STUDY ON ADOPTION OF CLOUD COMPUTING IN ENGINEERING COLLEGES

Mrs Anagha Vivek Dudgikar
Research Scholar, Marathwada Mitra Mandal's College of Engineering, Pune.

Dr. Smita Ravindra Chavan
Associate Director- NBN Sinhgad School of Computer Studies (NBN SSOCS), Pune.

Abstract:
Due to rapid growth of technology, educational system needs to be restructured to meet up with industrial demands. Especially, engineering sector is most resource intensive related to equipments, simulation and infrastructure. It needs huge capital investment. Cloud computing plays a key role in enrichment of education field. Cloud Computing is a wise solution to overcome such technical problems. It will mainly help in infrastructure service, effective usage of resources, cost savings and scalability of users.

The main focus of this review paper is on the adoption of cloud computing in engineering colleges. Data has been collected from different institutes to verify the assumptions. The main stakeholders are students, faculty, system administrators and Principals. Most of the colleges have adopted cloud computing on a private server and provided facilities as a private cloud. This paper throws light on all such issues.

Keywords: Cloud computing, scalability, on-demand.

INTRODUCTION

Cloud computing is “A model for enabling convenient, “on-demand” access to a shared pool of configurable computing resources, which can be rapidly provisioned and released with minimal management effort or service provider interaction. (Mell and Grance, et al 2009 NIST)”. Rather than a technology decision cloud computing is largely strategic. Cloud computing is a new Era for Education Sector. In 2009, big milestone in education sector engraved with Google Web. Browser-base application via Google apps and other apps started to offer by Google and others. Both Microsoft and Google started delivering services which are reliable and easy to consume. [Microsoft’s came up with Azure] (Arif Mohamed, et al 2009). Educational institutes hosted solution for their email, calendar, and chat through G Suite for Education, integrated communication and collaboration solution offered by Google. It is also providing complement the core suite to meet users’ needs, with access to several more Google services.

Cloud computing “offer a highly acceptable solution to the education sector, helping it adopt evolving technologies without the burden of excessive cost and complexity (Kamal Dhull et al 2013).” Due to such changes in technology, usage of various computer applications in engineering colleges is increasing in all branches. This increases burden of high cost on institutions. Cloud computing allows engineering colleges to align IT costs to usage. The Cloud services provide an opportunity to reduce IT costs. (R. Soundhara Raja Pandian, K.S. Kasiviswanathan et al 2011).
Cloud Computing Usage in Engineering Colleges

Engineering education is typically resource intensive in terms of Equipment, Simulation Facility, Computing, Modeling Facility & infrastructure. It requires huge capital investment. It is possible to meet those needs by efficient & effective use of cloud computing. However Cloud computing practices are rather pre-mature, unorganized and managed on ad-hoc basis. This indicates that cloud computing and its management is not institutionalized enough.

In the review report from AICTE some of the challenges which are being faced by these institutes for adopting cloud computing are discussed as below:

- Reluctance to change traditional teaching methods-Education policies, controlling factors limit the acceptance to new change
- Migration of Legacy systems on to new cloud services e.g. SOA Applications
- Lack of tried & tested cloud based education models for engineering institutes
- Cost effectiveness of cloud in engineering education is not worked out.

Due to all such challenges penetration of cloud computing is very less in engineering colleges. The main focus of this research paper is to represent data analysis on cloud computing adoption in engineering colleges. Data has been collected from students, staff, system administrators and Principal. As the students of other branches are unaware of the concept, main data collection has been done from IT and Computer department.

Below are some of the problems stated to identify key issues in those departments.

Statement of the Research Problem:

Problem statements:
1. To maintain IT departments and outsource services is complex and costly which is a main factor for engineering sector. Due to rapidly changing technology colleges are pressurized to adopt it for the benefits they put forward. It requires huge capital investments; in addition its management is cumbersome.
2. Industries are demanding for well trained students to minimize their efforts on training, due to the advancement of technology. To match up with industry needs, student’s demands colleges are over burdened with technology adoption.

As identified with such problems, based on it questionnaire is designed for stakeholders. Data has been collected and analysed for results. The statistical tests are carried out on the data. Findings from such tests detailed in next session.

Data Analysis:

Validity:
Validity is the degree to which an assessment measures what it is supposed to measure.

