

Cloud Computing is Marvellous Highway of an E-Governance in Gujarat State: A Study

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Abstract— Global revolution in Internet is changing our lives in terms of the way we work, learn and interact. These changes naturally should reflect the way government functions in terms of the organization of the government, its relationship with its citizens, institutions and businesses and cooperation with other governments. Also, the increasing generalization of technology access by citizen and organizations brings expectations and demands on government. It aims to deliver more interactive services to citizens through E-Governance. For this, cloud computing may lead to significant cost savings. In this paper, we describe how this newly emerged paradigm of cloud computing Gujarat state Government as an E-Governance.

Keywords— Cloud Computing, E-Governance, eyeOS, Cloudo, Panda Cloud

INTRODUCTION

Over the past few years, Cloud Computing has brought a new way of delivering services. The advantage of these changes have reduced implementation and maintenance costs, increased mobility for a global workforce, scalable infrastructures, IT department transformation, improve green computing, improve high availability of high performance. E-Governance is a process of reform in the way government work, share information, engage citizens and deliver services to external and internal clients for the benefit of both government and the clients that they serve. Currently Gujarat government implement many E-Governance projects like GSWAN, SWAGAT Online etc. All e-governance projects are running with their own hardware infrastructure, software, platform and communication channel. So that each requires their own hardware, software, platform and communication channel. It will require more maintenance, more electric power, more manpower, high cost of software and hardware. If all the E-Governance projects deploy and run on cloud computing environment. It will decrease, maintains power, decrease cost of hardware and software, give high performance. In this paper I have described about cloud computing, E-Governance, Current implementation of E-Governance project in Gujarat and technology use for E-Governance project. As well as idea of how to implement E-Governance project on cloud computing and which cloud model suitable of it and challenges.

PREMBLE OF CLOUD COMPUTING AND E-GOVERNANCE

1. Cloud Computing is internet based technology which provide pay per service and demand service like PAAS (platform as a service), SAAS (Software as a service), MAAS (Monitoring as a service) CAAS (Communication as a service), and IAAS (Infrastructure as a service).

The five characteristics:

1. On-demand self-service: individuals can set themselves up without needing anyone's help;
2. Ubiquitous network access: available through standard Internet-enabled devices;
3. Location independent resource pooling: processing and storage demands are balanced across a common infrastructure with no particular resource assigned to any individual user;
4. Rapid elasticity: consumers can increase or decrease capacity at will;
5. Pay per use: consumers are charged fees based on their usage of a combination of computing power, bandwidth use and/or storage

Models of Cloud Computing

- Private or internal Cloud: Cloud services are provided solely for an organisation and are managed by the organisation or a third party. These services may exist off site.
- Public Cloud: Cloud services are available to the public and owned by an organization selling cloud services, for example, Amazon.
- Hybrid Cloud: An integrated cloud services arrangement that includes a cloud model and something else (another cloud model, agency back end systems, etc), e.g. data stored in private cloud or agency database is manipulated by a program running in the public cloud.

How to Use Cloud Computing

Enticed by the idea of cloud computing but not entirely sure how to go about using it? Chances are, you have been doing just that by using web services to store your data for you. Here are five free ways

1. Use a cloud-based email service.
2. Investigate online Docs services.
3. Collaborate online.

4. Share photos.
5. Start a blog.

Gujarat E-Governance Project may be lucky enough to get free cloud computing services.

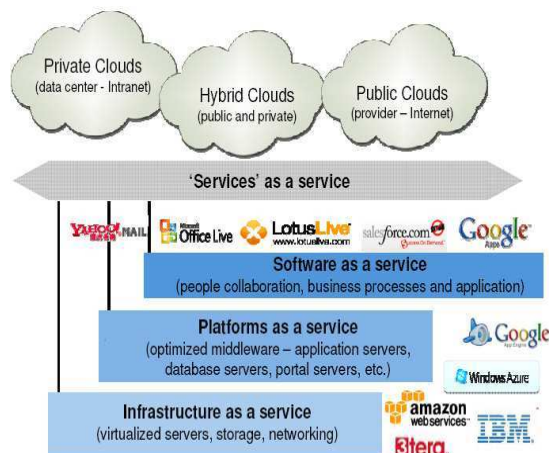


Figure 1: Cloud Computing

2. E-Governance and Its Scenario - “E-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions.”



Figure 2: E Governance Application

INDIA BASED CLOUD COMPUTING SERVICES PROVIDERS

21st century economic power house: India, the 2nd fastest growing economy has mesmerized the world with its stunningly high economic growth rate since last 2 decades. A World Bank report has projected that in 2010, the rate of growth of India's economy would be faster than the currently fastest growing economy (i.e. China). What does this mean for SMBs, PSUs, MNCs or any business entity based in India? Last 5 years have seen Indian companies on a buying spree, resulting in acquiring many big & small overseas companies. In brief, Indian companies, sitting on a huge cash piles, are ready to rapidly scale up in their niche.

