**A REPORT ON CLOUD COMPUTING OPPORTUNITIES FOR
E-GOVERNANCE AND IDENTIFYING BEST CLOUD PROVIDER FOR
PARTNERSHIP AT PAYODA TECHNOLOGY COIMBATORE**

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A PROJECT REPORT

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BONAFIED CERTIFICATE

Certified that this project report titled **"A report on cloud computing opportunities for E-Governance and identifying best cloud provider for partnership at Payoda Technology Coimbatore"** is the bonafide work of **Ms P.Jayashree, 11MBA079** who carried out the project under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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KCTBS

Submitted for the Project Viva-Voce examination held on

_____

Internal Examiner   External Examiner

DECLARATION

I, **Jayashree.P** hereby declare that the project report titled as **"A report on cloud computing opportunities for E-Governance and identifying best cloud provider for partnership at Payoda Technology Coimbatore"** done at Payoda Technology, Coimbatore, is an original work done by me in the partial fulfillment for obtaining the degree of Master of Business Administration from the Anna University, Coimbatore. It is the record of work carried out by me during the period from 26.06.12 to 06.08.12 under the guidance of **A.Priya Dharshini**, Assistant Professor KCTBS

The conclusion made in this project report is based on the data collected by me and no part of this work has been submitted elsewhere for any degree.

Place :   Signature:

Date :   Name   :

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EXECUTIVE SUMMARY

Cloud Computing provides a great opportunity for enabling reliable E-Governance quickly at lower costs. Governments can realize the potential benefits of Information Technology when providing e-services, more quickly. E-Services deliver cost-effective services that drive the growth of the economy and government productivity. Cloud Computing provides a great opportunity for enabling reliable E-Governance quickly at lower costs. Cloud computing features like application virtualization, end-to-end service management, instant deployment and ease of maintenance are catalysts, that jumpstart application deployment on the Cloud.

The strategy for E-governance would involve building a Private Cloud with public interfaces that can scale and provide the required agility and flexibility. Cloud migration can be attempted step-by-step, by piloting some applications. The experience and knowledge gained would help establish a solid infrastructure for e-governance. Technology merely gives tools, but it is the people and process aspects that must be understood well, and hence standard procedures and policies to maintain the Cloud infrastructure are a must. With proper planning, execution, training and good management, the Cloud can greatly reduce overall costs and help in efficient and better utilization of resources

CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION TO THE STUDY

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. This in turn helps the government going green, reducing pollution and effective waste management.

Enterprises and Small and Medium businesses are already reaping the benefits of cloud by using the pay-as-you-use service model, its massive scalability and ready availability. Since government requires a massive infrastructure it is important for government to use cloud computing on long term basis.

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. 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.

A unified e-government infrastructure, based on cloud and SOA architectures is required, that paves the way for interagency information sharing and workflow and is enabling the delivery of seamless services to the public.

Cloud architectures allow rapid deployment of turn key test environments with little or no customization. It also describes E-Governance general requirements, while delving more into the challenges of E-Governance and listing out the benefits of cloud computing architectures for the same. With the advent of cloud computing, resources are used as an aggregated virtual computer. This amalgamated configuration provides an environment where applications execute independently without regard for any particular configuration

1.2 CLOUD COMPUTING OVERVIEW

In the changing environment of today's world everybody want that their computational needs to be fulfil as soon as they demand, it includes software, platforms, as well as scalable communication. The cloud computing make it possible by providing best possible environment for the best usage of resources. This will reduce the possibility of hard exertion by centralized and regularized of communication technology setup and reduced the cost to an extent.
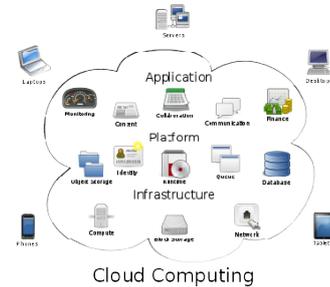

Fig 1.2.1 Cloud Computing Overview

Cloud computing is a comprehensive solution that delivers IT as a service. It is an Internet-based computing solution where shared resources are provided like electricity distributed on the electrical grid. Computers in the cloud are configured to work together and the various applications use the collective computing power as if they are running on a single system

The flexibility of cloud computing is a function of the allocation of resources on demand. This facilitates the use of the system's cumulative resources, negating the need to assign specific hardware to a task. Before cloud computing, websites and server-based applications were executed on a specific system.

1.3 ORANIZATION PROFILE

OVERVIEW

Payoda is a global IT solutions and service provider catering to the BFSI, Healthcare, E-Learning and e-Governance verticals. Service offerings encapsulate Microsoft and Open Source Application Development, Next Generation Mobile Development, Web Design, and Search Engine Marketing services, Independent Testing, Application Management Services and Infrastructure Management Services. A member of NASSCOM, Payoda follows industry best practices to bring the best services to its clients. Focussing on quality and standards, Payoda have adopted a CMMi L3 process at an early stage of organization.

VISION & PHILOSOPHY

To be a holistic business partner to the society by providing innovative products and services with dedication and enthusiasm for the greater cause

To achieve leadership in the areas of quality, customer satisfaction and business simultaneously being a holistic business partner with the society

CORE VALUES

- **Commitment and Dedication** on every project for faster go to market for customers
- **Innovation** in everything for making us and our clients pioneers in what we do and how we do
- **Trust and Honesty** in all relationships for long term partnerships

MISSION

Mission is based on 4 pillars

- People
- Process
- Technology
- Business

PRODUCT PROFILE

BFSI

The BFSI practice at Payoda provides IT services and solutions to banks, financial institutions and insurance companies globally. With a strong leadership team and a large pool of experienced technology consultants, the BFSI practice presents a wide range of service offerings. Payoda has in-depth industry experience in the following areas

- Retail banking
- Internet banking
- Mortgages
- Risk management
- Capital markets
- Asset management

HEALTHCARE

Payoda solutions for healthcare practice deliver knowledge intensive services to leading companies in the industry. Payoda has strong expertise in the healthcare domain, having developed products and solutions for global healthcare companies in the areas of:

- Patient data monitoring systems
- Patient safety solutions
- Hospital information systems
- Laboratory information systems
- Supply chain management process
- Claims processing systems

E-LEARNING

Payoda E-Learning team involve in design, develop and deliver effective computer-based training solutions. E-Learning services include self-paced learning / Instructor-Led Training (ILT) solutions, multimedia and interactive products, as well as progress and achievement monitoring.

It includes the following

- Creative and graphic design
- Consulting and project management
- Web development coding and programming
- Quality assurance and testing
- Training and support

E-GOVERNANCE

E -Governance automates and thereby speeds up routine administrative functions. It enables the government to work better, yields higher revenue growth and costs less, apart from servicing citizens' needs as never before. Citizens can freely interact with various government departments anytime, anywhere with minimal effort. E-Governance, with its advanced digitization empowers the government to interact comfortably, transparently, and cheaply to its citizens. Payoda, works closely with the governments in propelling the state forward and in developing a completely networked system.

- IT solutions for municipal bodies
- School education management system
- Village monitoring system
- Beneficiary monitoring system

SERVICES OVERVIEW

Managed Infrastructure Services

Services are designed to protect customers existing investments and intellectual capital by working with multiple platforms, delivery partners and their own teams.
Clients engages with Payoda for

- Data centre management & network management
- Desktop & server management
- Backup and storage management
- Virtualization
- Cloud computing
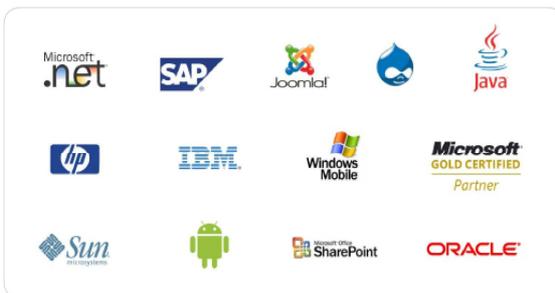
APPLICATION MAINTENANCE AND SUPPORT SERVICES

Payoda offers application maintenance and ongoing support services for all application maintenance needs of our clients. This process supports a distributed delivery environment wherein work responsibilities can be effectively divided between the different teams depending on the criticality of the requests.

- Ongoing maintenance and support services
- Code reviews
- Design and architecture updates
- Upgrades and patches
- Support & maintenance of application systems

MICROSOFT PLATFORM DEVELOPMENT

SharePoint has proven to be a popular collaboration environment and that is why companies are looking for migration from other platforms. Payoda offers firmly integrated, extremely consistent and secure Microsoft SharePoint solutions to suit all your needs from automating business processes, designing intranet portals, SharePoint installation, customization, development, training and collaboration. ITIL based Infrastructure support services offer total outsourced support and maintenance of SharePoint and other related technologies.

MOBILE APPLICATION DEVELOPMENT

Anticipating a fast growth in the mobile applications and gaming area, Payoda has invested resources and practices to provide high value mobile solutions since 2007.Mobile platform services team has extensive experience in various platforms such as iPhone, iPad, Android, Blackberry, Windows Mobile as well J2ME devices.

WEB DESIGN AND SEARCH ENGINE MARKETING SERVICES

With a very creative culture and a team of senior management with UX background, Payoda has done UX and web design work for some major organizations. Our user-centric design process focuses on understanding user needs upfront and obtaining feedback throughout the design process.

