



Cloud Computing in Higher Education: Gujarat State

Prof. Homera Durani, Prof. Nirav Bhatt

Assistant Professor, MCA Department

RK University, Gujarat, India

Abstract— For those in the education sector, “the cloud” can seem like a nebulous and unattainable technology goal, used only by large enterprises and corporations. But the cloud has the power to drastically advance the goals of the educational system: to make it easier for institutions to empower their students to succeed while at the same time cutting costs and expanding accessibility. Most of us use the cloud on a daily basis: We log into email accounts, go to Amazon or use other web-based services. The move to the cloud is happening in education too. Colleges in Gujarat State deliver coursework to their students through cloud-based classroom software. The potential for cloud technology can go far beyond that, however, and higher education professionals are taking notice. Cloud computing entails using a network of remote servers hosted on the internet as opposed to a local server. This helps cut IT costs as well as simplifies content management processes for schools and educational systems. Cloud computing increases these benefits, in addition to potential cost-savings, making it an attractive option for schools considering tablet schemes. Yet many teachers and educators are unclear on what computing in the “cloud” really means. 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. This paper describes the use of cloud computing in higher education in the state of Gujarat.

Keywords— Cloud Computing, E-governance, OS, Wide Network

I. INTRODUCTION

At their January 22, 2009, meeting, members of the EDUCAUSE Board of Directors advised the staff that: they believed that the time was right for EDUCAUSE to assume a more activist role in promoting higher education; and the shift to above-campus computing prompted by the maturation of “cloud computing” and related emerging technologies deserved close EDUCAUSE attention and probable action.

For those in the education sector, “the cloud” can seem like a nebulous and unattainable technology goal, used only by large enterprises and corporations. But the cloud has the power to drastically advance the goals of the educational system: to make it easier for institutions to empower their students to succeed while at the same time cutting costs and expanding accessibility [4].

II. CLOUD COMPUTING

Cloud is a demand resources or services over Internet scale and reliability of a data centre. Cloud computing is a style of computing in which dynamically scalable and often virtualized resources are provided as a serve over the Internet.

Cloud computing can be divided into three types: Software as a Service, Platform as a Service, and Infrastructure as a Service.

The literature on cloud computing suffers from hype and divergent definitions and viewpoints. One report by McKinsey & Co. uncovered 22 distinct definitions of cloud computing. For this exercise, we will use the Gartner definition of cloud computing as “a style of computing where massively scalable IT-enabled capabilities are delivered ‘as a service’ to external customers using Internet technologies. McKinsey presents a typology of software-as-a-service that elaborates the Gartner definition and is characterized by:

- Delivery Platforms
 - ✓ Managed hosting—contracting with hosting provider to host or manage an infrastructure (IBM, OpSource)
 - ✓ Cloud computing—using an on-demand cloud-based infrastructure to deploy an infrastructure or applications (Amazon Elastic Compute Cloud)
- Development Platforms
 - ✓ Cloud computing—using an on-demand cloud-based development environment to provide a general-purpose programming language (Bungee Labs, Coghead)
- Application-led Platforms
 - ✓ SaaS applications—using platforms of popular SaaS applications to develop and deploy application (Salesforce.com, NetSuite, Cisco Webex) [2].

In addition to being ill-defined, cloud computing is emergent. In its 2008 and 2009 hype cycles, Gartner characterizes cloud computing as a technology that is moving up toward the peak of inflated expectations. That said, Gartner predicts that by 2011, early technology adopters “will forgo capital expenditures and instead purchase 40% of their IT infrastructures as a service.”³ Gartner analyst Daryl Plummer and his colleagues go on to conclude that “the perception of infrastructure as something that must be bought, housed, and managed has changed. Companies are now seriously considering alternatives that treat the infrastructure as a service rather than an asset and that care less where the infrastructure is located and who manages it” [5].

Walter Bailey says the entire educational system is suffering from a lack of resources: small classrooms, staffing cuts, shortage of qualified teachers and constantly changing standards. But, as Bailey points out, the cloud is a valuable tool that can be used to improve accessibility to quality education and to boost achievement.

The cloud can help address these challenges in a number of ways, Bailey said, including by capitalizing on economies of scale. The problem of outdated, too-small, overcrowded classrooms can be addressed by virtualizing the classroom environment, he said.