Interestingly, India is a global leader in providing IT services but the implementation of IT in its burgeoning domestic market is still lagging. This may be a boon in disguise as they have an opportunity to adopt the latest trend in technology arena - Cloud Computing.

Now let us check out what are the options for companies that are looking for India based Cloud Computing Service providers. Currently, most of them are start-ups and are nowhere near the top global cloud vendors like Amazon, Google, Sales force or Microsoft but they have the potentials to compete with these giants in near future.

Here's the list of India based Cloud Computing Service Providers, in random order.

- Zenith InfoTech
- Wolf Frameworks
- OrangeScape
- TCS
- Cynapse India
- Wipro Technologies
- Netmagic Solutions
- Reliance Data Center (a division of Reliance Communications)
- Infosys Technologies
- Synage

Though the companies listed here have a long way to go before they can be compared with the best in the world yet they have the potential to grow big with the growing Indian economy.

E-GOVERNECE INFRASTRUCTURE IN GUJARAT STATE

Gujarat has been one of the frontline State in the implementation of E-Governance policies & projects in India. Independent agencies have rated Gujarat as one of the most e-prepared State in the country. State Govt. has adopted innovative / progressive policies for promotion of E-

Governance in the State. Some of the salient features of E-Governance strategies are as following:-

1. Gujarat State Wide Area Network (GSWAN)
2. State Data Center / Server Farm
3. Sachivalaya Integrated Communication Network (SICN)
4. Integrated Workflow and Document Management System (IWDMS)

MAJOR INITIATIVES FOR E-GOVERNANCE_ GUJARAT STATE

Awarded for Best E-Governance, Gujarat is a frontline State in the implementation of e governance policies, projects and setting up of key infrastructure for E-Governance. Gujarat Government focus on growth and development of new & emerging technology areas. It has been increasingly using the ICT (Information and Communication Technologies) to offer citizen based service as per convenient location with an initiative to improve the reach, make services more transparent and reduce response time with reducing costs. The Government is also pro active in its Initiatives and ranks first state in the country to have made E-Governance functional in all its Municipalities and Municipal Corporations.

List of E-Governance Project in Gujarat State

1. GSWAN (Gujarat State Wide Area Network);
2. SWAGAT Online (State Wide Attention on Grievances through Application of Technology)
3. E Gram – Vishvagram
4. e-Dhara
5. Health Management Information System
6. E-City
7. IWDMS (Integrated Workflow and Document Management System)
8. VAT (Value Added Tax)
9. E Procurement
10. SICN (Sachivalya Integrated Communication Network)
11. ICT and e readiness Initiatives
12. Gujarat State Data Centre
13. Home Department

E GOVERNANCE CHALLENGES & CLOUD BENEFITS FOR GUJARAT STATE

Data Scaling

- Challenge: The databases should be scalable, to deal with large data over the years for E-Governance applications. Where relational databases ensure the integrity of data at the lowest level, cloud databases could be scaled and can be used for such type of applications. Cloud databases available for deployment offer unprecedented level of scaling without compromising on the performance.
- Cloud Benefits: Cloud databases must be considered if the foremost concern is on-demand, high-end scalability

– that is, large scale, distributed scalability, the kind that can't be achieved simply by scaling up.

Auditing and Logging

- Challenge: Traceability to any changes to information content in E-Governance services is required. Corruption in government organizations can be controlled by using Information Technology services, by keeping the providers of the services accountable. Process audits, security audits must be done periodically to ensure the security of the system.
- Cloud Benefits: Cloud can help in analyzing huge volumes of data and detecting any fraud. It can help in building and placing defense mechanisms to enhance the security, thereby making the applications reliable and available. Rolling out New Instances, Replication, Migration Disaster Recovery Performance and Scalability Reporting and Intelligence for Governance Enforcing and Managing Policies Centrally Systems & Legacy Application Integration Obsolete Technologies and Migration .Support for 'Go-Green' Initiatives

Rolling out new Instances, Replication and Migration

- Challenge: Traditionally, applications in E-Governance work for department states and municipalities and hence take more time, effort, resources and budget. This happens for all the instances of these applications. Capabilities must exist to replicate these to include another municipality or e-court as part of E- Governance.
- Cloud Benefits: Cloud architectures offer excellent features to create an instance of application for rolling out a new municipality. Cloud can reduce the time to deploy new application instances.