PARTNERSHIPS

CLIENTS

Fig 1.3.1 Partners and Clients of Payoda

1.4 STATEMENT OF THE PROBLEM

Government have innumerable applications that can be automated. It aims to deliver more interactive services to citizens and businesses through E-Governance. For this cloud computing entails use over the Internet of computing hardware and software infrastructure and applications that are remotely hosted. But there is lack of Infrastructure Development, Accessibility, Security, Trust & Privacy, Transparency, Permanent Availability and Preservation, Cost Structures in business organisation to implement E-services.

1.5 OBJECTIVE OF THE STUDY

PRIMARY OBJECTIVE

- To explore different cloud computing opportunities for e-Governance and identifying best cloud providers for partnership at Payoda technologies.

SECONDARY OBJECTIVE

- To analyse the benefit, requirement and cost structure of different cloud provider for partnership.

- To identify different cloud services which suit for e-Governance.

1.6 SCOPE OF THE STUDY

The study mainly identifies the availability of government projects which can be automated using cloud services in India. Also it tries to give an insight on benefit, requirements and pricing information of different cloud providers. So that company can identify the best cloud provider for entering into partnership to deliver cloud services

CHAPTER 2

REVIEW OF THE LITERATURE

2.1. Cloud Computing: Future Framework for e-Governance K.Mukherjee, G.Sahoo International Journal of Computer Applications (0975 – 8887) Volume 7– No.7, October 2010

The existing e-Governance is very much server centric, cost effective in nature and finds it unable to address all categories of users starting from rural urban to metropolitan citizens. 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. In India, 70% of the total population earn less than $2 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 of India and remain unsuccessful. Hence a new effective framework of e-Governance based on cloud computing concept is evolved.

2.2.The cloudy future of Government IT: Cloud computing and the public sector around the world, David C. Wyld, 1Department of Management, South-eastern Louisiana University, Hammond, LA USA 2011.

Cloud computing encompasses a whole range of services and can be hosted in a variety of manners depending on the nature of the service involved and the data/security needs of the contracting organization. However, the basic idea behind the cloud model is that anything that could be done in computing — whether on an individual PC or in a corporate data centre from storing data to collaborating on documents or crunching numbers on large data sets can be shifted to the cloud.

2.3. A review of cloud computing and E-Governance, Kuldeep Vats, Shravan Sharma, Amit Rathee, International Journal of Advanced Research in Computer Science and Software Engineering, ISSN: 2277 128X

E-governance is no longer an option but it is a reality and a necessary of governance. E-Government can transform citizen service, provide access to information to empower citizens, enable their participation in government and enhance citizen economic and social opportunities, so that they can make better

lives, for themselves and for the next generation. E-governance should be value driven not technology-driven.E-government is not only the computerization of a government system, but contains the ability of high technology to achieve the high levels of improvement in various areas of government sectors, that provide convenient and effective services to citizens for improving high standards.

2.4. A Model based Approach to Implement Cloud Computing in E-Governance, Dr Ashish Rastogi, International Journal of Computer Applications (0975 – 8887) Volume 9– No.7, November 2010

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. In the current scenario every enterprise wants to implement Cloud Computing to fulfil their computing needs. 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.

2.5. Cloud Computing for Useful e-Governance, Ajay Prasad, Sandeep Chaurasia, Arjun Singh, Deepak Gour, IJCSIS) International Journal of Computer Science and Information Security,Vol. 8, No. 5, 2010.

Most of the services viewed in context to cloud computing are mostly confined to services that are available for intellectual purposes. The cloud computing are large scale distributed systems. 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. The government services can be rendered through fully customized Service-oriented Clouds

CHAPTER 3
ANALYSIS

3.1 EXISTING CLOUD COMPUTING OPPORTUNITIES FOR E-GOVERNANCE

3.1.1. UID, CLOUD COMPUTING & E-GOVERNANCE

OPPORTUNITIES

- UID stands for Unique Identification Number and new name for the project is given as AADHAAR means Support.
- It will provide support in providing proper identification to the individuals and this UID will be linked with a person's Passport Number, Driving License, PAN card, Bank Accounts, Voter ID etc. and all this information will be checked through a database
- A huge database for storing complete information is required. Infrastructure already available can be fully utilized with the help cloud computing
- Cloud computing potential lies not only in the evolution of technology but also in a sourcing strategy that uses resources shared by large number of users
- Instead of installing new software and procuring new hardware ,cloud computing utilises existing infrastructure, platform and software to deliver uid effectively

ADVANTAGES

- Clouds computing minimize the time to deploy new application instances
- Cloud virtualization technologies allow backups and restoring and hence help in disaster recovery
- Cloud computing provides the facility of application migration seamlessly as compared to traditional data centres
- Cloud computing also helps in minimizing pollution. Because if we are to maintain our resources at many places it will require lot of power, air conditioning at all places but as we utilize the same infrastructure in case of cloud computing lot of power consumption as well as environment can be saved particularly in case of data centres

CHALLENGES

- Data confidentiality is one of the most difficult things to guarantee in a cloud computing environment
- As public clouds grow number of people having access to customer data also increase and hence number of chances of breach of confidentiality also increases.
- Due to data duplication at many places for performance and fault tolerance also provides more chances to data thieves. Also end-to-end data encryption is not yet available

3.1.2. HIMS SOLUTIONS IN GOVERNMENT SECTOR- OPPORTUNITIES AND CHALLENGES

CHALLENGES TO IMPLEMENT HIMS

HIMS Solutions in the Government hospitals, it is necessary to understand the major problems faced by them

- Inadequate Resources
- High Fixed Expenses
- Insufficient funds for
- Variable Expenses
- Low User Charges
- Irregular Allocation for Capital Expenses
- Lack of Administrative Support
- Poor interface with the citizens

EXISTING SYSTEM

E-Sushrut, C-DAC's Hospital Management Information System is a complete ERP solution for Hospitals or a chain of Hospitals.. It provides an accurate, Electronic Medical Record (EMR) of the patient. A data warehouse of such records can be utilized for statistical and research requirements.

MODULES

- Patient Registration
- Emergency System
- Out Patient Management
- In Patient Management
- Laboratory Information System
- Patient Billing
- Blood Bank Management
- Personal Information System
- Payroll

OPPORTUNITIES FOR CLOUD

- In a cloud computing scenario, the beneficiary (hospital) would use the Hospital Information Services as a Service and does not need to undergo the challenges posed by technology, administration and implementation in computerization.
- The focus of the beneficiary just needs to be the service, which is available on demand. Technologically challenging tasks of designing, implementing and maintaining a Data Centre/Server, Databases, and Application etc are all eliminated and is left to such service providers of IT industry.
- In the cloud computing scenario, the remote Data Centre maintained by an HIMS solution provider would host the Application for the hospital and maintain the same
- This would literally provide HIMS solution as service and not a system to be maintained by the hospital

BENEFITS

- Hospital can be oblivious to the challenges of designing, implementing an IT infrastructure at their end. It is unaffected by the frequent changes in technology and the demands of up gradation of systems
- Hospitals do not have to maintain a large IT team for maintaining the IT infrastructure
- Hospitals do not have to take the pain of maintaining systems, services, etc.

- Maintaining high end servers, network equipment's etc. need sufficient amount of skill and financial resources
- It is a cost effective solution and helps reduce the cost of developing, deploying and maintaining an IT infrastructure. Even small clinics can avail of such services without much investment

3.1.3. IMPLEMENTING E-GOVERNANCE IN BANGLADESH USING CLOUD (BRTA)

DESCRIPTION

- In existing system in government organizations it is very difficult to exchange information between the different sub organizations.
- For instance data from election commission cannot be easily shared with the Police and Defence sections.
- When a situation arises, it has to go through levels of bureaucracy and authorization and a lot paperwork has to be done to finally get the required information which wastes huge amount of resources and time.
- The objective is to provide an e-governance model that will allow this information sharing very easily, reliably and with appropriate security attached to it without any such hassle. For instance if a traffic police wants to know personal information of a driver, he will just provide registration number of the driver and his personal information will be forwarded from the BRTA and election commission to the police officer
- The objective is to achieve this with cloud computing methodology.

EXISTING SYSTEM

- Traditionally web service methodology designs a service where we have to send three individual requests to three organizations.
- Every time we need to access to the Database to serve a service.
- Also we need individual server machine to deploy application and internet connectivity, bandwidth, maintenance and a system admin to manage the system. Which are a redundancy and a waste of our limited resource.
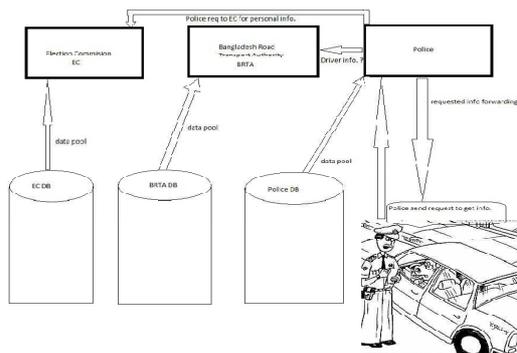
Fig 3.1.1 Existing Traffic system

PROPOSED SYSTEM & BENEFITS

- In this solution we don't need to be worried about all the management and other problems. Because inside of the cloud it maintains a central data centre (in case of Google apps cloud is maintain a key value mapping database name Big Table).
- Where it store data centrally in a data centre and update the data from the remote or local servers by maintaining scheduler.
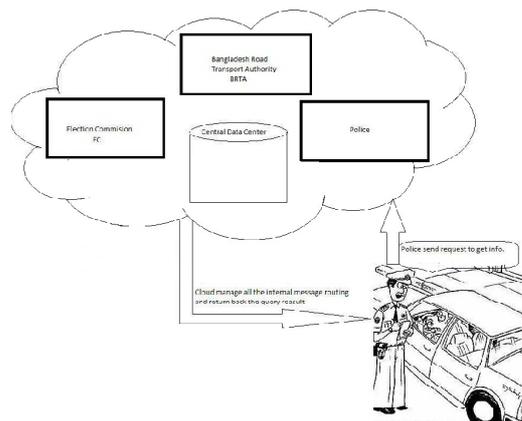- No need of local server machine to deploy a database and service application.

