International Journal of Advanced Technology in Engineering and Science
Vol. No. 09, Issue No. 07, July 2021
www.ijates.com
ijates
ISSN 2348 - 7550

IMPACT OF CLOUD COMPUTING ON E-GOVERNANCE

Eric Agbeko Kofi Adzapeni [1], Onib Dadgar[2]

[1]Department of Computer Science[1]Lovely Professional University,
India, Punjab, Jalandhar[1]
[2]School of Computer and Systems Sciences
JNU, New Delhi, 110067, India

Abstract

As a result of rapid increase in computing resources over the past years, many government agencies, businesses and individuals use the internet and web-based technologies in running their day to day activities. The introduction of E- governance has taken up in India many years back and information and communication technology plays vital role in the delivery of reliable, fast, secure and convenient services. A lot of other countries around the globe are making use of the e-governance. Cloud computing is a new way of computing which aims to provide excellent communication style and storage resources in a secure setting through internet. Through the use of cloud computing, there is an improvement in the workers capacity to deliver reliable and secure services to the citizens and government departments. Cloud computing and its impact on e-governance will be discuss in this paper.

Keywords: Cloud computing, E-governance, Benefits, NIST, infrastructure,Technology.

I. INTRODUCTION

In every country, government is responsible in controlling and managing all affairs. This simply shows that, government forms the backbone of every community. No activity can be performed in government agencies without the consent of the government. These activities need to be very efficient, transparent and beneficial to the people in the various communities. And before these activities can be very efficient and transparent, government needs to employ the use of E-

governance. E-governance has been in existence for more than a decade. The main purpose of introducing E-governance is to make lives of citizens better.

The utilization of information and electronic communication to interchange information between the state and the citizens, the state and the business corporations and between state institutions is termed as **E-governance.**

E- Governance plays important roles in the life of citizens and business organizations. It aims at improving the citizen's access to the government information and services.

According to world bank, electronic governance is when the government agencies use information technologies to change business activities positively andtransform relations with citizens and other arms of government. Example of such technologies are Wide AreaNetworks, the internet and mobile computing.The technologies listed above can be used in different ways and also for different purposes for better delivery of government services to citizens.

The objectives of E-governance are; improves efficiency, improves services, helps achieve specific policy outcomes, contributes to economic policy objectives, help bring trust between government and citizens, more convenient, lower cost, more reliable, radical improvement in the quality of services to customer and remote rural areas are being empowered by high speed internet access.

II. CLASSIFICATION OF E-GOVERNANCE

E- Governance has been **classified** into various types for better service delivery. These are;

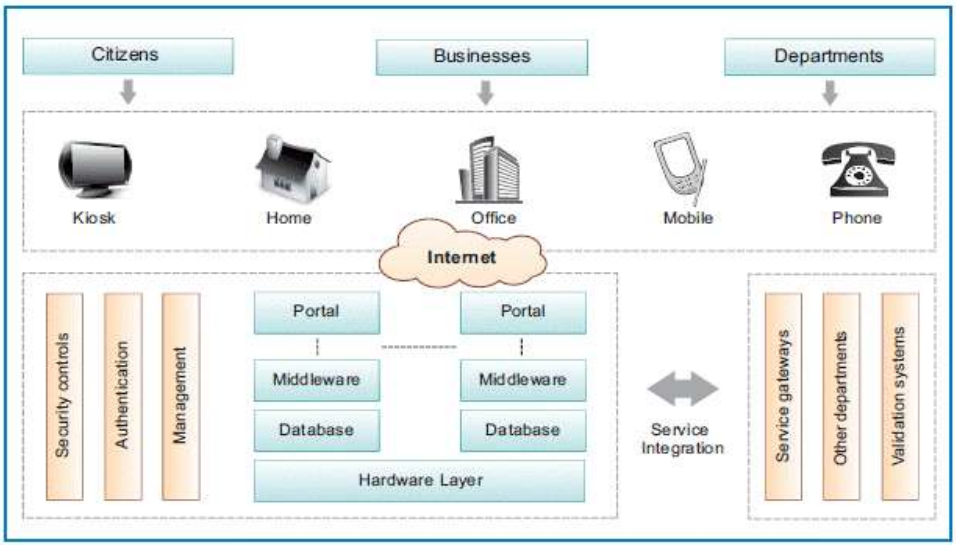
- **Government to Government (G2G)**
  - Administration
  - Inter Government control
  - Control, distribution and monitor
- **Government to Business (G2B)**
  - Tender
  - Control management
  - Policy enforcement
  - Tax. Standards and accountability
- **Government to Employee (G2E)**

- Document management
- Enterprise resource planning

❖ **Government to Citizens (G2C)**

- Services
- Grievances

Internet-based e-governance technique has many advantages to the state. Some of these benefits include lower expenditure, dispensed storage of data, availability of resources at minimized cost, controls security, adjustability, modifiability and accountability.Most of the government institutions are now adapting to the use of Cloud Computing in their delivery of services. Stakeholders who are involved in e-governance are being provided with the various services.



