Vital Role of Cloud computing technology in Indian education system: a study in Special reference for Technical Education

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Abstract—The strange part of Indian education system is that on the one hand we have college like IIT’s, IIM’s and many high-quality schools too which are well-recognized for their quality education, Research and highly intelligent faculties but on the other hand we have colleges which are not even nearby IIT’s or IIM’s. In the year 2011-2012 Indian Government has provided Rs in thousands crore to Ministry of Human Resources development (MHRD) for uplifting the education system in India. even though similar budgets have been allotted by the government earlier in many years to improve the education system but in spite of that one fourth population of the India is still uneducated and in this figure educated means number of peoples who have passed their school, if we check for higher education level then this percent again going to reduced. Reasons we find that there is no centralized system for the government to check the educational institutes. If we talk about technical education of India we found lack distribution of resources like teaching tools, Infrastructures, software’s, teaching stuffs etc. As Cloud Computing technology is the most capable technology that provide solution to all the mentioned deficiency, thus we recommend that with the help of this technology we can overcome these deficiencies and reach our goal of hundred percent literacy rates. And also complete the aim to provide quality education to each and every citizen of India. Cloud computing has the potential to provide computation and storage resources as services. Both the public as well as the private institutions can use the cloud computing to deliver better services with limited resources. Around 45 million people will be in the age group of 18 to 20 years by 2020 in India. To make available quality education for them will be challenging task. So this paper is an analytical study on role of cloud computing in Technical education.

Keywords: -Cloud computing, Characteristics of cloud computing, models of cloud computing, Distance Learning, Higher education, MHRD

I. INTRODUCTION

Cloud Computing is not a technology .it’s kind of internet. In your daily life you work with cloud computing but you don’t aware about this ,because your mail account (Gmail, hotmail, face book etc) also a kind of cloud .for example Gmail provide you 7 GB free space to store your data, which is saved on Gmail server . The most important thing is that you don’t know that where is your data saved that’s why, we called it cloud computing.

Cloud computing is a style of computing in which resources are provided “as a service” over the internet to users who need not have knowledge of, expertise in, or control over the technology infrastructure that supports them.

As per Wikipedia “cloud computing gets its name as a metaphor for the internet. Cloud computing is a construct that allows you to access applications that actually reside at a location other than your computer or other internet-connected devices; most often, this will be a distant datacenter”[8 ].

The beauty of cloud computing is that another company hosts your application (or suit of application, for that matter). This means that they handle the cost of servers. Cloud computing is a computing paradigm, where a large pool of systems are connected in private or public networks, to provide dynamically scalable infrastructure for application, data and file storage. With the advent of this technology, the cost of computation, application hosting, content storage and delivery is reduced significantly [7]. Forrester defines cloud computing as: “A pool of abstracted, highly scalable, and managed compute infrastructure capable of hosting end-customer applications and billed by consumption.”

A definition of cloud computing in white papers of F5 IT agility—yours way cloud computing survey results June-July 2009 “cloud computing I is a style of computing in which dynamically scalable and often virtualized resources are provided as a services. Users need not have knowledge of expertise in, or control over the technology infrastructure in the ‘cloud’ that supports them. furthermore, cloud computing employs a model for enabling available, convenient and on demand network access to a shared pool of configurable computing resources(e.g. networks, servers, storage, applications, services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.”

Cloud computing today become a well known It industry. cloud computing used in It industries and now shifting to educational institutes .The most Big MNC are prefer to adapt cloud services as compare a establish a infrastructure .Today most of people are used cloud services for example email and social sites. The institute where ERP system is follows also the example of cloud.

II. CLOUD SERVICES

A. Software as a Service (SaaS): In this model, a complete application is offered to the customer, as a service on demand. A single instance of the service runs on the cloud & multiple end users are serviced. On the customer’s side, there is no need for upfront investment in servers or software licenses, while for the provider, the costs are lowered, since only a single application needs to be hosted.
& maintained. Today SaaS is offered by companies such as Google, Salesforce, Microsoft, Zoho, etc.

B. Platform as a Service (Paas): Here, a layer of software, or development environment is encapsulated & offered as a service, upon which other higher levels of service can be built. The customer has the freedom to build his own applications, which run on the provider’s infrastructure. To meet manageability and scalability requirements of the applications, PaaS providers offer a predefined combination of OS and application servers, such as LAMP platform (Linux, Apache, MySql and PHP), restricted J2EE, Ruby etc. Google’s App Engine, Force.com, etc are some of the popular PaaS examples.

C. Infrastructure as a Service (Iaas): IaaS provides basic storage and computing capabilities as standardized services over the network. Servers, storage systems, networking equipment, data centre space etc. are pooled and made available to handle workloads. The customer would typically deploy his own software on the infrastructure. Some common examples are Amazon, GoGrid, 3 Tera, etc.