Fig 3.2.2 Proposed Traffic system

3.1.4. CLOUD FOR CONTROLLING POLLUTION AND GLOBAL WARMING

DESCRIPTION

- Pollution-cloud provides all organizational and management activity of pollution control by cloud computing for society.
- Pollution-cloud also provides alarming services on IPhone (Thin client) for Global warming and Green House Effects for coming future by data mining.
- POLLUTION cloud application is running on SaaS layer which is User Level Middleware as shown in diagram
- In this layer Pollution cloud application are directly available to end user.
- Intelligent Data Collector device collects data from various pollution measuring devices which are installed in different cites if they found above limits than data is transferred to cloud using thin client, ultimately all data are transferred to cloud in online mode

- Automatic Pollution measuring devices are installed at various point pollution (black listed areas) areas.
- Warehouse is developed for various distributed databases and mining done using prediction and association algorithms
- Warehouse contains various data related to disease developed of last year's where we have taken pollution data. Results from data mining are checked from last effects and calibrated for further use in pollution control and E-Governances by interfacing Cloud for E-Governance.
- Here no involvement of manpower in data collection so corruption is totally removed. All devices are automatically taking reading so we get actual data for air, water, sound pollution and global warming effects.

BENEFITS

- Actual data reading, monitoring and analysis without any corruption
- All advance tool are available for environmental analysis on demand or whenever required.
- Future forecasting of coming environment (pollution) and their control.
- Data mining for pollution effects and diseases association in localized form.
- Cloud computing is the solution which can help the companies and organizations to reduce the cost in handling pollution as well as it will help the companies in carrying out their corporate social responsibility

3.1.5. CLOUD COMPUTING FOR EDUCATION SYSTEM IN BANGLADESH AND THE IMPACT ON CURRENT EDUCATION SYSTEM

DESCRIPTION

- According to our proposed architecture each individual PC act as a cloud partner which offers the necessary resources to the cloud system from its available resources.
- However each of these individual PC is the property of a particular educational institute whereas the institute owned those PCs from the budget sanctioned by the government for that particular institute.

- There is a local server associated with individual institute who monitors everything ranging from PC status to individual requests for that institute.
- The users associated with a particular local server submit their request to the cloud via the local server.
- The local server collects the entire request from the clients in its domain within a specific time period and forward those request after verification.
- In addition there are some providers who have the agreement with the cloud system and offers different services to the user.
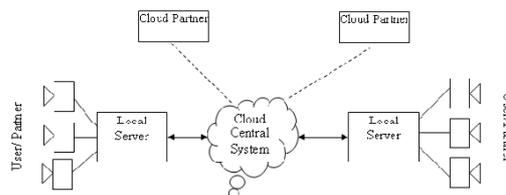
Fig 3.1.3 Cloud computing for education system

COMPARATIVE ANALYSIS OF PROPOSED CLOUD SYSTEM WITH THE EXISTING SYSTEM

A. Data Portability

Data portability is very important in educational sectors. Student does several projects and research works on diverse Fields The low economic country such as Bangladesh it is very hard to provide the expensive security related software or appoint experienced Lab administrators to take care of PCs efficiently on regular basis In addition, since the lab PCs are open for all so some students coarsely handle the computer which results deletion of some important files. In the current system there is no concept of Backup storage.

In proposed cloud computing architecture each institute has the opportunity to store their data in Cloud with the budget that is allocated for them. This will definitely feel the students more relax and help our country economically as well from the loss due to the storage.

B. Overseeing and Reporting

The current education system has some serious drawbacks in case of overseeing and reporting. According to the survey performed by the Transparency International Bangladesh a significant inconsistency or flaws subsists which engender corruption in our country's basic education system [13]. Some of the teachers are not well qualified since there is no transparency in teacher's intake.

In proposed system there is a monitoring committee that is an integral part of the Government Rules as Rule Based. The committee observes the overall circumstances of each educational section. Any user can send any complain as well as any valuable suggestion into the cloud. Since the monitoring committee can observe each educational sectors performance centrally and instantaneously without physically going to that organization so everybody will now become more conscious before doing any corruption.

3.1.6. SECURITY ENGINEERING IN G-CLOUD: A TREND TOWARDS SECURE E-GOVERNANCE

OPPORTUNITIES

- G-Cloud offers the cloud as base platform for government application services and interactions, reducing cost through data-centre consolidation, improving operations through virtualization, but the main benefit will come from how it changes ICT procurement model and the compounding effect this has in improving how all of government itself works. This initiative has most remarkable aspect of how it will change the interaction among government bodies and society.
- G-Cloud enables open government cloud computing, thus making government more transparent in terms of its accountability to public. This also makes government more available for public services, decision making and communication purposes. G-Cloud makes government open in terms of technology and data
- Public can access any information under Right to Information act for which they would not have to undergo cumbersome government procedures.

Fig 3.1.4 Security Engineering in G-Cloud

BENEFITS

- Centralized Data
- Password strength testing
- Logging
- Better performance
- Dependable builds

3.1.7. ELECTION RESULTS ON CLOUD-IN GOVERNMENT OF INDIA

OPPORTUNITIES

- Indian e-Governance policy and plan need to address exponential increase in users logging into Government websites for various services of which few services like election results attracts a sharp spike users for a short time.
- As more people go online to see polling results on Election Day, the increased traffic can wreak havoc on IT infrastructure not designed for huge spikes in demand.
- Emerging technologies and "cloud hosting" offers a highly reliable and scalable solution to avoid crashes which are agonizing an irritating

EXISTING PROBLEM

- During schools / college results, polling results on Election Day – there is a sudden increase in traffic wreaking havoc on captive IT infrastructure not designed for huge spikes in demand.

- It is very common to – election sites or Government sites getting crashed or become irritating slow during election or important results announcement.

SOLUTION SUGGESTED

- With the announcement of election in five states – election commission has an opportunity to experiment "election results on cloud".
- This will be important to ensure through put and reliability both.
- At first instance – and also in order to minimize the "risk factor" election commission can work on a "dual strategy" viz – continue with the existing website service and at the same time add a "cloud based service" with same URL.
- Cloud hosting which is considered more reliable and can upscale quickly to avoid crashes. Addition to the technical benefits of the cloud, election commission and other similar institutions would not require maintaining expensive infrastructure for a capability that's only used sporadically each year.
- Using cloud technology for elections reporting and results would not only save governments money but would improve "effectiveness" of information dissemination.

3.1.8. PROPOSAL OF SHARING MEDICAL IMAGES IN AN OPEN SOURCE CLOUD COMPUTING SYSTEM

DESCRIPTION

- The Hospital Information System incorporates an integrated computerized clinical Information system for improved hospital administration and patient health care. It also provides an accurate, electronically stored medical record of the patient.
- The medical equipment's used in the hospitals mostly generate the medical images in the form of DICOM (Digital Imaging and Communications in Medicine

- For a small township hospital it is incapable of constructing an independent information system which resulted in high construction costs and waste of resources.
- And also the equipment used in town hospitals will not support the DICOM images when patients change the different branch hospital which is not having high-end imaging system.
- In order to provide the unified standard for medical images our proposal system provides the conversion that is supported the low-end medical imaging system.
- In existing Hospital Information System the sharing of information is only within the same hospital.
- The proposal is based on the concepts of cloud computing. The medical image information sharing, exchanging and high-end processing is available in the "Cloud".
- The information (Medical Images) present in the cloud can provide the necessary details to the doctors and the patient can seek the treatment in different branch hospital, reduce the information and computational resource maintenance in the hospital.

