement. There for reliable and accessible applications can be created [18]. Facilitate proliferation and migration of applications is possible with virtualization technologies in the cloud which is useful in disaster recovery and reduction of time to establishment new softwares. Cloud provides tools and technology which simples and Eases the disaster recovery [12].

4.   Benefits of Cloud based E-Government

Despite of various legislative schemes and governmental approaches the annual report of Ministry of Labour and Employment, Government of India, 2016 - 2017 states that the Social Security schemes in India cover only a small segment of the organized Work – force is a matter of concern. Labour is the backbone of industrial growth and economic development. It is the segment, which contributes most significantly to the country's Gross Domestic Product. Realizing this, Government of India has enacted several laws giving protection to labour against retrenchment, employment injury, occupational diseases, and economical and social distresses. But the benefits of these laws have reached only to a small section of workers in the organized sector. There is ignorance of unorganized sector, on a comparative basis, the economic status of Government employees in is much better than a large section the majority of the populace, who suffer from poverty, financial insecurity, lack of adequate education and health facilities, etc. Thus, the government lacks equity considerations for taking proper care of the needs of employees, employed in different sectors.

Cloud computing technologies have many benefits in different parts of e-government. These benefits are not limited to the contents discussed in this section.

A. Rapid Elasticity

Cloud computing is designed to provide services with unlimited scalability which is regarded as one of its basic features [19]. Customers have access to a huge pool of virtual resources which allows them to respond to unpredictable periods of peak load with an efficient, flexible and costeffective method [20]. Therefore, performance and economic stability is balanced. In addition, cloud computing resources can be purchased automatically in any quantity at any time [21].

B. Protection, Care and Technical Support

Cloud computing service providers are hosts to applications and purchased servers. They are also responsible for updating software and provide technical support. The beauty of Cloud is appearing here to solve problems of e-government especially for small government department's outskirts of cities because employment of trained troops is not economical and also Professionals preferring not to work in such remote areas [22]. Moreover, in the cloud technology it is not necessary to update the software applications over a single computer [19]-[23]. This work will lead to save cost and time, and requires less trained personnel for developing countries and will increase system efficiency (by preventing maintenance errors) and its effectiveness.

C. Cost and Efficiency

The service models of cloud computing have focused to provide economical services to companies and Government agencies. It creates an opportunity to change from costs of investment to operating costs by reducing the cost of purchasing very expensive systems and employ professional employees to manage and maintain [21]. Hence one of the major barriers of having a huge and expensive technology infrastructure will be reduced and new opportunities for investment in developing countries will increase further.

D. Auditing and Logging

Traceability any change to contains of information is necessary in e-government services. Corruption in government agencies can be controlled with using information technology services and by responsibilities of service providers. Auditing process, security audits should be performed periodically to ensure system security. Cloud can help in analyzing huge volumes of data and detecting any fraud. This can help to build defense mechanisms to enhance the security, therefore applications are made available and reliable [24].

E. Disaster Recovery

This is really a critical issue for the survival of many organizations to ensure whether have the ability to survive at events Caused by their IT infrastructure or not. Disaster recovery programs in clouds provide more options than traditional disaster recovery model for organizations to restore information very quickly and effectively [19]. At this type of disaster recovery costs and recovery time are reduced [23]. Governments can store a backup of the server using the cloud as a backup for disaster recovery, daily basis and also can store it off-site using a third party storage service provider that has the ability to save in a different location.

F. Reporting and intelligently

Data Center (CPU, storage, network, etc.), the peak load, Consumption level, Use of energy along with time, are some factors That monitoring and reporting are necessary for better resource utilization. This minimizes costs and scheduling [24]. Profiling data makes various services provided by the government visible. Cloud provides the Best Smart Infrastructure Business in comparison with previous methods because it has its extent and functionality. Applications can extract large amounts of real time and reliable data to make the best decisions for providing better services [24].

G. Policies Management

E-government applications have to implement Policies raised by the government facing citizens [25]. These policies should be implemented Along with infrastructures and data centers to improve the daily performance. Cloud architecture is helping to implement this policy in a data center [24]. Security-related policies deploy applications, etc. Can be designed and implemented in the data center.

H. Systems Integration and Software LEGACY

Not only applications and offered services are transferred to the cloud, it also integrates with cloud-based applications [24]. Powers of IT are data correlation across applications and messages transmit in different systems to provide faster services to end users. Cloud is built based on the principles of SOA and can provide excellent solutions to integrate various applications. Also, applications can be seamlessly easily transferred into cloud [24].

I. Old technologies and Migrating to New Technologies

Transition from an old technology to a new one is always challenging. Using different versions of software, programs and security packages, is one of the nuances in the data center's security maintain in e-government [25]. E-government applications due to existence of Security and adaptability, Can manage the proposed policies using cloud. Different types of e-government applications are simply integrated [25]. Cloud architecture provides ability to run different versions of software at same time. After testing these applications they can enter the production phase [25].

J. Green technology

The use of ICT systems in the public sector has created a negative impact on the eco So that rate of carbon dioxide increases and requires more power consumption [23]-[26]. Cloud computing is relatively good in energy consumption and provides eco-systems through virtual services. Using Virtual Services, power consumption of an ordinary PC is reduced to 90% [26], [27]. Nowadays much attention has been paid to the effects of data centers. Power consumption and e-waste in the air can bring environmental hazards [25]. This could be one reason for the government's move towards cloud. Cloud rather than building new facilities, provides the possibility of centralizing the existing facilities.