Reliability:
The degree to which a questionnaire will produce the same result of administered gain or the test-retest concept. It is also a measure of the degree to which a questionnaire can reflect a true change.

The data analysis represents values for:

Faculty test retest reliability: .852**

<table>
<thead>
<tr>
<th></th>
<th>test_1</th>
<th>retest</th>
</tr>
</thead>
<tbody>
<tr>
<td>test_1 Pearson Correlation</td>
<td>1</td>
<td>.852**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>104</td>
<td>104</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
Student reliability Split half: .853

<table>
<thead>
<tr>
<th>Cronbach's Alpha</th>
<th>Part 1 Value</th>
<th>N of Items</th>
<th>.126a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Part 2 Value</td>
<td>N of Items</td>
<td>.031a</td>
</tr>
<tr>
<td></td>
<td>Total N of Items</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

Correlation Between Forms:.744

Spearman-Brown Coefficient

Equal Length: .853

Unequal Length: .853

Guttmman Split-Half Coefficient: .853

Cronbach’s alpha reliability coefficient is normally ranges between 0 and 1. There is no lower limit to the coefficient. If Cronbach’s alpha coefficient is closer to 1.0 then there is greater internal consistency of the items in the scale. It is also noted that an alpha of .8 is probably a reasonable good.

Findings:

- Due to initial high investments, colleges are reluctant to adopt services from service providers.
- The awareness of cloud computing benefits in engineering colleges is not adequate.
- The systematic approach for deployment & management of cloud computing is not available.
- Cloud computing practices are pre-mature, unorganized and managed on ad-hoc basis. Management models or cost effective models are not implemented in colleges.
- Private servers are installed as a private cloud which is preferred by most of the institutes.
- Students are unaware of cloud computing practical usage in curriculum.

Conclusion:

The current engineering system is facing challenges such as increasing cost of education, High cost for adoption of new technologies, Complexity in maintenance of technologies and Underutilization of technology resources. Adoption of Cloud computing is a wise solution for betterment of the engineering system. Due to the advancement of technology, industries are demanding for well trained students to minimize their efforts of training. Though google has been providing free cloud computing facilities, those are not being efficiently used. Few colleges have taken initiative by purchasing ERP for colleges from service providers. But adoption rate is very low. Sufficient literature is also not available specifically on engineering sector where the requirements are high for technology.

This study is significant as there has been scarcity in research in engineering field especially in India. This study shows a very strong need of further analysis and research in this field, to come up with a simplified acceptable model in Cloud Computing area which would help engineering institutes to easily adopt.
References:

2. Implementation of Cloud-based Virtual Labs for Educational Purposes


15. www.irosjournals.org


18. Olukunle A. Iyan Application of contingency theory to cloud computing: a strategy for enhancing research and learning in the Nigerian universities


20. Paul Korzeniowski Overcoming complex multi-cloud management challenges TechTarget


22. www.bmcsoftware.in/it-solutions/cloud-computing-software.html

23. How to Manage Foundational Issues with Cloud Computing Virtualization

24. Judith Hurwitz, Robin Bloor, Marcia Kaufman, and Fern Halper from Cloud Computing For Dummies


27. Ioan Petri a, c,*, Omer F. Ranaa, Gheorghe Cosmin Silaghi c, Yacine Rezgui Risk assessment in service provider communities ELSEVIER Future Generation Computer Systems 41 (2014) 32–43

28. Haralambos Mouratidis a, Shareeul Islam a, Christos Kalloniatis b

29. Stefanos Gritzalis A framework to support selection of cloud providers based on security and privacy requirements ELSEVIER The Journal of Systems and Software 86 (2013) 2276 – 2293


32. USA Cloud Adoption & Trends 2012 © Cloud Forum IP Ltd 2012


37. G. Reese, Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, O'Reilly Publisher, 2009.


40. www.manjrasoft.com/.../Manjrasoft%20Case%20Study%20-%20Solution

41. Ahmed Jameel Mansour Dong, B., Zheng, Q., Qiao, M., Shu, J., Yang, J.: Bluesky The Adoption of Cloud Computing Technology in Higher Education Institutions: Concerns and Challenges (Case Study on Islamic University of Gaza "IUG")