Fig 3.1.5 Medical Image sharing in cloud

BENEFITS

- Reduce the costs
- Flexible and extensible framework
- Better information sharing
- Reduce maintenance expenses
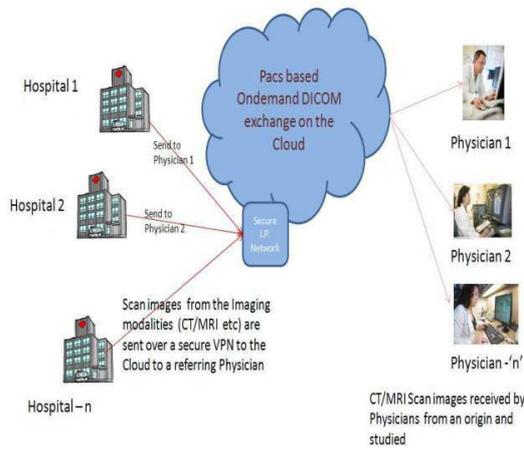- Reliable operation of the server

3.2 SWOT ANALYSIS OF PAYODA

STRENGTH	➢ Cloud concept Expertise ➢ Pre-Sales team to generate RFP for E-governance project in cloud ➢ Proactive partnership aiming for customer business success ➢ Diversify into high growth areas that align with our vision and philosophy ➢ Payoda works closely with the governments in propelling the state forward and in developing a completely networked system
WEAKNESS	➢ Limited infrastructure to install servers ➢ High installation cost ➢ New to the field ➢ Dependence on Cloud Service Providers ➢ Potential Loss of Control of Data once it is stored on Third Party Cloud
OPPORTUNITIES	➢ Expansion of infrastructure ➢ Partnership with cloud providers ➢ Different E-governance projects in cloud all over India ➢ Existing E-Governance project in Payoda ➢ Tenders issued by government ➢ Highest degree of transparency and automation in public service to reduce paper work, communication inefficiency and enable timely service. ➢ Cloud computing to create 2 million jobs in India by 2015 said by Microsoft
THREAT	➢ Competitors like Wipro, Infosys, Microsoft, IBM,TCS are already prevailing in market to deliver Cloud services for E-Governance ➢ Fear of security issues to adopt cloud computing ➢ No easy migration to another CSP. ➢ Measurement of resource usage and end user activities lies in the hands of the CSP

Table 3.2.1 SWOT analysis of Payoda

3.3 TOP CLOUD PROVIDERS

COMPANY	CLOUD SERVICES	BENEFITS
amazon webservices	White glove Cloud Desktop	With Cloud Desktop, remote users get the same desktop and features as users logging in from office but with the convenience of working form their own home
	Exchange server	Getting business class email using your existing domain and email addresses for a fixed monthly fee per mailbox.
	Hosted SharePoint	SharePoint makes it easier for people to work together. Using SharePoint, people can set up Web sites to share information with others
	Hosted AntiSpam	Blocks inbound Spam without purchasing or installing any hardware or software
	Cloud Server	White Glove Cloud Servers are a highly available solution that avoids the large capital expenditures involved with server implementations and upgrades.
	Cloud backup	Offers a complete and affordable Backup and Disaster Recovery (BDR) solution that allows rapid recovery from accidental deletions, server failures, and site catastrophes.
vmware	VMware vSphere	Run business critical applications with confidence and respond faster to your business needs with VMware vSphere, the industry-leading virtualization platform for building cloud infrastructures
	VMware Fusion	It is recommended for home users, students and business professionals who are looking for the easiest, fastest and most reliable way to run Windows programs on their Macs without rebooting
	VMware Workstation VMware Recovery Manager	VMware Workstation is recognized for its broad operating system support, rich user experience, comprehensive feature set, and high performance - Simple management of recovery and migration plans - Non-disruptive testing - Fully automated site recovery and migration

OpenNebula	Designing and Installing Cloud Infrastructure	Design, plan, install and basic setup a private cloud
	Setting up and Managing Cloud Infrastructure	Setup, manage and configure the different subsystems in a cloud infrastructure
	Setting up and Managing Virtual Resources	Setup and manage the virtual resources running on a cloud infrastructure Design, setup and management of advanced cloud deployments
Cynapse	Cyn.in	It helps teams to communicate faster and build collaborative knowledge by sharing and discussing various forms of digital content within a secure, unified application
	Sync.in	Multiple people can edit the same document simultaneously, any changes reflect on everyone's screen instantly
THE RACKSPACE CLOUD	Cloud Servers	- 1 to 50 servers in minutes - Choose a server size and pay for what you use - Accessible via online control panel and open API
	Cloud Servers-Managed	Cloud Servers, which includes monitoring, operating system and application infrastructure layer support, and technical guidance.
	Cloud Sites	- Reliable website hosting platform - Built-in scalability to handle traffic spikes - Fast response and resolution time - Zero server management
	Cloud Database	Cloud Databases delivers incredibly fast MySQL performance. The result is Speedier applications that get quick access to data.

netmagic	SimpliCloud	Netmagic's latest public cloud offering, projects and ideas can get access to enterprise-class IT setups made up of servers, network, and storage resources at a fraction of the cost of a traditional setup.
Cynapse	Cyn.in	It helps teams to communicate faster and build collaborative knowledge by sharing and discussing various forms of digital content within a secure, unified application
	Sync.in	Multiple people can edit the same document simultaneously, any changes reflect on everyone's screen instantly
Office 365	Microsoft Office 365	The software aimed to meet all business needs. Share your documents faster and work on the same projects simultaneously with your co-workers.
	Dynamics CRM Online	The power to uncover new sales possibilities. Improving customer relationships by giving your clients a space to submit and track cases.
	Windows Intune	The PC management software that simplifies your IT Perform updates quickly and directly using remote desktop software.
IBM Solutions	IBM Smartcloud Enterprise	IBM smart cloud enterprise is an agile cloud infrastructure designed to provide rapid access to security-rich, enterprise-class virtual server environments
	IBM CloudBurst 2.1	IBM CloudBurst 2.1 expands core service management capabilities across hardware, middleware and applications. Self-service portal with tools to extend cloud offerings into production
	IBM Lotus Live	World-class social networking services and online collaboration tools, including file sharing, Web conferencing, and instant messaging-all through your Web browser.
	IBM Smart Desktop Cloud	. Provides anytime, anywhere access to applications, information and resources. Delivers a resilient and secure, standards-based desktop environment behind your firewall.
Joyent	Joyent Cloud	Smart Machines are the building blocks to run data and user-intensive applications on the Joyent Cloud
	Joyent Smart Data centre	Power the applications that need high performance and low latency. Your developers and customers will recognize the difference.

Table 3.3.1 Top Cloud Providers

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CHAPTER 4
FINDINGS
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4.1 COMPANIES WHICH IMPLEMENTED E-GOVERNANCE PROJECT USING CLOUD

4.1.1. WIPRO INFOTECH SUCCESSFULLY IMPLEMENTED EMPLOYEES STATE INSURANCE CORPORATION (ESIC) PROJECT PANCHDEEP

Project Panchdeep will allow insured people to avail of medical services at any ESIC facility across India. With each Insured Person being given two biometric cards (one for himself and one for his family), family members can avail medical services even when the Insured Person is away at another location. The solution has also enabled automation, resulting in faster processing of claims, increased operational efficiency and improved decision making

Project Panchdeep has five components. Pehchan includes all services related to identification, authentication and verification of Insured Persons (IPs) through the use of biometric cards. Milap comprises of all services related to provisioning network and bandwidth; Pashan consists of services related to hardware for Datacentre, Disaster Recovery, desktops/PCs/Laptops and middleware and Dhanwantri embraces all services related to hospitals and dispensaries and finally Pragati for all services related to ERP modules

WIPRO SELECTS NCOMPUTING FOR ESIC PROJECT

ESIC and Wipro selected Computing's virtual desktops for 'Project Panchdeep', the largest e-Governance project in India, to streamline insurance and healthcare services that ESIC provides to employers, employees, and state and Central government workers.

The initiative includes the following

- Issuance 20 million medical ID cards that can be used at any ESIC facility
- Creation of one of largest medical records databases in the world
- Computerization of 144 hospitals, 620 insurance branches, 1,388 dispensaries/clinics, and 51 regional offices
- Creation of a 50 million fingerprint database - the largest in India

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- Rollout of a single Unified Information System that automates all ESIC processes for greater efficiency, transparency, and accountability
- Largest cloud computing deployment in India

4.1.2. MICROSOFT CORPORATION

Jammu & Kashmir became the first state in India to roll out cloud based ration card, birth/death certificate and recruitment services for citizens. It used the spare infrastructure from the data centres of Madhya Pradesh. The use of the cloud computing model enabled the J&K government to roll out these services within 60 days at zero initial cost. What helped J&K was the transformation of the data centres at Madhya Pradesh into a private cloud- allowing the latter to offer IT-as-a-service to any other state government, through what will eventually become a pay-per-use model.

Clearly, cloud computing has become a priority for the governments with the ministry of IT & Communications encouraging states to share applications and data centres. Government estimates say that if 2 or more states consume IT-as-a-service using the private cloud model, it could save the exchequer almost 50% of the `1,378 crore allocated for state data center projects. The state data center (SDC) project is part of the 27,000 crore National e-Governance Plan rolled out in 2005. Following the successful roll out of citizen services in Jammu & Kashmir, Microsoft pitched its cloud services to the governments of Himachal Pradesh and Uttaranchal to help them start their e-governance projects.

For cloud vendors like Microsoft, the private cloud model is turning out to be the next big opportunity. Not just governments but many large enterprises also want the benefits of cloud computing-fast deployment, increased agility, lower costs-but with tight control over things like physical infrastructure and security policies. While government departments with their massive data centres and stringent data privacy and security guidelines make a natural contender for private cloud rollouts, large enterprises which have already invested in their own data centres too are expressing interest and evaluating the proposition.

4.1.3. ORACLE I-GOVERNMENT

Oracle iGovernment delivers better information for decision-making, better deployment of resources, and better-targeted public policy. Oracle iGovernment helps in

Modernize the IT infrastructure: Combine open standards hardware and software, engineered to work together, to create a next-generation IT environment that ensures security and controlled access.