K. Security

The cloud computing which is presented after technologies such as service oriented architecture brings not only the benefits of these technologies, but it is trying to fix their flaws as well. To implement e-government, One of the major challenges of governments, was security issue particularly data security which before cloud computing created many problems including disruption of servers or data centers, lack of access to certain services at certain times of year, such as voting and election days for governments and users but Implementation of cloud computing includes advanced security technologies.

Having a pool of resources enables cloud providers to concentrate on all of the security resources in order to secure the environment. Also the automation within the cloud along with focused security resources creates advanced security features. Nevertheless no system can fully ensure the security.

5. Conclusion

Considering the expressed subjects and benefits of cloud computing technology and automation technology, this technology is currently the best option for e-government for India. Thus the best option for developing countries like India that have not yet fully implemented e-government is leading government towards cloud architecture. This will reduce costs and increase the efficiency and user satisfaction. Also the importance of benefits such as data integrity, acceleration of processes and the flexibility of cloud in government should not be ignored that these benefits can meet many challenges of governments to implement e-government. But significant challenge that perhaps governments are harassment to use cloud computing is laws and service level agreements because the countries laws are very different from each other. And in case government rent the service from cloud service provider in another country, it should accept not only the laws of the country of origin but also the laws of the country that is in the data transfer path if there is one. Thus the need to create new laws and regulations between countries is required in data transfer field, to use of services provided by service providers to be possible for governments all over the world. In this regard, and according to the developed countries and some developing countries are separately executing the e-government projects like India and have less participation in this field together. The developing countries with cooperating and using each other's experience to form a committee to investigate the cloud computing's depth and applications in e-government and laws related to data transfer is proposed. To be able to provide needs and necessary platforms to the development and implementation of egovernment and e-services with the achievements of the committee in a short time and instead of using separate operating teams for each country, the creation of such a committee can reduce many of the costs of research including financial and time in this field.. With the study was done in this paper the importance of using of new technologies like automation, cloud computing that are improving efficiency and reducing costs in government. Countless benefits like flexibility, cost effectiveness, integration in new technology, proper security that converted it to an appropriate option for use in e-government. From this paper it could be concluded that developing and even developed countries specially India have critical need to create e-Government to reduce costs and also having Sustainable Development in this economic and critical situations and the best way is the use of green and cheap technology which is the cloud computing and automation Undoubtedly, the participation of countries with each other on technical and legal issues is code key for achieving egovernment based on cloud computing and automation as soon as possible. And it can fix and or minimize the existing problems and challenges on the way and therefore an E-government is created which interest and participation of people to use its services is huge.

REFERENCES

[1]. F. Soleimanian, S. Hashemi, "Security Challenges in Cloud Computing with More Emphasis on Trust and Privacy", International Journal of Scientific & Technology Research, Vol. 1, ISSUE 6, 2012,

[2]. M. Monsef, N. Gidado, "Trust and privacy concern in the Cloud", 2011 European Cup, IT Security for the Next Generation, 2011, pp.1-15.

[3]. M. Firdhous, O. Ghazali, and S. Hassan, Trust and Trust Manage-ment in Cloud Computing – A Survey, Inter Networks Research Group, University Utara Malaysia, Technical Report UUM/CAS/ InterNetWorks/TR2011-01, 2011.

[4]. Qaisar, K.F. Khawaja, "Cloud Computing: Network/Security Threats and Countermeasures", Interdisciplinary journal of con-temporary research in business, Vol.3, No 9, 2012, pp. 1323-1329

[5]. Layne, K. and Lee, J. "Developing fully functional egovernment: a four stage model". Government Information Quarterly, vol.18, 2001, p. 122

[6]. Gopala Krishna Behara, Vishnu Vardhan Varre and Madhusudhana Rao, "Service Oriented Architecture for EGovernance", 2009, www.bptrends.com.

[7]. Waseda University International e-Government Ranking 2013, http://www.waseda.jp/eng/news12/130326_egov.ht ml [Accessed: August 2013]

[8]. KPMG, "The Cloud Changing the Business Ecosystem", Survey report, (2011), http://www.kpmg.com/in/en/issuesandinsights/articl espubl ications/page s/thecloud changing the businesse cosystem aspx .

[9]. Eric A. Marks, Bob Lozano. Executive's Guide to Cloud Computing. Hoboken, New Jersey: John Wiley and Sons, 2010, PP. 40 – 102.

[10]. Mahafuz Aziz Aveek, Md. Sakibur Rahman, "Implementing E-Governance in Bangladesh Using Cloud Computing Technology", BRAC University,2011

[11]. Cloud Computing for Singapore Government, http://www.egov.gov.sg/ egov-programmes/programmesby-government/cloud-computing-for-government [accessed: august 2013]

[12]. Malini Nathan, Cloud Computing for Singapore Government,IDASingapore,https://www.ida.gov.sg/ ~/medi a/Files/Archive/News%20and%20Events/News_and _Even ts_Level2/20120508123036/ CloudComputingFactsheet.pdf [accessed: august 2013]

[13]. David C. Wyld, The Cloudy Future of Government IT: Cloud Computing and the Public Sector around the World, International Journal of Web & Semantic Technology (IJWesT), Vol 1, Num 1, January,2010

[14]. R.HICKS "Thailand hatches plan for private cloud" Futuregov,may252009https://www.futuregov.net/art icle/20 09/may/25/thailand-plans-private-cloud-e-gov