E-Governance architecture key elements

III. WHAT IS CLOUD COMPUTING

In recent days all organizations, both private and public sectors are migrating their data onto the cloud. The big question now is why are they migrating their data onto the cloud and also what is cloud computing? Cloud computing has recently emerged as one of the buzzwords in the I.C.T industry.

The availability of the required computer system resources mostly cloud storage for data, computing power, databases etc. without direct active purchase and management (maintaining physical data centers and servers) by the end-users which is usually referred to us pay-as-you-go system is known as **CLOUD COMPUTING**. In other words**Cloud computing** is the use of remote, rented servers to store and manage data, rather than the use of a local, privately maintained server. Cloud computing is a new way of accepting and providing services over internet. Most government organizations are moving their data onto the cloud due to its benefits and advantages over the local, privately maintained server.

Cloud models are more cost-effective than on-site server installations and may even provide faster service than a traditional installation.

For any government to be able to render good services to their citizens there is a need to use cloud computing because it has so many benefits and advantages.

IV. CHARACTERISTICS OF CLOUD COMPUTING

As per N**ational Institute of Standards and Technology (NIST),** the characteristics of cloud Computing are listed below;

1. **On-demand self-service:** Computing capabilities, such as server and processing time, and network storage are provided automatically as needed.

2. **Broad network access:** The resources can be accessible virtually through the internet using the devices such as mobile phones, workstations, tablets and laptops.

3. **Resource pooling:** Resources are pooled to serve different users with physical and virtual resources dynamically appointed and reassigned as per request.

4. **Rapid elasticity allowing dynamic capacity management**. Resources are also available on demand. The resource may include processors, memory, secondary storage, network bandwidth which are customized for the client

5. **Agility:** It refers to increased speed of deployment i.e. faster to market. This is necessary for on-demand self service.

V. CLOUD SERVICES MODEL

Cloud service models are grouped into three types:

- Infrastructure- as- a -Service (IaaS)
- Platform as a Service (PaaS)
- Software as a Service" (SaaS)

i. **Infrastructure-as-a-Service** provides access to the following fundamental resources such as physical machines, virtual machines, virtual storage, virtual machine disk storage, Virtual local area network (VLANs), Load balancers, IP addresses and Software bundles. Customers access these resources on the Internet using a pay-as-per use mode.

Advantages of IaaS

- ✓ **Shared infrastructure**: Multiple users are allowed to share the same physical infrastructure in IaaS.
- ✓ **Pay-as-per-use model**: The users are required to pay for what they have used.
- ✓ **Web access to the resources**: IaaS allows IT users to access resources over the internet.

ii. Software as a Service (SaaS): In software as-a-service the user do not need to install any applications on his device, rather by hosting the application on a cloud. SaaS reduces maintenance and service costs.

Advantages of SaaS

- ✓ SaaS is easy to buy
- ✓ Less hardware required for SaaS
- ✓ Low maintenance required for SaaS

iii. Platform as a Service (PaaS): Provides required platform to develop and customize applications. It helps programmers to easily create, test, run, and deploy web applications

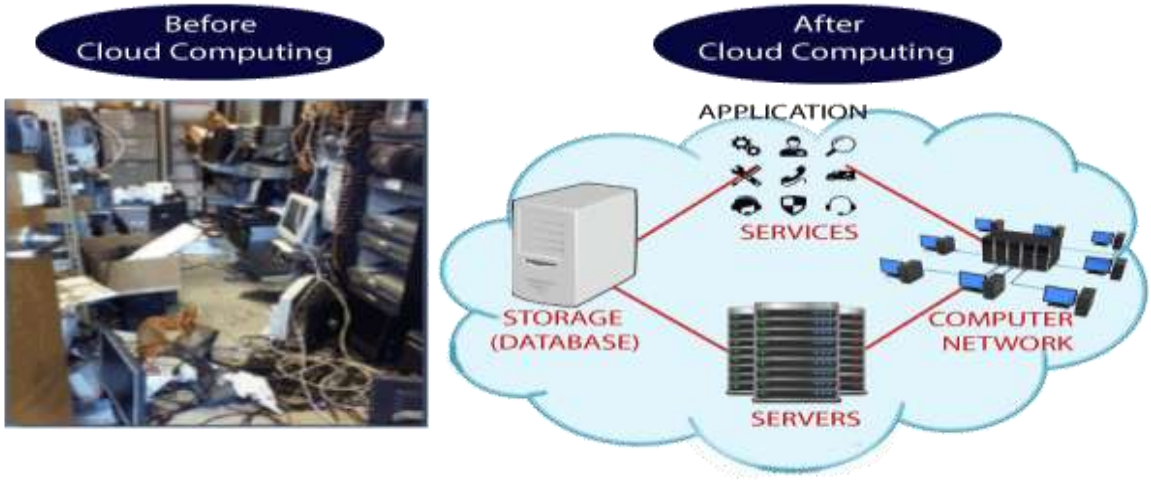
Advantages of PaaS

- ✓ It reduces the coding time
- ✓ It is available at multiple platform
- ✓ Speed and flexibility