Increase efficiency and transparency: Access the power of Oracle Applications and Fusion Middleware to deliver shared services, streamline and automate policy and processes, and ensure the integrity of operations.

Transform government service delivery: Use a common service delivery platform to support a wide array of government functions, from human services to public safety to economic development.

Oracle's Sun servers, storage, broadband network switch fabric, Solaris and Linux operating environments and Oracle VM can be combined to deliver the best-in-class Infrastructure-as-a-Service (IaaS) platform for Public Cloud offerings such as those provided by Amazon.com and Rackspace or to support your Private Cloud in a shared services data center. With Oracle's IaaS platform offerings, you can achieve increased system utilization to as much as 90% with Oracle virtualization technologies at no extra cost while at the same time reducing space requirements by up to 20:1 with fewer, more powerful Oracle servers and storage for improved capacity and response times. Additionally, the platform will decrease power consumption by up to 92% by consolidating and virtualizing applications onto a reduced number of more power-efficient Oracle servers, storage and network switches

4.1.4 TCS

TCS' MCA 21 solution for MCA involved digitizing of old records (45 million pages), automating the internal office processes of the Ministry, computerization of the entire payroll and administration functions, training the Ministry staff and the creation of a portal providing 24×7 access to stakeholders .

Key highlights of the solution were:

• MCA availability to the stakeholders 24×7×365 through the MCA portal mca.gov.in

• Multiple payment options including electronic payments – credit card, internet banking Digital signature-based governance – ensuring validity of documents in court of law

• Payment of stamp duty electronically through the system through e-Stamp.

• Unique identification of companies through the Company Identification Number

• Migration of 45 million historical documents into the electronic repository

• Electronic workflow-driven paperless back office for faster and easier processing

• Contractual enforcement of service levels, including a system of incentives and penalties as   part of the commercial terms

4.2 CLOUD SERVICES WHICH SUIT FOR E-COVERNANCE
CLOUD CONSULTING

Cloud consulting services help customers evaluate cloud as part of their overall IT service delivery strategy, recommend which enterprise applications can be moved to the cloud, target operating model, benefits/risks, people, process and technology for using Cloud.

The two key services in this space are Cloud Readiness Assessment and Migration Assessment.

CLOUD READINESS ASSESSMENT

Cloud readiness assessment services help large enterprises & SME's to adopt cloud technologies systematically and profitably. Cloud Readiness Assessment (CRA) collaboratively helps CIO's in finding answers to some critical questions which are:

- Can I leverage cloud to enhance value of IT?
- Which IT components are suitable for cloud?
- What kind of cloud is suitable for organization?
- Who should be the cloud provider?
- What is required to successfully adopt cloud?
- How do I incorporate cloud assessment in future IT projects?

Customers can evaluate readiness for the Cloud and also determine the business case and ROI for implementing and managing the Cloud Services. Organization leverages its deep expertise of working with large enterprises and innovative tools and accelerators to provide an unbiased cloud assessment and defining a strategic and business oriented cloud adoption strategy for its customers.

BUSINESS BENEFITS

1. Aligning cloud computing strategy with business strategy
2. Roadmap recommendations for cloud through focused business case
3. Quantitative assessment using tools to determine ROI analysis

CLOUD IMPLEMENTATION AND MIGRATION

The cloud implementation and migration services portfolio encompasses creation and enablement of private cloud, SaaS enablement services and IaaS/PaaS product development for ISV's and migration to public clouds such as Amazon, Google and Microsoft.

Organization having the right set of tools, processes and people to deliver system integration services which help customers in adoption of cloud technologies. Cloud Migration Services include:

- Migration Planning
- Impact Analysis
- Applications Re-factoring
- Application Packaging & Deployment
- Application Testing
- Switch over to cloud environment

Organization's proprietary tools and framework enables customers effectively migrate to cloud environment ensuring performance and agility while maintaining security, mitigating risk, and minimizing costs. Organization's frameworks support cloud environment in areas including test management, performance management and benchmarking, application migration, and data migration

CLOUD FLEIXI SCALING

- A fine balance of load balancing and automation maximizes performance and efficiency while minimizing cost
- Enable to increase or decrease capacity within minutes and commission hundreds of severe instances simultaneously
- Have complete control over instances and ability to place instances over multiple geographical locations
- Dynamic scaling and capacity management invisible to user

4.3 COMPARISON AMONG DIFFERENT CLOUD PROVIDERS
4.3.1. VMWARE VS OPENNEBULA
SPECIFICATIONS

Provider	OpenNebula	VMware
Computing Category	Infrastructure as a Service	Infrastructure as a Service
Year Founded	2005	1998
Control Interface	✔ API ✔ Command Line ✔ Web Based Application	✔ API X Command Line X Web Based Application
Overview	OpenNebula Cloud Computing Provider has a open source license with a $0¢ per hour base price. It guarantees uptime and 256 Mb of RAM, 1 CPU.	VMware Cloud Computing Provider has a Proprietary license with a N/A* base price. It guarantees uptime

PRICING INFORMATION

Subscription Type	Use Based and Subscription Plans	Subscription Plans
Pricing Information		Pricing Information (vmware.com)
Inbound Bandwidth Price	0¢ per GB	-
Outbound Bandwidth Price	0¢ per GB	-
Base Plan Details	256 Mb of RAM, 1 CPU	-

FEATURES

Free Support	✔	X
Free Security Features	✔ Backup Storage X Data Protection	X Backup Storage ✔ Data Protection
Paid Security Features	NA	✔ Data Protection
Auto scaling	X	X
Monitoring	Yes, Free	Yes, Free
Virtual Private Servers	X	X
Root Access	X	X
File Hosting Service	X	Yes, Free
Web Hosting Service	X	Yes, Free

COMPATIBILITY

Compatible Operating Systems	X Cent OS X Cent OS 5.1 ✔ Debian ✔ Linux Operating Systems ✔ Open Solaris ✔ Ubuntu 10.04	✔ Cent OS ✔ Cent OS 5.1 X Debian X Linux Operating Systems X Open Solaris X Ubuntu 10.04
Processor	✔ 32 Bit ✔ 64 Bit	✔ 32 Bit ✔ 64 Bit
Programming Languages Supported	✔ Java ✔ PHP ✔ Perl	✔ Java ✔ PHP ✔ Perl

SUPPORT

Free Support	✔	NA
Support Services	✔ 24/7 ✔ Forums	NA

Table 4.3.1 VMware vs Open Nebula

4.3.2. RACKSPACE VS VMWARE

SPECIFICATION

Provider	Rackspace	VMware
Computing Category	Infrastructure as a Service	Infrastructure as a Service
Year Founded	1998	1998
Control Interface	✔ API ✔ Web Based Application	✔ API X Web Based Application
Overview	Rackspace Cloud Computing Provider has a Proprietary license with a $1.50¢ per hour base price.	VMware Cloud Computing Provider has a Proprietary license with a N/A* base price. It guarantees uptime

PRICING

Subscription Type	Use Based	Subscription Plans
Pricing Information	Pricing Information (rackspacecloud.com)	Pricing Information (vmware.com)
Inbound Bandwidth Price	8¢ per GB	-
Base plan cost	$1.50¢ per hour	N/A
Base Plan Details	256 MB RAM, 10GB local storage, 10 Mbps Network Throughput	-
Additional IP	2$ per month	-

Cost		

FEATURES

Free Support	✔	X
Free Security Features	✔ Bootable Mode ✔ Critical Data Privacy ✔ Data Protection ✔ Persistency	X Bootable Mode X Critical Data Privacy ✔ Data Protection X Persistency
Paid Security Features	✔ Backup Storage X Data Protection ✔ Snapshot Backup	X Backup Storage ✔ Data Protection X Snapshot Backup
Autoscaling	Yes, Free	-
Load Balancing	Yes, Free	Yes, Free
Virtual Private Servers	Yes, Free	-
Root Access	✔	X
File Hosting Service	Yes, with a Charge	Yes, Free

COMPATIBILITY

Processor	X 32 Bit ✔ 64 Bit	✔ 32 Bit ✔ 64 Bit
Programming Languages Supported	X Java X PHP X Perl X SQL	✔ Java ✔ PHP ✔ Perl ✔ SQL

SUPPORT

Free Support	✔	X
Support Services	✔ 24/7 ✔ Forums ✔ Live chat ✔ Online resources ✔ Phone ✔ Urgent Resources	NA

Table 4.3.2 Rackspace vs VMware

4.3.3. AMAZON EC2 VS RACKSPACE

SPECIFICATIONS

Provider	Amazon EC2	Rackspace
Computing Category	Infrastructure as a Service	Infrastructure as a Service
Year	2002	1998

Founded		
Control Interface	✔ API ✔ Command Line X Web Based Application	✔ API X Command Line ✔ Web Based Application
Overview	Amazon EC2 Cloud Computing Provider has a Proprietary license with a $0.08¢ per hour base price. It guarantees 99.999% uptime and 1.7GB RAM, 160GB local storage, 1 EC2 Compute Unit.	Rackspace Cloud Computing Provider has a Proprietary license with a $1.50¢ per hour base price. It guarantees 100% uptime and 256 MB RAM, 10GB local storage, 10 Mbps Network Throughput.