The cloud computing is a new computing model which comes from grid computing, distributed computing, parallel computing, virtualization technology, utility computing and other computer technologies and it has more advantage characters such as large scale computation and data storage, virtualization, high expansibility, high reliability and low price service[7].

Cloud computing is the use combination of hardware or software resources that are delivered as service over network.

The name cloud comes from the use of cloud shaped symbol as an abstraction to define complex infrastructure. End users can access cloud based application through the web browser, light weight desktop, Mobile apps, Tablets.

III. BENEFITS OF CLOUD COMPUTING

A. Reduce capital costs: There’s no need to spend big money on hardware, software or licensing fees.

B. Cost savings - Cloud computing removes the requirement of a company to invest in storage hardware and servers.

C. Focusing on the business - Since all the services will execute over the internet, a company does not have to bother about technical issues and other problems associated with physical storage and backup. A company can thus focus more on their core business.

D. Performance - It delivers reliable performance irrespective to the geographical location of the user. Another key feature could be the automatic updating of services and applications.

E. Security - Cloud Computing offers optimum security which protects you against any unauthorized access, modification and loss of data.

F. Flexibility - Even if part of the cloud environment fails or stops working, the other resources continue to work until the problem is fixed.

IV. CLOUD IN EDUCATION

Cloud computing technology plays an important role in education. According to Wikipedia it is perfect fit for Technical education. The States could launch and run central cloud computing services for schools, eliminate the need for local IT and tech support, and level the playing computing field between rich and poor school districts. Some countries are already moving in cloud computing direction for education. It can change the education scenario.

Cloud computing infrastructure, platforms, and applications fit education like a glove. Universities are already on board so expect some of the most aggressive and creative cloud implementations to be based on campus. State and local governments who can overcome the political and compliance boundaries around cloud computing will also become leaders in cloud computing deployment and likely progressive educational programs as well.

Whenever we talk of cloud computing, we always talk about its impact on business. We read every where that how cloud computing can improve efficiencies, cut costs, save time and in general, give businesses a great return on investment. If we talk about cloud computing in education, found same salutations.

Cloud computing has a prominent role to play in the classrooms of tomorrow. Let me give a few examples. Many of our nation’s schools suffer from low graduation rates directly attributable to insufficient infrastructure – shorthanded staff, tiny classrooms, lack of teachers. Cloud computing solutions can solve many of these problems.

For support staff, a distributed management system can substantially reduce their load, leveraging efficiencies across the nationwide or statewide school network. The problem of tiny classrooms can be surmounted through virtual classrooms, with students attending class in their own homes on their own computers, with the teacher being present hundreds, even thousands of miles away. This can also help address the issue of insufficient number of teachers. With computers getting cheaper by the day, this does not seem unfeasible. And why stop only in America? With cloud-based education tools, the whole world can learn from the best.

From schools, let’s move to colleges. Many colleges do not have sufficient hardware or software to give students a complete learning experience. This problem is especially pronounced in the technical fields. However, with SaaS and IaaS, a limited budget will still allow students access to the latest technologies on offer. Simulating those complex weather patterns and running those complicated algorithms will no longer be something that only students at the top-of-the institutions like Stanford and MIT can do. So cloud computing is an opportunity for education system.

V. TO MEET THE CHALLENGING DEMANDS IN AN PROGRESSIVELY MORE COMPLEX ATMOSPHERE

College and university IT organizations are expected to keep up with a long list of competing demands, such as [2]:

i. Deploying applications and delivering web-based student services at a rapidly accelerating rate, often without a proportionate increase in budget for hardware, software, and personnel.

ii. Drastically reducing CapEx and OpEx costs while maintaining the highest levels of security and privacy.

iii. Maintaining a traditional IT infrastructure increasingly unable to accommodate the growing number of personal
devices – including tablets, smart phones, and laptops – that students bring into the campus environment.

iv. Offering sufficient bandwidth to accommodate huge swings in network usage.

v. Competing against other universities, many of which attempt to differentiate them in the market based on the services they offer to students.