Disaster Recovery

- Challenge: Natural disasters like floods, earthquakes, wars and internal disturbances could cause the E-Governance applications not only lose data, but also make services unavailable. Multiple installations in geographically separated locations with complete backup and recovery solutions must exist. This could create huge problems. Disaster recovery procedures must be in place and practiced from time to time. Applications and data must be redundant and should be available on a short notice to switch from one data center to center.
- Cloud Benefits: Cloud virtualization technologies allow backups and restoring. It offers application migration seamlessly compared to traditional data center.

FREE CLOUD COMPUTING APPLICATIONS FOR GUJARAT E-GOVERNANCE

There is no dearth of Cloud Computing based services if you are ready to pay. But we all love free stuff on the Internet, and

free stuff is often just as useful as the stuff you pay for. In fact, perhaps the best Internet innovation ever is absolutely free. If you guessed Google search, then you guessed correctly! I stumbled upon some excellent free software and services, though you can always debate on what makes them cloud based. Cloud Computing is still fuzzy and everyone has her or his own definition.

NIST (National Institute of Standards and Technology, an agency of the U.S. Department of Commerce) has come up with standard guidelines & is now widely accepted in the industry.

- Mint: A Cloud based personal finance tool to manage your money. Launched in September 2007, in just 2+ years of existence it has received 30+ prestigious web awards from the likes of CNN Money, Time, Business Week, PC Mag etc. Just create an account and access all your balances and transactions together on the web or on your iPhone. I think it's a simple but innovative concept: All your money related accounts viz. bank accounts, credit card, loans, stock brokerage and other investments in one place.
- iCloud: It's punch line: Your friends, files & digital life on any computer, truly represents what it does. Online storage, Photos, Music, Movies, Application development, Calendar, Mail, Media Player, Word Processors etc. It has both free and premium signup. It also offers a platform for web developers (Platform as a service, PaaS). The free account provides 3GB of iCloud drive storage. Check out the following screen shot, which I created after signing into my free account. Here you can view the wallpaper, desktop icons, Programs (like All Programs of any Windows OS), the user name (and his photograph), Start Menu, Taskbar etc.
- Cloudo: A free computer that lives on the Internet, right in your web browser. This means that you can access your documents, photos, music, movies and all other files no matter where you are, from any computer or mobile phone. Cloudo is a hosted service, there is no hardware or software to setup and maintain, and the DDE is fully accessible from any internet connected device. Other advantages of utilizing hosted software include centralizing data backup, updates, and security at the data center as well as the benefits of lower cost which can be associated with the administration of a single global instance of software versus many local instances.
- eyeOS: It describes itself as the Open Source Cloud's Web Desktop. I found it similar to the iCloud & Cloudo described above. It has a very attractive design, but as this is just an introduction, I am not providing any distinct comparison between these services. You should go and explore: Create an Account at eyeOS to get started with this free Cloud Desktop.
- Panda Cloud Antivirus: The first free Antivirus from the cloud. It has received many decent reviews. PC Magazine stamped its renowned Editor's Choice on Panda CloudAV for Best Free AV.
 - o No need to worry about regular updates.
 - o Occupies very little system resources.
 - o Uses collective intelligence servers for fast detection
 - o Simple interface.
 - o Also protects your PC while offline (not connected to internet) as it uses a local cache of signatures from Collective Intelligence. But please note that the local cache does not maintain a signature of virus/malware which it deems dead or not in circulation.
- Google App Engine: Released (Beta) in April 2008, it's a platform for developing and hosting web applications in Google-managed data centers. It virtualizes applications across multiple servers and data centers. Currently, the supported programming languages are Python and Java (and by extension, other JVM languages).
- Force.com Free Edition: It's a leading cloud platform (PaaS: Platform as a Service) for business applications and websites, an offering from the SaaS (Software as a Service) leader Salesforce.com. But you can build and run only your first application for free. Yet something is better than nothing. Just Sign up and explore.

CONCLUSION

Cloud provides a solid foundation for the introduction of widespread provision of services to various stakeholders. Applications designed using the principles of Service Oriented Architecture and deployed in cloud architectures will benefit the government in reducing operating costs and increasing the governance.

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