PRICING INFORMATION

Subscription Type	Use Based and Subscription Plans	Use Based
Pricing Information	Pricing Information (aws.amazon.com)	Pricing Information (rackspacecloud.com)
Inbound Bandwidth	0¢ per GB	8¢ per GB
Outbound Bandwidth Price	12¢ per GB	22¢ per GB
Base Plan Details	1.7GB RAM, 160GB local storage, 1 EC2 Compute Unit	256 MB RAM, 10GB local storage, 10 Mbps Network Throughput
Additional IP Cost	-	2$ per month

FEATURES

Free Security Features	✔ Advanced Firewall X Bootable Mode ✔ Critical Data Privacy ✔ Custom/Secure Permissions X Data Protection ✔ Failover Features X Persistency	X Advanced Firewall ✔ Bootable Mode ✔ Critical Data Privacy X Custom/Secure Permissions ✔ Data Protection X Failover Features ✔ Persistency
Paid Security Features	✔ Advanced Firewall X Backup Storage ✔ Critical Data Privacy ✔ Data Encryption	X Advanced Firewall ✔ Backup Storage X Critical Data Privacy X Data Encryption

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	✔ Intrusion Detection ✔ Persistency ✔ Snapshot Backup	X Intrusion Detection X Persistency ✔ Snapshot Backup
Auto scaling	Yes, Free	Yes, Free
Load Balancing	Yes, with a Charge	Yes, Free
Monitoring	Yes, Free	-
Virtual Private Servers	Yes, with a Charge	Yes, Free
Root Access	✔	✔
File Hosting Service	Yes, with a Charge	Yes, with a Charge
Web Hosting Service	X	Yes, with a Charge

COMPATIBILITY

Compatible Operating Systems	X Arch 2009.02 X Cent OS ✔ Cent OS 5.1 ✔ Debian ✔ Fedora ✔ Gentoo Linux ✔ Red Hat Enterprise Linux ✔ Ubuntu Linux ✔ Windows Server 2003 ✔ Windows Server 2008	✔ Arch 2009.02 ✔ Cent OS X Cent OS 5.1 ✔ Debian ✔ Fedora ✔ Gentoo Linux ✔ Red Hat Enterprise Linux ✔ Ubuntu Linux ✔ Windows Server 2003 ✔ Windows Server 2008
Processor	✔ 32 Bit ✔ 64 Bit	X 32 Bit ✔ 64 Bit
Programming Languages Supported	✔ Java ✔ PHP ✔ Perl ✔ SQL	X Java X PHP X Perl X SQL

SUPPORT

Free Support	X	✔
Support Services	✔ 24/7 ✔ Diagnostic Tools ✔ Forums ✔ Online Guides X Online Resources ✔ Phone	✔ 24/7 ✔ Diagnostic Tools ✔ Forums ✔ Online Guides ✔ Online Resources ✔ Phone

Table 4.3.3 Amazon vs Rackspace

4.3.4. CISCO VS HP SPECIFICATIONS

Provider	Cisco	HP
Computing Category	Infrastructure as a Service	Infrastructure as a Service
Year Founded	1984	2005
Control Interface	✔ API X Web Based Application /Control Panel	X API ✔ Web Based Application /Control Panel
Overview	Cisco Cloud Computing Provider has a Proprietary license with a N/A* base price. It guarantees 99.99% uptime .	HP Cloud Computing Provider has a Proprietary license with a N/A* base price. It guarantees uptime

FEATURES

Free Support	✔	✔
Free Security Features	✔Backup Storage	-
Paid Security Features	✔ Backup Storage	-
Autoscaling	X	X
Load Balancing	Yes, Free	Yes, Free
Monitoring	Yes, Free	Yes, Free
Virtual Private Servers		Yes, Free
Root Access	✔	✔
File Hosting Service	Yes, Free	-
Web Hosting Service	Yes, Free	-

COMPATIBILITY

Compatible Operating Systems	✔ Cent OS ✔ Linux Operating Systems ✔ Windows Server 2003 ✔Windows Server 2008	✔ Cent OS X Linux Operating Systems ✔ Windows Server 2003 ✔ Windows Server 2008
Processor	✔ 32 Bit X 64 Bit	✔ 32 Bit ✔64 Bit

Programming Languages Supported	-	✔ Java ✔ Ruby ✔ SAS

SUPPORT

Free Support	✔	✔
Support Services	X 24/7 X Forums	✔ 24/7 ✔ Forums

Table 4.3.4 Cisco vs HP

4.3.5. JOYENT VS VMWARE SPECIFICATION

Provider	Joyent	VMware
Computing Category	Infrastructure as a Service	Infrastructure as a Service
Year Founded	2004	1998
Control Interface	API	API
Overview	Joyent Cloud Computing Provider as a Proprietary license with a $0.09¢ per hour base price. It guarantees 100% uptime and Small 1GB RAM 1CPU SmartOS or Linux instance.	VMware Cloud Computing Provider has a Proprietary license with a N/A* base price. It guarantees uptime

PRICING

Subscription Type	Use Based	Subscription Plans
Pricing Information	Pricing Information	Pricing Information
Inbound Bandwidth Price	0¢ per GB	
Base Plan Cost	$0.09¢ per hour	NA
Base Plan Details	Small 1GB RAM 1CPU SmartOS or Linux instance	

FEATURES

Free Support	✔	X
Free Security Features	✔ Protection ✔ Persistency	✔ Data Protection X Persistency
Paid Security Features	✔ Backup Storage X Data Protection	X Backup Storage ✔ Data Protection
Auto scaling	Yes, Free	-

Load Balancing	Yes, with a Charge	Yes, Free
Monitoring	Yes, with a Charge	Yes, Free
Virtual Private Servers	Yes, Free	X
Root Access	✔	X
File Hosting Service	Yes, with a Charge	Yes, Free
Web Hosting Service	X	Yes, Free

COMPATIBILITY

Compatible Operating Systems	✔ Cent OS X Cent OS 5.1 ✔ Debian Linux ✔ Fedora ✔ Open Solaris ✔ Ubuntu Linux ✔ Windows Server 2008	✔ Cent OS ✔ Cent OS 5.1 X Debian Linux X Fedora X Open Solaris X Ubuntu Linux X Windows Server 2008
Processor	✔ 32 Bit ✔ 64 Bit	✔ 32 Bit ✔ 64 Bit
Programming Languages Supported	X Java X PHP X Perl X SQL	✔ Java ✔ PHP ✔ Perl ✔ SQL

Table 4.3.5 Joyent vs VMware

4.3.6. JOYENT VS OPEN NEBULA SPECIFICATION

Provider	Joyent	OpenNebula
Computing Category	Infrastructure as a Service	Infrastructure as a Service
Year Founded	2004	2005
Control Interface	✔ API ✔ Command Line X Web Based Application	✔ API X Command Line X Web Based Application

Overview	Joyent Cloud Computing Provider has a Proprietary license with a $0.09¢ per hour base price. It guarantees 100% uptime and Small 1GB RAM 1CPU SmartOS or Linux instance.	OpenNebula Cloud Computing Provider has a open source license with a $0¢ per hour base price. It guarantees uptime and 256 Mb of RAM, 1 CPU.

PRICING

Subscription Type	Use Based	Use Based and Subscription Plans
Pricing Information	Pricing Information	
Inbound Bandwidth Price	0¢ per GB	0¢ per GB
Base plan cost	$0.09¢ per hour	$0¢ per hour
Base Plan Details	Small 1GB RAM 1CPU SmartOS or Linux instance	256 Mb of RAM, 1 CPU

FEATURES

Free Support	✔	X
Free Security Features	✔ Data Protection ✔ Persistency	X Backup Storage ✔ Data Protection
Auto scaling	Yes, Free	X
Load Balancing	Yes, with a Charge	Yes, Free
Monitoring	Yes, with a Charge	Yes, Free
Virtual Private Servers	Yes, Free	X
Root Access	✔	X
File Hosting Service	Yes, with a Charge	Yes, Free
Web Hosting Service	X	Yes, Free

COMPATIBILITY

Compatible Operating Systems	✔ Cent OS ✔ Cent OS 5.1 X Debian Linux ✔ Fedora ✔ Open Solaris ✔ Ubuntu Linux ✔ Windows Server 2008	✔ Cent OS ✔ Cent OS 5.1 X Debian X Linux Operating Systems X Open Solaris X Ubuntu 10.04
Processor	✔ 32 Bit ✔ 64 Bit	✔ 32 Bit ✔ 64 Bit
Programming Languages	X Java X PHP	✔ Java ✔ PHP

Supported	X Perl X SQL	✔ Perl

SUPPORT

Free Support	✔	✔

Table 4.3.6 Joyent Vs OpenNebula

4.3.7. IBM CLOUD VS AMAZON EC2
SPECIFICATION

Provider	Amazon EC2	IBM
Computing Category	Infrastructure as a Service	Infrastructure as a Service
Year Founded	2002	2004
Control Interface	✔ API ✔ Command Line X Web Based Application/ Control Panel	X API X Command Line ✔ Web Based Application/ Control Panel
Overview	Amazon EC2 Cloud Computing Provider has a Proprietary license with a $0.08¢ per hour base price. It guarantees 99.999% uptime and 1.7GB RAM, 160GB local storage, 1 EC2 Compute Unit.	IBM Cloud Computing Provider has a Proprietary license with a $15¢ per hour base price. It guarantees uptime and One Virtual 32 bit CPUs with 1.25GHz; 2 Gb Virtual memory; 60 GB Instance storage..