VI. TYPES OF CLOUD COMPUTING

Cloud computing has been classified into four types based on the deployment model or location where the cloud is hosted. These are;

- **Public Cloud**: Cloud provider allocates resources on a per-user basis through web application. It allows unlimited access and unlimited data capacity for the consumers.
- **Community cloud**: Organizations of the same community share computing infrastructure. This cloud be managed by the organization or by a third-party.
- **Private cloud**: It is also known as internal cloud. This type allows increased data security and customized I.T network control.
- **Hybrid Cloud**: It is the combination of both public and private cloud



VII. IMPACT ON E-GOVERNANCE

Benefits of cloud computing on e-Governance

The introduction of cloud computing into e-Governance has brought so many benefits to the citizens. It has made the delivery of services in the Government agencies very fast, comfortable and easy. The key benefit for using the cloud for hosting of e-government is as follows

- **Cost saving:**Users do not need to acquire and install any I.T equipment and software on their premises, as the traditional e-governance. The cost of maintenance of cloud computing is less compared with the traditional method of storing data.
- **Efficiency and Reliability:**Cloud computing can be useful in increasing the efficiency and reliability at a reduced cost thereby improving the services in the government agencies.
- **Speed:**It is very fast in storing and transferring of data. Cloud can store large volume of data.
- **Accessibility:**It becomes very easy for users to access all the time once there is internet connectivity.
- **Better security:**There is high level of securing the data by service providers
- **Scalability:**Handles the uncertainty in demand and load in e-Governance

VIII. E-GOVERNMENT AND CLOUD COMPUTING TRENDS

- **Japan:** In Japan, there is a nationwide Cloud Computing called "Kasumigaseki Cloud" which helps the ministries to collaborate at their local levels.
- **India:** The state government of Jammu and Kashmir in India have take up cloud computing for their government services. The data Centre which belong to the government can be located at Madhya Pradesh provides e-government services on the cloud such as birth certificate and trade licenses.
- **Singapore:** The Singapore government has also adopted the use of cloud computing.
- **Australia:** The following departments in Australia have also adopted to the use of cloud computing; Department of Immigration and Citizenship, the Australian taxation office and Australian DBCDE.

- **United state:** The U.S Government has also migrated their services onto the Cloud. Departments such as the U.S Army, Air Force, Navy, Department of Education and many more agencies.
- Other countries which also migrate to the cloud are;United kingdom, France, South Korea , Italy, Germany and Canada

IX. Areas in Government Sector where Cloud Computing has been very helpful are listed below:

- Education
- Postal Services
- Food and Drug Administration
- Health and Land Records
- Centralized Monitoring and Evaluation"
- Centralized Auditing
- Agriculture
- Deployment of Citizen Services
- Unique Identification Authority of India (UIDAI)
- Management Information System (MIS)
- Case Management and Legal Records

X. Some Issues And Challenges For Adopting Cloud Computing in E-Governance

- Security and privacy:Security problems may happen in servers within the cloud, the client machines and the network.
- Integration of application becomes very difficult.
- Government losing control of data. The whole issue about cloud computing in public organization is trust.
- Internet connectivity: Internet speed will definitely affect the performance.

CONCLUSION

Cloud Computing has so many impacts on e-Governance. It offers many advantages and benefits to the government especially where administration systems are always busy and under pressure. It also has some issues or challenges on its implementation in e-Governance. Cloud computing is considered as a new measure and enhanced technology to be used in e-Governance. Majority of the government agencies in most countries are running all their applications in their cloud.

Cloud computing is the future of most of the sectors in government agencies.

REFERENCES

[1] Vijay Kumar, N. (2011) Role of ICT in E-Governance: Impact of Cloud Computing in Driving New Initiatives. SET-Labs Briefings, 9, 43-55.

[2] The World Bank Group (2009) Definition of E-Government, World Wide Web. http://www.worldbank.org/egov.

[3] Alshomrani, S. and Qamar, S. (2013) Cloud Based E-Government: Benefits and Challenges. International Journal of Multidisciplinary Sciences and Engineering, 4, 1-7.

[4] Tutorials Point (2018) Cloud Computing Security. Available from: https://www.tutorialspoint.com/cloud_computing/cloud_computing_security.htm

[5] Devasena LC (2014) Impact study of cloud computing on business development. Operations Research and Applications: An International Journal 1: 1-7.

[6]http://vikaspedia.in/e-governance/national-e-governance-plan/concept-of-e-governance

[7]https://www.citrix.com/enin/ghttps://datascience.foundation/sciencewhitepaper/impact-of-cloud-computing-technology-on-e-governancelossary/what-is-cloud-computing.html

[8] Alshomrani, S.: A comparative study on United Nations E-Government indicators. Journal of Emerging Trends in Computing and Information Science(2012)

[9] Apps.gov, http://apps.gov(accessed December 23, 2013)