Reasons to adopt Cloud Computing in Higher Education:

1. Collaboration
2. Mobility
3. Less weight in our bags

Importance of Cloud Computing:

- Driving down the capital and total costs of IT in higher education
- Facilitating the transparent matching of IT demand, costs, and funding
- Scaling IT
- Fostering further IT standardization
- Accelerating time to market by reducing IT supply bottlenecks
- Countering or channelling the ad hoc consumerization of enterprise IT services
- Increasing access to scarce IT talent

III. CHALLENGES AND RISKS

The challenges and risks that will constrain higher education’s adoption of cloud computing relate to trust, confidence, and surety. As Burton Group analyst Drue Reeves points out, “Building an IT organization’s confidence in a solution requires a combination of consistent performance, verifiable results, service guarantees, transparency, and plans for contingencies.” Clearly most cloud services do not have the track record on which one can build the necessary trust to shift existing services without either great deliberation or a very compelling benefit. These service and provider attributes only come with time, reputation, and experience. Compounding these challenges, most IT organizations in higher education are not themselves highly skilled in managing risk and service performance. In the commercial sector, lack of confidence in the cloud stems from:

- Poor or non-existent service level agreements
- Inadequate risk management
- ROI justification, management of change orders, and vendor lock-in
- Market immaturity
- Management issues

In higher education, the issues tend to be the same, though the magnitude of concern is amplified by the additional burdens of public trust placed on institutions that serve in loco parentis for students and who conduct patient care, research on human subjects, and so forth.

Cloud Computing

Cloud computing has a significant place in the college in that the appropriate use of cloud computing tools can enhance engagement among students, educators, and researchers in a cost effective manner. There are security concerns but they do not overshadow the benefits. Using cloud computing, college can concentrate more on teaching and research activities rather than on complex IT configuration and software systems management. Complexity has been reduced using cloud computing in this college.

Cloud computing offers many benefits to e-learning solutions by providing the infrastructure, platform and educational services directly through cloud providers and by using virtualization, centralized data storage and facilities for data access monitoring. Using cloud computing departments of this college can collaborate with each other and create a common virtual there by reducing the expenses and the man power required to install a well-equipped computing lab.

Cloud computing helps to collaborate with its internal departments of the college as well as other departments outside the college [3].

Benefits to the students and professors:

- Take online course
- Take exams
- Send feedback

- Send homework, projects
- Deal with content management
- Prepare tests
- Assess tests, homework, projects taken by students
- Communicate vice versa
- Access to applications from anywhere
- Support for teaching and learning and accounts management
- Software free
- 24 hours access to infrastructure and content
- Opening to business environment and advanced research
- Protection of the environment by using green technologies
- Increased openness of students to new technologies
- Increasing functional capabilities

The key roles in a cloud environment include the service consumer, the service creator and the service provider. The cloud service delegate needs a secure anytime anywhere access to low cost services that are flexible and easy to use. The biggest hurdle to adoption of cloud has to do with delegates discomfort in the following areas: security of service and the underlying data, service availability and reliability, service management to ensure service level agreements, ensuring control over access and policies, and the appropriate administration to facilitate flexible pricing structures. A service does not exist unless someone actually creates it. The cloud services creator needs tools and capabilities to offer differentiated services, offer incentives to ensure that consumers keep coming back to use the services, and the ability to change services on-demand to stay competitive and address threats. Finally the service provider actually runs the service that the service consumer wants and was designed and developed by the service creator.

The cloud as a ubiquitous computing tool and a powerful platform can enable educators to practice new ideas. One of the most useful free “cloud computing” applications are the Google Apps for Education which is a free online suite of tools that includes Gmail for e-mail and Google Docs for documents, spread sheets, and presentations. Using the cloud approach, everybody in the college can work on the same document at the same time to make corrections as well as improve it dynamically in a collaborative manner.

Limitations:

- Not all applications run in cloud
- Risks related to data protection and security
- Dissemination politics, intellectual property
- Security and protection of sensitive data
- Maturity of solutions
- Lack of confidence
- Standards adherence
- Offline usage with further synchronization opportunities
- Speed/lack of Internet can affect work methods

The main risks in cloud computing are security and data protection risks.

Issues regarding the security of cloud computing are:

- Lock-in
- Isolation failure
- Compliance risks
- Management interface compromise
- Data protection
- Insecure or incomplete data deletion
- Malicious insider
- Protection of intellectual property and of the data in cloud

IV. CONCLUSION

The cloud has the power to drastically advance the goals of the educational system: to make it easier for institutions to empower their students to succeed while at the same time cutting costs and expanding accessibility. Cloud Computing adds value with small capital expenses, assuring at the same time the protection of the environment. The use of Cloud Computing becomes a necessity and not an option for many Institutes. This aspect is due to a various factors such as costs increase, the pressure of income increase, students’ success, institutional performance and competition. At the end, educational Institutes may value the opportunities offered by Cloud Computing through researchers and students and thus leading to innovation. Cloud Computing provide many advantages to the higher education system all over the Gujarat.

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