PRICING

Subscription Type	Use Based and Subscription Plans	Use Based and Subscription Plans
Base plan cost	$0.08¢ per hour	$15¢ per hour
Inbound Bandwidth Price	0¢ per GB	15¢ per GB
Outbound Bandwidth Price	12¢ per GB	15¢ per GB
BasePlan Details	1.7GB RAM, 160GB local storage, 1 EC2 Compute Unit	One Virtual 32 bit CPUs with 1.25GHz; 2 Gb Virtual memory; 60 GB Instance storage.
Additional IP Cost		7.20$ per month

FEATURES

Free Support	X	✔
Free Security Features	✔ Advanced Firewall ✔ Critical Data Privacy ✔ Custom/Secure Permissions ✔ Failover Features	X Advanced Firewall ✔ Critical Data Privacy X Custom/Secure Permissions X Failover Features
Paid Security Features	✔ Advanced Firewall X Backup Storage ✔ Critical Data Privacy ✔ Data Encryption ✔ Intrusion Detection ✔ Persistency ✔ Snapshot Backup	X Advanced Firewall ✔ Backup Storage X Critical Data Privacy X Data Encryption X Intrusion Detection ✔ Persistency X Snapshot Backup
Auto scaling	Yes, Free	X
Load Balancing	Yes, with a Charge	X
Monitoring	Yes, Free	Yes, with a Charge
Virtual Private Servers	Yes, with a Charge	Yes, Free
Root Access	✔	✔
File Hosting Service	Yes, with a Charge	Yes, with a Charge
Web Hosting Service	X	X

COMPATIBILITY

Compatible Operating Systems	✔ OS 5.4 ✔ Debian ✔ Fedora	X Cent OS 5.4 X Debian X Fedora
Processor	✔ 32 Bit ✔ 64 Bit	✔ 32 Bit ✔ 64 Bit
Programming Languages Supported	✔ Java ✔ PHP	X Java X PHP

SUPPPORT

Support	✔ 24/7	X 24/7

Services	✔ Diagnostic Tools ✔ Forums ✔ Online Guides ✔ Online Resources X Phone	✔ Diagnostic Tools ✔ Forums X Online Guides ✔ Online Resources ✔ Phone

Table 4.3.7 IBM vs Amazon

4.3.8. IBM CLOUD VS OPEN NEBULA
SPECIFICATION

Provider	IBM	OpenNebula
Computing Category	Infrastructure as a Service	Infrastructure as a Service
Control Interface	✔ API X Command Line ✔ Web Based Application	✔ API ✔ Command Line ✔ Web Based Application
Overview	IBM Cloud Computing Provider has a Proprietary license with a $15¢ per hour base price. It guarantees uptime and One Virtual 32 bit CPUs with 1.25GHz; 2 Gb Virtual memory; 60 GB Instance storage..	OpenNebula Cloud Computing Provider has a open source license with a $0¢ per hour base price. It guarantees uptime and 256 Mb of RAM, 1 CPU.

PRICING

Subscription Type	Use Based and Subscription Plans	Use Based and Subscription Plans
Pricing Information	Pricing Information	-
Inbound Bandwidth Price	15¢ per GB	0¢ per GB
Outbound Bandwidth Price	15¢ per GB	0¢ per GB
Base Plan Details	One Virtual 32 bit CPUs with 1.25GHz; 2 Gb Virtual memory; 60 GB Instance storage.	256 Mb of RAM, 1 CPU
Additional IP Cost	7.20$ per month	-

FEATURES

Free Support	✔	X
Free Security Features	X Advanced Firewall ✔ Critical Data Privacy X Custom/Secure Permissions X Failover Features ✔ Snapshot Backup	X Backup Storage ✔ Data Protection
Paid Security Features	X Advanced Firewall	✔ Data Protection

	✔ Backup Storage	
Autoscaling	X	X
Load Balancing	X	Yes, Free
Monitoring	Yes, with a Charge	Yes, Free
Virtual Private Servers	Yes, Free	X
Root Access	✔	X
File Hosting Service	Yes, with a Charge	Yes, Free
Web Hosting Service	X	Yes, Free

COMPATIBILITY

Compatible Operating Systems	X Cent OS 5.4 X Debian X Fedora X Gentoo Linux X Open Solaris	✔ Cent OS ✔ Cent OS 5.1 X Debian X Linux Operating Systems X Open Solaris X Ubuntu 10.04 X OpenSUSE Linux
Processor	✔ 32 Bit ✔ 64 Bit	✔ 32 Bit ✔ 64 Bit
Programming Languages Supported	X Java X PHP	✔ Java ✔ PHP ✔ Perl

SUPPORT

Free Support	✔	✔
Support Services	X 24/7 ✔ Diagnostic Tools ✔ Forums	✔ 24/7 X Diagnostic Tools ✔ Forums X Online Resources

Table 4.3.8 IBM vs OpenNebula

4.4 CLOUD PROVIDERS BENEFITS, REQUIREMENT AND PRICING DETAILS
AMAZON

Benefits	Registered	Standard	Advanced
Partner Webinars and Events	✔	✔	✔
Partner Newsletter	✔	✔	✔
Technical Support Credits		$1,000 per year credit toward required AWS Support*	$1,000 per year credit toward required AWS Support*
AWS Service Credits		$1,000/yr.	$1,000/yr.
New APN Partner Logo		Consulting Partner logo	Advanced Consulting Partner logo
Listing in the AWS Partner Directory		Listing	Advanced Listing

Requirements	Registered	Standard	Advanced
# AWS-Trained Technical Staff		2	5
# Trained Sales Staff (online training)		2	5
Min. AWS billings (3 mo. avg.)		>$1,000/mo.	>$10,000/mo.
AWS Support		Developer or higher AWS Support†	Business or higher AWS Support†
Annual Program Fee‡		$2,000/yr.	$2,000/yr.
# Customer References (public or private)		2	4

Table 4.4.1 Benefits and Requirements of Amazon

VMWARE

Consulting and Integration Partner Program (CIPP)

CIPP specialized partners are focused in on 1 core services/consulting area

Program Requirements for CIPP Specialized Partners	
VMware Partner Program Agreement	Yes

GEO Coverage	County
Services Requirements	1 VMware Competency
Program Fee	$1,500 ($750 Developing)
Annual Revenue Requirement	No
Go-to-Market Solutions	1+

CIPP Regional-National partners are focused on 3 or more services/consulting areas

Program Requirements for CIPP Regional-National Partners	
VMware Partner Program Agreement	Yes
GEO Coverage:	Region
Services Requirements	3 Competencies, 5% Partners resources complete Role-based training
Program Fee	No
Annual Revenue Requirement	No
Go-to-Market Solutions	2+

Table 4.4.2 Benefits and Requirements of VmWare

RIGHT SCALE
PARTNER BUNDLES

Level	Affiliate			Strategy		
Minimum subscription	Standard edition			Premium edition		
Partner type	ISV	SI	IaaS	ISV	SI	IaaS
Premium onboarding			☐	☐		
My cloud			Premium	☐		
Training jumpstart-2-days		☐				
Support level	Bronze	Bronze	Bronze	Gold	Gold	Gold
Team	1yr	1yr	1yr	2yrs	2yrs	2yrs

Table 4.4.3 Partnership details of Right scale

USAGE AND COST

Level	Affiliate			Strategy		
Usage cost	ISV	SI	IaaS	ISV	SI	IaaS
RCU discount	n/a	10%	n/a	15%	15%	15%
Accounts/users	1/5	1/5	1/5	2/10	Unlimited	unlimited

Included mycloud capacity	n/a	n/a	½	n/a	n/a	2/20
Mycloud notes discount			10%			20%

MINIMUM COST SUMMARY

Level	Affiliate			Strategy		
Initial fee (Activating,Training,onboarding)	$5000	$10000	$10000	$5000	$30000	$25000
Subscription plus support	$500	$500	$500	$2000	$2000	$2000
Mycloud per year			$6000			$25000
Minimum annual cost	$11000	$16000	$22000	$29000	$54000	$74000

Table 4.4.4 Cost and Usage Details of Right Scale

RACKSPACE

Channel Program Incentives

Dedicated Hosting	Cloud Hosting*	Email Hosting
$1 = 1 Point	$1 = 2 Points	$1 = 5 Points

Partner Tier Structure

Membership Level	Points Required	Closed/Won Opportunities
Platinum	75,000	2+*
Gold	30,000	2+*
Silver	2,500	or 2*
Member	500	1*

Table 4.4.5 Partner Tier structure of Rackspace

RACKSPACE HOSTING PLATINUM PARTNER

REQUIREMENTS

Revenue Volume	
Annual minimum points	75,000
Closed/Won Opportunities	2+*
Education & Certification Requirements	
On-boarding Education (delivered via e-learning system)	Required within first 90 days of entering the program
Training Certifications Required (delivered via	4 required within first 90 days of entering the program

e-learning system)	
Business Plan	Required within first 90 days of entering the program
Net Promoter Score Survey	Required

BENEFITS

Dedicated & Cloud Hosting (reseller & referral)	15%
Upgrades (Dedicated only)	15%
Rackspace Email & Hosted Microsoft® Exchange (referral only)	15%
Renewals (Dedicated only)	3%
Rackspace Email (reseller only)	72%
Hosted Microsoft® Exchange & Microsoft® SharePoint® (Email reseller only)	20%

Table 4.4.6 Benefits and Requirements of Rackspace

COMPENSATION PAYOUT TERMS

Dedicated	Referral and Reseller - 12-month minimum term. Maximum term to pay is 24 months
Cloud	Reseller only - Email, Rackspace Cloud Drive (Jungle Disk), Cloud Servers/Files/ — No minimum or maximum term Referral only - Cloud Server/Files/Sites and Email —

Table 4.4.7 Compensation Payout Terms

MICROSOFT AZURE
PRICING

6-Month Plan (Cloud Services)

This offer provides Windows Azure Cloud Services at a significantly discounted monthly price. The offer is valid for a six month term and can be renewed for additional six month terms at the price in effect at time of renewal. Customers may purchase multiple Base Units to match their development needs.