Apart from the above said advantages Cloud computing, it can help universities, institutions by:-

i. Accommodating the rapid increase in mobile device dependency.

ii. Storing expansive amounts of sensitive data and information that’s easily accessible.

iii. Staying current (e.g. provides students with digital campus storage for class notes, papers and projects)

iv. Acquiring and implementing the latest software and application updates.

v. Streamlining enrollment and admissions processes that are costly and time-consuming.

vi. Turning subscriptions that are scalable and provide options.

vii. Offering schools, colleges, universities and others a low cost option for using high concept computing systems. All that’s needed is an internet connection which is low cost.

viii. Sharing work without having to use paper. Using paper is costly both to the environment and in monetary terms and is therefore no longer a viable way to educate.

ix. Removing the admin burden allows educational facilities to concentrate on their core business and be more productive. IT admin including licensing issues, software updates and IT security management will all be taken care of by Cloud provider.

x. Storing confidential and critical data centrally in the cloud, which is less prone to exposure threats such as the loss of theft of laptops or USB flash drives.

xi. Using cloud in underdeveloped or emerging countries creating a way of being able to teach children who would not ordinarily have access to education.

xii. Updating stock of information.

xiii. Allowing free access applications and other useful tools.

xiv. Providing efficient and friendly environment.

xv. Providing experience and feel of real world

VI. INDIAN GOVERNMENT EFFORTS FOR EDUCATIONAL INSTITUTES

Education in India is provided by the public sector as well as the private sector, with control and funding coming from three levels: central, state, and local. Takshasila was the earliest recorded centre of higher learning in India from at least 5th century BCE and it is debatable whether it could be regarded a university or not. The Nalanda University was the oldest university-system of education in the world in the modern sense of university.[9] Western education became ingrained into Indian society with the establishment of the British Raj.

In the year 2011-2012 Indian Government has provided Rs in thousands crore to Ministry of Human Resources development (MHRD) for uplifting the education system in India. Similar budgets have been allotted by the government earlier in many years to improve the education system.

VII. CHALLENGES OF CLOUD COMPUTING IN HIGHER EDUCATION

There are many challenges of cloud computing for educational institutions relate to its relative innovation and the underdevelopment of the market for cloud services. In higher education, decisions to adopt cloud computing will be influenced by more than technical and cost considerations. Information flow is like a lifeline in the academic system and decisions, on how to manage that information, can have far reaching political, social and economic effects on the students, faculty and the society.

Adoption of cloud computing presents many risks and other challenges like security, interoperability, control, performance, integrity and reliability instead of using a traditional outsourcing arrangement. The academic institutions need to weigh the costs and benefits but a major factor of these decisions will be their level of trust in both the cloud deployment model under consideration and the entity providing it [4]. Metz (2010) offers the example below to explain why the traditional IT infrastructure is sometimes not good enough: When an institution develops or deploys a new application, they first must jump through a number of hoops. For example, if an institution decides they would like to install the learning management system Moodle, they might have to order a server, wait for the vendor to ship it, install the server in the data center, provision an IP address for the server, set up the DNS for the new IP address, install the operating system, etc.

VIII. DAN MORRILL MENTIONS A NUMBER OF CHALLENGES IN CLOUD COMPUTING [5]

A. Cloud computing did not originate in the college environment, there are few colleges that are taking cloud computing seriously enough to be developing or teaching courses in this subject like MIT.

B. Cloud computing is truly multi-disciplined, in that the average system admin needs to understand a bit about networking, virtualization, routing, data movement, data use, process management, and security to be helpful to an organization using cloud computing.

C. Educators are not prepared to teach cloud computing – in general with a broad paint brush, many computer science educators at all but the most prestigious colleges are simply not able to teach this not so new but still cutting edge technology.

D. Cuts in funding – everyone everywhere has had their budgets slashed while we wait for consumers to come back and start spending again. This includes colleges because many colleges’ budgets are tied to the states budgets that are tied directly or indirectly to sales tax, use tax, B&O tax, or the many other ways that government taxes both businesses and consumers to accomplish tasks.

E. Cloud computing is generally ill understood by the general public, including governments, workers, and corporations. It is not enough to teach virtualization, you have to teach automation, design, architecture, monitoring, and with a dearth of tools out there, in many cases, you have to teach enough scripting or programming to get the tasks accomplished.

IX. CONCLUSION

Cloud Computing is the fastest growing part of Technology so authors summation is that Cloud computing offers a
solution to universities, research laboratories which utilize software’s, classrooms, professors talk etc. to do their own assignment. Indian government also provide fund in carores for develop our education system. So the cloud service is cost effective in education system.

The infrastructure of cloud computing is often located off-site and accessible through the internet. It is usually provided by a 3rd-part and users do not need to have technological expertise. Loss of control and access along with potential security risks are common issues raised against cloud computing. Users, however, experience device and location independence and they can access different applications through a web browser using different devices. Cloud computing was able to move up awareness towards resource optimization. Business executives are now looking into savings they’ll generate from support personnel, software licenses, power, and space if they get to the cloud. Initial steps are being undertaken by businesses, which not yet ready to bring their computing requirements to the cloud, to pool and consolidated data and computing resources as well as software efficiency.

REFERENCES