Base Unit Pricing

$71.99 per Base Unit per month.

Each Base Unit includes 750 small compute hours (equivalent of running 1 Small Compute instance full-time in a month or other sizes at their equivalent ratios)

Monthly usage in excess of the monthly amounts included with your offer will be charged at the Pay-As-You-Go rates.

Our Base Unit price represents 20% off our Pay-As-You-Go rates for Cloud Services.

Subscription term: 6 months

During the six month term of this subscription, you may increase the number of Base Units you purchase at any time. Any increase in Base Units will be effective as of the next billing cycle. Base Units may only be decreased at time of renewal.

Any unused portion of a Base Unit will not be refunded or carried over to the next billing cycle. The amount of service included in each Base Unit will not change during the term of your subscription.

Notification at least 30 days in advance of any changes to the Pay-As-You-Go rates.

New services may be added periodically to the Windows Azure platform. We will notify you in advance of these new services and any fees that might be charged for using them. However, you would only be charged if you elect to use the new services.

Any taxes which may result from receiving services at no charge are the sole responsibility of the recipient.

GOOGLE APP ENGINE

Details	Free quota per app per day	Pricing if exceed quota
Hosting	Free quota per app per day	Price
On demand fronted instances	28 free instance hours	$0.08 / hour
Reserved Frontend Instances		$0.05 / hour
High replication data store	1G	$0.24 / month
Outgoing Bandwidth	1G	$0.12 / G
Incoming Bandwidth	1G	Free
Datastore API	50k free read/write/small	$0.10/100k write ops $0.07/100k read ops $0.01/100k small ops
Blobstore API	5G	$0.13 / G / month
Email API	100 recipients	$0.01 / 100 recipients
XMPP API	10k stanzas	$0.10 / 100k stanza
Channel API	100 channels opened	$0.01 / 100 channels opened
Image Manipulation API	Unlimited	Unlimited
Memcache API	unlimited	Unlimited
Users API	Unlimited	Unlimited
Task Queue	Unlimited	Unlimited
Files API	Unlimited	unlimited
URL Fetch API	Unlimited	Unlimited
Prospective Search API	Unlimited	Unlimited

Table 4.4.8 Pricing Details of Google App Engine

JOYENT CLOUDPRICING

SIZE	DISK	PRICE/HOUR	PRICE/MONTH
Small 1GB (1 CPU)	30GB	$0.085	$62.05
Medium 2GB (1 CPU)	60GB	$0.17	$124.10
Medium 4GB (1 CPU)	120GB	$0.24	$175.20
Large 8GB (2 CPU)	240GB	$0.36	$262.80
Large 16GB (3 CPU)	480GB	$0.64	$467.20
XL 32GB (4 CPU)	760GB	$1.12	$817.60
XXL 48GB (8 CPU)	1TB	$1.68	$1226.40
XXXL 64GB (12 CPU)	1.5TB	$2.24	$1635.20

Dedicated 80GB (16 CPU)	2TB	$2.80	$2044
HIGH CPU VIRTUAL SERVERS (SMARTOS)			
Medium 1GB (2 CPU)	60GB	$0.17	$124.10
XL 8GB (4 CPU)	240GB	$0.65	$474.50

Table 4.4.9 Pricing Details of Joyent

IBM CLOUD

Virtual machine instances

Virtual machines 32-bit configurations	Copper	Bronze	Silver	Gold
Virtual CPUs with 1.25 GHz	1	1	2	4
Virtual memory (Gigabytes)	2	2	4	4
Instance storage (Gigabytes)	60	60+175	60+350	60+350
Reserved Price per VM Hr (without OS Support) (in addition to monthly reservation fee; see Reserved capacity table below)				
Red Hat Linux 5.4 and 5.5 OS	INR 4.450	INR 5.000	INR 6.750	INR 9.750
SUSE Linux Enterprise Server 11.0	INR 2.950	INR 5.000	INR 5.250	INR 8.250
Windows Server (2003 and 2008 versions)	INR 3.200	INR 3.750	INR 7.500	INR 10.500
Customer Provided OS	INR 1.950	INR 2.500	INR 4.250	INR 7.250
Reserved Price per VM Hr (with OS Support) (in addition to monthly reservation fee; see Reserved capacity table below)				
Red Hat Linux 5.4 and 5.5 OS	INR 9.450	INR 10.000	INR 11.750	INR 14.750
SUSE Linux Enterprise Server 11.0	INR 6.950	INR 7.500	INR 9.250	INR 12.250
Microsoft Windows Datacenter	INR 8.200	INR 8.750	INR 12.500	INR 15.500
Unreserved price per VM hour(without OS Support)				
Red Hat Enterprise Linux 5.4 and 5.5	INR 6.250	INR 7.250	INR 11.500	INR 18.000

Virtual machines 32-bit configurations	Copper	Bronze	Silver	Gold
SUSE Linux Enterprise Server 11.0	INR 4.750	INR 5.750	INR 10.000	INR 16.500
Windows Server (2003 and 2008 versions)	INR 5.000	INR 6.000	INR 12.000	INR 18.500

Table 4.4.10 Pricing Details of IBM

CHAPTER 5
5.1 SUGGESTION & CONCLUSION

5.1.1 SUGGESTION

Payoda can enter into partnership with the following companies

Priority based Partnership Details

No	Name	Type of Partnership	Details	Cost per year	Prerequisite	Comments
1	VMware	Consulting and Integration Partners (CIPP) Specialized	CIPP design, plan, integrate and deploy the most sophisticated virtual infrastructures to meet the demanding business needs of customers.	$1500	1 VMware competency	Virtualization experts in market. Has got Private cloud as an addon. Has good support. Would work easily in US, UK and ME markets.
2	OpenNebula	System Integrator Affiliate	Provides customers with consulting, integration, support and implementation services	$5,025.60	-	ONe is supported by an Italian company. Continental EU is mostly OpenSource or IBM shops. Very choosy spenders. OSS solutions would help.
3	Amazon	Consulting Partner Standard	APN Consulting Partners are professional services firms that help customers of all sizes design, architect, migrate, or build new applications on AWS.	$1000	2 AWS trained Technical staff 2 Trained Sales staff Min AWS billings = >$1000/yr Annual prgm fee=$2000/yr	Market leader in Public clouds. Has regional datacenters in US, EU and APAC.
4	Open Stack	Open cloud	OpenStack is an open and	$1,050 (basic)	Training Certification	Completely OSS. We have to build

| | | | scalable operating system for building public and private clouds. It provides both large and small organizations an alternative to closed cloud environments, reducing the risks of lock-in associated with proprietary platforms. | $1,800 (advanced) | s Required 4 required within first 90 days of entering the program | competency. USed by Rackspace, HP. Very popular among OSS circles. |

Table 5.5.1 Priority based Partnership Details

5.1.2 CONCLUSION

From this exploration of cloud opportunities the organisation can perform E-governance projects in cloud and other cloud services like cloud migration, cloud integration and also flexi scaling. The analysis helps the organisation to identify best partner in terms of cost, requirements and in benefits. The implementation of cloud computing in E-governance as a disruptive technology and business model offers an accelerator approach for economic growth as it connects people to data, information and computing resources anywhere and anytime.

Thus the Cloud will play a key role in transforming the current IT infrastructure model from CAPEX (Capital Expenditure) based into a 'Pay-as-you-go' or OPEX (Operational Expenditure) based. The cloud will drive down costs of e-Governance, Education, Medical Care & other Government computerization initiatives.

BIBILIOGRAPHY

WEBSITE REFERENCES

1. http://www.ijcaonline.org/volume7/number7/pxc3871613

2. http://search.iiit.ac.in/uploads/CloudComputingForEGovernance

3. http://opennebula.org/documentation:rel3.0

4. http://www.bvicam.ac.in/news/INDIACom%202011

5. http://www.infosys.com/infosys-labs/publications/Documents/e-governance/ict-e-governance

BOOK REFERENCES

1. Marijn Janssen, Winfried Lamersdorf, Jan Pries Heje, E-Government, E-Services and Global process, 2010 – 263 pages.

2. Tim Mather, Cloud Security and Privacy – An Enterprise Perspective on Risks and Compliance, 2009 -312 pages.

3. L S Subramanian, E-Badal- a national cloud computing infrastructure, 2011 – 100 pages.